Check for updates

EUROPEAN STROKE JOURNAL

European Stroke Journal
2017, Vol. 2(IS) 98–476
European Stroke Organisation 2017
Reprints and permissions:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/2396987317705242
journals.sagepub.com/home/eso
SAGE

3rd European Stroke Organisation Conference, 2017

Poster Abstracts

AS18-013

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DIRECE ORAL ANTICOAGULANT REDUCES STROKE SEVERITY IN PATIENTS WITH ACUTE ISCHEMIC STROKE AND NON-VALVULAR ATRIAL FIBRILLATION

Y. Sakamoto[1], S. Okubo[1] and K. Kimura[1]
[1]Nippon Medical School, Neurological science, Tokyo, Japan

Background and Aims: Anticoagulant treatment with vitamin K antagonist (VKA) was reported to reduce stroke severity when patients with atrial fibrillation (AF) suffered acute ischemic stroke (AIS). Direct oral anticoagulant (DOAC) also has a potential to reduce initial severity of AIS. However, the effect of DOAC therapy on severity of AIS has been hardly known. The aims of the present study were to investigate the effect of DOAC on initial stroke severity in patients with AIS and non-valvular AF (NVAF).
Method: From March 2011 through July 2016, consecutive AIS patients having NVAF were retrospectively recruited from the prospective registry. The effects of prior DOAC medication on severity were assessed by multivariate logistic regression analyses.
Results: A total of 484 patients (208 women; median age 79 [interquartile range 71–85] years; NIHSS score 9 [3–20]) were enrolled in the present study. Of these, 351 (73%) were on no anticoagulant medication, 52 (11%) undertreat VKA corresponding to admission prothrombin time-international normalized ratio (PT-INR) <1.6, 36 (7%) sufficient VKA corresponding to admission PT-INR ≥ 1.6, and 43 (9%) DOAC, prior to the index event. The initial NIHSS (median 10 in patients with no anticoagulation, 14 in undertreat VKA, 7 in sufficient VKA, and 6 in DOAC, $p = 0.009$) was different between the groups. Multivariate analysis revealed that DOAC was independently and negatively associated with initial NIHSS ≥ 10 (OR 0.39, $p = 0.040$), compared to no anticoagulant therapy.
Conclusion: DOAC treatment prior to the event was associated with reduced initial stroke severity in patients with AIS and NVAF.

AS18-016

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

CHARACTERISTICS AND PROGNOSIS OF PATIENTS NOT RECEIVING ORAL ANTICOAGULANTS AFTER ISCHEMIC STROKE WITH ATRIAL FIBRILLATION: THE SAMURAI-NVAF STUDY

D. Ando[1], S. Sato[1], M. Koga[2], K. Todo[3], E. Furui[4], Y. Shiokawa[5], S. Takizawa[6], T. Kameda[7], Y. Hasegawa[8], S. Shibuya[9], Y. Ito[10], T. Nakashima[11], K. Takamatsu[12], Y. Yamaguchi[1], T. Ide[1], H. Yamagami[2], S. Yoshimura[1], S. Arihiro[2] and K. Toyoda[1]
[1]National Cerebral and Cardiovascular Center, Division of Stroke Care-Department of Cerebrovascular Medicine, Suita, Japan
[2]National Cerebral and Cardiovascular Center, Division of Stroke Care-Division of Stroke Care Unit, Suita, Japan
[3]Kobe City Medical Center General Hospital, Department of Neurology, Kobe, Japan
[4]Kohnan Hospital, Department of Stroke Neurology, Sendai, Japan
[5]Kyorin University School of Medicine, Departments of Neurosurgery and Stroke Center, Mitaka, Japan
[6]Tokai University School of Medicine, Division of Neurology-Department of Internal Medicine, Isehara, Japan
[7]Jichi Medical University School of Medicine, Division of Neurology, Shimotsuke, Japan
[8]St. Marianna University School of Medicine, Department of Neurology, Kawasaki, Japan
[9]South Miyagi Medical Center, Department of Neurology, Ogawara, Japan
[10]TOYOTA Memorial Hospital, Department of Neurology, Toyota, Japan
[11]National Hospital Organization Kagoshima Medical Center, Department of Cerebrovascular Medicine Stroke Center, Kagoshima, Japan
[12]Brain Attack Center- Ota Memorial Hospital, Department of Neurology, Fukuyama, Japan

Background and Aims: Guidelines recommend oral anticoagulation aiming at secondary prevention in patients with ischemic stroke and non-valvular atrial fibrillation (NVAF). However, clinicians sometimes do not give oral anticoagulants to those with the both. We analyzed characteristics and prognosis of patients not receiving oral anticoagulants after ischemic stroke or transient ischemic attack (TIA) with NVAF.
Method: We used data from the Stroke Acute Management with Urgent Risk-factor Assessment and Improvement (SAMURAI)-NVAF study (a prospective, multicenter, observational study) in which NVAF patients with acute ischemic stroke or TIA within 7 days of onset were registered.
Results: Of overall 1192 patients, 49 (4.2%) patients were not given any oral anticoagulants at discharge. In multivariable analysis, factors

associated with not receiving oral anticoagulants were advanced age (odds ratio [OR], 1.08; 95% confidence interval [CI], 1.03–1.13), higher National Institutes of Health Stroke Scale score at day 7 (OR, 1.10; 95% CI, 1.06–1.15 per 1-point), renal dysfunction (OR, 6.81; 95% CI, 2.60–17.86), bleeding events during hospital stay (OR, 28.06; 95% CI, 4.24–185.62), and antiplatelet use (OR, 6.38; 95% CI, 2.68–15.17). Twenty-nine patients without anticoagulants (72.5%) and 195 with anticoagulants (20.1%) died during 2-year follow-up period. Not receiving oral anticoagulants was an independent factor of mortality (OR, 3.09; 95% CI, 1.14–8.36).

Conclusion: Patients without being prescribed oral anticoagulants after ischemic stroke or TIA were likely to have higher age, poor functionality, renal dysfunction, bleeding event during hospitalization, and alternative antiplatelet therapy. They had a higher risk of death during 2-year follow-up than those receiving oral anticoagulants.

AS18-026

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ISCHEMIC STROKE: DWI/FLAIR LESION PATTERN IS ASSOCIATED WITH ATRIAL FIBRILLATION

L.S. Milles[1], H. Erdur[1], J.F. Scheitz[1], K. Villringer[1], K.G. Haeusler[1], M. Endres[1], H.J. Audebert[1], J.B. Fiebach[1] and C.H. Nolte[1]

[1]Charité - Universitätsmedizin Berlin, Department of Neurology with Experimental Neurology, Berlin, Germany

Background and Aims: Atrial fibrillation (AF) is the most frequent underlying disease in embolic stroke. This study investigated the hypothesis of an independent association between the infarct pattern on magnetic resonance imaging (MRI) [namely Diffusion-Weighted-Imaging (DWI) and Fluid-Attenuated-Inversion-Recovery (FLAIR)] and the diagnosis of AF in acute ischemic stroke patients.

Method: We retrospectively analyzed patients with DWI-positive acute ischemic stroke who (1) received standard stroke unit care in an academic hospital and (2) underwent 3 Tesla brain MRI including DWI and FLAIR sequences.

DWI und FLAIR lesions were allocated to the (1) right or (2) left anterior or (3) posterior circulation, respectively. If DWI and/or FLAIR lesions were located in more than one of these three vascular territories, the lesion pattern was categorized as "more-than-one-territory-pattern" (MOTP).

Results: Overall, 1000 stroke patients were included. Of these, 299/1000 had either a history of AF or standard ECG, monitoring or Holter-ECG revealing formerly unknown AF (113/1000) respectively. Of 422/1000 patients with MOTP, 165/422 (39%) had AF. Median length of stroke unit monitoring was 3 days (Interquartile range: 2–4 days).

Multiple logistic regression analysis showed an independent association between AF and MOTP (adjusted OR 1.57; 95%-CI 1.17–2.12; $p = 0.003$). MOTP was also independently associated with older age, higher NIHSS on admission, and diabetes.

Conclusion: MOTP was significantly associated with documented AF in our stroke cohort. The association was moderate as 61% of patients with MOTP had no history of AF and did not reveal AF during standard AF screening on our stroke unit.

AS18-030

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

RIVAROXABAN PLASMA LEVELS IN PATIENTS WITH ACUTE ISCHEMIC STROKE AND INTRACEREBRAL HEMORRHAGE

D. Seiffge[1], G. Kägi[2], M. Zedde[3], Y. Béjot[4], G. Turc[5], P. Michel[6], U. Fischer[7], C. Cordonnier[8], S. Wegener[9], G. Rodier[10], A. Zini[11], M. Capellari[12], P. Sandor[13], S. Thilemann[1], A. Polymeris[1], D. Tsakiris[14] and S. Engelter[1]

[1]University Hospital Basel, Stroke Center and Neurology, Basel, Switzerland

[2]Kantonsspital St. Gallen, Stroke Center and Neurology, St. Gallen, Switzerland

[3]IRCCS-Arcispedale Santa Maria Nuova, SC Neurologia, Reggio Emilia, Italy

[4]University Hospital Dijon, Departement of Neurology, Dijon, France

[5]Sainte- Anne Hospital, Departement of Neurology, Paris, France

[6]CHUV, Departement of Neurology, Lausanne, Switzerland

[7]Inselspital, Departement of Neurology, Bern, Switzerland

[8]University Hospital Lille, Departement of Neurology, Lille, France

[9]University Hospital Zürich, Departement of Neurology, Zürich, Switzerland

[10]Centre Hospitalier Annecy Genevois, Departement of Neurology, Annecy, France

[11]S'Agostino-Estense Hospital- AUSL, Stroke Unit- Department of Neuroscience, Modena, Italy

[12]Azienda Ospedaliera Universitaria Integrata, USD Stroke Unit- DAI di Neuroscienze, Verona, Italy

[13]Kanonsspital Baden, Department of Neurology, Baden, Switzerland

[14]University Hospital Basel, Diagnostic Hematology, Basel, Switzerland

Background and Aims: In patients with acute stroke under Rivaroxaban, we explored whether plasma levels of Rivaroxaban (RivLev) (i) differed between type of stroke, (ii) were associated with clinical characteristics and (iii) whether INR-thresholds can exclude high RivLev.

Method: Multicenter cohort study (Novel-Oral-Anticoagulants-In-Stroke-Patients collaboration; NOACISP; ClinicalTrials: NCT02353585) of patients with stroke under Rivaroxaban and RivLevs measured on admission. We compared patients with acute ischemic stroke (AIS) versus intracerebral hemorrhage (ICH) regarding RivLev expressed as continuous and as categorical variable. We assessed association between RivLev and dosage, time-since-last-intake and glomerular filtration rate (GFR) and determined the accuracy of distinct INR-thresholds to predict RivLev $\leq$ 100 ng/ml. RivLevs were expressed as median[IQR].

Results: Among 241 patients (age 80 [IQR73–84], 49% females; median time-from-event-to-admission 2hours [IQR1–4,5 hours] RivLev 89 ng/ml[IQR31–194 ng/ml]), 190 had AIS and 51 had ICH. RivLev did not differ between AIS-patients (85[30–204] ng/ml) and ICH-patients (102[51–165 ng/ml]; OR 1.00(95%-CI 0.997–1.002). $RivLev_{trough}$(12–137 ng/ml) were similar often in AIS-patients (n = 110;58%) as in ICH-patients (n = 33;65%) as were $RivLev_{peak}$(184–343 ng/ml; AIS-patients n = 39;21% versus ICH-patients n = 10;20%, all ns). 18,6% of patients presenting >12 hours after last intake had $RivLev_{peak}$ or higher.

RivLev were significantly correlated with Rivaroxaban dosage and inversely correlated with GFR and time since last intake (Spearman's Rho = .15, -.13 and -.25 respectively, $p < .05$). The specificity to detect RivLev $\leq$ 100 ng/ml with INR $\leq$ 1.4/ $\leq$ 1.1/ $\leq$ 1.0 was 55%/84%/98% while the sensitivity was 90%/43%/26%, respectively.

Conclusion: RivLev did not differ between patients with AIS or ICH under Rivaroxaban. $RivLev_{peak}$ can be measured also in stroke patients

>12hours after last intake. INR was not shown a marker accurate enough to exclude high RivLev in individual stroke patients

AS18-032

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ELECTROCARDIOGRAPHIC LEFT ATRIAL ABNORMALITIES IN TRANSIENT ISCHAEMIC ATTACK (TIA) AND ISCHAEMIC STROKE: A POPULATION-BASED STUDY

G. Turri[1], L. Li[2], S. Lyons[2], G. Yiin[2], S. Monaco[1] and P.M. Rothwell[2]
[1]university of Verona, Neuroscience, Veronaitaly, Italy
[2]University of Oxford, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom

Background and Aims: One-third of TIA and ischaemic strokes are of undetermined aetiology (cryptogenic). Atrial cardiopathy could be a risk factor for thromboembolism in cryptogenic stroke even in the absence of underlying arrhythmia. We aimed to determine the prevalence of electrocardiogram (ECG) markers of atrial function in TIA/ischaemic stroke subtypes.
Method: In a population-based study in Oxfordshire, UK, among patients with a first TIA or ischaemic stroke from 2002–2015, we studied ECG markers of atrial function (P-wave morphology, duration and dispersion; RR interval variation) and echocardiographic markers of left atrial (LA) enlargement. We compared cryptogenic events versus large artery/small vessel subtypes (TOAST classification).
Results: Of 2213 eligible patients, 812 (36.7%) had cryptogenic events. The prevalence of enlarged LA did not differ in cryptogenic vs. large artery/small vessel events (24.3% vs. 24.0%, $p = 0.93$). However, among the 1881 patients in sinus rhythm on ECG at baseline, compared to those with large artery/small vessel disease, patients with cryptogenic events had a significantly higher prevalence of alteration of P-wave morphology (57.2% vs. 40.6%, $p < 0.0001$), P-wave dispersion ($\geq$60 ms - 32.5% vs. 25.4%, $p = 0.01$) and RR interval variation ($\geq$80 ms - 43.7% vs. 31.9%, $p < 0.0001$). Results were consistent for analyses stratified by age, when excluding patients with TIA, and when excluding those subsequently found to have paroxysmal AF.
Conclusion: Compared to patients with large artery or small vessel stroke/TIA, patients with cryptogenic events have a higher prevalence of ECG markers of abnormal atrial function without significant left atrium structure abnormality.

AS18-069

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

COMPARISON OF BIOCHEMICAL BIOMARKERS OF ATRIAL FIBRILLATION IN ISCHAEMIC STROKE PATIENTS

P. Jansky[1], L. Stovickova[1], O. Chudomel[1], H. Magerova[1], P. Kesnerova[1], J. Paulasova-Schwabova[1], T. Ruzickova[1], M. Horejsi[1], I. Sarbochova[1], M. Sramek[1], V. Bulkova[2] and A. Tomek[1]
[1]2nd Medical Faculty of Charles University and Motol University Hospital, Neurology Department, Prague, Czech Republic
[2]MDT-Medical Data Transfer, Telemedicine Center, Brno, Czech Republic

Background and Aims: The risk of stroke in paroxysmal and permanent atrial fibrillation (AF) is similar, however paroxysmal AF is frequently undetected by standard examination procedures in patients with acute ischaemic stroke. Biochemical biomarkers can be used to assess the indication of prolonged ECG monitoring in patients with cryptogenic stroke. The aim of the study was to compare the association of selected biomarkers with occurrence of AF in ischaemic stroke patients.
Method: Retrospective monocentric analysis of consecutive ischaemic stroke patients admitted to comprehensive stroke centre in five-months period (January to May 2015). As potential biomarkers, we compared haemostatic markers of prothrombotic state (D-dimer, fibrinogen, antithrombin III), cardiac biomarkers (NT-proBNP, high-sensitivity troponin I), markers of inflammation (CRP) and parameters of renal function (eGFR).
Results: The data of 195 patients (average age 63.3 years, 25–96) were analysed. The use of all monitoring modalities (ECG on admission, bedside ECG monitoring in ICU, telemetry on standard ward, long-term Holter and event loop monitoring) led to AF detection in 32.3% patients. Statistically significant difference in AF and non-AF patients was found in mean levels of NT-proBNP (927.9 vs 455.5 ng/ml, $P < 0.001$), high-sensitivity troponin I (1587.4 vs 0.1 ng/l; $P < 0.001$), D-dimer (4487.2 vs 667.4 ng/l; $P = 0.001$) and eGFR (1.0 vs 1.1 ml/s/1.73m2; $P = 0.003$). Levels of CRP, fibrinogen and antithrombin III were not significantly different between the AF and non-AF patients.
Conclusion: Elevated levels of NT-proBNP, D-dimer, high-sensitivity troponin I and decreased eGFR are associated with AF in ischaemic stroke patients.

AS18-002

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

TEMPORAL DISCORDANCE BETWEEN ATRIAL FIBRILLATION AND INTRACRANIAL HEMORRHAGE OR MAJOR BLEEDING AMONG PATIENTS WITH CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICES: IMPLICATIONS FOR ORAL ANTICOAGULATION MANAGEMENT

P. Ziegler[1], M. Askari[2], S. Schmitt[2], J. Fan[2], A. Ullal[2] and M. Turakhia[3]
[1]Medtronic, Diagnostics and Monitoring Research, Mounds View, USA
[2]Veterans Affairs Palo Alto Health Care System, Clinical Research, Palo Alto, USA
[3]Stanford University School of Medicine, Center for Digital Health, Palo Alto, USA

Background and Aims: Oral anticoagulation (OAC) effectively reduces stroke risk in patients with atrial fibrillation (AF) but increases the risk of intracranial hemorrhage and major bleeding events (ICH/MB). We explored the temporal relationship between AF and ICH/MB among patients on OAC with cardiovascular implantable electronic devices (CIED).
Method: Inpatient and outpatient data from the Veterans Administration and Medicare during 2004–2015 were linked to daily AF burden data from Medtronic CIEDs. Patients taking OAC for 90 days prior/including the date of ICH/MB having $\geq$75% of days monitored in both the 90 days preceding and following ICH/MB were included. Patients were categorized based on the presence/absence of AF ($\geq$6 minutes on any day) during both the 90 days prior/including and 90 days following the date of ICH/MB to better understand the temporal discordance between AF and ICH/MB.
Results: We identified 189 CIED patients with ICH/MB (69 ± 9.4 years, CHAD2S2-VASc 4.3 ± 1.4). Of these, 99 patients (52.3%) had no AF in the 90 days prior/including the day of ICH/MB. Among these, 13 of 99 patients (13.1%) experienced AF in the 90 days following ICH/MB.

Conversely, among the 90 patients with AF prior to ICH/MB, 19 (21.2%) did not have AF in the 90 days following ICH/MB.
Conclusion: The majority of ICH/MB among CIED patients on OAC occurred during long AF-free periods, suggesting that non-continuous OAC utilization could reduce harm if long-term AF monitoring is employed. However, given the potential for changes in AF status before and after ICH/MB, long-term cardiac monitoring would be required to successfully implement such a strategy.

AS18-003

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ELIGIBILITY OF CRYPTOGENIC STROKE PATIENTS FOR EMBOLIC STROKE OF UNDETERMINED SOURCE TRIALS AND THEIR INCIDENCE OF ATRIAL FIBRILLATION

P. Ziegler[1], M. Rymer[2], S. Liu[3] and R. Passman[4]
[1]Medtronic, Diagnostics and Monitoring Research, Mounds View, USA
[2]University of Kansas Medical Center, Neurology, Kansas City, USA
[3]Medtronic, Cardiac Rhythm Heart Failure, Mounds View, USA
[4]Northwestern University Medical Center, Cardiology, Chicago, USA

Background and Aims: Prophylactic use of novel oral anticoagulation (NOAC) in patients with embolic strokes of undetermined source (ESUS) is currently being investigated in the NAVIGATE ESUS and RE-SPECT ESUS trials. We evaluated the proportion of cryptogenic stroke patients from the CRYSTAL-AF trial eligible for these ESUS trials and calculated the underlying incidence of atrial fibrillation (AF) using insertable cardiac monitors (ICM) among ESUS-eligible and ESUS-ineligible patients.
Method: Both ESUS trials require cryptogenic stroke patients without evidence of lacunar infarcts after extensive work-up, mRS ≤ 3, and no chronic antiplatelet indication. NAVIGATE requires age ≥ 50 while RE-SPECT requires age ≥ 60 (or 18–59 with additional risk factors) for events within 3 months or age ≥ 60 with additional risk factors (or CHAD2S2-VASc ≥ 3) for events occurring within 3–6 months before randomization. AF detection rates at 3 years were computed from ICM data using Kaplan-Meier estimates.
Results: Among 221 ICM patients enrolled in CRYSTAL-AF, 91 (41.2%) and 118 (53.4%) met NAVIGATE and RE-SPECT inclusion criteria, respectively. AF detection rates at 3 years were 35.8% vs. 33.6% among patients eligible for NAVIGATE and RE-SPECT, respectively, and 28.4% vs. 24.2% among ineligible patients.
Conclusion: Approximately half of patients studied in CRYSTAL-AF were ineligible for the ongoing ESUS trials. The majority of ESUS-eligible patients had no AF detected within 3 years despite continuous arrhythmia monitoring. AF was detected in ~25% of ESUS-ineligible patients. Therefore the ESUS trial results are not generalizable to the broader cryptogenic stroke population and patients excluded from these trials have an AF incidence that may benefit from long-term monitoring to ensure appropriate antithrombotic therapy.

AS18-004

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

INCIDENCE OF ATRIAL FIBRILLATION WITHIN TWO YEARS OF CRYPTOGENIC STROKE AMONG A LARGE, REAL-WORLD POPULATION WITH INSERTABLE CARDIAC MONITORS

P. Ziegler[1], J. Rogers[2], A. Nichols[3], S. Ferreira[4], M. Richards[5], J. Koehler[1] and S. Sarkar[1]
[1]Medtronic, Diagnostics and Monitoring Research, Mounds View, USA
[2]Scripps Institute, Cardiology, La Jolla, USA
[3]Ohiohealth Heart & Vascular Physicians, Cardiology, Columbus, USA
[4]St. Louis University, Cardiology, St. Louis, USA
[5]ProMedica Cardiology, Cardiology, Toledo, USA

Background and Aims: The long-term incidence of atrial fibrillation (AF) in cryptogenic stroke (CS) patients has been explored in carefully controlled clinical trials but real-world data are limited. We investigated the two-year incidence of AF in real-world clinical practice among a large cohort of patients with an insertable cardiac monitor (ICM) placed for AF detection following CS.
Method: Patients in the de-identified Medtronic Discovery™ Link database who received an ICM (Reveal LINQ™) for the purpose of AF detection following CS were included and monitored for up to 2 years. All detected AF episodes ($\geq$2 minutes) were adjudicated. We quantified the AF detection rate using Kaplan-Meier survival estimates, the maximum duration of AF episodes, and the median time to initial detection of AF.
Results: A total of 1247 patients (65.3 $\pm$ 13.0 years, 53% male) were included and followed for 579 $\pm$ 222 days. AF episodes (n = 4183) were detected in 238 patients, resulting in an AF detection rate of 21.5% at 2 years. The median duration of the longest detected AF episode was 4.0 [IQR 0.8–12.7] hours and the median time to AF detection was 112 [IQR 35–293] days.
Conclusion: AF episodes were detected via continuous monitoring with ICMs in approximately 1 of every 5 CS patients within 2 years of follow-up. Most patients with AF had at least one episode lasting >1 hour and the first AF episode occurred well beyond the range of conventional external ambulatory monitors in the vast majority of patients. Therefore ICMs should be strongly considered in the evaluation of CS patients.

AS18-006

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

RISK FACTORS FOR MALIGNANT MIDDLE CEREBRAL ARTERY INFARCTION IN STROKE PATIENTS WITH ATRIAL FIBRILLATION

D.H. Kim[1], H.W. Nah[1] and J.K. Cha[1]
[1]Dong-A University Hospital, Department of Neurology, Busan, Republic of Korea

Background and Aims: Ischemic stroke with atrial fibrillation (AF) is more likely to have large infarct and severe neurological deficits. However, predictive factors of malignant middle cerebral infarction (MMI) in ischemic stroke patients with AF are not fully known. This study was aimed to evaluate the factors associated with MMI in stroke with AF.

Method: Consecutive patients with acute ischemic stroke developed in the middle cerebral artery territory and AF who underwent magnetic resonance image within 24 hour from onset were retrospectively enrolled. Prior users of warfarin were excluded. All patients were stratified into MMI and non-MMI groups using MMI definition of a National Institutes of Health Stroke Scale score >15 and infarct volume >82 cm^3 on an initial diffusion-weighted imaging or ischemic signs involving >50% of the MCA territory on follow-up brain computed tomography. Clinical characteristics were compared between two groups. Multivariate regression analysis was used to identify factors associated with MMI.
Results: A total of 142 patients were included and MMI was found in 31% of the patients. In univariate analysis, patients with MMI were older and had higher D-dimer and brain natriuretic peptide level. On multiple logistic regression analysis, earlier onset-to-image time (OR 0.85, 95% confidence interval [CI] 0.73–0.98, P = 0.025 for 1 hour) and higher brain natriuretic peptide level (OR 1.22, 95% CI 1.07–1.39, P = 0.003 for every 100 pg/mL) were independently associated with MMI after adjustment for potential confounders or mediators.
Conclusion: Plasma brain natriuretic peptide level and onset-to-image time are independently associated with MMI among patients with stroke and AF.

AS18-007

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

TARGET ORGAN DAMAGE AND RISK OF STROKE IN PATIENTS WITH ATRIAL FIBRILLATION AND 1 ADDITIONAL THROMBOEMBOLIC RISK FACTOR DUE TO HYPERTENSION

V.G. Grachev[1], D.Y. Nikolin[2], A.A. Lipchenko[3], E.G. Fokina[2], A.V. Rezaykin[4] and M.V. Arkhipov[3]
[1]Ural State Medical University, Depertment of Faculty Therapy and Endocrinology, Ekaterinburg, Russia
[2]Medical Foundation "Novaya Bolnitsa", Department of Cardiology, Ekaterinburg, Russia
[3]Ural State Medical University, Department of Therapy of Faculty of Professional Training and Retraining, Ekaterinburg, Russia
[4]FSIS Yekaterinburg Research Institute of Viral Infections Under Russias Inspectorate for Protection of Consumers Rights and Human Welfare, Laboratory of Enteral Viral Infections, Ekaterinburg, Russia

Background and Aims: In patients with atrial fibrillation (AF) and 1 additional to sex category risk factor (ARF) according CHA2DS2VASc score the current guidelines allow to use or not to use oral anticoagulants (OAC). Hypertension is common stroke risk factor in AF. Aim: to assess the importance of ultrasound signs of target organ damage for risk of stroke in patients with AF and 1 ARF due to hypertension.
Method: We analyzed data from medical records of 37 ischemic stroke patients with AF, having before stroke 1 ARF due to hypertension (group 1) and 48 patients with AF and 1 ARF due to hypertension without stroke (group 2). The results of echocardiography and carotid ultrasonography were assessed. Increased left ventricular mass index (LVMI) and increased carotid intima-media thickness (IMT) were considered as signs of target organ damage.
Results: There was no significant difference between groups in clinical and demographic characteristics. Mean values of LVMI (125.7 ± 23.5 versus 103.6 ± 27.6 g/m^2, p = 0.0001) and IMT (1.04 ± 0.14 versus 0.87 ± 0.13 mm, p < 0.0001) were significantly greater in group 1 than in group 2. The prevalence of LV hypertrophy in group 1 was 67.6%, in group 2 - 42.6%, p = 0.028, prevalence of IMT >0.9 mm 73.0% versus 25.5% respectively, p < 0.0001. Increased LVMI (OR 2.81; 95% CI 1.15–6.91) and increased IMT (OR 7.88; 95% CI 2.96–20.94) were associated with increased risk of stroke.
Conclusion: LVMI and carotid IMT may be considered in in decision-making process about the use of OAC in patients with AF and 1 ARF due to hypertension

AS18-008

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

RELATIONSHIP BETWEEN ATRIAL STRUCTURAL REMODELING AND CHA2DS2-VASC SCORE IN NON-PAROXYSMAL ATRIAL FIBRILLATION

K. Kumagai[1], K. Minami[1], Y. Sugai[1] and S. Oshima[1]
[1]Gunma Prefectural Cardiovascular Center, Division of Cardiology, Maebashi, Japan

Background and Aims: Nonvalvular atrial fibrillation (AF) confers a five-fold increased risk of stroke. AF is known to be associated with several pathophysiological mechanisms including endothelial dysfunction of the heart and arterial vessels. Furthermore, low voltage areas (LVAs) in the left atrium (LA) have been reported to reflect injured myocardium as results of atrial structural remodeling by AF. This study aimed to evaluate the relationship between atrial structural remodeling and CHA2DS2-VASc score indicating endothelial dysfunction in LA in non-paroxysmal AF patients.
Method: In 73 patients with non-paroxysmal AF patients (AF duration: 22 ± 31 months, 42 persistent and 31 long-standing persistent) who performed circumferential pulmonary vein isolation (PVI), they were divided into Group1: AF patients with a CHA2DS2-VASc score >2 and Group2: those with a CHA2DS2-VASc score ≦2.
Results: The AF freedom rate without antiarrhythmic drugs was 69.0% after PVI over 12-month follow-up period. LA volume, hypertension, men, B-type Natriuretic Peptide level (BNP) and body mass index (BMI) indicated significant differences between the both groups. LVAs (<0.5 mV)/LA surface area after PVI indicated significant differences between the both groups (Group1: 27% vs. Group2: 14%, p = 0.001). Sinus rhythm (SR) at procedure begin were significantly found more in the patients in Group2 as compared with those in Group1 (p = 0.001).
Conclusion: Atrial structural remodeling in non-paroxysmal AF may be related with a CHA2DS2-VASc score. High CHA2DS2-VASc score may reflect not only endothelial dysfunction but also myocardial injury, suggesting an increased risk of stroke in patients with non-paroxysmal AF.

AS18-009

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

NEW STRATEGIES FOR STROKE PREVENTION: LEFT ATRIAL APPENDAGE CLOSURE

A. De Felipe Mimbrera[1], L. Salido[2], C. Matute[1], R. Vera[1], A. Cruz Culebras[1], R. Álvarez-Velasco[1], R. Hernández Antolin[2], C. Estévez Fraga[1], P. Martínez Ulloa[1], F. Acebrón Sánchez Herrera[1], C. Anciones[1], A. Albóniga Chindurza[1] and J. Masjuan[1]
[1]Hospital Ramon y Cajal, Neurology, Madrid, Spain
[2]Hospital Ramon y Cajal, Cardiology, Madrid, Spain

Background and Aims: Left atrial appendage closure (LAAC) is recommended in patients with non-valvular atrial fibrillation (NVAF) at high risk of stroke and contraindication of oral anticoagulation (OA) in those centers with previous experience.

Method: Prospective registry of LAAC for stroke prevention performed by the Department of Interventional Cardiology at our hospital since March 2012-September 2016. Patients with NVAF were considered eligible if CHA2DS2VASc >1, contraindication of OA, or ischemic stroke (IS) despite correct OA.
Results: Thirty-two patients were included, 65.6% male, mean age was 72.9 years (range 50–95). Median CHA_2DS_2VASc was 4 (3–5), mean follow-up was 11.4 months (2–48). LAAC was considered for secondary stroke prevention in 20 patients (62.5%) and for primary stroke prevention in the remaining. Contraindication for OA was due to cerebral haemorrhage in 15 patients, gastrointestinal bleeding in 10 and one patient had multiple cavernomatosis. LAAC was done in 6 patients with IS despite correct OA. Twenty-five patients with contraindication for OA were started on dual antiplatelet therapy during a mean of 1.6 ± 1 months, leaving one antiplatelet agent for 11 ± 11.8 months. Six patients were treated with OA and single antiplatelet therapy. During the procedure there was one non-fatal cardiac tamponade. During follow-up 4 patients suffered gastrointestinal bleeding and there were 2 deaths not related to the procedure (pneumonia and cardiac failure).
Conclusion: Left atrial appendage closure is safe in those centres with previous experience, and seems effective in patients with high thromboembolic risk and contraindication for OA or inadequate OA.

AS18-011

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

VOXELWISE DISTRIBUTION OF ACUTE ISCHEMIC STROKE LESIONS IN PATIENTS WITH NEWLY DIAGNOSED ATRIAL FIBRILLATION: TRIGGER OF ARRHYTHMIA OR ONLY TARGET OF EMBOLISM?

T. Rizos[1], A. Bartsch[2], T. Johnson[3], F. Dittgen[4], T. Nichols[5], U. Malzahn[6] and R. Veltkamp[7]
[1]Department of Neurology, Heidelberg, Germany
[2]Heidelberg University, Neuroradiology, Heidelberg, Germany
[3]University of Michigan, Department of Biostatistics, Michigan, USA
[4]Heidelberg University, Neurology, Heidelberg, Germany
[5]University of Oxford, Oxford Centre for Functional MRI of the Brain, Oxford, United Kingdom
[6]Würzburg University, Clinical Trial Center Würzburg, Würzburg, Germany
[7]Imperial College London, Department of Stroke Medicine, London, United Kingdom

Background and Aims: Atrial fibrillation (AF) is frequently detected after ischemic stroke for the first time, and brain regions involved in autonomic control have been suspected to trigger AF. We examined whether specific brain regions are associated with newly detected AF after ischemic stroke.
Method: Patients with acute cerebral infarctions on diffusion-weighted magnetic resonance imaging were included. Stroke lesions were mapped and modeled voxelwise using Bayesian Spatial Generalised Linear Mixed Modeling to determine differences in infarct locations between stroke patients with new AF, without AF and with AF already known before the stroke.
Results: 582 patients were included (median age 68 years; 63.2% male). AF was present in 109/582 patients [(18.7%); new AF: 39/109 (35.8%), known AF: 70/109 (64.2%)]. AF patients had larger infarct volumes than patients without AF (mean: $29.7\,ml \pm 45.8\,ml$ vs. $15.2\,ml \pm 35.12\,ml$; $p < 0.001$). Increasing stroke size predicted progressive cortical but not pontine and thalamic involvement. Patients with new AF had more frequently lesions in the right insula compared to patients without AF when stroke size was not accounted for, but no specific brain region was more frequently involved after adjustment for infarct volume.
Conclusion: Our investigation highlights the need to account for stroke size in searching for infarcted brain areas that may trigger cardiac arrhythmias. Our results challenge the neurogenic hypothesis of AF according to which a relevant proportion of new AF is triggered by ischemic brain lesions of particular locations.

AS18-012

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DETECTION OF RIGHT-TO-LEFT SHUNT IN YOUNG ISCHEMIC STROKE PATIENTS – FINAL RESULTS

M. Roubec[1], M. Kuliha[1], D. Skoloudik[1], A. Goldírová[1], E. Hurtikova[1], R. Herzig[2], J. Krajca[3], V. Prochazka[3] and M. Kolek[4]
[1]University hospital Ostrava, Neurological, Ostrava, Czech Republic
[2]University Hospital Hradec Kralove, Neurological, Hradec Kralove, Czech Republic
[3]University Hospital Ostrava, Radiological, Ostrava, Czech Republic
[4]University Hospital Ostrava, Cardiosurgery, Ostrava, Czech Republic

Background and Aims: Right-to-left shunt is associated with a number of clinically important syndromes including paradoxical thromboembolism causing stroke or other systemic infarct, mainly in young patients. Flow detection system CardioxTM (FDS) represents a new, comfortable method for right-to-left shunt detection independent on examiner experience with exact measurement of Valsalva maneuver. The aim was to assess the correlation between FDS, contrast transcranial Doppler ultrasound (cTCD) and transesophageal echocardiography (TEE) in right-to-left shunt detection in young ischemic stroke patients.
Method: All consecutive patients presenting with acute ischemic stroke/transient ischemic attack aged 18–55 years and able to perform sufficient Valsalva maneuver were enrolled to the pilot study during 5 months. TEE, FDS, cTCD and brain MRI/CT were performed in all patients. Correlations in right-to-left shunt detection were statistically evaluated using Spearmańs and interclass correlation coefficient.
Results: Totally 44 patients (27 males, mean age 46.1 ± 8.7years) were included. Right-to-left shunt was detected in the same 16 (36.4%) patients using TEE and cTCD, and in two more patient (totally 18, 40.9%) using FDS. Spearmańs coefficients for FDS and cTCD were 0.91 and 1.00, resp. Interclass correlation coefficient was 0.978. Sensitivity, specificity, positive and negative predictive values were 100%, 92.8%, 88.8%, 100% for FDS and 100%, 100%, 100%, 100% for cTCD, resp.
Conclusion: Correlations between FDS and cTCD, and TEE as a gold standard in right-to-left shunt detection were very high with 100% sensitivity. Both FDS and cTCD seem to be sufficient as a screening method.
Supported by the internal grant of University Hospital Ostrava RVO-FNOs/2014.

AS18-014

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

CHANGES IN COGNITIVE FUNCTION IN THE CONTEXT OF LEFT ATRIAL APPENDAGE OCCLUSION

M. Laible[1], M. Andermann[1], C. Jansen[1], K. Hess[1], N. Geis[2], S. Pleger[2], S. Schüler[3], T. Rizos[1], R. Veltkamp[4] and S. Horstmann[1]
[1]Heidelberg University Hospital, Department of Neurology, Heidelberg, Germany
[2]Heidelberg University Hospital, Department of Internal Medicine III, Heidelberg, Germany
[3]Institute of Medical Biometry and Informatics- University of Heidelberg, Department of Medical Biometry, Heidelberg, Germany
[4]Imperial College London, Department of Stroke Medicine, London, United Kingdom

Background and Aims: Cognitive dysfunction is a frequent phenomenon after surgical and cardiovascular interventions. No data on cognitive function after left atrial appendage occlusion (LAAO) are available so far. We aimed to determine the incidence of cognitive dysfunction in patients after LAAO. We hypothesized that cognitive function would not differ after LAAO compared to before LAAO.
Method: Patients who underwent LAAO for treatment of atrial fibrillation at the Heidelberg Department of Internal Medicine III were eligible for this observational, explorative, single-center, non-randomized cohort study, between July 2013 and January 2016. Neurological examination and neuropsychological assessments were conducted one day before LAAO and one month after LAAO, using a comprehensive neuropsychological test battery that included several cognitive domains including executive function, verbal fluency, verbal and non-verbal memory. Paired *t*-tests and correlation analyses were applied to compare test results pre- and post-intervention. In addition, we descriptively analyzed the number of relevant changes ($\pm$1 standard deviation) over all cognitive domains for each patient.
Results: 20 patients completed the study. Mean age was 72.6 $\pm$ 6.8 years and 15 (75%) were male. There were no significant changes in any of the tested cognitive domains in group statistics. Descriptive single case analysis showed a greater number of deteriorations then improvements by one standard deviation over all cognitive domains in three patients, while in 11 patients the number of positive changes exceeded the number of negative changes.
Conclusion: LAAO does not adversely affect cognitive function in the majority of cases.

AS18-015

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ARE ANTICOAGULATED PATIENTS WITH ATRIAL FIBRILLATION AND ISCHEMIC EVENTS DUE TO SMALL VESSEL DISEASE MORE AT RISK OF BLEEDING? A LONG-TERM FOLLOW-UP STUDY

C. Kremer[1], K. Nyberg[2], T. Karlsson[2] and F. Perren[3]
[1]Skåne University Hospital- Department of Clinical sciences Lund, Neurology, Malmö, Sweden
[2]Trelleborg Hospital, Neurology, Trelleborg, Sweden
[3]HUG: Medical Faculty University of Geneva- Dep. Clinical Neuroscience, Neurology, Geneva, Switzerland

Background and Aims: Patients with atrial fibrillation and lacunar stroke are treated with oral anticoagulation (OAC) despite the stroke mechanism is unknown. It is unclear if such patients have the same benefits as patients with cardioembolic stroke. We performed this long-term study to investigate the outcome of patients with atrial fibrillation and lacunar stroke.
Method: Retrospective study of patients with lacunar stroke or transient ischemic attack and atrial fibrillation. Clinical outcome was assessed by the Rankin Scale. Recurrent stroke rate, stroke etiology and complication of secondary prevention (antiplatelet therapy or OAC) were documented.
Results: Fifty-five patients (10%) out of a total of 551 could be included. Twenty-eight received OAC and the other antiplatelet therapy. At follow-up after 4,2 years there was a non-significant tendency towards a higher risk of intracranial bleedings in the group of patients receiving OAC (3 vs. 2). No difference in stroke recurrency (3 vs. 3) was found.
Conclusion: This study showed no difference in stroke recurrence but interestingly there was no significant difference in the rate of intracranial bleedings between the two groups. Given an only slight higher long-term risk of bleeding – as compared to those treated with antiplatelet - patients who suffered a lacunar stroke with atrial fibrillation should be closely monitored and treated for vascular additional risk factors.

AS18-017

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ATRIAL FIBRILLATION IN PATIENTS WITH FIRST-EVER STROKE: INCIDENCE TRENDS AND ANTITHROMBOTIC THERAPY BEFORE THE EVENT

K.Y. Lee[1], Y. Jung[2] and Y.D. Kim[3]
[1]Gangnam Severance Hospital, Neurology, Seoul, Republic of Korea
[2]Changwon Fatima Hospital, Neurology, Changwon, Republic of Korea
[3]Severance Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Atrial fibrillation (AF) is the most common cardiac arrhythmia. Despite of the proven advantage in primary and secondary stroke prevention in patients with AF, oral anticoagulation (OAC) therapy has been reported to be underused in many countries. We investigated the trends in the incidence of AF-related stroke in Korea from 2004 to 2013 as well as in the preventive antithrombotic therapy pattern before the ischemic stroke.
Method: Data source for this study were obtained from the nationwide sample cohort comprising 1,025,340 individuals (2% of entire population in Korea) which were established by Nationwide Health Insurance System. We selected first-ever acute ischemic stroke (AIS) patient from the cohort and collected data on comorbidities and medication history.
Results: The proportion of AIS with AF significantly increased from 2004 (13.4%) to 2013 (22.6%). The proportion of patients with OAC therapy was noted to fluctuate during the study period between 11.1% and 17.9%. However, the proportion of patients with antiplatelet agents had increased from 17.8% in 2004 to 46.7% in 2013, while that of no treatment group decreased from 64.4% in 2004 to 42.2% in 2013.
Conclusion: AIS with AF steadily increased over recent 10 years. However, only 14.4% of AF patients with high risk of stroke were receiving OAC therapy before the stroke. Instead, the proportion of AF patients treated with antiplatelet agents before stroke increased. Our study demonstrated that there was still a huge gap between clinical practice and optimum treatment for AF in Korea.

AS18-019

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

CLINICAL IMPLICATIONS OF COLLATERAL MIDDLE CEREBRAL ARTERY FLOW IN ACUTE CARDIOEMBOLIC STROKE WITH CERVICAL INTERNAL CAROTID ARTERY OCCLUSION

T. Uehara[1], H. Terasawa[1], H. Shimizu[1] and Y. Kita[1]
[1]Hyogo Brain and Heart Center at Himeji, Neurology, Himeji, Japan

Background and Aims: The purpose of this study was to determine clinical implications of collateral middle cerebral artery (MCA) flow in acute cardioembolic stroke with cervical internal carotid artery (ICA) occlusion.
Method: Subjects of this study were 30 patients (12 men, 83.4 ± 8.5 years) with cervical ICA occlusion due to cardioembolism who admitted to our department within 24 hours of onset between January 2012 and December 2016. Collateral MCA flow was defined as the presence of MCA signals from proximal to distal MCA branches ipsilateral to the ICA occlusion by magnetic resonance angiography.
Results: Three patients (10%) had collateral MCA flow. The National Institute of Health Stroke Scale (NIHSS) score on admission was significantly lower in patients with collateral MCA flow than those without (7.3 ± 8.5 vs 26.4 ± 7.7, $p = 0.0496$). There were no differences in median modified Rankin Scale at discharge (6 vs 5, $p = 0.7571$) and mortality during hospitalization (66.7% vs 33.3%, $p = 0.2557$) between patients with and without collateral MCA flow. Two of 3 patients with collateral MCA flow died from cerebral herniation by enlargement of infarct lesion to whole MCA territory. Although remaining one patient had early neurological deterioration (14-point increase in the NIHSS score) due to subsequent ipsilateral ICA distal occlusion, her neurological symptoms improved (12-point decrease in the NIHSS score) because of recanalization of ICA distal occlusion by endovascular treatment.
Conclusion: Collateral MCA flow reduced initial stroke severity but was unlikely to protect against early neurological deterioration in acute cardioembolic stroke patients with cervical ICA occlusion.

AS18-022

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PREVALENCE OF ATRIAL FIBRILATION IN 395 PATIENTS PRESENTING WITH TRANSIENT AND PERMANENT OCULAR ISCHAEMIC EVENTS IN A TERTIARY LONDON CENTRE

A. Zarkali[1], A. Cheng[1], A. Dados[1], R. Simister[1] and A. Chandratheva[1]
[1]University College London Hospital NHS Foundation Trust, Stroke, London, United Kingdom

Background and Aims: Atrial fibrillation (AF) in patients with ischaemic ocular events is often under-investigated.
We aimed to determine the prevalence of AF in these patients.
Method: Setting: University College Hospital London daily TIA clinic. Main referral centre for North-Central London and Moorfields Eye hospital. Consecutive records for all patients with transient or permanent ischaemic visual loss were reviewed, 1st January 2014–30th September 2016. Electrocardiograms (ECG), prolonged cardiac monitoring reports and history of AF were recorded.
Results: Of 395 patients, 220(55.4%) male, mean age 64 years ($SD = 15.1$), 261(66%) had transient and 134(34%) permanent events. ECG was performed in 360(91%) but only 236(60%) had further cardiac monitoring; 386(91.1%) had carotid imaging. 8%(31) had AF and 8%(31) symptomatic carotid disease (CAS) with more than 50% stenosis. Median ABCD2 score in AF patients was 3, not significantly different from non-AF patients. Only 51.6% with known AF were anticoagulated at presentation. Hypertension ($p = 0.012$), previous TIA($p < 0.001$) and stroke ($p = 0.014$) were more common in those with AF but gender ($p = 0.951$), age ($p = 0.833$), diabetes ($p = 0.793$), smoking ($p = 0.653$) and hypercholesterolaemia ($p = 0.144$) were not.
90-day recurrence of stroke/TIA/ocular ischaemia was 10.1%. This was higher in AF patients (16.1%, mean 12.3 days, median 7) and comparable to patients with CAS (18.9%). Patients with AF were more likely to represent with stroke within 90 days ($HR = 5.74$, 95%CI = [0.54,61.6], $p = 0.239$).
Conclusion: 8% of patients with ischaemic ocular events had AF, same as CAS; this is probably an underestimate, as these patients are often under-investigated with only 60% undergoing prolonged cardiac monitoring.

AS18-023

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ANTICOAGULANTS TO THE OLDEST OLD WITH ISCHEMIC STROKE AND ATRIAL FIBRILLATION

P. Appelros[1], B. Farahmand[2], A. Terént[3] and S. Åsberg[3]
[1]Örebro University Hospital, Neurology Department, Örebro, Sweden
[2]EpiConsult, EpiConsult, Stockholm, Sweden
[3]Uppsala university, Department of Medical Sciences, Uppsala, Sweden

Background and Aims: Anticoagulant (AC) treatment is effective for preventing recurrent ischemic strokes in patients who have atrial fibrillation (AF). This benefit is paid by a small increase of hemorrhages. AC-related hemorrhages seem to increase with age, but there are few studies showing if the benefits of treatment persist in old age.
Method: For this observational study, four different registers were used, among them Riksstroke, the Swedish stroke register. Patients who have had a recent stroke, and were 80–100 years of age and had AF, were included from 2006 through 2013. The patients were stratified into three age groups, 80–84, 85–89, and $\geq$90 years. Information regarding stroke severity, risk factors and comorbidity were gathered from the registers. The patients were followed with respect to ischemic or hemorrhagic stroke, other hemorrhages, or death.
Results: Of all 23,356 patients with AF, 6361 (27%) used ACs after an ischemic stroke. AC treatment was associated with less recurrent ischemic stroke in all age groups. Hemorrhages increased most in the $\geq$90 year age group, but this did not offset the overall beneficial effect of AC. Apart from age, no other cardiovascular risk factors or comorbidity was identified, that influenced the risk of AC-associated hemorrhage. Other drugs than ACs did not influence the incidence of major hemorrhage.
Conclusion: Given the patient characteristics in this study, there is room for more patients to be treated with ACs, without hemorrhages to prevail. In nonagenarians, hemorrhages increased somewhat more, but this did not affect the overall outcome in this age stratum.

AS18-024

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DETECTION OF ATRIAL FIBRILLATION USING A LIGHTWEIGHT AMBULATORY CARDIAC DEVICE IN A STROKE UNIT COHORT

Y. Imam[1], W.M. Yu[1], H. Chandrashekar[1], C. Poudel[2], M. Lambert[1], I. Logan[1], S. Das[1] and A. Doney[1]
[1]Ninewells Hospital, Acute Stroke Unit, Dundee, United Kingdom
[2]Ninewells Hospital, Acure Stroke Unit, Dundee, United Kingdom

Background and Aims: Atrial Fibrillation (AF) related stroke carries increased morbidity and mortality, yet diagnostic methods for paroxysmal AF remain insufficient with unclear preferred method or duration in national guidelines. R-test monitors are ambulatory lightweight cardiac monitors that are fitted for 24 to 72 hours or more and retrieved in-house at our stroke unit. We aim to see if these devices increase the accuracy of diagnosis.
Method: A retrospective review of all R- test performed in the stroke unit at Ninewells hospital. Data collected between 1st June 2016 and 30th November 2016. The primary outcome was AF detection by R- test after negative electrocardiogram (ECG).
Duration of R-test monitoring, duration of signal retrieved, age, gender and stroke subtype using the Bamford classification were recorded.
Results: Out of 310 patients admitted into the stroke unit in that period; 199 (64.2%) had an R-test requested. Results were available for 169 patients (54.5%). 55% were males, mean age 72.3 + 13.3 years.37.7% were TACI/PACI,35.9% LACI, 13.2% POCI, 10.8% TIAs and 2.4% intracerebral bleeds. The mean duration of R-test monitoring was 87.3 + 40.6 hours. The mean duration of signal retrieved was 61 + 33.7 hours.
R- test detected AF in 18 patients (10.7%). 55.6% were males, mean age 76.1 + 11.2 years. Majority were TACI/PACI (50%), with LACI (22.2%), POCI (16.7%), intracerebral bleeds (5.6%) and TIAs (5.6%).
Conclusion: R-test increases the diagnostic accuracy for detection of AF in a stroke unit cohort despite signal loss. Having access to the device in-house facilitates its utilisation irrespective of stroke sub-type.

AS18-028

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

IDENTIFICATION OF WHITE MATTER LESION IN ATRIAL FIBRILLATION PATIENTS WITH ISCHEMIC STROKE USING CARDIAC BIOMARKERS IN HAN POPULATION

C. Wei[1], S. Zhang[1], J. Liu[1], R. Yuan[1], S. Zhang[1] and M. Liu[1]
[1]West China Hospital of Sichuan University, Department of Neurology, Chengdu, China

Background and Aims: Chinese Han population bears a huge burden from the world's largest population of atrial fibrillation (AF) patients. White matter lesion (WML), a surrogate maker of small vessel disease, was associated with high risk of stroke. Magnetic resonance imaging (MRI) was the most sensitive technique to detect WML but not the routine tests for AF patients. We aimed to discover the correlation between cardiac biomarkers and WML in the AF patients with stroke, to investigate the clinical significance of cardiac biomarkers in identification of WML in early stage in the AF patients at high risk of stroke.
Method: AF patients with ischemic stroke within one week were consecutively enrolled. Baseline data including cardiac biomarkers (myoglobin, high-sensitive cardiac troponin T (hs-cTnT), creatine kinase isoenzyme and terminal pro-brain natriuretic peptide) levels within 48 hours after admission were collected. WML was assessed by the Fazekas scale based on MRI scans.
Results: Of 171 Han patients included finally, 120 (70.2%) patients presented WML. Either myoglobin or hs-TnT elevation above the median (41.18 ng/mL and 13.9 ng/L, respectively) was associated with moderate to severe periventricular lesions. After adjustment for the confounders, patients with increased myoglobin and hs-TnT were 2.4- and 2.6- times more likely to have moderate to severe periventricular lesions than those with lower levels, respectively (OR 2.460, 95%CI 1.071–5.650 and OR 2.608, 95%CI 1.088–6.249 separately).
Conclusion: It is promising to identify the moderate to severe periventricular lesions via Myoglobin and hs-TnT elevations in AF patients with ischemic stroke for its clinical applicability in Chinese Han population.

AS18-029

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ASSOCIATION BETWEEN LEFT VENTRICULAR EJECTION FRACTION AND THE MULTIPLE INTRACRANIAL ATHEROSCLEROSIS

K.B. Lee[1], N. Choi[1], J.Y. Lee[1], J.S. Sunwoo[1], H. Roh[1], M.Y. Ahn[1], M.H. Lee[2], B.W. Park[2] and M.S. Hyon[2]
[1]Soonchunhyang University Hospital, Neurology, Seoul, Republic of Korea
[2]Soonchunhyang University Hospital, Cardiology, Seoul, Republic of Korea

Background and Aims: Echocardiography is performed in many patients with atherosclerotic cardiovascular disease. Left ventricular ejection fraction (LVEF) is commonly measured as a general marker of a patient's cardiac function, but the relationship with the severity of atherosclerosis or risk of stroke is largely unknown. This study was aimed to investigate whether LVEF is associated with the severity of intracranial stenosis.
Method: Transthoracic echocardiography was done in the consecutive acute ischemic stroke in Soonchunhyang University Hospital between January 2006 and December 2015. The clinical data and echocardiographic LVEF of 1,966 patients were reviewed excluding the patients with a high risk source of cardiogenic embolism. Intracranial atherosclerosis was graded from 0 to 3 by the number of significant (>50%) stenosis on intracranial magnetic resonance angiography. Ordinal regression test were applied for the associated factors with the multiplicity of intracranial stenosis adjusting traditional vascular risk factors.
Results: The means of LVEF were 66.75 ± 7.43 for no stenosis (n = 512), 65.57 ± 8.67 for 1 stenosis (n = 434), 66.56 ± 9.42 for 2 stenosis (n = 366), and 65.51 ± 8.95 for 3 stenosis (n = 363). In ordinal logistic regression, the number of intracranial stenosis was significantly correlated with age (OR 1.044, 95% CI 1.034–1.054), hypertension (OR 1.999, 95% CI 1.576–2.537), diabetes (OR 1.692, 95% CI 1.246–2.299), and LVEF (OR per 10% decrease of LVEF 1.149, 95% CI 1.008–1.310).
Conclusion: LVEF was associated with the severity of intracranial stenosis in patients with acute non-cardioembolic infarction independent of conventional risk factors of intracranial atherosclerosis. Further studies are warranted to elucidate clinical implication of LVEF as a predictor of ischemic stroke risk.

AS18-033

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

EVALUATION OF ASYMPTOMATIC CEREBRAL INFARCTION ASSOCIATED WITH RADIOFREQUENCY CATHETER ABLATION FOR ATRIAL FIBRILLATION

K. Kumagai[1], K. Minami[1], Y. Sugai[1] and S. Oshima[1]
[1]Gunma Prefectural Cardiovascular Center, Division of Cardiology, Maebashi, Japan

Background and Aims: Circumferential pulmonary vein isolation (CPVI) has become a routine procedure for both paroxysmal and persistent atrial fibrillation (AF). An incidence of 1.4% of periprocedural, clinically evident thromboembolic events when using an irrigated-tip catheter has been reported. In contrast to the situation for symptomatic cerebral infarction (CI), the incidence of asymptomatic CI has not been fully evaluated due to its asymptomatic nature. The present study aimed to determine the incidence and predictors of asymptomatic CI identified by diffusion-weighted (DW) magnetic resonance imaging (MRI) after AF ablation.
Method: A total of 70 consecutive AF patients who underwent catheter ablation using an irrigated-tip catheter were subjected to DW-MRI of the brain 1 day after the procedure.
Results: In 10 (14.3%) of 70 patients, MRI revealed acute CI, but neither symptoms nor abnormal neurological findings were present in these patients. In univariate analysis, a history of persistent AF, left atrial dimension, presence of spontaneous echo contrast (SEC), and electrical cardioversion during the procedure differed significantly between the two groups, those with and without CI. Moreover, there were no significant differences in the common risk factors of CI, including age, or history of coronary artery disease, hypertension, lipid metabolism abnormality, or diabetes mellitus between the two groups. Multivariate logistic regression analysis identified SEC as predictive of acute asymptomatic CI after AF ablation.
Conclusion: DW-MRI revealed a relatively high incidence of asymptomatic CI associated with AF ablation despite the use of an irrigated-tip catheter. Spontaneous echo contrast was a predictive factor for asymptomatic CI.

AS18-035

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DURATION NEEDED TO DETECT ATRIAL FIBRILLATION IN STROKE PATIENTS USING AMBULATORY CARDIAC MONITORING

W.M. Yu[1], Y. Imam[1], H. Chandrashekar[1], M. Lambert[1], C. Poudel[1], S. Das[1] and A. Doney[1]
[1]Ninewells Hospital, Acute Stroke Unit, Dundee, United Kingdom

Background and Aims: Atrial fibrillation (AF) is a major etiology for cardioembolic stroke. Detection rates are known to vary according to patient population, method of detection and duration of recording. There are no conclusive national guidelines indicating the optimum duration required for AF detection using cardiac monitoring. We aim to investigate the duration needed to detect AF using ambulatory R-Test monitoring in the local population of Tayside.
Method: Data collected from 1st June 2016 to 30th November 2016 for stroke patients admitted into Ninewells Hospital.
Patients with known AF, history of paroxysmal AF or new AF detected on admission ECG were excluded from the data collection. 169 stroke patients were included for R-Test investigation.
Results: 18 (10.7%) out of 169 patients had AF detected with maximum of 235 hours monitoring. Cumulative detection rates were plotted against duration of R-Test monitoring (Figure 1).
The graph yielded shows a concave down, increasing curve.
The duration to detect AF at 150 hours yielded 88.9% of detection at which point plateauing start to occur.
The local practice of 72 hour cardiac monitoring only yielded 27% of AF detection.

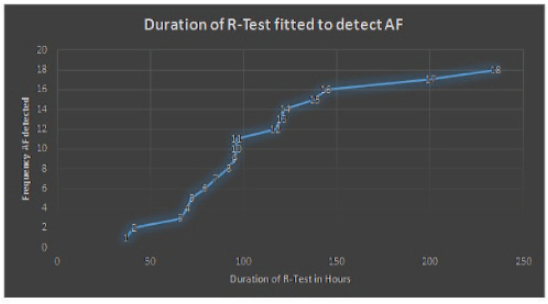


Figure 1: Duration of R-Test needed to detect paroxysmal AF in stroke patients

Conclusion: Increased duration of R-Test monitoring is associated with increased AF detection. In our retrospective cohort of stroke patients, it is suggestive that R Test fitting for 150 hours would detect most AF. Longer monitoring may be required if there is strong clinical suspicion.

AS18-036

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

IMPACT OF SIGNAL LOSS ON THE DETECTION OF PAROXYSMAL ATRIAL FIBRILLATION IN A IN-HOUSE STROKE UNIT CARDIAC MONITORING SERVICE

Y. Imam[1], W.M. Yu[1], H. Chandrashekar[1], C. Poudel[1], M. Lambert[1], I. Logan[1], S. Das[1] and A. Doney[1]
[1]Ninewells Hospital, Acute Stroke Unit, Dundee, United Kingdom

Background and Aims: R-test monitors are ambulatory lightweight cardiac monitors that are fitted and retrieved in-house at our stroke unit to diagnose paroxysmal atrial fibrillation (PAF). The protocol is to fit them for 3 days, however evidence suggests that the more you monitor, the more AF you detect. We aim to investigate if detection of AF is correlated with monitoring duration and signal attainment in our in - house service. We also aim to examine the impact of signal loss on AF detection.
Method: A retrospective review of all R- tests performed in the acute stroke unit at Ninewells hospital, Dundee, United Kingdom. Starting 1 June 2016 through 30th November 2016. The primary outcome was duration of R-test monitoring, signal retrieved, percentage signal loss, and their correlation with AF detection.
Results: 310 patients were admitted to the stroke unit in that period. Results were available for 169 patients (54.5%). The R-test was in place for a mean of 87.3 + 40.6 hours (median 75 hours range 19–257).
The mean signal retrieved was 61 + 33.7 hours (median 57 hours, range 4–225). R- test detected AF in 18 (10.7%).

Monitoring in the AF group was 105.8 + 11.9 hours Vs. 85.2 + 3.2 in the non AF group (p = 0.042) and mean signal detected 75.7 + 10.6 hours Vs 59.2 + 2.6(p = 0.05).
Mean signal loss in the AF group was 28.7% + 15.9, median 31.4% Vs 29.5% + 20.8, median 26.2 (p = 0.8)
Conclusion: Longer duration of monitoring and signal detection significantly correlate with AF detection. Signal loss is comparable between the 2 groups and did not compromise AF detection in our in-house self - maintained system.

AS18-037

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PREDICTORS FOR IN-HOSPITAL DEATH OF PATIENTS WITH ACUTE ISCHAEMIC STROKE AND ATRIAL FIBRILLATION

S. Wu[1], Y. Cheng[1], R. Yuan[1], Y. Xiong[1], S. Zhang[1], B. Wu[1] and M. Liu[1]
[1]West China Hospital, Department of Neurology, Chengdu, China

Background and Aims: Anticoagulation benefits stroke patients with atrial fibrillation (AF); however, it is often delayed and underused in practice. To inform acute phase management, we aimed to identify patients with a high risk of death during hospitalisation.
Method: We consecutively included patients with ischaemic stroke and atrial fibrillation admitted to West China Hospital between January 2009 and November 2015. We observed in-hospital death or discharge as outcomes and compared the following factors between these two groups: age, sex, National Institute of Health Stroke Scale (NIHSS), proportions of valvular AF and complications (hypertension, diabetes, heart failure, prior major bleeding, renal or hepatic dysfunction), by ANOVA or odds ratio (ORs). Factors with $p < 0.05$ were included in logistic regression for predicting in-hospital death, where adjusted ORs and 95% confidence intervals (CIs) were calculated.
Results: Of 4245 patients with ischaemic stroke, 326 (7.7%) with AF were included (113 with valvular and 213 with non-valvular AF). Twenty-one (6.4%) patients died in hospital and 305 (93.6%) were discharged. In univariate analyses, age, NIHSS, renal dysfunction, and prior bleeding were significantly different between groups ($p < 0.05$). In logistic regression, NIHSS ≥ 9 (OR 13.4, 95% CI 1.7 to 104.8), prior bleeding (OR 7.7, 95% CI 1.9 to 30.7), renal dysfunction (OR 6.8, 95% CI 2.1 to 22.8), and age ≥ 75 (OR 3.5, 95% CI 1.1 to 11.4) were independent predictors for in-hospital death.
Conclusion: Patients with older age, higher NIHSS, bleeding history and/or abnormal renal function were more likely to die during hospitalisation. They may require more urgent and intensive clinical management upon admission.

AS18-039

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ATRIAL CARDIOPATHY IN PATIENTS WITH EMBOLIC STROKE OF UNKNOWN SOURCE

S. Jalini[1], R. Rajalingam[1], A.D. Javier[2], A. Woo[2] and A. Pikula[1]
[1]University Health Network- Toronto Western Hospital, Neurology, Toronto, Canada
[2]University Health Network- Toronto General Hospital, Cardiology, Toronto, Canada

Background and Aims: Embolic strokes of unknown source (ESUS) comprise majority of cryptogenic stroke patients. Despite lack of atrial fibrillation (AF) on prolonged cardiac monitoring, etiology remains likely cardiac in nature. Atrial cardiopathy (AC) is an emerging independent risk factor for stroke. We aimed to determine the prevalence of AC among ESUS patients.
Method: In our retrospective, case-control study, we reviewed charts of consecutive ESUS patients admitted to Toronto Western Hospital (from Oct-2011 to Dec-2015). AC was defined as severe left atrial enlargement (LAE) or P-wave terminal force in V1 (PTFV1) >5000 mV-ms; while cerebral microbleeds (CMBs) and white matter hyperintensities (WMH) were defined based on previously validated methods. We compare traditional risk factors and imaging findings between those with and without AC.
Results: Of 159 ESUS patients, 24.5% had presence of AC markers; 3.8% patients had severe LAE and 22.6% had PTFV1 >5000 mV-ms. Among 109 patients with GRE/SWI sequences, 27.5% had CMBs, 8% with >6 CMBs. Of 114 patients with FLAIR sequences; 79.8% had WMH; and 51.6% had moderate/severe WMHs. Of various clinical and imaging factors measured, AC patients were more likely to have diabetes (48.7% vs 25.8%, p = 0.008).
Conclusion: A significant portion of ESUS patients had markers suggestive of AC. Patients with AC had a higher incidence of diabetes, while both groups had comparable prevalence of CMBs and WMHs. Ongoing trials will answer if ESUS patients would benefit from anticoagulation, but defining population with concomitant presence of AC is critical, as this group could be at higher risk for recurrent strokes than those without AC.

AS18-040

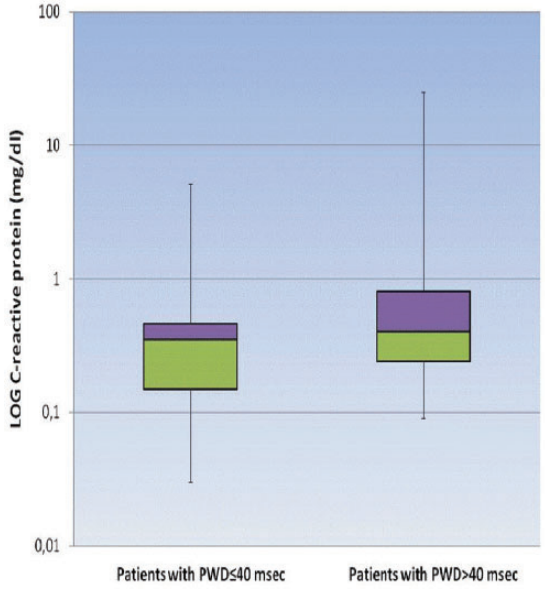
ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

P WAVE DISPERSION AS A RISK FACTOR FOR CARDIOEMBOLISM IN CRYPTOGENIC STROKE: THE ROLE OF INFLAMMATION

M. Acampa[1], P.E. Lazzerini[2], F. Guideri[3], R. Tassi[1], R. Valenti[1], G. Marotta[1], G. Lo Giudice[1], P. D'Andrea[1] and G. Martini[3]
[1]Stroke Unit, Department of Neurological and Sensorineural Sciences-Azienda Ospedaliera Universitaria Senese - "Santa Maria alle Scotte" General Hospital- Siena- Italy, Siena, Italy
[2]University of Siena, Department of Medical Sciences- Surgery and Neurosciences, Siena, Italy
[3]Stroke Unit, Department of Medical Sciences- Surgery and Neurosciences- University of Siena- Italy, Siena, Italy

Background and Aims: About one third of ischemic strokes are classified as cryptogenic. A silent atrial fibrillation (AF) may play a pathogenic role in these strokes and high P wave dispersion (PWD), representing a predictor of paroxysmal AF, may be an EKG marker of cardioembolism. Furthermore, current evidence links AF to inflammation: inflammatory indexes, such as high-sensitive C-reactive protein (hsCRP), have been related to the development and persistence of AF, contributing to the atrial remodeling. The aim of this study was to evaluate PWD and hsCRP in patients with cryptogenic stroke to highlight a possible role of inflammation in the atrial electrophysiological remodeling, that predisposes to AF.
Method: We enrolled 87 patients (54 males, 33 females; 68.51 ± 12.89 years) with cryptogenic ischemic stroke. All patients underwent neuroimaging examination, arterial ultrasound examination, echocardiography and EKG. PWD and hs-CRP were measured in all subjects.
Results: In patients with high PWD (>40 msec; n = 45), hsCRP was significantly higher than in patients with normal PWD (≤40 msec;

n = 42)(1.29 ± 2.5 vs 0.48 ± 0.61 mg/dl, p = 0.04; unpaired t test)(Figure 1).
Conclusion: Our results show increased hsCRP level in cryptogenic stroke patients with high PWD. These findings suggest a possible role of inflammation in the atrial remodeling providing a substrate for AF.



AS18-045

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

CARDIOVASCULAR PREDICTORS OF POOR SURVIVAL IN MCA ACUTE ISCHEMIC STROKE SUBMITTED TO THROMBOLYSIS

R.D. Ducci[1], R.H.D. Cirino[1], B.O. Erbano[1], M. Lange[1] and V. Zétola[1]
[1]Universidade Federal do Paraná, NEUROLOGY, Curitiba, Brazil

Background and Aims: Although it is known that heart disease is a major risk factor for ischemic stroke (IS), associated with increased mortality, few studies have evaluated cardiac factors such as echocardiogram variables as prognostic factors for this population. The aim of this study is to identify cardiovascular predictors of mortality in patients with first-ever IS in the middle cerebral artery (MCA) territory submitted to intravenous thrombolysis
Method: Cohort study with 145 consecutive patients with first-ever IS in the MCA territory who underwent IVT at the Hospital de Clínicas of the Federal University of Paraná between March 2010 and February 2015. All patients were investigated with electrocardiogram, transthoracic echocardiogram and Doppler ultrasound imaging of the carotid and vertebral arteries. The predictors of mortality were evaluated using adjusted Cox proportional-hazards regressions model and the Kaplan-Meier method.
Results: A total of 145 patients, mean age of 62.9 ± 12.4, 51.7% men, were follow-up for a median time of 26.6 months (0.4–58.6). At the end of the study, 36 patients (24.8%) had died. Regardless of age, door-to-needle time, hypertension, creatinine clearance, hypokinesia, akinesia, left atrium and cardio-aortic embolism stroke, multivariate analysis revealed that atrial fibrillation (AF) (HR = 5.13, CI95% 1.48–17.79, p = 0.010) and in-hospital pneumonia (HR = 3.00, CI95% 1.11–8.11, p = 0.030) were predictors of poor survival. There was a tendency to consider lower values of ejection fraction as predictor of unfavorable outcome (HR = 0.084, CI95% 0.90–1.01, p = 0.084).
Conclusion: Not only AF and pneumonia during hospitalization, but also lower rates of EF were associated with mortality in first-ever IS patients, in MCA territory, submitted to IVT.

AS18-046

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

VARIABLE COAGULATION TESTS IN STROKE PATIENTS WITH NONVALVULAR ATRIAL FIBRILLATION TAKING DIFFERENT NON-VITAMIN K ANTAGONIST ORAL ANTICOAGULATIONS: RIVAROXABAN VS. DABIGATRAN

J.M. Hong[1], J.S. Lee[1], S.E. Lee[1], S.J. Lee[1] and M.H. Choi[1]
[1]Ajou university school of medicine, Department of Neurology, Suwon, Republic of Korea

Background and Aims: In patients with non-valvular atrial fibrillation, vitamin K antagonist is rapidly switching to non-vitamin K antagonist oral anticoagulant (NOACs) for stroke prevention due to no INR monitoring and little dosage adjustments. Even in short-term administration of different types (factor Xa and direct thrombin inhibitors) of NOACs, it can lead to some alternations of individual anticoagulant activity. Therefore, we intended to explore routine coagulation tests and thromboelastography (TEG) in patients taking different types of NOAC.
Method: In out-patient clinic of a referral stroke center, subjects are eligible when a cardioembolic stroke patient with nonvalvular atrial fibrillation gave a consent for this study and when they were taking rivaroxaban or dabigatran for the past 3 months. We performed the routine coagulation tests including prothrombin time, activated partial thromboplastin time, and international normalized ratio, and standard (kaolin) TEG assays including reaction (R) time, angle, maximum amplitude (MA), and actual lysis percentage after 30 minutes (Ly30).
Results: A total of 91 subjects were classified into rivaroxaban (n = 50) and dabigatran groups (n = 41). Baseline characteristics and vascular risk factors were not different between the groups. Rivaroxaban group (vs. dabigatran group) had prolonged prothrombin time (p = 0.032) and higher value of international normalized ratio (p < 0.001). Dabigatran group (vs. rivaroxaban) had prolonged activated-partial thromboplastin time (p < 0.001), prolonged R time (p = 0.024) and decreased MA (P = 0.041). However, there was no difference values of angle and Ly30.
Conclusion: Our data suggest that different types of NOAC can differently influence routine coagulation tests and TEG findings.

AS18-047

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

THE RELEVANCE OF THE TRANSESOPHAGEAL ECHOCARDIOGRAPHY IN STROKE - FINDINGS OF A SINGLECENTRE CROSS-SECTIONAL STUDY

M. Schnieder[1], T. Siddiqui[1], A. Karch[2], M. Bähr[1], G. Hasenfuß[3], M. Schroeter[3] and J. Liman[1]
[1]University Medical Center, Neurology, Göttingen, Germany
[2]Helmholtz Centre for Infection Research- Braunschweig- Germany-German Center for Infection Research, Research group Epidemiological

and Statistical Methods ESME- Department of Epidemiology, Braunschweig, Germany
[3]University Medical Center, Cardiology, Göttingen, Germany

Background and Aims: There is growing evidence that most of the cryptogenic strokes are thromboembolic and often caused by an undetected atrial fibrillation (AF). Measured slow flow in the left atrial appendage (LAA) is thought to be an indicator for the thromboembolic risk and possibly associated with AF.
Regarding the cryptogenic stroke, the clinical of patent foramen ovale (PFO) with and without atrial septum aneurysm (ASA) in cryptogenic stroke remains uncertain and controversial.
Method: We evaluated 909 patients admitted with an ischemic stroke to our stroke unit who underwent TEE examination between 2012 and 2014. Baseline characteristics, CVRF, ECG monitoring data, relevant clinical parameters, the NIHSS, the localization of the stroke as well as TEE findings were collected and analyzed.
Results: Stroke severity in patients with a low flow in the LAA was significantly higher than in patients without LAA low flow (6.1 vs. 3.9; $p < 0.001$) and similar to patients with AF (7.61 vs. 6.11 $p = 0.058$). Already at a velocity below 60 cm/s we were able to document an abrupt increase in stroke severity assessed by NHISS.
Looking closer at the PFO, those patients had lower NIHSS value (4.1 vs. 5.3; $p = 0.017$) than corresponding patients without a PFO. Moreover, there was no significant difference in the NIHSS values of patients with a PFO alone or its combination with an ASA (4.3 vs. 3.8; $p = 0.602$).
Conclusion: Reduced flow velocity in the LAA could be a possible indicator for potential benefit of oral anticoagulation or at least prolonged rhythm monitoring for paroxysmal AF in these patients.

AS18-048

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PREVALENCE OF SILENT BRAIN INFARCTS IN PATIENTS WITH ATRIAL FIBRILLATION USING 3T-MRI: ASSOCIATED RISK FACTORS AND A PREDICTIVE MODEL

I. Escudero-Martínez[1], R. Ocete[2], A. Pilar[3], A. López-Rueda[4], Á. Vega[3], F. Mancha[3], P. Piñero[2], E. Fajardo[2], J.R. Fernández-Engo[5], A. Galvao[6], E. Zapata-Arriaza[1], L. Lebrato[1], J.A. Cabezas[1], B. Pardo[1], I. Ayuso[3], A. González[7], F. Moniche[1] and J. Montaner[8]
[1]Hospital Universitario Virgen del Rocío/Instituto de Biomedicina de Sevilla, Neurology, Seville, Spain
[2]Hospital Universitario Virgen del Rocío, Radiology, Seville, Spain
[3]Instituto de Biomedicina de Sevilla, Neurovascular Laboratory, Seville, Spain
[4]Hospital Clinic, Radiology, Barcelona, Spain
[5]Andalusian Healthcare Ministry, Informatics, Sevilla, Spain
[6]Universidad de Loyola, Neuropsychology Department, Sevilla, Spain
[7]Hospital Universitario Virgen del Rocío/Instituto de Biomedicina de Sevilla, Radiology, Seville, Spain
[8]Hospital Universitario Virgen Macarena/Instituto de Biomedicina de Sevilla, Neurology, Seville, Spain

Background and Aims: Silent brain infarcts (SBI) are a frequent finding on neuroimaging associated with higher risk of future stroke. Atrial Fibrillation (AF) has been previously identified as a cause of SBI. The aim of this study is to determine the prevalence of and risk factors for SBI in patients with AF and low to moderate embolic risk according to CHADS2 score.
Method: Patients with a history of AF who scored 0–1 in the CHADS2 score were selected from Seville urban area using the Andalusian electronic healthcare database (DIRAYA). A 3T brain MRI was performed to all participants >50 years and with absence of neurological symptoms. Demographic and clinical data were collected.
Results: 443 patients were included from May 2015 to June 2016. 66 patients (14.9%) presented SBI on the MRI. After logistic regression analysis, age ≥ 62.5 years (OR 3.84, 95% CI 1.07–13.75, $p = 0.039$) and left atrium enlargement ≥40 mm (OR 3.13, 95% CI 1.15–8-55, $p = 0.026$) were independent risk factors for SBI. ROC analysis showed AUC value of 0.75 (95% CI 0.63–0.86). The group of patients ≥62.5 years with left atrium enlargement had huge rates of SBI (30.6%).
Conclusion: Age (≥62.5 years) and left atrial enlargement (≥40 mm) on echocardiogram were associated with SBI in patients with AF and low or moderate embolic risk according to CHADS2 score. That group might benefit from a neuroimaging screening to be offered anticoagulation therapies in order to improve stroke prevention.

AS18-049

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

AF DETECTION FROM THE ACUTE PHASE OF STROKE WITH NEWLY TEXTILE WEARABLE HOLTER IN THE CRYPTO-AF REGISTRY

J. Pagola[1], J. Juega[1], J. Francisco[2], A. Moya[2], A. Bustamante[3], A. Peñalba[3], M. Usero[4], E. Cortijo[4], J.F. Arenillas[4], J. Rubio[5], I. Escudero-Martinez[6], F. Mancha Molina[6], F. Moniche[6], R. de Torres[6], S. Eichau[6], A. Vega[6], A. Pedrote[7], E. Arana-Rueda[7], J. Montaner[6] and C. Molina[1]
[1]Vall d'Hebrón hospital, Stroke Unit, Barcelona, Spain
[2]Vall d'Hebrón hospital, Arrhythmia Unit, Barcelona, Spain
[3]Vall dHebrón Research Institute, Neurovascular Research Lab, Barcelona, Spain
[4]Valladolid Hospital, Stroke Unit, Valladolid, Spain
[5]Valladolid Hospital, Arrthymia Unit, Valladolid, Spain
[6]Macarena-Virgen del Rocio Hospitals, Stroke Unit, Sevilla, Spain
[7]Macarena-Virgen del Rocio Hospitals, Arrthymia Unit, Sevilla, Spain

Background and Aims: Crypto-AF is an ongoing prospective multicenter registry designed to describe innovative surrogate markers of cover AF in cryptogenic stroke.
Method: We performed a continuous early (0–72 h) and prolonged (4 weeks) monitoring with a Textile Wearable Holter (TWH) from the acute stroke phase. We assessed monitoring compliance, level of comfortability by a graded scale (1 to 5 points) and skin lesions by TWH. We compared our protocol ($n = 76$) with a non-continuous ambulatory monitoring (RC group, $n = 76$) performed by external loop recorder (ELR). Two subjects underwent TWH, ELR and 24 hours Holter simultaneously in order to compare the validity of the techniques.
Results: The global rate of AF detection with TWH was 20% (26/130). The global time compliance was 87% of the time expected (559/640 hours). The level of comfortability was high: 5 points (IQR 4–5). We detected reversible skin lesions in 5.2% ($n = 4$). The correlation among techniques (24-h Holter, TWH and ELR) was good ($k = 1$). Within the first two weeks from stroke onset, the cumulative percentage of AF detection was 3-fold higher in TWH group [TWH 20.8% vs. RC group 6.7%]. We had missed one third of detections in TWH group if the patients wouldńt have been monitored the first two weeks after stroke.
Conclusion: Early and continuous TWH monitoring comprised high rate of AF detection from the acute phase of the stroke.

AS18-050

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

MEDITERRANEAN DIET AND PHYSICAL ACTIVITY PROTECT FROM SILENT BRAIN INFARCTS IN A COHORT OF PATIENTS WITH ATRIAL FIBRILLATION

I. Escudero-Martínez[1], Á. Vega[2], F. Mancha[2], I. Ayuso[2], P. Algaba[2], L. Lebrato[1], R. Ocete[3], A. López-Rueda[4], P. Piñero[3], E. Fajardo[3], J.R. Fernández-Engo[5], A. Galvao[6], E. Zapata-Arriaza[1], J.A. Cabezas[1], B. Pardo[1], A. González[7], F. Moniche[1] and J. Montaner[8]

[1]Hospital Universitario Virgen del Rocío/Instituto de Biomedicina de Sevilla, Neurology, Seville, Spain
[2]Instituto de Biomedicina de Sevilla, Neurovascular Laboratory, Seville, Spain
[3]Hospital Universitario Virgen del Rocío, Radiology, Seville, Spain
[4]Hospital Clínic, Radiology, Barcelona, Spain
[5]Andalusian Healthcare Ministry, Informatics, Seville, Spain
[6]Universidad de Loyola, Neuropsychology Department, Seville, Spain
[7]Hospital Universitario Virgen del Rocío/Instituto de Biomedicina de Sevilla, Radiology, Seville, Spain
[8]Hospital Universitario Virgen Macarena/Instituto de Biomedicina de Sevilla, Neurology, Seville, Spain

Background and Aims: Silent brain infarcts (SBI) are a frequent finding on neuroimaging associated with higher risk of future stroke and cognitive decline. Atrial Fibrillation (AF) has been previously identified as a cause of SBI. We hypothesized that a healthy lifestyle would reduce the rate of SBI among AF patients.
Method: Patients with a history of AF who scored 0–1 in the CHADS2 score were selected from Seville urban area using the Andalusian electronic healthcare database (DIRAYA). A 3T brain MRI was performed to all participants >50 years and with absence of neurological symptoms. Demographic and clinical data and 2 specific self-administered questionnaires (adherence to Mediterranean Diet from PREDIMED Study and IPAQ for physical activity) were collected.
Results: 443 patients were included from May 2015 to June 2016. 66 patients (14.9%) showed SBI in the MRI. After logistic regression analysis including vascular risk factors, age $\geq$ 62.5 years was an independent predictor of SBI (OR 3.47, 95% CI 1.72–6.97, $p < 0.001$) and the combination of a moderate/high Mediterranean diet adherence (score $\geq$ 8 in the adherence questionnaire) plus high level of physical activity ($\geq$3000 METS per week) was independently associated with a lower risk of SBI (OR 0.49, 95% CI 0.24–0.98, $p = 0.046$). Patients $\geq$62.5 years with low adherence to Mediterranean diet plus low/moderate level of physical activity had huge rates of SBI (22.8%).
Conclusion: Our findings suggest that a healthy lifestyle and Mediterranean diet may be recommended for the prevention of SBI and stroke in patients with AF, especially among the elders.

AS18-051

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

UNRECOGNIZED HISTORY OF TRANSIENT ATRIAL FIBRILLATION INCREASED ONE-YEAR RECURRENT STROKE RISKS AMONG ISCHEMIC STROKE PATIENTS

M. Lee[1], H. Kamel[2], Y.L. Wu[3], J.D. Lee[4], B. Ovbiagele[5] and D. Singer[6]

[1]Chang Gung University and Memorial Hospital, Neurology, Puzi, Taiwan R.O.C.
[2]Weill Cornell Medical College, Neurology, New York, USA
[3]Chang Gung University, Research Services Center for Health Information, Taoyuan, Taiwan R.O.C.
[4]Chang Gung University and Memorial Hospital, Neurolgy, Puzi, Taiwan R.O.C.
[5]Medical University of South Carolina, Neurology, Charleston, USA
[6]Harvard Medical School, Medicine, Boston, USA

Background and Aims: History of transient atrial fibrillation (AF) may be unrecognized during ischemic stroke. Our aim was to determine whether an unrecognized history of AF increased the 1-year recurrent stroke risk among ischemic stroke patients without AF identified at discharge.
Method: We conducted a cohort study by identifying all surviving hospitalized patients ($\geq$20 years) with a primary diagnosis of ischemic stroke but not having AF identified in discharge records between 2001 and 2012 from the Taiwan National Health Insurance Research Database. Patients were categorized in 2 groups: unrecognized AF and no AF. Patients with unrecognized AF were defined as having AF during the hospitalization or twice at outpatient clinics before index stroke. Analyses were conducted based on original cohort and propensity score matching. The primary endpoint was recurrent stroke within 1 year after the index stroke. Cox's proportional hazards regression was used to estimate the hazard ratios (HR) and 95% confidence intervals (CI) in the group who had an unrecognized history of transient AF, with the group who had no AF history as the reference.
Results: Baseline characteristics of patients without AF vs. with unrecognized AF were presented in Table 1. During the 1-year follow-up period, ischemic stroke patients with an unrecognized history of AF had higher risks of recurrent stroke both in an original cohort (HR 1.37, 95% CI 1.27 to 1.47) and propensity score matching (HR 1.45, 95% CI 1.33 to 1.59) (Table 2).

Table 1 Characteristics at Baseline and Outcomes

	Original			Matched		
Demographic characteristic	Unrecognized AF (N=8,912)	No AF (N=230,089)	P value	Unrecognized AF (N=8,906)	No AF (N=17,812)	P value
Men, n (%)	4662 (52.3)	137359 (59.7)	<0.001	4660 (52.3)	9345 (52.5)	0.8286
Age, y, mean ±SD	77.3±9.6	68.3±12.7	<0.001	77.3±9.6	77.6±9.3	0.017
Comorbidity, n (%)						
Hypertension	8014 (89.9)	186697 (81.1)	<0.001	16158 (90.7)	8008 (89.9)	0.0366
Diabetes	4072 (45.7)	102592 (44.6)	0.0398	4072 (45.7)	8144 (45.7)	1.0000
Hyperlipidemia	3453 (38.8)	103942 (45.2)	<0.001	3453 (38.8)	6954 (39.0)	0.6702
Ischemic Heart Disease	6342 (71.2)	72510 (31.5)	<0.001	6336 (71.1)	13001 (73.0)	0.0015
Prior Stroke/TIA	2970 (33.3)	48404 (21.0)	<0.001	2967 (33.3)	6138 (34.5)	0.0626
Chronic Kidney Disease	1234 (13.9)	15363 (6.7)	<0.001	1231 (13.8)	2250 (12.6)	0.0064
Heart failure	4501 (50.5)	23459 (10.2)	<0.001	4495 (50.5)	8649 (48.6)	0.0032
Chronic obstructive pulmonary disease	3606 (40.5)	45958 (20.0)	<0.001	3600 (40.4)	7227 (40.6)	0.8119
Peripheral vascular disease	302 (3.4)	5166 (2.3)	<0.001	301 (3.4)	515 (2.9)	0.0287
Sleep apnea	28 (0.3)	586 (0.3)	0.2763	28 (0.3)	44 (0.3)	0.3167
SSI			<0.001			0.7479
Mild	5115 (57.4)	177724 (77.2)		5115 (57.4)	10314 (57.9)	
Moderate	1467 (16.5)	30055 (13.1)		1467 (16.5)	2916 (16.4)	
Severe	2330 (26.1)	22310 (9.7)		2324 (26.1)	4582 (25.7)	
Oral anticoagulant before index stroke	1260 (14.1)	2498 (1.1)	<0.001	1260 (14.2)	423 (2.4)	<0.001

*SSI: Stroke Severity Index; Oral anticoagulant included Warfarin, Dabigatran, Rivaroxaban, Apixaban

Table 2 Multivariate-adjusted Hazard Ratio of One-Year Recurrent Stroke (Unrecognized AF vs No AF)

Original Cohort					
	Unrecognized AF (N=8912)	No AF (N=230089)	Crude ratio (95% CI)	Adjusted HR (95%CI)	P value
Recurrent stroke, n (%)	797 (8.9)	15770 (6.9)	1.47 (1.37-1.58)	1.37 (1.27-1.47)	<0.001
Secondary Outcome, n (%)					
Ischemic stroke	727 (8.2)	14234 (6.2)	1.48 (1.37-1.59)	1.38 (1.27-1.49)	<0.001
ICH	70 (0.8)	1536 (0.7)	1.32 (1.04-1.68)	1.24 (0.96-1.59)	0.0446
AF documented within 1 year after index stroke	3120 (35.0)	5236 (2.3)	21.22 (20.29-22.18)	10.92 (10.36-11.50)	<0.001
Propensity Score matched Cohort					
	Unrecognized AF (N=8906)	No AF (N=17812)	Crude ratio (95% CI)	Adjusted HR (95%CI)	P value
Recurrent stroke, n (%)	797 (9.0)	1162 (6.5)	1.45 (1.32-1.58)	1.45 (1.33-1.59)	<0.001
Secondary Outcome, n (%)					
Ischemic stroke	727 (8.2)	1040 (5.8)	1.47 (1.34-1.62)	1.48 (1.34-1.62)	<0.001
ICH	70 (0.8)	122 (0.7)	1.20 (0.89-1.60)	1.20 (0.89-1.60)	0.2339
AF documented within 1 year after index stroke	3118 (35.0)	916 (5.1)	8.61 (8.00-9.27)	8.67 (8.05-9.33)	<0.001

Model was adjusted for age, sex, hypertension, diabetes, hyperlipidemia, ischemic heart disease, prior stroke, chronic kidney disease, heart failure, chronic obstructive pulmonary disease, peripheral vascular disease, sleep apnea and stroke severity index.

Conclusion: An unrecognized history of AF was associated with higher risks of recurrent stroke among ischemic stroke patients.

AS18-052

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

OPPORTUNISTIC DETECTION OF ATRIAL FIBRILLATION IN PRIMARY CARE: A MIXED METHODS EVALUATION OF THE INTRODUCTION OF NEW HEALTHCARE TECHNOLOGY

J. Gibson[1], M. Hanjari[1], C. Watkins[1] and U. Chauhan[2]
[1]University of Central Lancashire, School of Nursing, Preston, United Kingdom
[2]NHS East Lancashire, NHS East Lancashire Clinical Commissioning Group, Nelson, United Kingdom

Background and Aims: Many people with atrial fibrillation (AF) are undiagnosed. National UK guidance recommends pulse checks for AF during routine patient contact, but this is underperformed. We evaluated the introduction of opportunistic AF detection using a handheld ECG device (MyDiagnostick) in primary care.
Method: Devices and access to manufacturer's training and information were provided to nurses and health care assistants (HCA) in 5 general practices and one community nursing team in North West England. Patient eligibility: aged 65 or over; did not have an existing AF diagnosis; attending a practice nurse or HCA clinic; not receiving end-of-life care. Uptake and outcomes of MyDiagnostick testing were monitored for three months. Patient acceptability was evaluated using self-completed questionnaires. Staff views were evaluated via qualitative interviews based on Normalisation Process Theory.
Results: 5/6 sites completed the pilot between July-December 2016; one is due to complete February 2017. 26/445 responders (5.6%) had a positive result, requiring further assessment. Patients' views were overwhelmingly positive; suggested improvements were: more time to decide about the test and clearer explanation of results. To date, interviews have been conducted with 7 staff. Preliminary findings suggest that although the opportunity to detect and treat AF was valued, challenges such as technical problems, documentation and referral, and management of workload, needed to be overcome.
Conclusion: The introduction of medical devices to facilitate opportunistic detection of AF in primary care is well-received by patients, but needs planning and support to enable staff to incorporate testing into routine practice and to provide appropriate patient information and support.

AS18-054

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ADMINISTRATION OF ANTICOAGULANTS IN STROKE PATIENTS WITH ATRIAL FIBRILLATION BEFORE AND AFTER INTRODUCTION OF NEW ORAL ANTICOAGULANTS

C. Gronemann[1], A. Oldag[1], A. Breja[1], S. Schreiber[1], H.J. Heinze[1] and M. Goertler[1]
[1]Otto-von-Guericke University Magdeburg, Department of Neurology, Magdeburg, Germany

Background and Aims: To investigate whether the introduction of new oral anticoagulants (NOAC) in 09/2011 changed prescription and recommendation of antithrombotic secondary prevention in acute stroke patients with atrial fibrillation (AF) at an university stroke center.
Method: Between 07/2008 and 07/2015 4549 consecutive patients were admitted with an acute transient ischemic attack or ischemic stroke. Diagnostic evaluation of stroke etiology included CT/MRI, CT-/MR-angiography, extracranial and transcranial duplex sonography, echocardiography and 24 to 72 hour Holter monitoring. In patients with known or newly diagnosed AF doctor's letters were analyzed for recommended and administered antithrombotic secondary prevention.
Results: In 1150 patients (25.3 % of all; 45.8 % men, mean age 76.1 years, SD 9.6 years) AF was diagnosed as the cause of stroke. Percentage of patients with cardioembolic stroke was similar before (413; 24.3 %) and after introduction of NOAC (737; 25.9 %). At discharge from hospital, percentage of patients on anticoagulants differed significantly ($p < 0.001$; chi-square test) between the pre-NOAC period (121; 29.3 %) and the post-NOAC period (343; 47.2 %). In doctor's letters anticoagulation was recommended in 204 patients (68.9 %) before and 623 (92.0 %) after NOAC introduction ($p < 0.001$; chi-square test). This difference was significant also after correcting for age, stroke severity, and CHA_2DS_2-VASc score.
Conclusion: Introduction of NOAC was associated with a significant increase of prescription and administration of anticoagulants in hospitalized patients with an acute stroke and accompanying atrial fibrillation.

AS18-056

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PHARMACOLOGICAL CARDIOVERSION IN ATRIAL FIBRILLATION OF RECENT ONSET IN ACUTE ISCHEMIC STROKE PATIENTS

A. Zini[1], E. Iori[1], S. Mimmi[2], G. Bigliardi[1], L. Vandelli[1], L. Picchetto[1], M.L. Dell'Acqua[1], F. Rosafio[1], D. Laterza[1], S. Maffei[1] and P. Nichelli[1]
[1]Nuovo Ospedale Civile Sant'Agostino Estense, Dept. of Neuroscience-University Hospital of Modena, Modena, Italy
[2]Local Health Unit, AUSL Modena, Modena, Italy

Background and Aims: No data are available in literature in acute ischemic stroke patients with recent-onset atrial fibrillation (AF) if it is better to follow strategies of rhythm or rate control therapies or about efficacy and safety of early pharmacological cardioversion (PC).
Method: a retrospective study analyzed the management of recent-onset AF in acute ischemic stroke patients admitted in Stroke Unit (2007–2015). We collected baseline demographic and clinical features, details about AF episodes and type of treatment. The choice of treatment was freely made by cardiologists. As outcome measures we collected recurrences of stroke and recurrences of AF at 7 and 90days.
Results: 139 patients were included in analysis. 95 patients (68.4%) received PC. 44 patients (31.6%) received rate control therapy. No statistical differences in demographic and clinical features were found between two groups. Restoration to sinus rhythm during hospitalization happened in 85.3% in PC group and 63.6% in rate control group ($p = 0.008$), 66.3% and 43.2% at 24 h, respectively ($p = 0.099$). Recurrence of AF was 45.7% and 39.3% at 7days, and 50.6% and 42.9% at 90days ($p = ns$).
Recurrence of stroke at 7 days was 1.1% in PC group and 4.5% ($p = ns$) in rate control group, at 90 days 3.2% and 6.8% respectively ($p = ns$). Logistic regression analysis confirmed no association of cardioversion with recurrence of stroke at 90days (OR = 0.025, $p = 0.95$), whereas atherosclerotic stroke was significately associated (OR 10.1, $p = 0.01$).
Conclusion: PC seems to be effective and safe in recent-onset AF in acute ischemic stroke patients. Further studies with larger cohort and standardized protocol are needed to confirm these preliminary data.

AS18-058

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

TIMING OF TREATMENT INITIATION OF DABIGATRAN (PRADAXA) IN NON-VALVULAR ATRIAL FIBRILLATION PATIENTS WITH ACUTE ISCHEMIC STROKE: AN ANALYSIS FROM THE SITS REGISTRY DATA

N. Ahmed[1], C. Teutsch[2], M. Mazya[3], A. Tomek[4], Z. Gdovinova[5], V. Caso[6], D. Toni[7] and N. Wahlgren[8]
[1]Stockholm, Sweden
[2]Boehringer Ingelheim Pharma GmbH & Co. KG, Medical Department-TA Cardiology and Metabolics-, Ingelheim, Germany
[3]Department of Neurology & Department of Clinical Neuroscience, Karolinska University Hospital & Karolinska Institutet, Stockholm, Sweden
[4]Charles University- Motol University Hospital, Department of Neurology- 2nd Faculty of Medicine, Prague, Czech Republic
[5]PJ. Safarik University Košice, Department of Neurology- Faculty of Medicine, Košice, Slovak Republic
[6]Santa Maria della Misericordia, Stroke Unit- University of Perugia, Perugia, Italy
[7]Policlinico Umberto I- Rome, La Sapienza- Neurology and Psichiatry, Rome, Italy
[8]Karolinska Institutet, Department of Clinical Neuroscience, Stockholm, Sweden

Background and Aims: Dabigatran is the first non-VKA oral anticoagulant (NOAC) for stroke prevention in non-valvular atrial fibrillation (NVAF) patients and its benefit has been assessed in clinical trials and confirmed by clinical practice data. However, time ranges of dabigatran initiation after acute ischemic stroke have not yet been established. We aim to evaluate timing and clinical outcome of dabigatran treatment initiation for secondary prevention in NVAF patients after hospitalization for an acute ischemic stroke or TIA.
Method: The SITS international registry has implemented extended data entry for AF and OAC since June 2014. Data on NVAF patients and first ischemic stroke or TIA who received dabigatran (approximately > 600) from all European countries between July 2014 and March 2017 and registered in SITS will be analysed. Descriptive statistics for baseline and demographic characteristics for patients treated with dabigatran within 3 months of index event will be described and outcome (recurrent stroke, ICH, death) event rates and corresponding 95% confidence intervals reported.
Results: We will describe the timing of dabigatran initiation for secondary prevention of stroke when treatment is initiated within 3 months post stroke. Furthermore, we will describe the factors important for physician's decision when to initiate dabigatran in the post stroke setting and clinical outcomes at 3 months after the index event.
Conclusion: This will be one of the largest cohorts describing the use of dabigatran in NVAF patients after acute ischemic stroke in clinical practice. The results will provide important insights into the use of dabigatran in the post stroke setting.

AS18-059

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DETECTION RATE OF INSERTABLE CARDIAC MONITORS IS NOT INFLUENCED BY EMBOLIC PATTERN IN NEURORADIOLOGICAL IMAGING

A. Prakapenia[1], L.P. Pallesen[1], J. Mayer[2], J. Barlinn[1], K. Barlinn[1], T. Siepmann[1], C. Piorkowski[2] and V. Puetz[1]
[1]University Hospital/TU-Dresden, Neurology, Dresden, Germany
[2]Heart Center Dresden, Cardiology, Dresden, Germany

Background and Aims: In the CRYSTAL-AF study, insertable cardiac monitors (ICM) have shown intermittent atrial fibrillation (AF) at 1 year in up to 12.4% of patients with stroke of unknown cause. We analyzed whether distinct embolic patterns on neuroradiological imaging were associated with AF detection rate and may therefore facilitate the selection of patients for implantation of ICM.
Method: From 01/2014 to 12/2016 all consecutive stroke patients from our tertiary stroke center who received an ICM were prospectively included and detailed data regarding baseline characteristics, treatment modalities and time of AF diagnosis were recorded. We analyzed CT and MRI images for evidence of single lesion (SL) in one vascular territory (anterior or posterior circulation), scattered lesions (SCL) in one vascular territory or multiple lesions (ML) in two or more vascular territories.
Results: Of 137 patients with implantation of ICM, complete clinical and imaging data data were available for 65 (47%) patients. Among these, intermittent AF was detected in 13 (20%) patients after a mean period of 57 days. Comparing patients without vs. patients with AF detection, 16/52 patients (34%) vs. 9/13 patients (69%) had SL, 18/52 (38%) vs. 3/13 (23%)

had SCL and 13/52 (28%) vs. 1/13 (8%) had ML (Fisher-Freeman-Halton-test $p = 0.094$)

Conclusion: In our study patients with stroke of unknown source who received an ICM, the distribution of distinct embolic patterns on neuroradiological imaging was not associated with the detection of intermittent AF. Our data suggests that the decision for implantation of ICM should primarily be made clinically.

AS18-060

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

RELEVANCE BETWEEN HYPERTROPHIC CARDIOMYOPATHY AND LEFT ATRIAL APPENDAGE THROMBUS IN DIRECT ORAL ANTICOAGULANT THERAPY

K. Minami[1] and K. Kumagai[1]
[1]Gunma Cardiovascular Center, Cardology, Maebashi, Japan

Background and Aims: [Background] Anticoagulation therapy is necessary to prevent stroke and systemic embolization in patients with atrial fibrillation (AF). Currently direct oral anticoagulant (DOAC) have shown similar efficacy and safety compared to warfarin. But even if taking DOAC strictly and correctly, detecting the left atrial appendage thrombus (LAAT) by transesophageal echocardiogram (TEE) was reported occasionally. However there are only isolated reports describing the relevance between LAAT and DOAC.

[Objective] The purpose of this study was to investigate the effectiveness and ineffectiveness of DOAC for non-valvular AF patients.

Method: [Methods] We retrospectively enrolled 3616 patients with non-valvular AF (44% persistent) who underwent TEE to detect LAAT 24 hours before catheter ablation or electrical cardioversion in our institution from May 2010 to December 2016.

Results: [Results] Among the 3616 patients, warfarin therapy was observed in 1491 patients and 2125 patients took DOAC for anticoagulation. 30(2.0%) patients of 1491 were detected LAAT by TEE in warfarin therapy, but only 5(0,23%) patients of 2129 were detected LAAT in DOAC therapy. ($P < 0.01$). 5 patients who were detected LAAT despite taking DOAC were all hypertrophic cardiomyopathy (HCM).

Conclusion: [Conclusion] Non-valvular AF patients with hypertrophic cardiomyopathy may have a potential risk of LAAT even though taking DOAC correctly.

AS18-062

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

SEASONALITY IN ISCHEMIC STROKE SUBTYPE : IS CARDIOEMBOLIC STROKE MORE COMMON IN WINTER?

Y.J. Cho[1], K.S. Hong[1], J.M. Park[2], K. Kang[2], K.B. Lee[3], T.H. Park[4], S.J. Lee[5], J.G. Kim[5], J. Lee[6], J.K. Cha[7], D.H. Kim[7], H.W. Nah[7], J.S. Lee[8], J. Lee[9] and H.J. Bae[10]
[1]Ilsan Paik Hospital Inje University, Neurolgy, Goyang, Republic of Korea
[2]Nowon Eulji Medical Center- Eulji University, Neurology, Seoul, Republic of Korea
[3]Soonchunhyang University Hospital, Neurology, Seoul, Republic of Korea
[4]Seoul Medical Center, Neurology, Seoul, Republic of Korea
[5]Eulji University Hospital, Neurology, Daejeon, Republic of Korea
[6]Yeungnam University Hospital, Neurology, Daegu, Republic of Korea
[7]Dong-A University Hospital, Neurology, Busan, Republic of Korea
[8]Asan Medical Center, Clinical Research Center, Seoul, Republic of Korea
[9]Korea University College of Medicine, Biostatistics, Seoul, Republic of Korea
[10]Seoul National University Bundang Hospital, Neurology, Sungnam, Republic of Korea

Background and Aims: Several studies have suggested a link between ischemic stroke and season. The aim of our study was to examine ischemic stroke subtype and clinical characteristics with seasonality.

Method: All consecutive patients, who admitted via emergency room of 8 tertiary hospitals from 2008/06 to 2015/05, for 7 years, were identified based on a prospective stroke registry. All patients were presented within 7 days from onset and had relevant ischemic lesions on brain imaging. We excluded patients with TIA and a history of previous stroke. Ischemic stroke subtype by TOAST classification, age, sex, initial NIHSS, and common risk factors including atrial fibrillation were identified. We categorized stroke onset date according to 4 seasons, such as spring (Mar to May), summer (Jun to Aug), fall (Sep to Nov), and winter (Dec to Feb).

Results: Among 17639 patients included, 4506 (25.5%) in spring, 4383 (24.9%) in summer, 4412 (25.0%) in fall, and 4338 (24.6%) in winter, mean age were 67.2, 66.5, 67.1, and 67.5, male were 58.3%, 59.1%, 58.2%, and 57.2%, respectively. Proportion of cardioembolic stroke was highest in winter (24.2%) compared to spring (22.8%), fall (20.3%) and summer (19.9%) ($p < 0.0001$, chisq), initial NIHSS (mean $\pm$ SD) were 6.4 ± 6.6, 5.9 ± 6.3, 6.0 ± 6.3, and 5.7 ± 6.1 ($p < 0.0001$, ANOVA), patients with newly-diagnosed-atrial fibrillation were 12.4%, 10.9%, 10.0%, and 9.7% ($p = 0.0002$, chisq), and average temperature (°C) in Seoul, Korea were -1, 12, 15, and 24, respectively.

Conclusion: Cardioembolic stroke and severe stroke were observed more common in winter. These seasonality might be linked to the higher rate of newly diagnosed atrial fibrillation in winter.

AS18-064

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PREDICTIVE VALUE OF TIME IN THERAPEUTIC RANGE (TTR) OVER THE RISK OF INTRACRANIAL HEMORRHAGE (ICH) IN PATIENTS ANTICOAGULATED WITH VITAMIN K ANTAGONISTS (VKA)

C. Estevez-Fraga[1], M. Molina-Sanchez[2], R. Alvarez-Velasco[3], E. Viedma-Guiard[3], P. Aguero-Rabes[4], A. De Alboniga-Chindurga[3], L. Crespo-Araico[3], C. Matute-Lozano[3], A. De Felipe-Mimbrera[3], A. Cruz-Culebras[3], R. Vera-Lechuga[3] and J. Masjuan Vallejo[3]
[1]Hospital Universitario Ramon y Cajal, Neurology, Madrid, Spain
[2]Hospital Principe de Asturias, Neurology, Madrid, Spain
[3]Hospital Ramon y Cajal, Neurology, Madrid, Spain
[4]Hospital Ramon y Cajal, Neurology, Neurology, Spain

Background and Aims: To determine the quality of anticoagulation in the previous six months, in patients treated with vitamin K antagonists (VKA) that presented with an intracranial haemorrhage (ICH).

Method: Prospective registry of patients treated with VKA admitted in our Stroke Unit due to ICH between 2013–2015. INRs were retrospectively collected during the six previous months in order to determine time in therapeutic range (TTR).

Results: 50 patients were included. Mean age was 79 years. 48 % were women. 46 had non valvular atrial fibrillation and 4 mechanic prosthetic valves. ICH were deep in 44%, lobar in 26 %, extensive parenchymal in 20 % and in brainstem in 10 %. Median NIHSS on admission was 10. Mean INR on admission was 2.8. 36% presented supratherapeutic INR on admission. TRT was 67 %. Time over range and time below range were both 17%.

8/21 patients haematoma expansion was confirmed. Aggresive therapeutical interventions were discarded upon admission in 30%. In 60 % anticoagulation was reversed. Three patients underwent surgery.
After 3 months only 30 % were independent (mRS: 0–2) and mortality was 57 %.
Conclusion: Patients who presented with VKA-ICH were correctly anticoagulated during the six previous months.

AS18-065

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

DIAGNOSTIC YIELD OF A STRUCTURED CARDIAC MONITORING PROTOCOL AFTER ISCHEMIC STROKE OR TRANSIENT ISCHEMIC ATTACK

B. van der Veen[1], F.J. Rovers[1], C.E.P. van Munster[1], S.M. van Schaik[1] and R.M. van den Berg - Vos[1]
[1]OLVG West, Neurology, Amsterdam, The Netherlands

Background and Aims: Detecting atrial fibrillation (AF) in patients with ischemic stroke or transient ischemic attack (TIA) is of great clinical importance. Not all data obtained from noninvasive cardiac monitoring during stroke unit admission are being used effectively in clinical practice. The aim of this study is to investigate the yield of using a structured analysis protocol in detecting AF.
Method: We performed a single-center before-after study in patients with ischemic stroke or TIA admitted at the stroke unit of OLVG West hospital, Amsterdam, The Netherlands. A standard method of noninvasive cardiac monitoring was compared with an updated method using a protocol in which several automated alarms and a structured analysis were introduced. Data were collected from April 2015 to April 2016. The primary outcome was the newly diagnosed AF detection rate before and after introducing the new protocol, secondary outcome was protocol adherence.
Results: A total of 345 patients were included, with a mean $\pm$ SD age of 71.3 ± 13.1 years. AF was detected in 16/174 patients (9.2%) using the standard method, compared with 16/171 patients (9.3%) using the structured analysis protocol ($p = 1.00$). Separate analysis by protocol adherence showed AF detection in 9/137 patients (6,6%) using the standard method, compared with 23/208 patients (11,1%) with partially or completely followed protocol ($p = 0.19$).
Conclusion: No significant increase in AF detection rate was observed after introducing a structured analysis protocol of noninvasive cardiac monitoring in patients with ischemic stroke or TIA. Further studies are needed to investigate whether optimal protocol adherence leads to a higher detection rate.

AS18-066

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

PREDICTORS OF ARRHYTMIC LOAD IN PATIENTS WITH CRYPTOGENIC STROKE AND COVERT ATRIAL FIBRILLATION DETECTED BY IMPLANTABLE LOOP RECORDERS

M. de Lera[1], L.R. Bulnes[2], E. Cortijo[1], S. Bombín[2], A.I. Calleja[1], E. García-Morán[2], E. Rojo[1], M. Sandín[2], L. López-Mesonero[3], P. García-Bermejo[1], M. Usero[1], O. Ortega[1], L. Blanco[1], A. Juanatey[1], L. Bautista[1], J. Rubio[2] and J.F. Arenillas[1]
[1]Hospital Clínico Universitario de Valladolid, Neurology, Valladolid, Spain
[2]Hospital Clínico Universitario de Valladolid, Cardiology, Valladolid, Spain
[3]Hospital Universitario de Salamanca, Neurology, Salamanca, Spain

Background and Aims: Implantable loop recorders (ILR) may allow detection of covert paroxysmal atrial fibrillation (cpAF) in patients with embolic strokes of undetermined source (ESUS). Arrhythmic load (AL) may serve as better indicator of AF-related recurrence risk than a single AF episode. We aimed to identify predictors of a higher AL in ESUS patients with cpAF detected by ILR.
Method: ILR were implanted in consecutive ischemic stroke patients fulfilling ESUS criteria after a complete diagnostic work-up. Real-time ILR-derived information was stored online. After false positive episodes were discarded by cardiological review, number and duration of all confirmed > 2 min FA episodes were calculated. AL was defined as the % time spent on confirmed AF during follow-up. The predictive value of baseline variables (clinical, neuroimaging and cardiac parameters including precocity and duration of first AF detected episode) was analysed. Minimum follow-up time was one year.
Results: Between January 2013 and December 2015, we included 117 ESUS patients (mean age 65 years, 73% men) who were followed-up during 12.5 months. Confirmed cpAF episodes were detected in 28 (24%) patients. Median AL was 0.33 [0.001–60.24]. We found positive correlations between AL and: age, shorter time from implant to first AF episode, and duration of first AF episode. Adjusted logistic regression model revealed that both a higher duration of first AF episode ($p = 0.049$) and a shorter time to first episode detection predicted a higher AL ($p = 0.004$).
Conclusion: A more praecox and longer first cpAF episode detected by ILR in ESUS patients may predict a higher arrhythmic load.

AS18-067

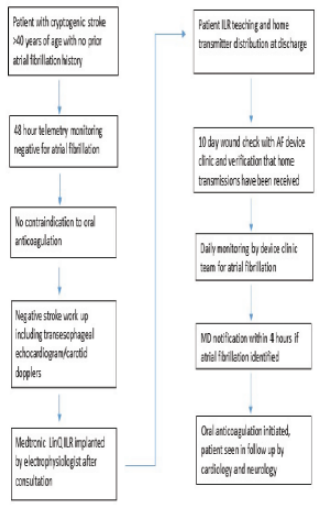
ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

SURVEILLANCE FOR ATRIAL FIBRILLATION IN PATIENTS WITH CRYPTOGENIC STROKE USING AN IMPLANTABLE LOOP RECORDER DURING AN INPATIENT HOSPITALIZATION IN A COMMUNITY HOSPITAL SETTING

P. Sethi[1], S. Biby[1], J. Allred[2], A. Seiler[2] and J. Xu[1]
[1]Cone health, stroke center, Greensboro, USA
[2]Cone health, cardiology, Greensboro, USA

Background and Aims: Embolic strokes related to atrial fibrillation (AF) carry significant morbidity and mortality. Identifying patients with asymptomatic AF following stroke is difficult. We established a protocol for incorporation of implantable loop recorders (ILR) in stroke management in the inpatient setting during acute stroke evaluation.
Method: Our protocol for evaluation of patients with cryptogenic embolic stroke using ILR for detection of AF (Figure 1). Patients implanted with ILR were enrolled in an AF clinic with structured remote follow-up. The primary end point was time to first detected AF. Secondary end point was time to initiation of anticoagulation following identification of AF.

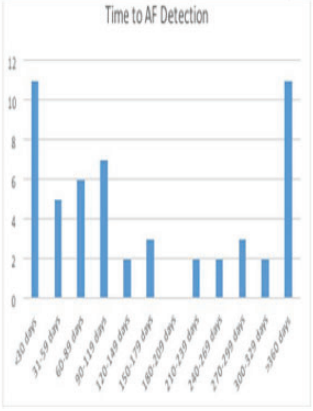
Figure 1: Protocol for Evaluation of Patients with Cryptogenic Stroke



Results: 197 patients underwent ILR placement between March 2014 and December 2016. Baseline characteristics are shown in Table 1: Baseline Characteristics. The median time between stroke and ILR placement was 3 days with a range of 1 to 8 days. The median follow-up time was 454 days (range 50 – 951). 54 patients (27.4%) had AF detected during the study period. Of note, 7 patients were lost to follow up, 13 patients died. See Table 2: AF Time to Detection. 98.1% were anticoagulated - warfarin (11.1%), apixaban (42.6%), dabigatran (1.9%), edoxiban (1.9%), rivoroxaban (40.6%), no anticoagulation (1.9%).

Table 1: Baseline Characteristics

Age (years)	67.9 (range 40 – 91)
Gender	53.6% male
Median Time from Index Event to Device Implant (days)	3 (range 1 – 8)
Median Device Follow-up Time (days)	454 (50 – 951)



Conclusion: A protocol for incorporating ILR in evaluation of cryptogenic stroke patients in an inpatient setting can improve AF detection and time to initiation of anticoagulation on follow up.

AS18-068

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

ATRIAL FIBRILLATION (AF) RELATED STROKES: A DISTRICT GENERAL HOSPITAL EXPERIENCE IN THE UNITED KINGDOM

H. Komber[1] **and K. Nagaratnam**[1]
[1]Royal Berkshire Hospital, Stroke Medicine, Reading, United Kingdom

Background and Aims: The aim of the analysis was to ascertain the prevalence of AF, anticoagulation prescription and outcomes among ischaemic stroke patients admitted to our center.

Method: The data was obtained retrospectively from the Sentinel Stroke National Audit Programme between 1st May2015 and 30th April2016. The 72-hour ambulatory ECG monitoring (R-test) data was obtained from the local cardiology database.

Results: Of the 612 patients with ischaemic stroke 105*(17.2%)* had known AF on admission. Of whom 59*(56.2%)* were not anticoagulated, 30*(28.6%)* were on warfarin and 16*(15.2%)* were on Non-vitamin K-antagonist Oral Anti-Coagulant (NOAC). The INR was <2.5 in 21 of 30 patients taking warfarin.

Patient characteristics and outcomes:

	AF absent on admission (n = 507)	AF present on admission (n = 105)
Females	232*(45.8%)*	57*(54.3%)*
Mean age (years)	72.4	82.5
Mean admission NIHSS	7.98	10.06
Previous Stroke/TIA	116*(22.9%)*	38*(36.2%)*
CCF	21*(4.1%)*	17*(16.2%)*
Hypertension	269*(53.1%)*	63*(60.0%)*
Diabetes	91*(17.9%)*	15*(14.3%)*
Mean discharge Rankin score	1.5	2.4
Discharged home	199*(39.3%)*	28*(26.7%)*
Died	41*(8.1%)*	18*(17.1%)*

On discharge, 11*(10.5%)* were on warfarin and 60*(57.1%)* were on NOACs.

Ambulatory ECG monitoring (R-test) was performed in 166/507(32.7%) patients and 13 tests showed paroxysmal-AF corresponding to 7.8% pick-up rate.

Conclusion: Despite increasing awareness of AF-related strokes the majority of the known-AF patients were not anticoagulated on admission. AF-related strokes were more severe and associated with poorer outcome and comorbidity.

Patients were more likely to be prescribed warfarin in Primary care in contrast to increased use of NOACS in Secondary care. More than two-thirds*(70%)* of warfarinised patients had subtherapeutic INR on admission.

Three day ambulatory ECG monitoring increased the chance of AF detection post stroke.

AS18-070

ATRIAL FIBRILLATION, CARDIOEMBOLISM & HEART-BRAIN INTERACTIONS

NEW VERSUS CONVENTIONAL NON INVASIVE CARDIAC MONITORING FOR ATRIAL FIBRILLATION DETECTION IN TIA CLINIC

A. Chandratheva[1], J. Pleming[1], A. Dados[1] and R. Simister[1]
[1]Univeristy College London, Stroke, LONDON, United Kingdom

Background and Aims: New non-invasive cardiac monitoring devices are available for atrial fibrillation (AF) detection. We aimed to compare these to current Holter monitoring.
Method: Setting: University College London hospitals, daily TIA clinic. Consecutive TIA patients from September 2015. After initial brain and vascular imaging, aetiology remained unknown or suggestive of cardioembolism had: 72-hour Holter monitor reviewed by cardiac technician, 14-day Zio Patch, 3-day E-patch both reported by computerized algorithm and reviewed by cardiac technician. In clinic monitoring using Apoplex AF monitor reported by computerized algorithm.
Results: Of 80 patients, 48(60%) male, mean age 61.4 years (SD14.4), 9(11.3%) >80yrs. Twenty had 72 hour Holter (£569), 20 Zio Patch (£300/patch), 20, 3 day E-patch (£600/unit, £16/electrode, £35/report), 20 had in-clinic monitoring using Apoplex (£650/unit, £20/report). Average time to device placement from clinic (days): Holter 54, Zio Patch 0.2, E-patch 1, Apoplex 1. Time to reporting from device placement (days): Holter 13.4, Zio Patch 15.6, E-patch 9.5, Apoplex 1.2.
Time to reporting from clinic date in days was significantly shorter for both Zio Patch 15.0 (SD 4.6) and E-Patch 11 (SD8.9) vs Holter 64.3(SD26.9), $p < 0.01$. Artefact; Zio Patch 1.5%, E-patch 12.8% not routinely reported by Holter or Apoplex. AF was detected in four patients, ZIO:1(5%), E-patch:2(10%), Apoplex:1(5%), Holter 0. Other significant arrhythmias were recorded by all devices except Apoplex, 9 brief VT (Holter:1, Zio:8) and 15 SVT (Holter:4, Zio:11), no significant pauses detected.
Conclusion: New patch devices provide an immediate, cost-effective and well tolerated means of cardiac monitoring with little artefact compared to standard Holter monitoring and significantly shorter delays to reporting.

AS19-002

BRAIN-HEART INTERACTIONS

AQUAPORIN-4 BUT NOT SULFONYLUREA-RECEPTOR-1 INHIBITION ATTENUATES CEREBRAL EDEMA AFTER ASPHYXIAL CARDIAC ARREST IN DEVELOPING RATS

R. Jha[1], J. Wallisch[1], H. Alexander[1], G. Farr[2], P. Kochanek[1] and M. Manole[1]
[1]University of Pittsburgh, Critical Care Medicine, Pittsburgh, USA
[2]Aeromics, Vice President of Pharmacology, Ohio, USA

Background and Aims: Cerebral edema (CE) is associated with unfavorable neurologic outcomes after cardiac arrest. It remains unclear whether edema reflects underlying injury, contributes to secondary injury, or is a beneficial compensatory response. Sulfonylurea-receptor-1(SUR1) and Aquaporin-4(AQP4) have been implicated in CE development. SUR1 inhibition (glibenclamide) and AQP4 inhibition (AER-271) were compared in a rat model of asphyxial cardiac arrest (ACA). We hypothesized that both decrease acute CE.
Method: 9-minute ACA was induced in post-natal day-17 rats ($n = 40$). Rats were intubated, paralyzed and subsequently disconnected from the ventilator. After 9-minute ACA, mechanical ventilation was resumed and animals were resuscitated until return of spontaneous circulation (ROSC). Rats were randomized to AER-271 (5 mg/kg at ROSC and 60 minutes post-ROSC), or glibenclamide (10ug/kg at ROSC). Wet-dry weight analysis was performed at 3 h.
Results: AER-271 reduced CE to naïve levels (naïve percent brain water, %BW, 83.19 ± 0.04; AER-271 83.28 ± 0.05; vehicle 83.87 ± 0.08, $p < 0.0001$, one-way ANOVA). There was a trend towards increased CE in rats that received glibenclamide (%BW 84.20 ± 0.31) compared with vehicle (%BW 83.60 ± 0.12) and naïve (%BW 83.47 ± 019; one-way ANOVA $p = 0.06$).
Conclusion: Our data supports a role of AQP4 in acute ACA CE. Possibly, SUR1 requires additional time for induction/upregulation versus AQP4, explaining the different effects at 3 h. AER-271 ameliorated edema, however there was a surprising non-significant trend towards increased %BW with glibenclamide. Unlike some strokes and nearly all traumatic brain injuries, the blood-brain-barrier remains intact after ACA suggesting AER-271 may be more beneficial against acute cytotoxic edema. Glibenclamide's previously described neuroprotection in ACA may be via alternate mechanisms (anti-inflammatory) i.e. edema-independent.

AS19-003

BRAIN-HEART INTERACTIONS

RELIABILITY OF CARDIAC BIOMARKERS IN ACUTE STROKE

P. Fiori[1], A. Corbo[1], L. Iorillo[1], P. Savino[2], L.M. Giannetti[3], E. Mazza[4], C. Tammaro[5] and A. Monaco[1]
[1]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Neurology, Ariano Irpino AV, Italy
[2]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Internal Medicine, Ariano Irpino AV, Italy
[3]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Infantile Neuropsychiatry, Ariano Irpino AV, Italy
[4]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Radiology, Ariano Irpino AV, Italy
[5]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Laboratory, Ariano Irpino AV, Italy

Background and Aims: Troponin ths (Tro ths) and NT-pro-Brain-Natriuretic Peptide (NT-pro-BNP) are increased in cerebrovascular conditions. No significant modifications were found at serial assessment by ANOVA. Although levels may reflect more the chronicity rather than the acuity of heart dysfunction, it is recommended to monitor them (Fiori P et al, 2014–2016). The aim of our study is to evaluate their modifications, according to the "delta criterion".
Method: We recruited 953 acute strokes (AS), 500 chronic cerebrovascular diseases (CCVD), 193 other neurological diseases (OND).
Results: Levels of Tro ths above 15 pg/ml were detected in 6,7% OND, 58,2% CCVD, 67,5% AS. Signs of myocardial necrosis were observed in a minority of patients, 2,7% OND, 1,1% CCVD, 3,5% AS at electrocardiograms, 4,8% OND, 4,8% CCVD, 7,3% AS at echocardiograms. Significant differences of cardiac biomarkers were found between patients in class I/II, A/B compared to class III/IV, C/D NYHA and ACA scales. We attained significant absolute and relative percentage decrease of Tro ths in CCVD and AS, NT-PBNP in OND, CCVD, AS. AS patients with at least a 50% decrease of NT-pro-BNP had better outcomes at day 7.
Conclusion: "Delta criterion" is pivotal for early detection of sudden acuity or worsening of chronicity. NT-pro-BNP is an early marker of cardiac overload and heralds possible rise of Tro ths. While the former is a sign of functional alteration, the latter represents already a structural

damage. Absolute changes are more critical than relative ones. The reliability of cardiac biomarkers has to be evaluated in the context of clinical conditions, ECG/echocardiography.

AS19-006

BRAIN-HEART INTERACTIONS

ECHOCARDIOGRAPHIC MARKERS OF LEFT ATRIAL DYSFUNCTION IN CRYPTOGENIC STROKE

K. Yuan[1], Q. Fang[2], D. Bibby[2], N.B. Schiller[2] and K. Meisel[1]
[1]University of California- San Francisco, Neurology, San Francisco, USA
[2]University of California- San Francisco, Medicine - Cardiology, San Francisco, USA

Background and Aims: Left atrial (LA) cardiomyopathy without atrial fibrillation (AF) is implicated as an embolic source for cryptogenic stroke (CS). Unlike atrial size, markers of function like LA functional index (LAFI) and LA emptying fraction (LAEF) have not been studied in CS. We aim to characterize atrial physiology in CS at rest and during stress to inform risk stratification and prevention strategies.
Method: Subjects at a single center ages 18–80 with CS (after standard work up) and no AF on long-term heart monitoring were prospectively enrolled, ancillary to Health eHeart, a web-based study of cardiovascular outcomes. Within 3 months after stroke, 3D resting and exercise bike echocardiogram was performed and read with blinding to stroke vs. control. Age-, sex-, and body surface area-matched controls were selected from healthy subjects without cardiovascular disease who had completed the same protocol.
Results: Compared to controls, CS subjects had worse atrial emptying capacity (represented by LAEF, see Table 1 for abbreviations), significantly poorer atrial filling with stress (change in LAEDVI), and lower atrial output (LASVI), underscoring reduced LA compliance and function, despite normal LA size (LAESVI). LAFI was normal in this preliminary analysis of 8 CS subjects. Incidentally, MVP without MR was significantly prevalent in CS; its role in atrial filling warrant further investigation.

Table 1. Clinical and echocardiographic characteristics of cryptogenic stroke patients and healthy controls

	Cryptogenic stroke[a] (N=8)	Matched normal (N=32)	P value
Mean age, yrs	57±15	57±13	0.9
Female	3(37%)	12(38%)	0.7
BSA (m^2)	2.0±0.3	1.9±0.2	0.4
History of hypertension or diabetes	7(88%)	0	<0.001*
MVP without MR	4(50%)	1(3.1%)	0.015*
LVEF (%)	68±5	65±6	0.1
LVMI[b] (g/m^2)	83±17	69±16	0.03**
LAESVI (ml/m^2)	28±6	28±8	0.9
% change LAESVI from rest to peak exercise	-3.5±19	-14±2.7	0.14
LAEDVI (ml/m^2)	13±4	12±4	0.3
% change LAEDVI from rest to peak exercise	-12±7	-40±17	<0.001**
LAFI (Units)	0.46±0.12	0.52±0.22	0.46
LAEF (%)	52±9	59±8	0.05
LASVI (ml/m^2)	14±3	18±5	0.02**

a: Cryptogenic stroke patients had no significant intracranial or extracranial atherosclerosis, no major cardioembolic source of stroke, no AF on at least two weeks of ambulatory cardiac monitoring, no hypercoagulable state, and most were embolic appearing on MRI.
b: LVMI is expected to be greater in stroke patients due to prevalence of hypertension in that group.
*Fisher's exact test.
**student t-test.

BSA: body surface area; MVP: mitral valve prolapse; MR: mitral regurgitation; LVEF: left ventricular ejection fraction; LVMI: left ventricular mass index, analog of hypertrophy; LAESVI: left atrial end systolic volume index, accepted marker of LA volume, when LA is filled at end systole; LAEDVI: left atrial end diastolic volume index; LAFI: left atrial functional index; LAEF: left atrial emptying fraction; LASVI: left atrial stroke volume index

Conclusion: Lower LAEF and LASVI and blunted LAEDVI change with exercise mark LA dysfunction in CS, even without LA enlargement. Stress echocardiography can reveal markers of subtle LA dysfunction.

AS19-007

BRAIN-HEART INTERACTIONS

IS THE TIME LIMIT VALID FOR ACUTE STROKE TREATMENT OF THE PATIENTS WITH DILATED CARDIOMYOPATHY?

P. Gelener[1] and S. Akpinar[2]
[1]Near East University Hospital, Neurology, Nicosia, Cyprus
[2]Near East University Hospital, Radiology, Nicosia, Cyprus

Background and Aims: According to the recent trials, it is shown that endovascular treatment reduced disability in patients with anterior circulation stroke who were treated within 8 hours after symptom onset. However there is a group of patients who had endovascular thrombectomy according to time and imaging criteria and the clinical outcome was well behind the expectation. This group comprised of dilated cardiomyopathy patients accompanying atrial fibrillation whereas reduced ejection fraction leading to low cardiac output and decrease in cerebral blood flow. We aimed to investigate the clinical outcome of those patients within the time limit defined in trails.
Method: We investigated the post intervention radiologic findings of anterior circulation stroke patients with dilated cardiomyopathy and reduced ejection fraction (EF $\leq$ 30%). NIHSS scores, ejection fraction in transthoracic echocardiography, CT angiography and digital subtraction angiography results, TICI scores and mRS scores were evaluated.
Results: Four patients were evaluated having dilated cardiomyopathy. All of the patients were within the first four hours of the symptom onset. Mean age was 70, mean NIHSS score was 20 and all had EF $\leq$ 30%. All of them were treated within the early time window but the clinical outcome was well behind in spite of the revascularization success of TICI 2b-3.

Conclusion: We suppose that decrease in salvageable brain tissue, even in the therapeutic time window for dilated cardiomyopathy patients with low EF is significant and larger infracted core is formed in spite of good TICI scores in this patient group. This study postulates that the time limit should be optimised for these patients.

AS19-008

BRAIN-HEART INTERACTIONS

CAN PRE-EXISTING DIABETES, HYPERTENSION OR LIPID PROFILING IDENTIFY PATIENTS WITH SIGNIFICANT ASYMPTOMATIC CORONARY DISEASE FOLLOWING FIRST ISCHAEMIC STROKE IN PATIENTS WITH LARGE-ARTERY ATHEROSCLEROSIS?

K.X. Ng[1], D. ngo[1], N. menon[1], R. nusrat[1], S. Kelavkar[1], S. Rashmi[1], S. shah[1], I. Haq[1], I. vlahovic[1], P. guyler[1], E. Giallombardo[1] and I.Q. Grunwald[1]
[1]Southend University Hospital, Stroke, Essex, United Kingdom

Background and Aims: The 5 year risk of Myocardial infarction or vascular death is estimated at 17.4% following first ischaemic stroke. CT Coronary Calcium score is a useful tool to identify patients at risk of coronary disease following ischaemic stroke. Our previous poster in 2011 at ESOC showed that such CT screening identified 37% patients as high cardiovascular risk and 20% had subsequent revascularisation.
Method: Between 2012–2015, 78 patients under the age of 65 with proven ischaemic stroke (large-artery atherosclerosis on TOAST criteria) with no history or symptoms of ischaemic heart disease were risk assessed using a CT based Coronary Calcium score. Patients were stratified into groups based on the degree of CT calcium scoring. All had risk factor assessment and their Fasting lipid profiles assessed on admission
Results:

	CT Calcium Score		
	0–50	**51–499**	**>500**
Number of patients	38	24	16
Pre-existing diabetes	2 (5%)	3 (13%)	7 (44%)
Pre-existing Hypertension	11 (29%)	9 (38%)	11 (69%)
Mean Fasting Total cholesterol (mmol/L)	5.00	5.30	5.15
Mean Fasting LDL(mmol/L)	3.1	3.3	3.1
Mean Fasting HDL(mmol/L)	1.2	1.3	1.3
Current smoker	14 (37%)	12 (50%)	5 (31)
Ex-smoker	3 (7%)	3 (12%)	2 (13%)

Conclusion: Pre-existing diabetes and hypertension predict a higher burden of asymptomatic coronary disease risk patients in this study but this requires a bigger sample to prove statistical significance.
All the patients, regardless of pre-existing dyslipidaemia and treatment with statin therapy, had high LDL-cholesterol and low HDL-cholesterol levels at the time of their ischaemic stroke, but there was no difference in underlying coronary calcification.

AS19-012

BRAIN-HEART INTERACTIONS

TCD FEATURES IN REST COULD DETERMINATE A HIGH RISK FOP POPULATION ?

J. Chamma[1], M. Dornelles[1], E. Piovesan[1], M.C. Lange[1], G. Pereira Braga[2], R. Bazan[2] and V. Zétola[1]
[1]Universidade Federal do Paraná, NEUROLOGY, Curitiba, Brazil
[2]Universidade Estadual Paulista, NEUROLOGY, BOTUCATU, Brazil

Background and Aims: Studies have demonstrated a higher prevalence of patent foramen ovale (PFO) in patients with cryptogenic stroke (CS) but also in patients with migraine with aura (MA). The PFO features in these patients have been studied in order to find some predictors of high risk and etiological causality to the events. The aim of this study is to compare the RLS features by Transcranial Doppler in patients with CS, transient ischemic attack (TIA) and MA.
Method: 179 patients were selected from a PFO database and separate in three groups: cryptogenic stroke (CS), transitory Ischemic stroke (TIA) and migraine with aura (MA group). All of exams were performed by the same TCD protocol. The RLS was classified in significant (more than 10 MES), positive in rest phase and large shunt ('curtain').
Results: Of total, 93 patients had CS, 37 TIA and 49 MA. Significant results were obtained when the groups were compare during rest phase: 78.1% of CS group compared to 50% of AIT group and 61.5% of MA group (p: 0.004). There was no statistical significance in the quantification analyzes of the 3 groups (p:0,190) even when the only 'curtain' patients was isolated (p:0,757)
Conclusion: Our study reveal a great importance of microbubbles detection in rest phase in CS group that could determinate a high risk in PFO population. Large studies should be performed to consolidate this findings.

AS19-014

BRAIN-HEART INTERACTIONS

THE DISPERSION OF REPOLARIZATION IN CEREBROVASCULAR EVENTS

A. Danese[1], M. Cappellari[2], E. Pancheri[2], G. Mugnai[2], N. Micheletti[2], G. Tomelleri[2], M. Carletti[2], S. Forlivesi[2], G. Turri[2], S. Monaco[2] and P. Bovi[2]
[1]university of Verona, Department of Neurological- Neuropsychological-Morphological and Movement Sciences- Section of Clinical Neurology, Veronaitaly, Italy
[2]AOUI Verona, Neurology Department, Verona, Italy

Background and Aims: Our study sought to analyse the dispersion of myocardial repolarization in patients with ischaemic and haemorrhagic stroke during the acute phase and before the discharge analysing a possible association with type/exstension of stroke, and also with in-hospital mortality and change in functional status (Δ NIHSS) and disability (Δ mRS) during the hospital stay.
Method: All consecutive patients admitted to our hospital from July to November 2016 presenting with ischaemic or haemorrhagic stroke were subjected to 12-lead ECG on admission and before the discharge. All ECG parameters including QTc, Tpeak-to-Tend (TpTe), TpTe/QT, and QT dispersion (QTd) were analysed in each precordial lead.
Results: A total of 31 patients (55% male; 73.7 ± 12.9 years) presenting with a cerebrovascular event were enrolled. No deaths occurred. Increased values of TpTe max and QTc max were observed on admission (112.4 ± 14.9 ms and 471.2 ± 23.8 ms, respectively). TpTe, QTc and QTd values were significantly higher on admission compared with the second

ECG. No significant differences in repolarization values were found between hemorragic and ischaemic strokes, between different locations of the events and between TIA and strokes. No correlation was also found between repolarization dispersion parameters and Δ NIHSS/Δ mRS.
Conclusion: Based on these preliminary results, the dispersion of repolarization was found considerably high in the acute phase of cerebrovascular events and significantly decreased over the hospital stay. However, in this small sample of patients, no correlation was found between repolarization dispersion and changes in functional status and disability during the hospitalisation.

AS31-001

CASE REPORTS

EARLY NEUROPLASTIC CHANGES IN AN ADULT STROKE BRAIN AFTER WORKING MEMORY TRAINING: A CASE ILLUSTRATION

R. John- MSc.[1], B.P.S. Ng[1] and A. Leung- PhD.[1,2,3]
[1]University of Alberta, Occupational Therapy, Edmonton- Alberta, Canada
[2]Rotman Research Institute, Baycrest Centre for Geriatric Care, Toronto- Ontario, Canada
[3]University of Alberta, Centre for Neuroscience, Edmonton- Alberta, Canada

Background and Aims: Stroke may impair several cognitive functions, including working memory. In adult stroke patients, studies have shown that improvements in working memory capacity post-insult are predictive of functional gains (Vallat et al., 2005). This study investigated neural activities after auditory working memory (WM) training in a stroke out-patient using functional magnetic resonance imaging (fMRI).
Method: The client (JL) was a 54-year-old woman who sustained right cerebral infarction involving the right middle and temporal cerebral arteries two months before the experiment. No surgery was performed, and MRI revealed lesions at the right postcentral and superior temporal regions. During training, JL performed 1-back, 2-back, and 3-back auditory WM tasks for 6 weeks, 5 days a week, 40 minutes a day, with increasing task difficulties across weeks. Before and after training, JL performed fMRI on visual and auditory 1-back and 2-back WM tasks.
Results: fMRI results revealed increased neural activity in the fronto-parietal network for both visual and auditory 2-back WM tasks, which was coupled with improved hit rate (by 11.1%) and reaction time (by 20.8%) for the auditory task and by 20% and 24.8%, respectively, for the visual task, in post-training testing. During training, JL demonstrated steady improvement on all WM tasks.
Conclusion: These findings showed promising neural plastic effects as well as cross-modal training effects of WM training. The relationships between JL's neuroimaging findings and her neuropsychological and functional performance were discussed. Future studies on a larger sample are needed to verify the relationship between increased neural efficiency and transfer effects to similar cognitive tasks.

AS31-006

CASE REPORTS

SIMULTANEOUS ACUTE LIMB ISCHEMIA AND ACUTE EMBOLIC STROKE, 2 CASE REPORTS AND REVIEW FROM THE LITERATURE

P. Pire García[1], L. Castillo Moreno[1], M. Villa López[1], M.E. Novillo López[1], A. Pérez Rodríguez[1], M. Rosón González[1], A. Méndez Burgos[1], F.J. Barriga Hernández[1] and L. Vela Desojo[1]
[1]Hospital Universitario Fundacion Alcorcon, Neurology, Madrid, Spain

Background and Aims: Simultaneous presentation of acute ischemic stroke and acute limb ischemia (AULI) are extremely uncommon. We present two concurrent cases of AULI and acute embolic stroke.
Method: Study of two clinical cases and review from the literature
Results: Case A: A 50-year-old woman with vascular risk factors, presented with a clinical picture consistent with a right-MCA infarction. CT scan demonstrated an established infarction in MCA territory. She developed an intense pain in the right arm and had no pulse in distal section of forearm. Vascular surgeon diagnosed a thrombus in brachial artery and proceed to surgical embolectomy. MRI brain ruled out acute infarction in multiple intracranial arterial territories.
Case B: A 53-year-old woman with a history of smoking and hypertension was admitted for parethesias in left arm and sudden loss of vision in both eyes. She developed an intense pain in the left upper limb and absence of radial pulse. Upper extremity enhanced CT showed a left brachial artery occlusion. A balloon catheter embolectomy was done with a good outcome. MRI showed an ischemic acute infarction in both occipital lobes.
Due to the presence of acute embolism in multiple arterial territories, both patients needed anticoagulation. For the moment, an exhaustive study identified no source of embolism and require follow-up careful watching.
Conclusion: These two cases stress the importance of early recognition of this potential disabling emergency, that can as well mimic a stroke as an acute monoparesis. Only two cases have been described in the literature which makes our series particularly intriguing and challenging.

AS31-007

CASE REPORTS

RECURRENT NOCTURNAL HEMIBALLISM IN A PATIENT WITH STRIATOCAPSULAR INFARCTION

B.J. Ahn[1] and K.Y. Kwon[2]
[1]Soonchunhyang University Gumi Hospital, neurology, gumi, Republic of Korea
[2]Soonchunhyang University Seoul Hospital, neurology, seoul, Republic of Korea

Background and Aims: Hemiballism is a relatively rare movement disorder and is strongly linked to brain lesions involving the contralateral subthalamic nucleus or basal ganglia. Common etiologies of hemiballism include stroke and nonketotic hyperglycemia, although its causes could vary. Here, we report a case of a non-diabetic woman with striatocapsular infarction who showed recurrent episodes of nocturnal hemiballism and underwent complete remission after haloperidol treatment.
Method: A 44-year-old woman admitted to our hospital owing to acute ischemic stroke in the left striatocapsular area with segmental stenosis in the left middle cerebral artery. About 10 days after the ischemic stroke, she presented with involuntary jerky movements in her right proximal limbs at night, which occurred particularly while falling asleep. The nocturnal hemiballism continued for about 5 days, owing to which she could not achieve deep sleep. Notably, the movement did not develop while

taking a nap during daytime. To stop the nocturnal hemiballism, intravenous (IV) haloperidol 5 mg was administered in 500 mL normal saline at night. From that night, the right-sided hemiballism completely resolved. IV haloperidol was administered without any recurrence of hemiballism for several nights; thereafter, oral medication of haloperidol was maintained for only about 2 weeks. About 3 weeks after the treatment, with no further medication, the nocturnal hemiballism had not recurred.
Results: About 3 weeks after the treatment, with no further medication, the nocturnal hemiballism had not recurred.
Conclusion: This case suggests that nocturnal involuntary movement disorder could occur after ischemic stroke in the basal ganglia.

AS31-008

CASE REPORTS

EFFECTIVE INTRALUMINAL SHUNT UTILIZATION AS A TOOL FOR ANGIOGRAPHY AND CAROTID ENDARTERECTOMY FOR CAROTID ARTERY NEAR OCCLUSION

Y. Kawamura[1] and K. Iihara[1]
[1]Kyushu University, Dept. of Neursurgery, FUKUOKA, Japan

Background and Aims: Carotid artery near occlusion is a critical degree of stenosis whereby blood flow through stenosis decreases and the distal cervical internal carotid artery (ICA) and intracranial ICA are prone to collapse. This report introduces our carotid endarterectomy (CEA) technique using an intraluminal shunt for carotid artery near occlusion in a hybrid operating room (OR).
Method: Because an accurate evaluation of tandem stenosis or patency of the post-stenotic ICA is often difficult preoperatively, we performed revascularization for a case of carotid artery near occlusion in a hybrid OR, where intraoperative digital subtraction angiography (DSA) and endovascular angioplasty or stenting for distal lesions can be performed if necessary. Additionally, we used an intraluminal shunt for "shunt angiography" as a replacement for conventional DSA and injected contrast material through an intraluminal shunt inserted during CEA to evaluate the distal ICA intraoperatively. Furthermore, an intraluminal shunt holds the collapsed lumen open and provides a scaffold for suturing, which make suturing more easily and prevent postoperative stenosis of distal ICA.
Results: Four CEA procedures were performed using intraoperative angiography in a hybrid OR. We used conventional angiography for 2 patients and the present technique for 2 patients. No patients showed tandem stenosis or required additional treatment. In our cases, no complications were encountered following shunt insertion.
Conclusion: Our method may be preferable in some cases in a hybrid OR. The present technical note is intended to underline the merits of shunt angiography as a scaffold.

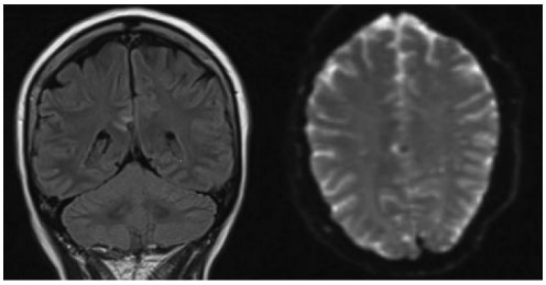
AS31-010

CASE REPORTS

ISCHAEMIC STROKE MIMICKING CLASSIC TRANSIENT GLOBAL AMNESIA (TGA)

A. Shah[1] and A. Mohd Nor[1]
[1]Plymouth Hospitals NHS Trust, Neurology, Plymouth, United Kingdom

Background and Aims: Diffusion changes in the hippocampi are well-recognised in TGA and are thought to be unlikely to represent cerebral ischemia. There are however very rare reports of patients with acute stroke presenting with classical history of TGA. We report such a case with cingulate gyrus infarction.
Method: Case Report
Results: We report the case of a 63 year old lady with a history of hypertension, who was found by her husband, repeatedly asking the same question and with no recollection of events in the last six weeks. She was seen well thirty minutes before. She knew where she was and recognised family members. She was assessed five hours after the onset of her symptoms and was found to have no neurological or cognitive deficit apart from a left extensor plantar. She was amnesic for about three hours.
The patient's CT brain scan was normal. An ECG after the patient recovered showed atrial fibrillation. A MRI brain scan revealed a focus of restricted diffusion in the right cingulate gryus, with corresponding high signal on FLAIR, indicating acute infarction (image). The patient subsequently received anticoagulation with Apixaban.



Conclusion: Ischemic stroke may have an identical presentation to TGA and caution needs to be taken to exclude stroke, especially if there are co-existent vascular risk factors or examination abnormalities.

AS31-011

CASE REPORTS

CONVEXITY SUBARACHNOID HAEMORRHAGE (SAH) SECONDARY TO SEVERE CAROTID ARTERY STENOSIS: LESSONS FROM TWO CASES

A. Shah[1], A. Mohd Nor[1] and M. Maviki[2]
[1]Plymouth Hospitals NHS Trust, Neurology, Plymouth, United Kingdom
[2]Plymouth Hospitals NHS Trust, Neuroradiology, Plymouth, United Kingdom

Background and Aims: It has been suggested that patients with carotid stenosis develop collateral pial vessels which may be friable. During ischaemic stroke haemodynamic changes may precipitate vessel rupture and SAH. We report two cases of subarachnoid haemorrhage (SAH) in patients admitted with cerebral ischaemia and severe carotid stenosis.
Method: Report of two cases
Results: The first patient was admitted with right hemispheric crescendo transient ischaemic attacks. His CT brain scan revealed infarcts in the right hemisphere and SAH in the right central sulcus. CT angiography showed >90% stenosis of the right internal carotid artery (ICA) and collateral vessels around the right frontal convexity. He underwent an uncomplicated carotid endarterectomy (CEA) and had no further ischemic events. The second patient presented with transient right sided weakness. His CT brain scan was unremarkable apart from demonstrating left M2 thrombus. CT angiography revealed left ICA plaque with adherent fresh thrombus, causing apparent vessel occlusion. He subsequently had recurrent ischemic events and was treated with aspirin, clopidogrel and then intravenous heparin. Subsequent carotid doppler showed a patent left ICA, but with >90% stenosis. A repeat CT brain scan, performed due to new aphasia, revealed new left peri-sylvian SAH.

The patient recovered well but was lost to follow-up and never underwent CEA.
Conclusion: We propose that investigation of convexity SAH should include carotid imaging. Aggressive anti-thrombotic therapy is often considered in crescendo cerebral ischemia but this may predispose to SAH in severe carotid stenosis. Further research is warranted to assess the risk of SAH in patients with severe carotid stenosis.

AS31-013

CASE REPORTS

CEREBRAL MYXOMATOUS ANEURYSM TREATED BY M2-M2 BYPASS; CASE REPORT AND REVIEW OF LITERATURES

J. Chung[1], J.C. Park[1], J.S. Ahn[1], B.D. Kwun[1] and W. Park[1]
[1]Asan Medical center, Department of Neurosurgery, Seoul, Republic of Korea

Background and Aims: Cardiac myxoma is an extremely rare cause of multiple aneurysms. The diagnosis and management of multiple cerebral myxomatous aneurysms are still under debate due to its low incidence. We present one case of multiple myxomatous aneurysms with literature review.
Method: A 20-year-old female admitted to our institute for evaluation and management of multiple cerebral aneurysms. Medical record, radiologic exam findings, and surgical outcomes were reviewed retrospectively.
Results: The patient had a sudden onset of left side motor weakness due to total occlusion of middle cerebral artery (MCA), and it was recanalized by intravenous thrombolytic agents. Cardiac myxoma was revealed from cardiac sonography and surgical evacuation was performed. From transfemoral cerebral angiography, multiple cerebral aneurysms were identified. A large fusiform aneurysm from right MCA was planned to perform a surgery with a preparation of STA-MCA bypass. From the surgical exploration, the aneurysm which we thought to be a fusiform aneurysm was MCA bifurcation aneurysm with a permanently occluded inferior trunk of M2. M2-M2 end-to-end anastomosis with resection of the aneurysm was performed. There was no evidence of metastatic myxoma invasion from pathologic studies.
Conclusion: Various treatments options were reported for cerebral myxomatous aneurysm, including, clipping, coiling, radiotherapy, and clinical observation. There are two theories for the development of a cerebral aneurysm by myxoma, which are a direct invasion of a tumor and intimal trauma due to tumor emboli. Our case supports the later theory, and surgical resection could be one of the options for treatment of cerebral myxomatous aneurysms.

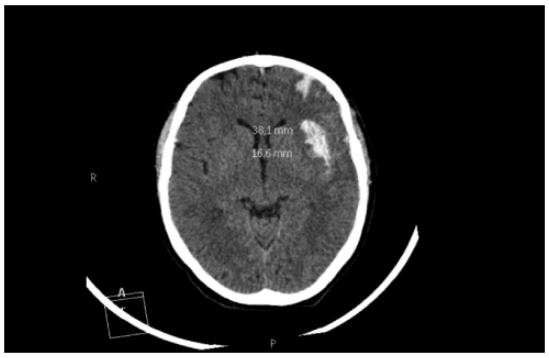
AS31-015

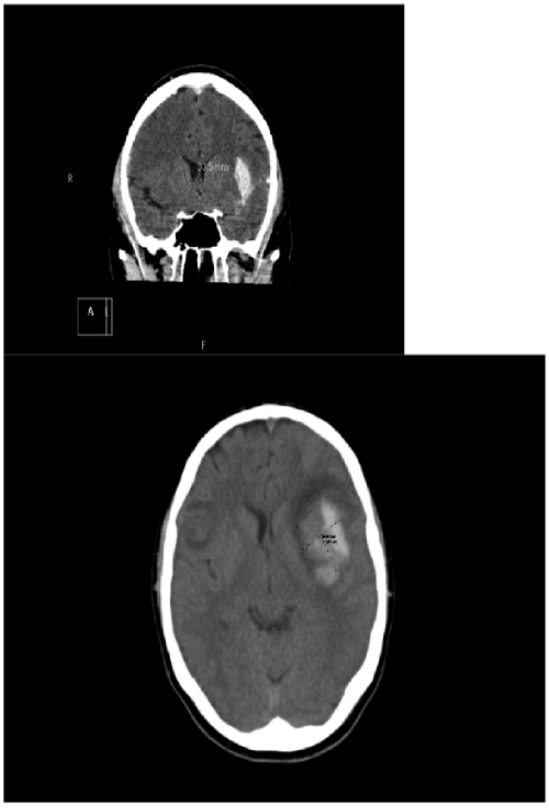
CASE REPORTS

HEMORRHAGE AND VENOUS THROMBOSIS SHOULD ANTICOAGULATION BE USED?

M.D. Calabria[1], L. López[1] and L. Redondo[1]
[1]Complejo Asistencial Universitario de Salamanca, Neurology, Salamanca, Spain

Background and Aims: To present a case report of a patient with concomitant presence of intraparenchymatous hematoma, subarachnoid hemorrhage and cerebral venous thrombosis.
Method: The patient is a 29-year-old man with a personal history of bilateral pulmonary thromboembolism related to a deficiency of protein C for coagulation and positive result for lupus anticoagulant. The patient followed treatment with acenocoumarol for some months and then suspended it. Currently, he is not following any treatment.





He was admitted as an emergency after two generalized tonic-clonic seizures associated with frontal right and left intraparenchymatous hematomas, and subarachnoid hemorrhage in the left frontotemporal convexity and left lateral sulcus caused by cerebral venous thrombosis of the superior sagittal sinus. He showed a decreased level of consciousness and started anticoagulation therapy with heparin sodium which was replaced by low molecular weight heparin due to difficulties to maintain a therapeutic range. A cranial CT scan 48 hours after admission revealed an increase in the size of the intraparenchymatous hematoma with associated cerebral edema and mass effect.
Results: Anticoagulation was maintained with low molecular weight heparin for a month. On discharge the patient presented right-central facial palsy and mild dysarthria and he started treatment with acenocoumarol.

Conclusion: There is evidence of anticoagulant use in patients who associate SAH with concomitant CVT, and we consider that this is an example of how in spite of a clinical and radiological worsening of the patient's condition after 48 hours, it is beneficial to maintain anticoagulation to improve the clinical evolution.

AS31-017

CASE REPORTS

LIMB-SHAKING SYNDROME (LSS): A RARE CONDITION OR A COMMON MISCONCEPTION?

B. Hughes[1], S. Mahmood[1], W. Gaba[1] and H. Ramadan[1]
[1]Bradford Royal Infirmary, Hyper-acute stroke unit, Leeds, United Kingdom

Background and Aims: Introduction: LSS is a rare manifestation of TIAs, usually secondary to severe carotid artery disease. It can be a precursor to imminent stroke, and so early identification and management can reduce morbidity and mortality.
Method: Case reports:
Case1: 62-year-old lady seen in clinic with right lower-limb postural shaking episodes. She presented 12-days later with right-sided weakness and aphasia. CT brain showed a left hyperdense MCA sign and patient was thrombolysed. Carotid imaging showed a fully occluded right ICA and >70% stenosed left ICA. She had left carotid endarterectomy 3-months later with no further symptoms.
Case2: 50-year-old gentleman presented with multiple episodes of right arm paraesthesia, weakness and dysphasia. His MRI showed left ICA occlusion and an old left MCA infarct which was treated as TIA. He presented 3-months later with 5-minute episodes of right leg shaking when standing, further exacerbated when looking up to climb a ladder. These symptoms were secondary to complete left ICA occlusion.
Case3: 54-year-old gentleman presented with uncontrollable shaking of left arm, left-sided limb weakness and dysarthria. Carotid imaging showed chronic left ICA occlusion and previously stented right ICA occluded on background of previous TIAs and laryngeal cancer. Three-months later in clinic he reported right hand shakes when in an upright posture and postural syncope.
Results: -
Conclusion: Discussion: Limb-shaking TIAs should be suspected in patients with paroxysmal movement disorders but not to be confused with focal seizures. Symptoms almost invariably arise after manoeuvres that provoke cerebral hypoperfusion. Management involves early diagnosis, improving cerebral blood flow and carotid endarterectomy.

AS31-018

CASE REPORTS

REPEATED INTRAVENOUS THROMBOLYSIS IN PATIENTS WITH RECURRENT ISCHEMIC STROKE IN VERTEBROBASILAR TERRITORY

D. Černík[1,2], D. Šaňák[2] and F. Cihlář[3]
[1]KZ a.s.- Masaryk Hospital, Department of Neurology, Ústí nad Labem, Czech Republic
[2]Palacký University Medical School and Hospital, Department of Neurology, Olomouc, Czech Republic
[3]KZ a.s.- Masaryk Hospital, Department of Radiology, Ústí nad Labem, Czech Republic

Background and Aims: Acute ischemic vertebrobasilar stroke (AIVBS) is usually associated with poor outcome and prognosis. Moreover AIVBS due to occlusion of basilar artery (BAO) is mostly fatal. Intravenous thrombolysis (IVT), as a standard recanalisation therapy of acute ischemic stroke (IS) within first 4.5 hours, can be administrated beyond this therapeutic time window in case of symptomatic BAO. Repeated thrombolytic therapy in case of early recurrent IS is generally contraindicated, however recurrent AIVBS can be fatal. The aim was to present two cases of repeated IVT for recurrent AIVBS with discussion of specific situations, when repeated IVT may be considered.
Method: Two male patients (mean age 63 years) with AIVBS were treated with IVT and early severe recurrent IS stroke occurred in both cases with a median of NIHSS 16 points and with mean time since first IS of 7 days.
Results: In both patients, repeated IVT was performed with very good clinical outcome (NIHSS after 24 hrs: 2 points; mRS 1). The failure of antiplatelet therapy was considered the cause of early recurrent IS in both cases and thus intravenous Eptifibatidum was administrated to support antiplatelet therapy. Up to now, repeated thrombolytic treatment was reported only in cases of recurrent stroke in carotid circulation.
Conclusion: However, repeated IVT is still contradicted in case of early recurrent IS, it could be considered in an individual case when the early recurrent IS in vertebrobasilar territory has a high risk being fatal.
Acknowledgment: Supported by the grant IGA-KZ-2016-1-2.

AS31-019

CASE REPORTS

SIMULTANEOUS CEREBELLAR AND SUBCLAVIAN ARTERY EMBOLISM CAUSED BY FLOATING THROMBUS IN THE AORTIC ARCH

I. Vastagh[1], A. Tóth[1], J. Gyebnár[2], P. Sótonyi[3], A. Berencsi[3] and D. Bereczki[1]
[1]Semmelweis University, Department of Neurology, Budapest, Hungary
[2]Semmelweis University, Department of Radiology, Budapest, Hungary
[3]Semmelweis University, Heart and Vascular Centre, Budapest, Hungary

Background and Aims: Floating thrombus in the aortic arch (FTAA) is an uncommon cause of systemic emboli or ischemic stroke. Widespread use of high-resolution imaging modalities allows to diagnose them more frequently. There is no guideline recommendation for the treatment of FTAA. We report a case of a 49-year-old woman with simultaneous embolism of cerebellum and subclavian artery caused by FTAA.
Method: A heavy smoker 49-year-old female was hospitalized with vertigo. She also complained pain and numbness in her left hand. Brain CT scan detected two acute ischemic lesions in the left cerebellar hemisphere. Duplex sonography showed stenosis at the origin of vertebral and subclavian artery. CT angiography (CTA) revealed floating thrombus in the aortic arch situated at the origin of the subclavian artery and a second fragment of mobile mass in the proximal part of the subclavian artery. Heart origin was excluded by transthoracic and transesophageal echocardiography. Hypercoagulable states were not confirmed. Inflammation was presumed on the basis of elevated white blood cells and C-reactive protein, but the source of infection was not established.
Results: Thrombectomy of aortic arch was performed after posterolateral thoracotomy and percutaneous transluminal angioplasty, combined with stent implantation of subclavian artery. The histopathological examination revealed fibrin thrombus without malignant cells. The patient received warfarin combined aspirin and high dose rosuvastatin treatment. She recovered without complications.
Conclusion: Extensive search of source of emboli is required in case of simultaneous brain and systemic ischemic lesions. FTAA can explain the multi-territorial embolization and CTA is the useful imaging modality for diagnosis.

AS31-021

CASE REPORTS

NEUROSURGICAL AND OBSTETRIC CONSIDERATIONS OF CEREBRAL ARTERIO-VENOUS MALFORMATIONS IN PREGNANCY: A CASE REPORT AND LITERATURE REVIEW

J. McCabe[1], A. Suleiman[2], C.W. Fan[2], J. Donnelly[3] and S. Murphy[1]
[1]Mater Misericordiae University Hospital, Stroke, Dublin, Ireland
[2]St. Mary's Hospital, Medicine for the Older Person, Dublin, Ireland
[3]Rotunda Hospital, Obstetrics, Dublin, Ireland

Background and Aims: Ruptured cerebral arterio-venous malformations (AVMs) are rare in pregnancy. AVM haemorrhage in pregnancy is associated with significant foetal and maternal morbidity. The management of such complex cases is controversial.
Method: We examined the clinical notes of a case of a ruptured AVM in pregnancy with successful term delivery. We performed a literature review of the evidence in relation to neurosurgical and obstetric considerations in the management of such cases.
Results: A 35 year old woman of 12 weeks gestation presented with aphasia and right sided weakness. An MRI Brain with angiography identified a large left frontotemporal intraparenchymal haemorrhage secondary to a Spetzler-Martin Grade 3 AVM. She underwent an emergency left craniotomy with haematoma evacuation and AVM excision. Her perioperative course was uncomplicated and a post-operative pelvic ultrasound identified a viable foetus. Her 6-month modified rankin score was 3. A successful elective caesarean section was performed at 38 weeks gestation following consensus between the Obstetrician, Stroke physician, Anaesthetist and Neurosurgeon. A literature review failed to identify a consensus regarding the most appropriate neurosurgical management of haemorrhagic AVMs. Emergency surgery is indicated if there is a risk of cerebral herniation or neurological deterioration. The timing of elective AVM resection is controversial with some reports advocating early intervention during pregnancy; particularly if there is low operative risk and cases occurring in early pregnancy.
Conclusion: Consensus guidelines on the best practice management of AVMs in pregnancy are lacking. We present our own experience of the neurological and obstetric complexities involved in the management of such cases.

AS31-026

CASE REPORTS

NASTY NOSEDROPS - INTRACEREBRAL HEMORRHAGE IN A YOUNG ADULT DUE TO NAPHAZOLINE OVERDOSE

M. Heise[1], M. Schwarze[1], J. Nicolic[1], G. Liogkas[1], C. Plassmeier[1], F. Kiunka[1], B. Salihaj[1], M. Groen[1], J. Glahn[1] and P.D. Schellinger[1]
[1]Johannes-Wesling-Klinikum, Neurologie, Minden, Germany

Background and Aims: The 44-year-old computer scientist and recreational diver presented in a nearby hospital with a hypertensive crisis (240/57 mmHg), bradycardia (27'/min) and with severe headache. Patient history was unremarkable, the only medication were intermittent "over-the-counter" nose drops from time to time before diving. Immediately prior to symptom onset, intake of some newly prescribed naphazoline nose drops was reported (different from his usual medication). These were prepared in a pharmacy.
Method: Initial head CT showed extensive subarachnoidal, subdural and also bifrontal intracerebral hemorrhage, repeat-CT only 2 h later revealed blooming and additional bleedings (thalamus on the left, basalganglia on the right and intraventricular) with development of a hydrozephalus. CTA and DSA showed no evidence of underlying vascular anomaly and no vasospasm, laboratory results (including Factor-VIII and v. Willebrandt-factor) were normal.
Results: We finally sent the naphazoline emulsion to an external laboratory, where a naphazoline-concentration 1000 times above the prescribed dose was found. Besides from its vasoconstrictive effect, naphazoline is known to have several side-effects such as a reactive hyperemia, an increase of blood-pressure, epistaxis but also – in case of intoxication - a bradycardia, drowsiness and respiratory depression.
Conclusion: As the main cause of the bilateral multilocular bleedings we discussed the excessive hyperemia following the initial vasoconstriction in combination with hypertensive crisis because of intake of the overdosed naphazoline-preparation. Hemorrhage seen in patients with reversible vasoconstriction syndrome with or without risk factors such as intake of vasoactive substances, or in post partum period or others may have a similar underlying mechanism.

AS31-031

CASE REPORTS

INTRACRANIAL INFLAMMATORY ARTERIOPATHY WITH PARTIALLY THROMBOSED ANEURYSMS AS PRESENTING FEATURE OF POLYARTERITIS NODOSA

C. Halabi[1], R.A. Colorado[1] and S.A. Josephson[2]
[1]Fellow in Vascular Neurology, University of California, San Francisco
[2]Professor of Neurology, University of California, San Francisco

Background and Aims: Polyarteritis nodosa (PAN) is a systemic vasculitis which rarely presents with intracranial aneurysm.
Results: A 56 year old woman with hypertension developed headache and progressive bulbar symptoms. Brain MRI revealed multiple dolechoectatic aneurysms in the anterior and posterior circulation, including partially thrombosed giant basilar aneurysm with mass effect. A staged intervention was designed for the posterior circulation, including extracranial –intracranial surgical bypass followed by flow-diverting pipeline embolization device (PED) deployment. The first step in the staged approach was a left occipital artery to left anterior inferior cerebellar artery end-to-side bypass surgery which was completed successfully. The patient then developed progressive abdominal pain, and subsequent CT imaging of the chest, abdomen, and pelvis revealed diffuse, partially thrombosed fusiform visceral aneurysms. Serial imaging revealed progressive thrombotic disease with visceral infarcts. A systemic vasculitis was suspected and surgical pathology obtained from the bypass surgery was then reviewed. The presumed unaffected left occipital artery demonstrated inflammation with focal disruption of the external elastic lamina. Based on the clinical picture and surgical pathology, a diagnosis of PAN was given and the patient was immunosuppressed with cyclophosphamide. The giant basilar aneurysm was then treated with PEDs.
Conclusion: Marked inflammatory intracranial arteriopathy warrants consideration of systemic vasculitidies in the appropriate clinical context in order to expedite diagnosis and treatment of specific conditions.

AS31-032

CASE REPORTS

BOW HUNTER'S SYNDROME – HUNTING A PHANTOM

B. Matosevic[1], A. Mayr[1], A. Mismas[1], M. Harrasser[1], J. Blocher[1], V. Verocai[1], A. Zangerl[1], A. Fussenegger[2], T. Haglmüller[2], J. Mazraeh[2] and P. Werner[1]
[1]LKH Feldkirch, Instute for acute neurology and stroke, Feldkirch, Austria
[2]LKH Feldkirch, Department of Radiology, Feldkirch, Austria

Background and Aims: The term Bow hunter's syndrome originally describes the rare dynamic occlusion of the vertebral artery by rotational head movements. Often this occlusion is facilitated by vertebral osteophytes. Some authors report direct vessel wall injury by osteophytes with consecutive embolism as a variant of the disease.
Method: Case report
Results: We present a 70 year old man with recurrent embolic infarctions in the vertebrobasilar territory within a period of 12 months. Three times of four he was treated with intravenous alteplase, every time with good outcome. In a thorough work up, cardiac embolism, vasculitis and arteriosclerosis of the aortic arch could be excluded. By vascular ultrasound and CTA vertebral artery stenosis could be excluded; in detail hypoplastic vertebral artery on the right and slight arteriosclerotic irregularities on the dominant left vertebral artery were evident. At the level of the fourth cervical vertebra prominent osteophyte adjacent to the vertebral artery could be identified. After his fourth vertebrobasilar stroke CT angiogram revealed a new occlusion of the left vertebral artery at the mentioned level, whereas compensatory enlargement of the initially hypoplastic right vertebral artery was seen. Patient has been stable since the self occlusion of the initially dominant vertebral artery.
Conclusion: Degenerative vertebral spine disease can provoke ischemic strokes by diverse mechanism. In this patient the natural course of the disease prevented further ischemic events. Depicting the case in detail, pathophysiology, diagnosis, and potential treatment options of Bow hunter's syndrome will be discussed.

AS31-035

CASE REPORTS

INTRAVENOUS THROMBOLYSIS IN ISCHEMIC STROKE CAUSED BY TAKAYASU ARTERITIS

M. Lopes[1], J.N. Alves[1], M. Monteiro[2], C. Ferreira[1] and J. Pinho[1]
[1]Hospital de Braga, Neurology, BRAGA, Portugal
[2]Hospital de Braga, Internal Medicine, BRAGA, Portugal

Background and Aims: Takayasu Arteritis (TA) is a large vessel vasculitis causing ectasia or occlusion of the aorta and its main branches. Stroke occurs in 10–20% of cases and thrombolysis was reported in rare cases, and in none of these patients aortic aneurysm was described.
Method: Case-report
Results: A 51 year-old woman with history of excessive alcohol intake and arterial hypertension was admitted for a sudden onset speech difficulty and right motor deficit. Examination revealed motor-predominant dysphasia, right homonymous hemianopia, right central facial palsy and right upper limb motor deficit (NIHSS 9). ASPECTS in admission CT was 8 and intravenous thrombolysis was started. Significant asymmetry in brachial blood pressure was noted (lower on the left) and angioCT revealed a large aneurysmal dilation of the aortic arch, with common carotid artery and subclavian artery occlusions, but preserved blood flow in internal carotid artery and intracranial circulation. Thrombolysis was completed and there was no neurological improvement or hemodynamic change. Retrospectively, family reported recent significant weight loss and asthenia. Blood tests showed anemia and significant elevation of sedimentation rate, PET scan showed increased FDG uptake in the thoracic aorta wall and the emergence of the left common carotid and subclavian arteries. No hemorrhagic complication occurred during hospital stay, and the patient was treated with antiplatelet, steroid therapy and subsequently with azathioprine.
Conclusion: We present a patient with TA who presented with acute ischemic stroke and was treated with intravenous thrombolysis. Despite having a complex aortic aneurysm, no hemorrhagic complications occurred. Thrombolysis for ischemic stroke in TA may be safe.

AS31-037

CASE REPORTS

INCREASED SIGNAL INTENSITIES IN SPLENIUM OF CORPUS CALLOSUM: STROKE VS ENCEPHALOPATHY

K.Y. Lee[1], S.W. Han[2] and J.H. Park[2]
[1]Gangnam Severance Hospital- Yonsei University College of Medicine, Neurology, Seoul, Republic of Korea
[2]Sanggye Paik Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Metronidazole has been used in the treatment of anaerobic, protozoal infections, or brain abscess. It is comparatively safe but can produce neurological disorders especially when exceeding 2 g/day or following weeks of treatment.
Method: An 88-year-old woman with atrial fibrillation visited the emergency room complaining of mild dysarthria and dizziness. She had been received 5 days of daily 1500 mg of intravenous metronidazole for chronic appendicitis and discharged two days before symptoms onset. She continued to take the same dosage of oral metronidazole after discharge. She was alert and oriented. Her neurologic examination was normal except mild dysarthria.
Results: Brain MRI showed high signal intensities on diffusion-weighted image (DWI) intensities and low signal on apparent diffusion coefficient (ADC) map in the splenium of corpus callosum, suggesting cytotoxic edema. Though metronidazole induced encephalopathy was suspected, metronidazole was administered continuously since the total period of treatment was only seven days. She was also treated antiplatelets for the possibility of acute cerebral infarction. After eleven days of metronidazole treatment, trunkal ataxia and moderate dysarthria was developed. Follow-up brain MRI demonstrated high signal intensities in the bilateral dentate nuclei and the splenium of corpus callosum on DWI. Metronidazole was stopped and after twelve days of cessation, her symptoms were slowly improved.
Conclusion: Metronidazole induced encephalopathy is potentially reversible disease in patients with acute neurological deficits. Though the total treatment time was short as days, the suspicion of metronidazole as a cause of acute toxic encephalopathy was essential in patients with metronidazole treatment.

AS31-039

CASE REPORTS

THE FIRST USE OF TENECTEPLASE IN CENTRAL RETINAL ARTERY OCCLUSION

A. Lee[1], S. Chryssidis[2], S. Thoo[3] and C. Chen[4]
[1]Flinders University, Centre for Neuroscience Innovation, KENT TOWN, Australia
[2]Flinders University, Jones and Partners Radiology, Adelaide, Australia

[3]University of Adelaide, Ophthalmology, Adelaide, Australia
[4]Flinders University, Neuro-ophthalmology Unit, Adelaide, Australia

Background and Aims: Central retinal artery occlusion (CRAO) is the ocular analogue to cerebral ischemia where there is an occlusion of the retinal artery by a thrombus or embolus. While it is a rare cause of monocular vision loss, it accounts for significant morbidity due to an increased risk of falls as a result of loss of depth perception. There is no known effective treatment. Two randomized trials delivering alteplease either intra-arterially or systemically have not shown efficacy, although a positive signal in terms of vision restoration was found if the thrombolytic was delivered within 6 hours of symptom onset.
Method: Recently tenecteplase, a more fibrin specific agent has been shown to be of value in the reperfusion of cerebral stroke. Herein we report the first ever use of tenecteplase for the successful reperfusion of CRAO.
Results: A 30 year old woman underwent coiling of an incidental left para-ophthalmic artery aneurysm that was discovered incidentally on brain imaging. Post successful coiling it was noted that she had developed a painless left monocular vision loss with a right afferent pupillary defect and count finger only. Consent was obtained for off-label use of tenecteplase 0.25 mg/Kg infused as a single bolus dose 4.5 hours post symptom onset. No complications occurred. The visual acuity improved to 6/21 within the first 24 hours with a final acuity of 6/12 at 30 days.
Conclusion: This is the first report of the use of tenecteplase in CRAO. It provides further impetus for larger trials using this agent

AS31-042

CASE REPORTS

LIPOID PROTEINOSIS AND SPONTANEOUS INTRA-CEREBRAL HAEMORRHAGE A CASE REPORT AND REVIEW OF THE LITERATURE

A. Pusalkar[1]
[1]Lister Hospital, Stroke, Stevenage, United Kingdom

Background and Aims: Introduction: We report a case of a Caucasian man with a prior diagnosis of Lipoid Proteinosis who presented with a primary intra-cerebral haemorrhage. Lipoid proteinosis is a rare autosomal recessive disease characterized by the deposition of hyaline material in the skin, mucosa, and viscera. Symptoms are present from early childhood and include skin thickening and hoarseness of voice. As far as we are aware, no cases of lipoid proteinosis have been reported suggesting an association with intra-cerebral haemorrhage.
Method: Case Description: A 52 year old man was admitted with sudden onset of dysphasia and right sided weakness. He was diagnosed with lipoid proteinosis since early childhood. He had no known risk factors for haemorrhagic stroke. General examination revealed mucosal thickening of the oral cavity and the presence of waxy and thickened skin. A dense right sided hemiparesis and severe expressive and receptive dysphasia was noted. Ambulatory blood pressure monitoring, ECG and echocardiography did not reveal any evidence of hypertension. CT brain revealed left intra cerebral haemorrhage. CT angiography and MRI of the brain did not point to an underlying aetiological cause.
Results: Discussion: Lipoid proteinosis is linked to mutations in the gene encoding extracellular matrix protein 1 (*ECM 1*). One case report of gastrointestinal haemorrhage has shown evidence of deposition of hyaline in gastrointestinal tract. Intracranial haemorrhage has not been reported in lipoid proteinosis before.
Conclusion: This case demonstrates possible association between lipoid proteinosis and spontaneous primary intra-cerebral haemorrhage. Deposition of hyaline material may possibly affect vascular integrity, however this needs further investigation.

AS31-043

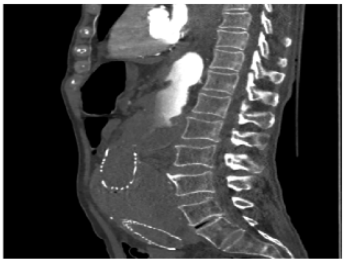
CASE REPORTS

DIFFICULTIES IN USING IV TPA IN PATIENTS WITH PREVIOUS EVAR FOR AAA REPAIR: SHOULD WE HAVE LOWER BLOOD PRESSURE TARGETS?

R. Rayessa[1]
[1]United Kingdom

Background and Aims: The safe BP targets for patients being considered for IV tPA for hyper-acute revascularisation of ischemic stroke is currently 185/110. We consider the (admittedly) rare problem of stroke patients who have had aortic aneurysmal repair in the past and whether they need more aggressive BP targets, and how to balance this against the potential adverse outcomes on their infarcts
Method: We have seen two patients recently, both of whom had undergone an EVAR procedure 2–3 years previously and had had serial post-EVAR scans which confirmed stable appearances of the aneursym sac and the graft (most recent was 6 months and 4 months prior to thrombolysis, respectively) Before thrombolysis, both patients had intermittent hypertension. Both patients were treated to targets of $<$185/110 but not less than 150/90. Unfortunately patient A deteriorated 1 hour post lyis. His CT aortogram showed a ruptured aneurysm and he died shortly afterwards.
The second patient had very similar presentation. His BP was managed to be below 180/100 but no less than 150/80. He ruptured his hitherto stable EVAR SITE but recovered well with conservative measures.
(only patient A's scans are shown)
Results:





Conclusion: We wonder whether vascular surgical opinion and a normal CT aortogram is a pre-requisite before thrombolysis decisions are made and whether we can safely adopt a lower BP(<150/80) target to ensure minimising the risk of aneurysmal rupture, whilst preserving the outcomes attributable to stroke thrombolysis. We also wondered whether tPA should be contraindicated in these patients and primary endovascular revascularisation, where available, considered instead.

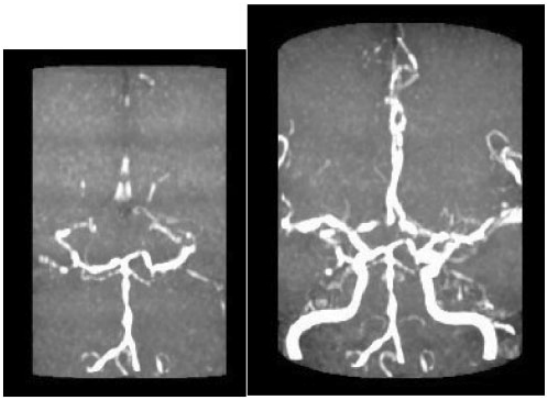
AS31-044

CASE REPORTS

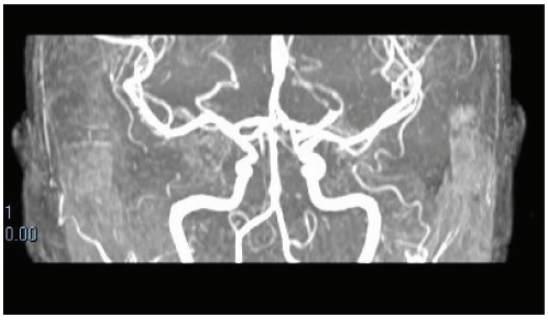
REVERSIBLE CEREBRAL VASOCONSTRICTION SYNDROME AFTER TREATMENT WITH AN OVARIAN STIMULATION DRUG

R. Gutiérrez Zúñiga[1] and R. Calle Calle[1]
[1]Complejo Hospitalario Universitario de Granada, Neurology, Granada, Spain

Background and Aims: Reversible cerebral vasoconstriction syndrome (RCVS) is characterized by diffuse segmental constriction of cerebral arteries that resolves spontaneously within 3 months. The main symptoms are thunderclap headache and focal neurological deficits related to vascular insult of the brain.
Method: A 39 years old woman was admitted to our hospital with a two weeks history of thunderclap headache and high blood pressure. She had transient cortical blindness and right hemiparesis since the day before her admission. She was treated with an ovarian stimulation drug two weeks before her initial symptoms. Magnetic resonance angiography (MR-A) showed segmental narrowing and dilatation (string of beads) of cerebral arteries, and brain magnetic resonance (MR) showhe right occipital lobe.



Results: The patient was treated with Nimodipine 30 mg per 4 hours and 24 hours later, the patient was recovered, with only a light headache. An extensive workup did not reveal other cause of RVCS. The patient was discharge after one week without symptoms. A MR-A, which was performed after one month of her admission, was normal.



Conclusion: There are several causes of RVCS, but only a few cases report of RVSC after ovarian stimulation drugs. Recognize the predisposing cause for RVCS is hard in some patients, in whoses are necessary a proof clinical investigation.

AS31-046

CASE REPORTS

MARCHIAFAVA-BIGNAMI DISEASE PRESENTED AS STROKE MIMIC

M. Alvarez[1], F.J. Dominguez Diez[2], L. Redondo Robles[2], S. Marquez Batalla[3], M. Villanueva[3] and L. Lopez Mesonero[2]
[1]COMPLEJO ASISTENCIAL UNIVERSITARIO SALAMANCA, Neurology, Salamanca, Spain
[2]COMPLEJO ASISTENCIAL UNVERSITARIO SALAMANCA, Neurology, Salamanca, Spain
[3]COMPLEJO ASISTENCIAL UNVERSITARIO SALAMANCA, Radiology, SALAMANCA, Spain

Background and Aims: Marchiafava-Bignami disease (MBD) is a rare condition characterized by demyelination and necrosis of the corpus callosum which is seen in patients with chronic alcoholism. Clinical features include impaired consciousness, seizure, dysarthria, limb hypertonus, frontal lobe symptoms in the acute stage and interhemispheric disconnection syndromes in the chronic stage.
We present a clinical case of Marchiafava-Bigmani disease which presented to our emergency department with acute neurological symptoms mimicking a stroke.
Method: We report a case of a 54-year-old man with history of macular degeneration. He did not have any relevant family history; he had toxic habits: smoking 10 cigarettes per day and drinking 2 liters of wine per day. The patient was first admitted in the Department of Neurology in June 2016 with symptoms of dysarthria, dizziness and general discomfort. The physical examination revealed dysarthria, weakness of upper left limb and right heel-knee dismetria. The NIHSS scale punctuated 3.
Results: During hospitalization, a complete analysis was performed; the analysis showed 12,7 g/dl hemoglobin with a MCV of 104 fL and 0,8 ng/ml folate acid. The brain CT revealed a generalized hipodensity of the genu and splenium of the corpus callosum which did not enhance after the administration of intravenous contrast. No changes were observed in the control CT.
B vitamin complex was added to the treatment and a progressive improvement of the neurological symptoms was observed.
Conclusion: Marchiafava-Bigmani should be considered in the differential diagnosis of alcoholic and malnourished patients which present as acute neurological symptoms mimicking an anterior cerebral artery stroke.

AS31-047

CASE REPORTS

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME AND SYSTEMIC LUPUS ERYTHEMETOSUS -AN INCREASINGLY RECOGNISED ASSOCIATION

S. Saber[1], M. Ng[1] and R. Stratton[1]
[1]Royal Free Hospital, Medicine, London, United Kingdom

Background and Aims: Posterior Reversible Encephalopathy Syndrome (PRES) is an increasingly recognised cause of headache, visual disturbance and altered mental state. There are striking

chrecteristic findings on neuroimaging. PRES is associated with number of conditions including autoimmune disease.
Method: A 37 year old women presented to accident and emergency with six day history of worsening headache, generalised bodyache, severe photophobia, pyrexia, rigors and vomiting. She had a background of systemic lupus erythematosus (SLE) complicated by lupus nephritis, pancytopenia and antiphospholipid syndrome, migraine and complex partial seizure. She had previously left pre-retinal haemorrhage while on low molecular weight heparin. She was taking prednisone and mycophenolate mofetil and having monthly plasmapheresis.
Neuroimaging showed bilateral change involving parieto-occipital lobes features consistent with PRES.
The patient's blood pressure increased during admission and received antihypertensive to limit progression of PRES.
Results: The patient's visual symptoms had mostly resolved on discharge. However she was re-admitted several days later with progression of lupus nepheritis, requiring re-admission. During her admission she experienced generalised tonic-colonic seizure. Repeat neuroimaging showed completely resolved previous abnormal areas, however there were new areas of ischaemic changes in the frontal parietal occipital lobe, as well as cerepellar hemispheres, midbrain and pons. This changes possibly represent areas of ischaemia or inflammation secondary to anti phospholipid and SLE.
Conclusion: PRES is an under recognised clinical and radiological syndrome which could present with various neurological features. An association between PRES and SLE becoming increasingly recognised.
PRES is often, but not always reversible and can result in permanent neurological damage.

AS31-048

CASE REPORTS

ACUTE HIPPOCAMPAL INFARCTIONS PRESENTING AS SUDDEN ONSET TRANSIENT MEMORY LOSS, PICKED UP BY EARLY MRI IMAGING

T. Rathnayake[1], L. Alwis[1], A. Asokanathan[1], S. Sethuraman[1], D. Phiri[1] and L. Sekaran[1]
[1]Luton & Dunstable University Hospital, Department of Stroke, Luton, United Kingdom

Background and Aims: Transient Ischaemic attacks (TIA) and Strokes, involving the hippocampus could be misdiagnosed as the symptoms are atypical. We present two such cases diagnosed by early MRI at a rapid access TIA clinic.
Method: A 71 year old lady presented with sudden onset impairment of short term and long term memory. Her past medical history included benign essential tremors, hypothyroidism and hypercholesterolemia. She had no previous cognitive impairment. Next morning she had completely recovered. She had no other focal neurological symptoms or signs. MRI head showed evidence of acute infarction involving the tail of left hippocampus.
A 77 year old man developed sudden onset dizziness and transient sensory alteration on the right arm and leg. He noticed that he had forgotten how to use the television remote controller. He also had memory impairment. He had vascular risk factors which included diabetes mellitus, hypertension and ischaemic heart disease. Symptoms and signs resolved completely within 24 hours. MRI head showed an acute infarct involving the left hippocampus.
Results: Both patients had appropriate aetiological investigations and their secondary preventive measures were optimized.
Conclusion: Hippocampus is a part of the limbic system, plays an important role in consolidating short and long term memory. These cases emphasize the importance of early MRI scan in evaluation of patients with acute transient memory loss.

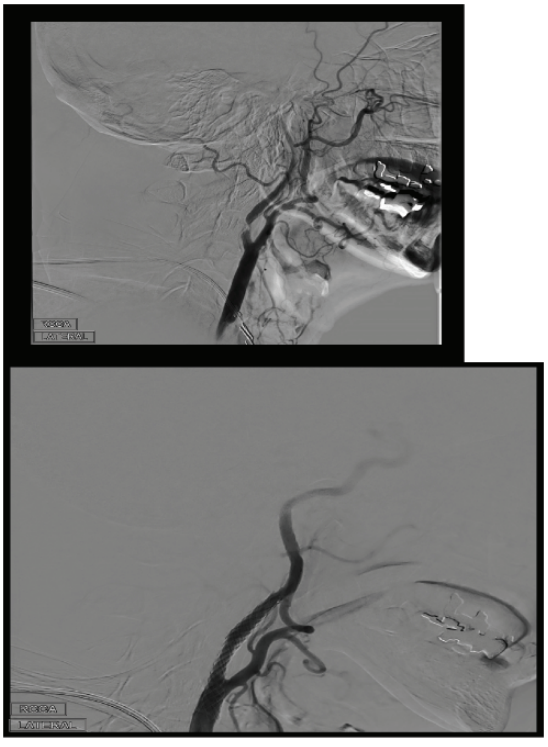
AS31-049

CASE REPORTS

STENTING OF A CRITICAL INTERNAL CAROTID ARTERY STENOSIS AS AN ADJUNCT TO THROMBECTOMY: A CASE REPORT

S. Hervey[1], I. Kane[1], M. Poitelea[2] and L. Ramsawak[3]
[1]Brighton and Sussex University Hospitals NHS Trust, Stroke Medicine, Brighton, United Kingdom
[2]Brighton and Sussex University Hospitals NHS Trust, Neuroradiology, Brighton, United Kingdom
[3]Sussex and Surrey Healthcare NHS Trust, Geriatric Medicine, Redhill, United Kingdom

Background and Aims: A 61 year old man presented with an acute loss of vision in his right eye followed by a right total anterior circulation stroke syndrome.
Method: He was initially treated with thrombolysis. Catheter angiogram revealed a critical stenosis of his right internal carotid artery, thrombus within the M1 and M2 branches of his right middle cerebral artery, and an incidental anterior communicating artery aneurysm of 7 mm diameter.
Mechanical thrombectomy was performed, and following discussion between the interventional radiologist and stroke consultant, a stent was applied to the right internal carotid artery.



Results: The patient improved clinically, and was discharged home three days later with dual antiplatelet therapy. He was referred to the neurovascular multidisciplinary team meeting for discussion regarding management of the aneurysm.
Conclusion: Optimal timing for revascularisation after thrombolysis is unknown. In patients under 70 there is no difference in risk of stroke or

death with endovascular therapy in comparison with surgical endarterectomy.
In this case, treatment decisions were made in the best interest of the patient and following discussion between two experienced clinicians. The detection of an aneurysm highlights the importance of screening for other pathology which may require further management.

AS31-050

CASE REPORTS

ENCEPHALOPATHY AND MULTIPLE ACUTE CEREBRAL INFARCTS AS CADASIL DISEASE ONSET

F. Acebrón[1], R. Vera[2], C. Anciones[2], A. De Albóniga-Chindurza[2], E. Monreal[2], A. Cruz[2], A. De Felipe Mimbrera[2], C. Matute[2], J. López-Sendón[2] and J. Masjuan[2]
[1]Hospital Ramon Y Cajal, Neurology Departament. Stroke Unit, Madrid, Spain
[2]Hospital Ramon Y Cajal, Neurology Unit, Madrid, Spain

Background and Aims: CADASIL is a hereditary microangiopathy that causes strokes, migraine and progressive cognitive impairment. CADASIL onset as encephalophalophaty and acute cerebral infarcts is exceptional.
Method: Case report.
Results: A 42 year old man known to be a previously asymptomatic carrier of a CADASIL causing mutation (Arg 332 Cys mutation). Previous cranial magnetic resonance imaging (MRI) revealed mild temporal lobe hyperintensities consistent with CADASIL. He arrived at the hospital with a three-day clinical course of dysarthria, instability, left limb weakness and somnolence. During the previous week he had had an influenza illness with high fever. The physical examination showed fever, altered mental status with drowsiness, inattention and disorientation. He had dysarthria, trunk ataxia, bilateral dysmetria and mild left hemiparesis. Cranial MRI (diffusion-weighted technique) showed multiple acute simultaneous infarcts; two of them in both medium cerebellar peduncles. The rest of the study was normal, including cerebrospinal fluid analysis. During hospitalization, patient received hydration, aspirin, statins and antipyretics. He had progressive improvement and was discharged from hospital after 15 days with only mild dysarthria and ataxia. At the month of discharge, mild dysarthria persisted and he had not cognitive complaints, Minimental test score was 30/30.
Conclusion: We describe a case of a patient with carrier of a presymptomatic CADASIL mutation, who developed rapidly progressive encephalopathy and multiple simultaneous brain infarcts, as the first clinical manifestation of the disease. The increased metabolic rate secondary to fever, dehydration and failures in vascular tone regulation are possible causes of these manifestations.

AS31-051

CASE REPORTS

STROKE, ABSCESSES, DYSPNEA AND EPISTAXIS. A CASE REPORT

B. Oyanguren[1], M. González-Salaices[1], M. Eimil[1], C. Lopez de Silanes[1], M.J. Gil[1], L.I. Casanova[1] and S. Muñiz[1]
[1]Hospital de Torrejón, Neurology, Madrid, Spain

Background and Aims: Rendu-Osler-Weber syndrome (ROWS) or Hereditary haemorrhagic telangiectasia (HHT), is an infrequent autosomic dominant vasculopathy which causes multifocal arteriovenous malformations (AVM) and telangiectasias, with a wide variety of clinical presentations.
Method: We describe a case report.
Results: A 57-year-old female, with hypertension, chronic ischemic cardiopathy, ROWS with pulmonary arteriovenous fistulae (PAF) which required periodic embolizations and complicated with septic cutaneous embolisms and pyomiositis; is admitted to Internal Medicine following progressive left hemiparesis (MB: arm 3/5; leg 2/5); apyrexial. Gadolinium enhanced MRI showed multiple bilateral frontal abscesses, and cerebral biopsy detritus, coccoid flora and necrotic tissue, without signs of malignancy. Empirically treated with cefotaxime, vancomicine, metronidazole and dexametasone, she experiences complete recovery.
She is readmitted three years later to our Stroke Unit following a sudden onset of dizziness, paleness and left hemiparesis (0 + 1) and hemihypoesthesia (1). NIHSS 2. Previous abscesseś sequelae seen on multiparametric CT (no thrombus on CT angiogram), as well as anemia (hemoglobin 8 mg/dl), contraindicated revascularization. Cerebral MRI showed a right MCA acute infarction and TCD-USS a massive extracardiac right-to-left shunt. TTE was normal, whereas thorax CT angiogram showed multiple pulmonary PAFs, one of them with a thrombus within its efferent vein. Endovascular treatment eas performed without complications. Upon discharge, three weeks later, just left hemihypoesthesia (1) remained, NIHSS 1.
Conclusion: -Embolic neurologic complications are frequent and severe in HHT. AVMś embolization and a close follow-up are the clues for prevention.
-Nevertheless, the treatment of AVMś thrombosis remains controversial because of the high risk of iatrogenic embolism during the procedure.

AS31-052

CASE REPORTS

NEUROVASCULAR COMPLICATIONS IN PNEUMOCOCCAL MENINGITIS: IMPROVING DETECTION AND MANAGEMENT

M. Eimil[1], J.C. Méndez[1], B. Oyanguren[2], M. González-Salaices[1], C. Lopez de Silanes[3] and E. De Antonio[4]
[1]Hospital de Torrejón, Neurology, Madrid, Spain
[2]madrid, Spain
[3]Hospitald e Torrejón, Neurology, Madrid, Spain
[4]Hospital de Torrejón, Neurology, Neurology, Spain

Background and Aims: Neurovascular complications occur in 30% of patients with pneumococcal meningitis due to inflamation, vasoespasm and hypercoagulation. They associate a poor prognosis despite medical treatment. Endovascular treatment remains controversial in these patients.
Method: We describe a case of pneumococcal meningitis with neurovascular complications diagnosed with TCD-USS and successfully treated with an endovascular approach.
Results: A 42 year-old-drinker male was found unconscious and pyrexial at home. He had last been seen well 36 h before. On admission to the Emergency Department he was diagnosed with acute bacterial meningitis (GCS 5) and admitted to the Intensive Care Unit on antibiotics and steroids. A pneumococcal etiology was confirmed, however, despite appropriate medical treatment he did not experience any clinical improvement during the first week, and, on day +8 of admission, Cranial CT showed multifocal acute strokes in both anterior and posterior territories. TCD-USS showed generalized increased flow velocities and CT angiogram confirmed multifocal vasospasm, especially severe in the left MCA. Endovascular treatment with nimodipine was then applied and angioplasty on the left MCA was performed, without complications. During the following days, both clinical symptoms (GCS 10: O4 M5 S1) and neurosonological parameters improved, and no new acute ischemic lesions were seen in control neuroimaging.
Conclusion: -TCD-USS is a good tool to diagnose neurovascular complications in pneumococcal meningitis.

-Endovascular treatment may be considered in some cases.

AS31-053

CASE REPORTS

AUTO-IMMUNE ACQUIRED HEMOPHILIA A ASSOCIATED WITH CLOPIDOGREL: A TREATABLE LIFE-THREATENING CONDITION

R. Hourez[1], M.A. Azerad[2], B. Dachy[1] and M.D. Gazagnes[1]
[1]CHU Brugmann, Neurology Department, Brussels, Belgium
[2]CHU Brugmann, Hematology Department, Brussels, Belgium

Background and Aims: Acquired hemophilia A (AHA) is a rare bleeding disorder caused by autoantibodies against factor VIII (FVIII). Treatment with clopidogrel is a rare cause of AHA, its clinical course and treatment are largely unknown.
Method: We describe the case of a 58-year-old man who was hospitalized for a right hemispheric stroke. After four weeks of clopidogrel use, the patient presented an unstoppable bleeding from a benign razor cut on the chin and acute anemia requiring blood transfusions. CTs revealed a left subdural hematoma and a large hematoma of the gluteus maximus.
Results: aPTT was prolonged and the FVIII and FVIII inhibitor levels were <1% and 4 Bethesda units/mL, respectively. Clopidogrel-associated AHA was considered, clopidogrel administration was terminated and we began steroid treatment. The patient required more transfusions and FVIII levels remained <1%. Recombinant factor VIIa was administered. The patient kept deteriorating with enlargement of the subdural hematoma. The patient was treated with steroids, cyclophosphamide and repeated FVIIa administrations for two months before FVIII, FVIII inhibitor, and aPTT values were normalized. No further bleeding or aPTT prolongation has been reported during the 1-year follow-up period.
Conclusion: Auto-immune acquired hemophilia A should be considered in patients taking clopidogrel and experiencing bleeding. Steroids, cyclophosphamide and recombinant factor VIIa are therapeutic options.

AS31-055

CASE REPORTS

INTERARM TEMPERATURE DIFFERENCE: MANIFESTATION OF SUBCLAVIAN STEAL SYNDROME?

O. Ibrahimagic[1], D. Smajlovic[1], Z. Dostovic[2], A. Iljazovic[1] and B. Kojic[1]
[1]University Clinical Center Tuzla, Neurology, Tuzla, Bosnia - Herzegovina
[2]University Cinical Center Tuzla, Neurology, Tuzla, Bosnia - Herzegovina

Background and Aims: Background: Subclavian steal syndrome (SSS) is a circulatory disorder usually caused by atherosclerosis, accompanied by ischemic symptoms of the vertebrobasilar region and the hand.
Aim: To evaluate possible interarm temperature difference in patient with SSS.
Method: Case Report.
Results: We present unusual features at 80-year-old male Caucasian. He experienced ischemic stroke of left frontoparietal region with contralateral hemiparesis on the basis of the arterial hypertension, diabetes, and active smoking for more than 55 years. He had no history of arm claudication, syncopae, and problems with vertebrobasilar circulation. Except disregulation of blood sugar values, laboratory findings were normal. We found a discrepant brachial systolic arterial blood pressure, for 35 mm Hg less on the left arm (grade 2), as well as the absence of ipsilateral radial pulse. There were no vascular bruits on the neck. Dopler-sonography demonstrated continuous reversed flow (CRF) in the left vertebral artery. Our patient met criteria for asymptomatic SSS. Body temperature in supraclavicular, axillary and cubital regions was lower on left side (0.6 C/0.7 C/0.3 C), and equal in palmar regions
Conclusion: Brachial systolic arterial blood pressure gradient is related to severity of SSS. Hypothetically, interarm temperature difference could be an unrecognized manifestation of SSS. We presume that chronic prolonged ischemic process may have a consequence on skin temperature, too. According to literature survey, there were no similar reports. We emphasize that further studies should show possible influence of local ischemia on local temperature in patients with SSS.

AS31-056

CASE REPORTS

SYPHILITIC CEREBRAL VASCULITIS AS THE INITIAL MANIFESTATION OF A HIV/SYPHILIS CO-INFECTION

R. Hourez[1], V. Gudumac[2], B. Dachy[2] and M.D. Gazagnes[2]
[1]CHU Brugmann, Neurology, Brussels, Belgium
[2]CHU Brugmann, Neurology Department, Brussels, Belgium

Background and Aims: Syphilitic cerebral vasculitis is a forgotten, highly treatable cause of vasculitis. In the current era, neurosyphilis is most common in patients with HIV infection
Method: A 39-year-old previously healthy Ukrainian man was admitted for subacute headache, dysarthria and left hemiparesis.
Results: MRI showed extensive diffusion restriction in the right middle and posterior arteries territories. CTA and MRA showed stenosis of both vertebral arteries, basilar artery, both posterior cerebral arteries and posterior M2 branches of the right middle cerebral artery. CSF showed increased WBCs, protein levels and hypoglycorrhachia. HIV and syphilis screening tests were positive with the following serologic values: VDRL/RPR 256U, Treponema IgG-IgM positive, TPHA Index Vienna 2000 921, V1H1 134000 copies/ml (blood), 600000 copies/ml (CSF). The patient was treated with intravenous Penicillin G (4 milllions UI 6x/d for 14 days) with a good clinical recovery.
Conclusion: Neurosyphilis can affect the central nervous system in the form of either meningovascular or parenchymatous neurosyphilis. Presentation varies from no symptoms to meningitis, tabes dorsalis, and general paresis. *Treponema pallidum* can invade any vessel in the subarachnoid space resulting in thrombosis, ischemia, and infarction. Meningovascular syphilis most commonly affects the middle cerebral artery followed by basilar artery, causing stroke-like symptoms in a young person that can be easily mistaken as primary central nervous system (CNS) vasculitis. In the current era, neurosyphilis is most common in patients with HIV infection. Meningitis and meningovascular disease are the usual manifestations. Clinical suspicion and cerebrospinal fluid (CSF) examination are keys to the diagnosis of neurosyphilis.

AS31-057

CASE REPORTS

RECURRENT ISCHAEMIC EVENTS IN INTERNAL CAROTID ARTERY DISSECTION – A CASE FOR ALTERNATIVE 1ST LINE IMAGING?

N. Christina[1], M. Ghosh[1], S. Mahmood[1], E. Lawrence[1] and Y.Y.K. Kee[1]
[1]Croydon University Hospital, Care of the Elderly, Croydon, United Kingdom

Background and Aims: Current guidelines in the UK advise early Carotid imaging for patients presenting with TIA/stroke[1]. Most UK services currently use carotid doppler as the first line of investigation.
In patients presenting with recurrent symptoms it is important to exclude a diagnosis of dissection, which may change the management[2] and subsequent investigations to find tackle risk factors[3].
Method: We present two cases of ICA dissection which were challenging to be diagnosed.
Results: A 50 year old smoker presented to the TIA clinic with transient right sided weakness. The MRI head showed left caudate and basal ganglia infarct. The carotid Doppler showed minimal plaques bilaterally. He was commenced on Clopidogrel and secondary preventive management. Two weeks later he represented with similar symptoms, and Contrast Enhanced MRA showed a dissection of his left distal internal carotid artery.
The next case is of a 70 year old who presented with a right MCA infarct following collapse and acute confusion. His carotid doppler showed <30% stenosis of right ICA. A subsequent CT angiogram of aortic arch showed severe stenosis of right distal cervical internal carotid artery and MRA head confirmed the diagnosis of distal internal carotid artery dissection.
Both were commenced on oral anticoagulants.
Conclusion: In the cases described, dissection was not found on initial doppler imaging. Additionally some studies have shown up to 65% of patients have intracranial extension of their dissection[4]. This raises the question, that perhaps CTA/MRA should be used as 1st line imaging to pick up carotid dissection and distal disease in certain populations.

AS31-058

CASE REPORTS

AN UNUSUAL CASE OF RECURRENT TRANSIENT GLOBAL AMNESIA

M. Ghosh[1], S. Mahmood[1], C. Negansan[1], E. Lawrence[1] and Y.Y.K. Kee[1]
[1]Croydon University Hospital, Care of the Elderly, Croydon, United Kingdom

Background and Aims: Transient global amnesia (TGA) is an uncommon diagnosis with the cardinal features of anterograde memory loss, absence of confusion, absence of focal neurology and absence of seizure activity. With an incidence of 5–11 per 100 000 population per year (1), it is rarely seen with low recurrence rates between 3% and 26% annually (2).
Method: This case discusses an elderly Caucasian gentleman who presented to the TIA clinic with an episode of transient amnesia.
Results: His symptoms lasted 30 minutes, with all residual symptoms resolving in 24 hours. He reported no epileptiform activity at any point in his life, no other neurological symptoms during the episode and no evidence of a confusional state. As his history was not consistent with a TIA or stroke, he was reassured about his symptoms and sent home. 1 year later, he presented with the same symptoms. An urgent MRI within 72 hours of symptom onset showed bilateral mesiotemporal hyperintense dot lesions on DWI with corresponding hypointensities on the ADC map.
Conclusion: Often recurrent episodes and ones of shorter durations have been attributed to other pathologies such as Transient Epileptic Amnesia (3), however the characteristic MRI above are not found in this (4). We explore possible aetiologies of TGA and the likelihood of ischaemia as the underlying aetiology.

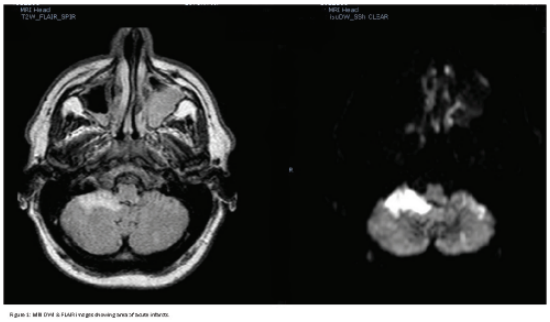
AS31-059

CASE REPORTS

ACUTE ISCHAEMIC STROKE PRESENTING AS ACUTE VESTIBULOCOCHLEAR FAILURE

C. Oliver[1], H. Habib[1], M. Tsuda[1], L. Sekaran[1], D. Phiri[1], S. Sethuraman[1], L. Alwis[1] and A. Asoknathan[1]
[1]Luton & Dunstable NHS University Hospital, Stroke Medicine, Luton, United Kingdom

Background and Aims: Sudden onset bilateral deafness is an unusual presentation of acute ischaemic stroke. It is due to posterior circulation events, mostly anterior inferior cerebellar artery infarction. Previous series have indicated a relatively good prognosis of the hearing deficit, up to 65% of patients experience partial or complete resolution. Therefore, it's important to recognise these cases of acute deafness, for initiation of secondary prevention & rehabilitation.
Method: Here we present the case of a 52 year old man, with sudden onset bilateral deafness and unsteadiness, first noticed on waking. He had hypertension & type 2 diabetes mellitus. On examination there was truncal ataxia & bilateral horizontal nystagmus. MRI and MRA confirmed restricted diffusion in the cerebellar pontine angles bilaterally, the cerebral peduncles, the medulla, & multifocal areas in the left cerebellar hemisphere and significant bilateral vertebral artery disease (figure 1).
Results:



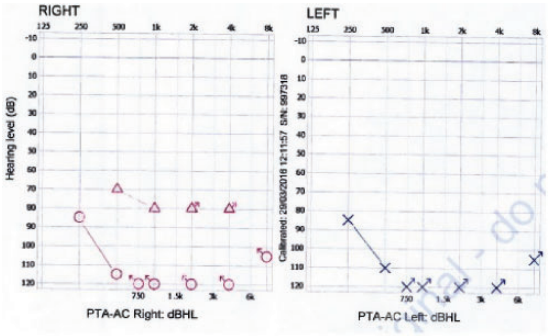


Figure 2: Audiogram: bilateral profound hearing loss

Conclusion: The patient was rehabilitated on our hyperacute stroke unit & initiated on secondary prevention medications. Detailed neuro-otological testing has revealed bilaterally absent auditory brainstem response, & profound hearing loss on pure tone audiogram; confirming bilateral audiovestibular failure (figure 2). The vertigo & ataxia gradually improved, but unfortunately the profound hearing deficit persists.

AS31-060

CASE REPORTS

BRAINSTEM TIA UPON INFUSION OF AUTOLOGOUS HEMATOPOIETIC STEM CELLS CRYOPRESERVED WITH DIMETHYLSULFOXIDE - A CASE REPORT

A.A. Polymeris[1], G.T. Stehle[2], M. Medinger[2] and G.M. De Marchis[1]
[1]University of Basel and University Hospital Basel, Department of Neurology and Stroke Center, Basel, Switzerland
[2]University Hospital Basel, Department of Hematology, Basel, Switzerland

Background and Aims: Neurologic adverse events can occur upon infusion of hematopoietic stem cells cryopreserved with dimethylsulfoxide (DMSO). DMSO is associated with stroke, seizures and encephalopathy, but the evidence is sparse. Here, we aim to contribute to the body of evidence with a new case, promptly investigated with MRI.
Method: This is a case report.
Results: A 67-year-old man diagnosed with IgA multiple myeloma underwent his first autologous hematopoietic stem cell transplantation (HSCT) cryopreserved using 7.5% DMSO. Five minutes after HCST-end, the patient became confused and somnolent. Neurological examination revealed: (i) internuclear ophthalmoplegia with adduction palsy on the left eye and nystagmus on the abducted right eye, (ii) right central facial palsy, (iii) right tongue palsy with dysarthria, and (iv) distal right arm paresis. An urgent MRI revealed no infarct or cerebral disease. All symptoms abated within 90 minutes without any therapy.
Conclusion: The close temporal association between the brainstem TIA and the HSCT suggests DMSO as trigger for the TIA. The reason why DMSO can be associated with such focal symptoms remains unclear. Despite such alarming brainstem symptoms, the normal MRI and rapid clinical improvement were reassuring.

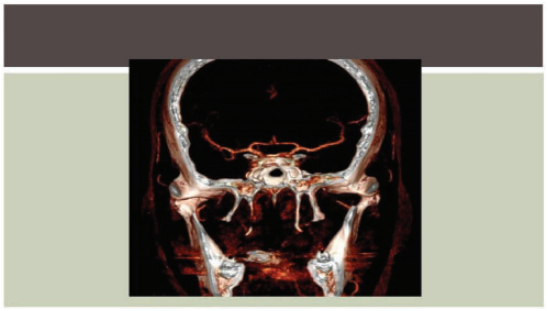
AS31-062

CASE REPORTS

BILATERAL THALAMIC INFARCTION DUE TO ARTERY OF PERCHERON OCCLUSION - SHOULD WE THROMBOLYSE OR NOT

T. Chakraborty[1]
[1]Countess Of Chester Hospital, Stroke and Acute Medicine, Chester, United Kingdom

Background and Aims: Bilateral thalamic infarcts are rare presentations of stroke. The Artery of Percheron is a rare vascular variant in which a single dominant thalamoperforating artery arises from one P1 segment and bifurcates to supply both paramedian thalami. Occlusion of this uncommon vessel results in a characteristic pattern of bilateral paramedian thalamic infarcts. We report a case of a 54-year old man with acute bilateral thalamic infarcts and an occlusion in Artery of Percheron was suggested on MRI brain.
Method: This 54 year old gentleman,previously fit and well was admitted with a history of collapse on the floor. *His GCS* was 8 on arrival to A&E and had anisocorea was noted. The pupillary response to light was sluggish. He had a gaze palsy to the left and also had an abnormal posturing of both upper limbs. As his initial CT Brain was unremarkable and his neurological findings were not improving, he was thrombolysed whilst intubated. He subsequently had MRI Brain on the same day which showed bilateral thalamic infarcts (Figure 1) with suggestion of artery of Percheron occlusion.
Results: Bilateral thalamic infarcts are rare occurrences,accounting for 22 to 35% of all thalamic infarcts [1,2].
Post thrombolysis he improved significantly with some remnant of gaze palsy and some memory issue, MRI confirmed that he suffered bilateral paramedian thalamic infarct and decision of thrombolysis was justified with his clinical improvement.
Conclusion: Occlusion of a vascular variant, the Artery of Percheron results in bilateral paramedian thalamic infarcts with or without midbrain involvement. Treatment options include thrombolysis and medical therapy. It usually carry a favorable prognosis.



AS31-065

CASE REPORTS

CEREBRAL AIR EMBOLISM POST INTRAVENOUS THROMBOLYSIS-A RARE COMPLICATION

M. Tsuda[1], H. Habib[1], C. Oliver[1], A. Asokonathan[1], L. Alwis[1], L. Sekaran[1], S. Sethuraman[1] and D. Phiri[1]
[1]Luton and Dunstable Hospital, Stroke medicine, Luton, United Kingdom

Background and Aims: Cerebral air embolism can occur in the venous or arterial system, the latter being far more serious. As little as 2 ml of air in the cerebral arteries can prove fatal. The cause is often iatrogenic and is associated with cardiovascular, neurological and gastrointestinal interventions. We report a rare case of cerebral air embolism following thrombolysis.
Method: A 70 year old gentleman attended hospital with right-sided pyramidal features. He has COPD and a recent diagnosis of lung cancer with a prognosis of more than one year. On examination, right arm power was 2/5; right leg 3/5 with normal sensation; NIHS score 7, GCS 15. CT head showed no bleed or established infarct. The patient was thrombolysed intravenously four hours after onset of symptoms. Three hours later his GCS fell to 3. A repeat CT head showed a left MCA infarct with air embolism (Fig 1). ECG showed ST elevation (inferior

and anterolateral leads) with a raised Troponin, 243. The patient did not regain consciousness and subsequently died of malignant MCA syndrome.
Results:

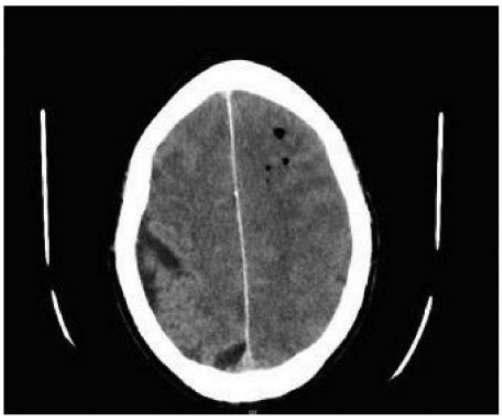


Fig1
Conclusion: Air embolisms have been reported following vascular catheter interventions. We are not aware of any reported case of air embolism after IV thrombolysis. We assume in our patient, air may have escaped from his lungs and crossed to the left heart through a patent foramen ovale (PFO) causing air embolism.

AS31-066

CASE REPORTS

THE CONSTRICTED BRAIN

S. Ponnambath[1], L. Carter-Brzezinski[1], H. Woodcraft[1], T. Scriven[1], R. Hinton[1], C. Holmes[1] and S. Kestenbaum[1]
[1]Univeristy Hospitals Bristol NHS Foundation Trust, Stroke Medicine, Bristol, United Kingdom

Background and Aims: Case Report
39 year old lady presented with sudden onset maximal headache six days prior to admission. The pain was occipital and progressed to a dull ache over six days. On the day of admission, she developed an acute on chronic occipital headache with associated right arm and leg paraesthesia and weakness. Further inquiry revealed she was a crack-cocaine user.
Neurological examination revealed four out of five power in all muscle groups in the right arm and leg, with associated reduced non dermatomal sensation to light touch and pin prick. Joint position sense was also affected on the right.
Method: We undertook investigations for ischaemic or haemorrhagic causes to explain the neurology.
Results: Plain CT showed a low density within the body of the corpus callosum to the left. Subsequent MRI head demonstrated infarction of the splenium of the corpus callosum, with a few other scattered small high signal intensity lesions. Having excluded other causes, we diagnosed this patient with Reversible Cerebral Vasoconstriction Syndrome. We managed this patient in consultation with our neurology colleagues with high dose aspirin and secondary prevention measures.
Conclusion: This is an interesting case of a young patient presenting with a stoke mimic syndrome. It should be considered as an important differential in a young patient presenting with stroke-like symptoms, especially if the symptoms are recurring. It is also vital to exclude other causes of splenium infarction including transient hypoglycaemia, encephalitis, anticonvulsant therapy, ADEM and multiple sclerosis. The imaging modality of choice is MR angiography.

AS31-068

CASE REPORTS

BIOPSY PROVEN WARFARIN INDUCED VASCULITIS : A CASE REPORT

S.M. Noh[1] and S.R. Han[1]
[1]St. Vincent's hospital- school of medicine- The catholic university of Korea, Neurology, Suwon, Republic of Korea

Background and Aims: Oral anticoagulants are widely used in the prevention and treatment of cardioembolic stroke. Warfarin sodium is most extensively used oral anticoagulant despite its narrow therapeutic range and variable drug interactions. Although the major concern of use of warfarin is bleeding, other adverse events are also considerable, including gastrointestinal or dermatological problems. Common warfarin induced skin changes are ecchymosis, purpura that cause by an excessive anticoagulant effect. Warfarin induced leukocytoclastic vasculitis is rare condition and its causal relationship is still unclear. We report on a patient who developed leukocytoclastic vasculitis during warfarin therapy.
Method: A 77-year-old man admitted to emergency department with epigastric pain. He had taken warfarin for one month due to atrial fibrillation and old ischemic stroke. Laboratory studies showed elevated liver enzymes (AST/ALT 552/359). Other causes which may lead to increase liver enzymes were not found on evaluation. Physical examination revealed well-demarcated non pruritic skin lesion on both legs. The international normalized ratio (INR) was 2.29 on admission. Skin biopsy was performed by dermatologist on affected area. Liver enzymes decreased and skin after discontinuation of warfarin.
Results: Histological examination demonstrated that perivascular infiltration of polymorphonuclear leukocytes and mononuclear cell, it suggest leukocytoclastic vasculitis. He received oral prednisolone and antiplatelet agent.
Conclusion: Non-hemorrhagic adverse event of warfarin is usually non-fatal. Warfarin induced vasculitis is also non-fatal complication, but it is clinically important because of it may require interruption of warfarin instead of dose adjustment.

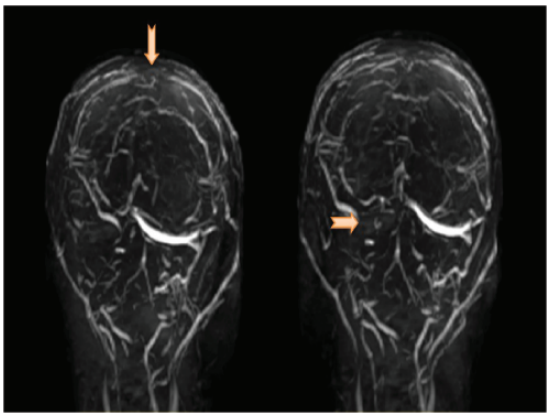
AS31-069

CASE REPORTS

SUPERIOR SAGITTAL AND RIGHT TRANSVERSE SINUS THROMBOSIS AS A CAUSE OF EPISODIC DIZZINESS IN A YOUNG MAN: A CASE REPORT

P. Olarte[1], J. Navarro[2] and K.J. Lara[1]
[1]Jose R Reyes Memorial Medical Center, Neurology, Manila, Philippines
[2]Jose R Reyes Memorial Medical Center- St. Luke's Medical Center-University of Santo Tomas, Neurology, Manila, Philippines

Background and Aims: Thrombosis of the dural sinus and/or cerebral veins (CVT) is an uncommon form of stroke, usually affecting young individuals. It represents only ~0.5% to 1% of all strokes, and of all CVT, approximately only 4.8% of patients have cerebellar involvement. Although there is abundant literature on supratentorial CVT, literature on infratentorial involvement is relatively sparse.
Method: We report a case of Superior Sagittal and Right Transverse Sinus Thrombosis in a 19 year old Filipino male presenting initially with episodic then subsequent persistent dizziness with no focal deficit over the course of 9 months. Work-up revealed leukocytosis and thrombocytosis in the absence of other findings of infection. No further studies for prothrombotic conditions were done, as the patient's hematologic picture spontaneously became normal.



Results: Our patient was managed as a case of superior sagittal and transverse sinus thrombosis, arriving almost nine months from the onset of symptoms, and was started on enoxaparin and subsequently shifted to warfarin. During admission and on follow-up at 10 and 12 months post ictus, still on oral anticoagulation, the patient was seen neurologically stable with no subjective complaints.
Conclusion: The diagnosis of CVT is typically based on clinical suspicion and imaging confirmation, and because of diverse causes and presenting circumstances, it is important to know the possible manifestations of this rare condition. CVT may be more commonly encountered than what is recorded not only by neurologists but by other subspecialties as well. Delayed recognition or lack of clinical suspicion subsequently delays treatment and contributes to poorer outcome.

AS31-070

CASE REPORTS

INTRAVENOUS THROMBOLYSIS IN B-THALASSEMIA STROKE PATIENT: CASE REPORT

D. Tzanetakos[1], V. Zisimopoulou[1], M. Safarikas[1], D. Kanellopoulos[1], D. Kaliontzi[2] and I. Chatzi[1]
[1]IASO General Hospital, Neurology, Cholargos- Attiki, Greece
[2]IASO General Hospital, Haematology, Cholargos- Attiki, Greece

Background and Aims: β-thalassemia major (TM) is a congenital haemolytic anaimia characterized by deficiency in the production of β-globin chains. Numerous studies have confirmed the association of TM with hypercoagulable state and increased risk of stroke. Optimal treatment of acute stroke in TM patients has not yet been established and there is very limited literature regarding the use of intravenous thrombolysis.
Method: We report a 51-year-old TM patient with a past medical history of splenectomy, myocardial siderosis, dilative cardiomyopathy, paroxysmal atrial fibrillation and diabetes. He presented with acute onset of right-sided hemiplegia, global aphasia and gaze deviation to the left. The NIHSS upon admission was 24. The brain CT scan revealed early signs of infraction in the left temporoparietal region, and a left hyperdense MCA. Coagulation parameters were normal, hemoglobin (Hb) was 10 g/dl and the carotid ultrasound had no abnormal findings.
Results: The patient received 47 mg rt-PA (0.9 mg/kg) 2 hours after symptoms onset and improved to an NIHSS of 12. There was a drop in Hb at 7,5 g/dl 6 hours after thrombolysis and blood transfusion was initiated. No systematic bleeding occurred, abdomen ultrasound had normal findings and coombs testing was negative. On the follow-up brain CT scan 24 hours post thrombolysis there was no sign of hemorrhagic transformation. On day 4 the patient had a cardiac arrest and he was successfully resuscitated only to have another cardiac arrest and pass away the following day.
Conclusion: Intravenous thrombolysis can be considered as a relatively safe option for TM patients accompanied with early initiation of blood transfusion and a close hematologic monitoring.

AS31-071

CASE REPORTS

SYSTEMIC THROMBOLYSIS IN ACUTE ISCHEMIC STROKE AFTER DABIGATRAN ETEXILATE REVERSAL WITH IDARUCIZUMAB – A CASE REPORT

D. Tireli[1], J. He[1], M.M. Nordling[2] and T. Wienecke[3]
[1]Zealand University Hospital- University of Copenhagen, Neurovascular Center- Department of Neurology, Roskilde, Denmark
[2]Zealand University Hospital- University of Copenhagen, Department of Radiology- Research Center for Advanced Imaging-, Roskilde, Denmark
[3]Zealand University Hospital- University of Copenhagen, Neurovascular Center- Department of Neurology- Faculty of Health and Medical Sciences- University of Copenhagen- Denmark, Roskilde, Denmark

Background and Aims: Introduction: Ischemic Stroke patients on oral anticoaculation are not eligible for intravenous thrombolysis (r-tPA) in case of acute Ischemic Stroke. Idarucizumab (Praxbind) reverse anticoagulation caused by Dabigatran Etexilate (Pradaxa) and might be a future treatment option prior to r-tPA.
Patient: A 71-year old male patient, treated with Dabigatran Etexilate because of paroxysmal atrial fibrillation and hypertension was referred to the Stroke Unit. On arrival, the patient had dysarthria, left side central facial palsy and hemiparesis (NIHSS 6). Brain Computer Tomography (CT) was without any sign of infarction, but the brain CT Perfusion revealed a perfusion defect in the right cerebral hemisphere.
Method: Dabigatran etexilate was antagonized with idarucizumab, approximately 2.5 hours after his last dose. Immediately after the infusion of idarucizumab, the patient received thrombolytic therapy,
Results: On day 3 the patient was discharged with a discrete dysarthria. Brain CT 24 hours and brain MRI 10 days after rtPA were without any infarction.
Discussion: Non-Vitamin K oral anticoagulants (NOACs) are widely used for prevention of embolic stroke in patients with atrial fibrillation. Dabigatran Etexilate is an oral thrombin inhibitor, which is reversed by Idarucizumab by directly binding Dabigatran Etexilate and neutralize its activity. Reversal of Dabigatran Etexilate using Idarucizumab was safe and successful without Idarucizumab interactions with r-tPA.
Conclusion: In the present case, Idarucizumab neutralized Dabigatran Etexilate and the following r-tPA treatment was safe and a successful clinical outcome.

AS31-072

CASE REPORTS

CASE-BY-CASE ANALYSIS OF EARLY AND LATE HEMORRHAGIC COMPLICATIONS AFTER ACUTE STROKE INTERVENTION

I. Stetkarova[1], B. Koznar[2], T. Peisker[1], P. Vasko[1], F. Rohac[2], J. Vavrova[2], J. Kroupa[2] and P. Widimsky[2]
[1]Third School of Medicine - Charles University - Hospital Královské Vinohrady, Neurology, Prague 10, Czech Republic
[2]Third School of Medicine - Charles University - Hospital Královské Vinohrady, Cardiology, Prague 10, Czech Republic

Background and Aims: Endovascular therapy (catheter-based mechanical thrombectomy with a stent retriever or aspiration) became the

superior indication for patients presenting within less than 6 hours from symptom onset in anterior circulation. Hemorrhagic events are the most serious complications of this therapy. In case-by-case analysis, we describe three types of hemorrhagic complication: a) reperfusion syndrome, b) periprocedural complication (perforation/dissection), and c) effect of anticoagulation therapy.
Method: Inclusion criteria to perform acute stroke intervention were moderate-to-severe acute ischemic stroke (NIHSS $\geq$ 6), no large ischemia on the admission CT scan and CT angiography evidence for occluded large intracerebral artery.
Results: A group of 108 patients (58 males, mean age 66 yrs, range 32–86 yrs) have been enrolled into this study. According to hemorrhagic complications, reperfusion syndrome was present in 2,7 % (3 pts), vessel perforation/major dissection was in 3,7 % (4 pts), and adverse effect of anticoagulation therapy in 1,8 % (2 pts). Outcomes of patients with these complications were poor; all but one died within 90 days.
Conclusion: Mechanical thrombectomy with stent retrievers is an effective treatment for patients with ischemic stroke, although hemorrhagic complications may occur. Case-by-case analysis of these event is important.
Supported by the Charles University Research Project Progress Q35.

AS31-073

CASE REPORTS

RECURRENT CARDIOEMBOLIC STROKE AND DABIGATRAN RESISTANCE: CLINICAL CASE

C. Anciones[1], R. Vera[1], A. de Albóniga-Chindurza[1], F. Acebrón[1], S. García Madrona[1], C. Matute[1], A. de Felipe[1], A. Cruz[1] and J. Masjuán[1]
[1]Hospital Universitario Ramón y Cajal, Neurology, Madrid, Spain

Background and Aims: Direct oral anticoagulants have improved stroke prevention in patients with non-valvular atrial fibrilation (NVAF). They do not require routinary measure of their anticoagulation activity. Dabigatran Etexilate (DE) increases qualitatively the activated Partial Thromboplastine Time (aPTT) and quantitatively the Thrombine Time (TT).
Method: Case report.
Results: A 78 year old woman with NVAF taking DE 110 mg/12 h, was admitted to the hospital with a cardioembolic ischaemic stroke 12 hours after the last dosage of DE. After hospital discharge, DE dosis was changed to 150 mg/12h. Three months later, she suffered a second ischaemic stroke and two peripheral embolisms to the left lower limb. Transesophageal echocardiography was performed, and a thrombus was detected in the left atrial appendage. The patient ensures strict accomplishment of her treatment but the blood test showed a normal aPTT and the HEMOCLOT® showed that diluted TT was not increased enough (67.4 sec) 2 hours after the intake of DE 150 mg/12h, revealing a parcial resistance to the treatment. Finally, she was switched to a factor Xa inhibitor, and scheduled to percutaneous closure of the left atrial appendage.
Conclusion: DE resistance is unusual, but it should be considered in patients with NVAF that comply the anticoagulant treatment and present recurrent embolisms and/or normal aPTT, in order to improve the secondary prevention of stroke.

AS31-074

CASE REPORTS

BOVINE AORTIC ARCH: AN ANATOMICAL VARIANT ON A CASE OF ACUTE ISCHEMIC STROKE

S. García Madrona[1], J. Martinez Poles[1], B. Escribano Paredes[1], V. Nedkova Hristova[1], C. Anciones[1], A. De Felipe Mimbrera[1], M.C. Matute Lozano[1], R. Vera[1], A. Cruz Culebras[1] and J. Masjuan[1]
[1]Hospital Ramon Y Cajal, Neurology, Madrid, Spain

Background and Aims: Bovine aortic arch is a anatomical variant that consists in a common origin for the right brachiocephalic trunk (BT) and left common carotid artery. The incidence of this pattern in global population is reported to be between 10,2% and 22%. We present a clinical case of stroke secondary to critical stenosis of brachiocephalic trunk with bovine arch origin.
Method: A 54-year-old man, smoker of two packs a day without other medical history, developed acute onset of motor speech disorder, and left-sided weakness. He was admitted to our emergency department. Initial examination showed BP 140/80, HR 80 bpm, drowsiness, dysarthria, left homonymous hemianopsia, left hemiplegia, hemisensory loss and left hemineglect., scoring 14 in the National Institute of Health Stroke Scale (NIHSS).
Results: Brain CT showed acute ischemic signs in right hemisphere. CT angiography revealed critical stenosis of BT and occlusive thrombus extending from the right internal carotid artery origin to M1 segment of middle cerebral artery. In the absence of improvement with intravenous thrombolysis, the patient underwent angiography, and recanalization was achieved with ballon angioplasty and mechanical thrombectomy. Posterior angiography showed persistence of critical stenosis of BT with bovine arch origin and right subclavian steal syndrome, and stenting of BT was successfully achieved. At three months the patient's deficit improved, and presented only mild dysarthria, left hemiparesis and left homonymous hemianopsia (NIHSS,8 and mRS 2).
Conclusion: Critical stenosis of brachiocephalic trunk with bovine aortic arch origin may produce atherothrombotic stroke and stent implantation could prevent new episodes.

AS31-075

CASE REPORTS

PIN-POINT HEMORRHAGE IN THE CHOROID PLEXUS OF THE DORSAL THIRD VENTRICLE IN EOSINOPHILIC GRANULOMATOSIS WITH POLYANGIITIS

T. Ohtsuki[1]
[1]Kindai University Hospital, Stroke Centre, Osaka-Sayama, Japan

Background and Aims: The eosinophilic granulomatosis with polyangiitis (called Churg-Strauss syndrome) is a type of systemic necrotizing vasculitis, that causes glomerulonephritis, bronchio-alveolar hemorrhage, purpuric dermal nodules, and mononeuritis multiplex/polyneuropathy. CNS involvement was reported as small but widely disseminated infarcts from small vessel occlusion, but was rarely as subarachnoid hemorrhage followed by intraventricular hemorrhage.
Method: A 50-year-old woman with asthma, who suffered from purpura and blood blister developing for 2 weeks, presented thunderclap headache. She showed decreased alertness with nuchal rigidity. CT demonstrated subarachnoid hemorrhage behind the medulla oblongata, and spinal tap showed xanthochromia. Marked eosinophilia, increases in

serum IgE and positive MPO-ANCA reaction were also noted. Skin biopsy demonstrated perivascular infiltration of eosinophil and neutrophil. Cerebral angiography could find no vascular abnormality such as aneurysm or fistula. Two day later, pin-point *de novo* hematoma localized in the dorsal third ventricular choroid plexus adjacent to the orifice of the cerebral aquaduct caused acute obstructive hydrocephalus.
Results: She was subjected to temporal ventricular drainage and subsequent prednisolone 1mg/kg combined with cyclophosphamide. The skin nodular purpura and intra-choroidal hematoma were gradually ameliorated with such immunosuppressive treatments following intravenous IgG. However, ventricular drainage complicated symptomatic parenchymal bleeds around to the drainage and multiple remote small infarcts, while the hydrocephalus was cleared.
Conclusion: Eosinophilic granulomatosis with polyangiitis prone to hemorrhage was challenging disease process to manage not only hemorrhagic and ischemic stroke but also a prudent indication of neurosurgery.

AS31-077

CASE REPORTS

VASCULITIS OF CENTRAL NERVOUS SYSTEM AND RENAL NEOPLASIA : A CASE REPORT

A. Maurousset[1,2], J.P. Cottier[3], A. May[4], G. Marie[1], D. Séverine[1], L. Adrien[5] and B. Adrien[6]
[1]University Hospital Center of Tours, Stroke Unit, Tours, France
[2]Université François-Rabelais, Faculté de médecine, Tours, France
[3]University Hospital Center of Tours- Tours- France, Department of General Radiology- Diagnostic and Therapeutic Neuroradiology, Tours, France
[4]University Hospital Center of Tours, Urology unit, Tours, France
[5]University Hospital Center of Tours, Infectious diseases unit, Tours, France
[6]University Hospital Center of Tours- Tours - France, Internal medicine unit, Tours, France

Background and Aims: Cerebral paraneoplastic vasculitis is an exceptional syndrome, which involves small or medium-sized vessels. We report the case of vasculitis of the central nervous system (CNS) associated with renal cancer.
Method: A 50-year-old man was admitted to the Neurology Department for a 7-day onset of headache, nausea and vomiting. He had medical history of hypertension and active smoking. He took no medication. Six day after admission, he presented with aphasia, dysarthria and left facial paralysis. Blood test eliminated infectious or autoimmune diseases. Cerebrospinal fluid (CSF) showed mild pleocytosis and normal glucose and proteinorachia. Cerebral MRI exhibited multiple bilateral white matter hyperintense lesions on FLAIR and diffusion weighted imaging, leptomeningeal enhancement, and multiple parenchymal and subarachnoid hemorrhages. Conventional angiography showed irregular and asymmetrical stenosis. Abdominopelvic CT scan diagnosed heterogeneous renal mass suspect of neoplasia.
Results: Various neoplasic syndromes have been associated with patients with renal cell carcinoma. There have been few previous descriptions of systemic vasculitis in association with renal cell carcinoma. Paraneoplasic vasculitis is more frequently associated with hematological disorder rather than solid tumors, such as small-cell lung cancer, renal and gastroenteric neoplasia. But to our knowledge, cerebral vasculitis has never been reported as a harbinger of renal neoplasia. This case is suggestive of primitive vasculitis of the CNS. However the close temporal relationship of renal cancer and vasculitis suggested a paraneoplasic vasculitis.
Conclusion: This case indicates the importance of searching neoplasia in patients with cerebral vasculitis when the etiologic agent is unknown.

AS31-081

CASE REPORTS

CONTRAST-RELATED ENCEPHALOPATHY AFTER THROMBECTOMY: POSSIBLE RELATION WITH ENDOTHELIAL DAMAGE

S. Bashir Viturro[1], S. Trillo Senin[2], C. Ramos Martin[2], L. Martinez Vicente[2], A. Ximenez-Carrillo[2] and J. Vivancos Mora[2]
[1]Hospital Universitario de la Princesa, Neurology, Madrid, Spain
[2]Hospital Unversitario de la Princesa, Neurology, Madrid, Spain

Background and Aims: Contrast-related encephalopathy associated with endotelial damage (CREED) occurs in patients who undertake revascularization procedures, due to a disturbance in autorregulation of blood flow after reperfusion, favoured by the disruption of the blood-brain barrier. We described a case series of patients who developed CREED after thrombectomy, and analyzed the possible variables associated.
Method: Descriptive study of patients with acute ischemic stroke treated with thrombectomy in our center, who developed CREED(defined as neurological deterioration and contrast extravasation in CT scan, resolved in subsequent CTs), after achieving a succesful recanalization. They were compared with patients treated who didńt develop CREED. We used the Mann-Whitney U test to analyze the results.
Results: 6 cases of CIEED:Mean age:78.2 years (SD:5.2), women:16.7%, median NIHSS:20, mean Rankin at dismissal:2. Compared to those patients without CREED(N:118), patients who developed CREED had a statistically significant correlation with older age (78,7 vs 65,9; $P < 0,05$), greater number of catheter passes (4 vs 1;$p < 0,01$) and greater NIHSS at 24 hours (19,5 vs 5,5;$P < 0.05$). No statistcally significant differences were found between both in relation to the duration of the procedure, nor with the functional outcome (at dismissal and at 3 months).
Conclusion: CREED is a relatively frequent complication in patients treated with thrombectomy. Its appearance could be related with direct endothelial damage done during thrombectomy as well as by reperfusion. Its incidence rises along with age, and, in this series, its presence does not affect their long term prognosis. Due to the potential reversibility of symptoms, these patients would benefit from mantaining a supportive treatment in spite of the neurological deterioration.

AS31-082

CASE REPORTS

HYPEREOSINOPHILIC SYNDROME AND STROKE

C. Brunner[1], D. Voskova[2], G. Ransmayr[1], R. Wunn[3] and M. Vosko[1]
[1]Kepler University Hospital Linz- Med Campus III, Clinic of Neurology 2, Linz, Austria
[2]Kepler University Hospital Linz- Med Campus III, Clinic of Internal Medicine 3 – specialised in Hematology- Oncology and Palliative Care, Linz, Austria
[3]Kepler University Hospital Linz- Med Campus III, Central Institute of Radiology, Linz, Austria

Background and Aims: Hypereosinophilic syndrome (HES) is a rare disorder characterized by persistently elevated eosinophil counts over 1,500/mm^3 in peripheral blood and bown marrow for more than 6 months.
Different types of HES exsist: reactive, non-reactive and idiopatic. The pathogenesis of HES still remains controversial and affects predominantly males. Clinical manifestations are markedly heterogeneous, since any organ can be effected due to eosinophilia-associated tissue damage. Granula of

eosinophilic granulozytes contain various proinflammatoric, cytotoxic and lytic mediators (e.g. major basic protein, MBP, eosinophilic cationic protein, ECP, eosinophil peroxidase, EPO, eosinophil-derived neurotoxin, EDN).
Neurological impairment occurs in up to 65% of patients with HES. Most common types are brain infarction, encephalopathy and peripheral sensory neuropathy. Once a HES is diagnosed a complete workup is reasonable to exclude common causes of eosionphilia.
Treatment of HES is complicated and depends on the type of HES and should be initiated as fast as possible to reduce signs of symptoms and maintain the eosinophil count below 1,500/m^3.
Method: Case Report
Results: We report a 47-year old women with internal watershed infarction in the setting of an idiopathic hypereosinophilic syndrome.
Conclusion: This case highlights that HES can be a cause of multiple embolic brain infarcts. We present an overview of pathophysiology and diagnostic algorithm of HES and border zone strokes as well.

AS31-083

CASE REPORTS

ESSENTIAL THROMBOCYTHAEMIA IN ISCHAEMIC STROKE: DO NOT BE MISGUIDED BY A NORMAL PLATELET COUNT

H. Harris[1], L. Jones[1], N. Mason[1] and P. Kerr[2]
[1]Royal Devon & Exeter Hospital, Stroke Department, Exeter, United Kingdom
[2]Royal Devon & Exeter Hospital, Haematology Department, Exeter, United Kingdom

Background and Aims: Essential Thrombocythaemia (ET) is a chronic myeloproliferative disorder recognised as a rare cause of ischaemic stroke with increased risk of thrombotic and haemorrhagic complications. It is important for stroke physicians to consider ET as a treatable cause of ischaemic stroke.
Method:
Results: Case Presentation
A previously fit and well 57 year old wine merchant was admitted with a left total anterior circulation syndrome (NIHSS of 23). His CT head showed a possible dense left middle cerebral artery and he was thrombolysed. A CT angiogram revealed a saddle thrombus extending in to the left common carotid and right brachiocephalic arteries which was not amenable to clot retrieval. Risk factors included smoking and hypercholesterolaemia.
His transthoracic echocardiogram, cardiac monitor and antiphospholipid screen were normal. Repeat CT angiogram at two weeks showed complete thrombus resolution. His platelets were initially 541 10^9/L and normalised with intravenous fluids however they subsequently rose to 1046 10^9/L at fourteen days post stroke. Janus Kinase (JAK) 2 was positive. He was diagnosed with Essential Thrombocythaemia and was treated with hydroxycarbamide. A repeat CT head at day sixteen demonstrated haemorrhagic transformation of his infarct therefore his Aspirin was withheld.
Conclusion: This case posed a number of challenges. Haemorrhagic transformation of an infarct in patients with ET presents a dilemma regarding antithrombotic therapy. Secondary prevention strategies are different in this group of patients and the role of statin therapy is still unclear. The diagnosis of ET in ischaemic stroke should not be overlooked on the basis of a normal platelet count.

AS31-084

CASE REPORTS

REFRAINING FROM THROMBOLYSIS IN HYPERACUTE FOCAL NEUROLOGICAL SIGNS - 4 CASES OF STROKE MIMIC

E. Dongo[1], I. Sipos[1], G. Rudas[2] and D. Bereczki[1]
[1]Semmelweis University, Department of Neurology, Budapest, Hungary
[2]Semmelweis University, Szentágothai Knowledge Center- MR Laboratory, Budapest, Hungary

Background and Aims: In acute ischemic stroke, thrombolysis is the treatment of choice if the patient meets guideline criteria. However, in some cases, even if the patient apparently fits all criteria, the right decision is to avoid fibrinolytic treatment. We present four cases where refraining from thrombolysis was the right decision.
Method: Brain CT and CT angiography, brain MRI scans and ultrasonography of the carotid and vertebral arteries was used.
Results: A 68 year-old man had been hospitalized four times and thrombolysed twice in the previous two years with right hemispheric symptoms. The accompanying headache led us to the diagnosis of hemiplegic migraine.
The systolic heart murmur over the aortic valve and the livid fingertips on the weak arm of a 60 year-old male were all pointing toward systemic embolization of the brachial artery.
A 27 year-old man with apparent left hemispheric complaints – speech difficulty and right arm weakness – had somatization disorder based on the detailed history, the lack of objective neurological signs and his obvious anxiety.
After a detailed revision of the MR scans of an 55 year-old woman, the left hemianopsy was the result of brain vasculitis.
Conclusion: Although it has been reported that intravenous fibrinolytic treatment has a low complication rate in stroke mimics, with thorough history and clinical examination unnecessary treatments can often be avoided.

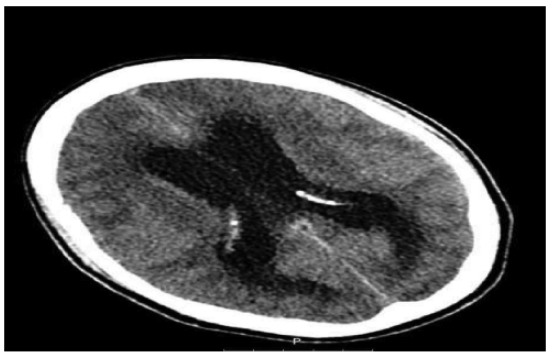
AS31-085

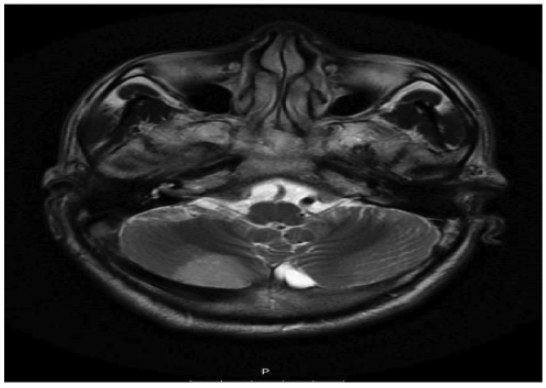
CASE REPORTS

MULTIPLE ISCHAEMIC INFARCTS SECONDARY TO TUBERCULOSIS MENINGITIS

N. Joyce[1], E. Byrne[1] and D. Vahidassr[1]
[1]Antrim Area Hospital, Stroke Medicine/Geriatric Medicine, Antrim, United Kingdom

Background and Aims: Tuberculous meningitis is a rare but important cause of cerebrovascular events in the UK.
Method: Case report. Discussion of association between Tuberculosis meningitis and Ischaemic Stroke. Written consent obtained for case report and images.
Results: This case involved a 44 year old East Timorese man who presented with a two week history of increasing confusion, headaches, ataxia and pyrexia. He had a history of exposure to tuberculosis but had no previous formal diagnosis. With aforementioned presenting symptoms he underwent a CT scan and MRI brain which demonstrated hydrocephalus and a right-sided inferior cerebellar infarct.





He was urgently transferred to the regional Neurosurgery unit for insertion of an extra-ventricular drain. A cerebrospinal fluid sample cultured Mycobacterium tuberculosis and he was initiated on appropriate antibiotics and Dexamethasone. Further MRI imaging demonstrated new areas of acute infarction in the right parieto-temporal and left frontal lobe.
His condition improved and was transferred to his local hospital for ongoing neurorehabilitation.
Proposed mechanisms for vascular complications include vasculitic processes leading to proliferative changes with vessel wall necrosis and finally thrombosis.
Conclusion: Cerebrovascular events are an important complication of tuberculosis meningitis and are associated with significant neurological disability and poorer outcome.

AS31-087

CASE REPORTS

INFECTION AND INFARCTION: A CASE OF MULTI-TERRITORIAL STROKE AND MULTIPLE INFECTIONS IN AN ELDERLY MAN

W. Brown[1], M. Theodoreson[1], E. Stratton[1], E. Barton[1], I. Garaeva[1], F. Rickard[1], C. Holmes[1] and S. Ponnambath[1]
[1]University Hospitals Bristol NHS Trust, Stroke Medicine, Bristol, United Kingdom

Background and Aims: Varicella zoster virus (VZV), human immunodeficiency virus (HIV), and *Treponema pallidum* (syphilis) infections are all causes of multi-territorial strokes. VZV infection is an increasingly well-established risk factor for ischaemic stroke. Cases of post-zoster stroke and meningovascular syphilis (a form of tertiary syphilis) are well described in patients with HIV infections. In this report, we describe a 70-year old Caucasian male who presented with an acute ischaemic stroke.
Method: The patient was admitted with a five-day history of loss of balance, left-sided hemiplegia and visual neglect. He had no known vascular risk factors. Two months previously, he had been treated for a VZV infection of the ophthalmic division of the right trigeminal nerve.
Results: An MRI head demonstrated acute right frontal and multiple small cerebellar infarcts. An echocardiogram was normal and the electrocardiogram demonstrated normal sinus rhythm. There was no evidence of vasculopathy on MRI or CT angiogram. The CSF was negative for VZV, but both CSF and blood samples were positive for active *Treponema pallidum* infection. Immunoassay for HIV antibodies subsequently confirmed the patient was positive for HIV type 1. At presentation, his CD4+ T cell count was 80 cells/mm(3) (7%) and his viral load was 28474 copies/mL.
Conclusion: Multi-territorial strokes with no cardioembolic source should prompt physicians to consider testing for other causes, including infections. Physicians should maintain a high index of suspicion for immunodeficiency in all patients. Elderly patients are often diagnosed at an advanced stage of HIV, and late diagnosis is associated with increased morbidity and mortality.

AS31-089

CASE REPORTS

THE BLIND SPOT – BLINDNESS AS INITIAL PRESENTATION OF SUBARACHNOID HAEMORRHAGE

A.J. Gordinho[1], S. Rosado[1], N. Ferreira[1], T. Mesquita[1], F. Araujo[1] and J.L. Araujo[1]
[1]Hospital Beatriz Ângelo, Medicina Interna, Loures, Portugal

Background and Aims: Terson's syndrome is recognized as intraocular haemorrhage associated with subarachnoid haemorrhage (SAH). It's a rare condition affecting 3% to 28% of SAH and its presence is associated with higher mortality.
The authors present the case of a 47-year-old Caucasian man with medical history of arterial hypertension that was admitted after a seizure. At arrival to the emergency department he was blind, high blood pressure (165/110 mmHg), right hemiplegia and severe agitation (requiring sedation and tracheal intubation). The brain CT showed a diffuse basal cisterns SAH with a ruptured basilar aneurism. He was admitted for neurovascular procedure and embolization, the intervention improved the neurological examination but blindness persisted. A fundoscopic examination revealed a left eye vitreous haemorrhage and both eyes with diffuse haemorrhages from papilla to macula. He was submitted to vitrectomy and laser therapy being discharged five days later maintaining left eye blindness and able to count fingers 1 meter distance with the right eye. Two months after discharge, he was revaluated at our clinic with left eye blurred vision and almost normal right eye visual acuity.
This case illustrates a rare presentation of SAH, although its presence is an adverse prognostic our patient survived without neurological motor deficits and recovered part of his visual acuity.
Method:
Results:
Conclusion:

AS31-093

CASE REPORTS

ACUTE HEMICHOREA-HEMIBALLISMUS: AN EXCEPTIONAL PRESENTATION OF CAROTID STENOSIS

M.E. Ramos-Araque[1], J.C. Morán-Sánchez[2], I. Gómez Esteve[1], Y. Berdei Montero[1] and J.C. Gómez-Sánchez[1]
[1]Institute of Biomedical Research of Salamanca IBSAL, University Hospital of Salamanca-University of Salamanca, Salamanca, Spain
[2]University Hospital of Salamanca, Neurology, Salamanca, Spain

Background and Aims: Hemichorea associated with carotid artery occlusive disease is extremely rare. Carotid stenosis should be considered in the differential diagnosis of hemichorea-hemiballismus.
Method: Case report.
Results: A 90-year-old man with past medical history of arterial hypertension, presented with acute left hemichorea-hemiballismus involving the arm and leg. Neurological examination revealed left repetitive, involuntary, irregular, purposeless, and non-rhythmic movements of the left arm and leg; without other neurologic signs. The severity of the movements increased with standing up. Blood tests including: full blood count, inflammatory markers, coagulation studies, renal, glucose, liver, thyroid function, autoimmunity and serologies were unremarkable. Computed tomography (CT) of the head and brain magnetic resonance imaging (MRI) were normal. Carotid duplex ultrasonography revealed 90% stenosis in the right internal carotid artery, confirmed by digital subtraction angiography. Single-photon emission computed tomography (SPECT) showed hypoperfusion of the right parietal and temporal lobes. Carotid arterial stenting was performed with gradually complete resolution of the movement disorder.
Conclusion: This case supports the hypothesis of hemodynamic ischemia in the pathophysiology of hemichorea associated with carotid artery stenosis. It has been suggested that the underlying mechanism may be the vulnerability of the nigrostriatal system to cerebral ischemia with consequent excessive release of dopamine. Neurovascular imaging is strongly recommended for the early identification of carotid disease in those patients, since its detection may allow treatment of chorea and prevent cerebral infarction.

AS31-094

CASE REPORTS

AMNESTIC STROKE SECONDARY TO TEMPORAL LOBE HAEMORRHAGE

P. Claffey[1], O. Hannigan[1], R. Kelly[1], R. Coen[2], D. Bradley[3] and J.A. Harbison[1]
[1]St. James Hospital, Stroke/Medicine for the Elderly, Dublin 8, Ireland
[2]St. James Hospital, Mercers Institute for Research on Ageing, Dublin 8, Ireland
[3]St. James Hospital, Department of Neurology and Stroke Medicine, Dublin 8, Ireland

Background and Aims: Amnesia is a rare presentation of stroke. We describe a case where temporal lobe haemorrhage resulted in severe antegrade and retrograde amnesia.
Method: A 44 year old man was admitted with headache, decreased level of consciousness and dysphasia. He was disoriented, GCS 12. CT showed left temporal lobe haemorrhage with ventricular spread. He was referred for extra ventricular drain insertion but developed a contralateral P2 infarction secondary to mass effect and compression against the tentorium.
Results: His motor and speech deficits improved but there remained profound amnesia. Extensive neuropsychological testing was performed. Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) demonstrated that both his immediate and delayed memory indices were highly amnestic with failed recall of both verbal and visual material. (<1st percentile). His Visuospatial/Constructional Index was well preserved scoring in the 73rd percentile. Attention Index was again poor. (2nd percentile). Language Index identified significant anomia (50%) with recall of family names poor or variable. During the NUFFACE test, he could not recall any of the twenty famous personalities by name. To assess the recall of his personal life, the Autobiographical Memory Interview was administered. He demonstrated definite impairment recall of semantic aspects of his autobiographical memory for recent back to early adult periods and was borderline for childhood periods. Recalling specific autobiographical events, he scored in the "definitely impaired" category for recent events, "probably abnormal" for early adult period and "preserved" for childhood period.
Conclusion: This is a previously undescribed cause of profound post stroke amnesia.

AS31-095

CASE REPORTS

OXYGEN SATURATION IN STROKE PATIENTS AT THE TIME OF ARRIVAL TO HOSPITAL

H. Maguire[1], A. Barry[1], K. Finney[1], J. Grocott[1], N. Abano[1], C. Roffe[2], A. Remegoso[1], A. Butler[1], S. Stevenes[1], R. Varquez[1] and R. Carpio[1]
[1]University Hospitals of the North Midlands, Stroke Research office, Stoke-on-Trent, United Kingdom
[2]Keele University, Institute for Science & Technology in Medicine, Newcastle-under-Lyme, United Kingdom

Background and Aims: Hypoxia is common, but frequently intermittent, in the first few days after stroke and associated with worse outcomes. UK Stroke guidelines suggest that oxygen should be given if the oxygen saturation falls below 95%. The aim of this survey is to determine how common hypoxia is very early after the stroke, immediately after presentation to accident and emergency.
Method: Baseline demographics and vital physiological parameters including oxygen saturation are recorded immediately after arrival for every patient who presents to the emergency services at the Royal Stoke University Hospital. These data were collected retrospectively for all patients with a confirmed diagnosis of acute stroke for this audit between 01.11.2015 and 31.03.2016.
Results: Two hundred seventy-four sequential patients were included. The mean oxygen saturation on arrival was 96.9% (range 85–100%). Of these 244 (89%) had an oxygen saturation >95%, 28 (10 %) a saturation of 90–95%, and 2 (0.7%) a saturation below 90% (85 and 86% respectively). Four patients (1.5%) were treated with oxygen at the time of arrival. Their oxygen saturations were 92% on 2L/min, two with 93% on 4 L/min, 93%, and 95% on 4 L/min. Severe hypoxia (saturation less than 90% on air or <95% on oxygen) occurred in 6 (2%).
Conclusion: Very early after acute stroke, most patients have normal or high normal oxygen saturation. Severe hypoxia is very uncommon on arrival.

AS31-096

CASE REPORTS

HYPERTENSIVE ENCEPHALOPATHY, POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME AND REVERSIBLE CEREBRAL VASOCONSTRICTION SYNDROME: THE CLINICAL, RADIOLOGICAL AND ANGIOGRAPHIC FEATURES OF A DISEASE CONTINUUM

F. Bernardo[1], **S. Machado**[1] **and A.N. Pinto**[1]
[1]Hospital Prof. Doutor Fernando Fonseca, Neurology, Amadora, Portugal

Background and Aims: Hypertensive Encephalopathy (HE) may present with headache, confusion, seizures and visual disturbance or other focal neurologic deficits. The radiological hallmark of Posterior reversible encephalopathy syndrome (PRES) is reversible bilateral vasogenic oedema on brain MRI. Reversible cerebral vasoconstriction syndrome (RCVS) is characterised by segmental vasoconstriction of intracranial arteries that resolves within three months. Stroke is a possible complication of this spectrum of disorders.
Method: Case report
Results: A 72-year-old man, with history of uncontrolled hypertension, was admitted to the emergency department with confusion and visual disturbance. He was hypertensive (230/120 mmHg) and right hemianopia was found. A few hours later he developed right hemiplegia. Initial workup with brain CT and MRI, blood and CSF analysis and EEG was not enlightening. Over the following days, there was clinical fluctuation with decrease consciousness and the blood pressure was difficult to manage. A second brain MRI showed acute cortico-subcortical left MCA territory, left MCA/ACA watershed and left cortical occipitoparietal ischemic lesions. MRA documented diffuse segmental vasoconstriction including bilateral P1, M1, M2, A1 and A2 segments. Nimodipine was started. Hypertension study revealed a non-secretor adrenal adenoma and end organ lesions (myocardium, kidney and retina). A fortnight later, a new MRA showed partial resolution of the vasoconstriction status and transcranial Doppler documented normal velocities of intracranial arteries. He was discharged after clinical improvement.
Conclusion: Clinical judgment and imaging studies play a critical role in the diagnosis of HE/PRES/RCVS. Further studies are needed to better understand the pathophysiology of these overlapping syndromes that probably represent a disease continuum.

AS31-099

CASE REPORTS

SOMETIMES COINCIDENCES HIDE STROKES

I.M. Ion[1]
[1]Centre Hospitalier Perpignan France, Neurology, Perpignan, France

Background and Aims: Movements disorders have been reported after an ischemic stroke, different mechanisms being taken into consideration and consequently having major impact on the treatment. Less than 1% of stroke patients develop a movement disorder, hemiballism-hemichorea being the most common movement disorder to occur (40%)
Method: A 79 year-old man presented with a 5-day history of sudden right-sided upper and lower extremity shaking without any focal neurologic deficit suggesting a hemiballism-hemichorea. He had no vascular risk factor nor movement disorder history. He had no response at Tetrabenazine, Clonazepam calmed the amplitude of his movements by 50%.
Results: Metabolic and toxicological screenings on admission were normal. The blood count, the metabolic and autoimmune markers were normal.
Bilateral carotid artery duplex showed a severe stenosis of the left internal carotid artery confirmed by CT-angiography (80%). MRI showed no ischemic lesion within the basal ganglia and no cortical hypo-perfusion.
There were no signs of dopamine loss on DaTscan and no lesion on the whole body CT-scan.
The CSF analysis; chemistry, cellularity, the levels of protein tau, p-tau and 14–3-3 were normal and there was no argument for bacterial or viral infection
Conclusion: Hemiballism is most commonly caused by ischemic stroke and most cases have a favorable prognosis. After a large workup to exclude other possible etiologies, we concluded for a vascular cause considering the sudden symptoms and the partial improvement in the early phase.
Resolution was achieved after endarterectomy. This result supports the vascular origin and that paroxysmal hemiballism-hemichorea might be induced by cerebral hemodynamic or microembolic ischemia

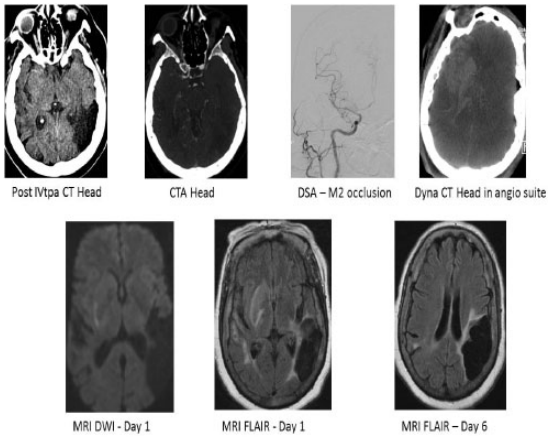
AS31-103

CASE REPORTS

A CASE OF SYMPTOMATIC BLOOD BRAIN BARRIER DISRUPTION AFTER STROKE: TRANSIENT AND REVERSIBLE

D. Gulati[1] **and S. Nimjee**[2]
[1]The Ohio State University, Neurology, Columbus, USA
[2]The Ohio State University, Neurosurgery, Columbus, USA

Background and Aims: The BBB is rapidly disrupted following an acute ischemic stroke and can be quantified as increased permeability of the BBB. Contrast staining is an incompletely understood imaging finding and thought to represent an early CT imaging finding of acute infarction.
Method: A 66-year-old female presented with a right MCA syndrome (NIHSS-18) s/p IVtpa at 90 mins. CTA demonstrated right M1 occlusion. DSA at 150 mins showed distal propagation of clot to distal branch of MCA with reperfusion of >50% right MCA territory without any intraarterial intervention. During DSA, patient became unresponsive. DSA was immediate aborted. CT Head demonstrated intraparenchymal hyperdensity in right MCA territory with mild effacement of right ventricle. MRI brain revealed small area of DWI in right external capsule and temporal lobe on day 1 and day 6 with no evidence of hemorrhage or reperfusion injury (Figure 1).



Results: BBB disruption could be transient and benign after stroke. There is mild edema in our case associated with contrast staining. The short interval between onset, IVtpa (resulting in hyperperfusion) and DSA likely contributed to early capture of this finding
Conclusion: Contrast staining on CT likely represents altered integrity of endothelium resulting from cerebral vascular dysregulation (resulting in maximum vasodilation) along with no-reflow phenomenon with inability to efficiently clear contrast. It is vital to understand the clinical significance of this imaging sign as it may lead to better management strategy and improved prognostic information for patients following interventions

AS31-104

CASE REPORTS

CT PERFUSION FOR 'WAKE-UP STROKE' AND A GOOD OUTCOME FOLLOWING THROMBOLYSIS

S. Hervey[1], C. Hammond[1], I. Kane[1] and P. Koumellis[2]
[1]Brighton and Sussex University Hospitals NHS Trust, Stroke Medicine, Brighton, United Kingdom
[2]Brighton and Sussex University Hospitals NHS Trust, Neuroradiology, Brighton, United Kingdom

Background and Aims: An 82 year old right-handed woman was admitted to the Royal Sussex County Hospital after waking with right sided weakness and speech difficulties.
On examination there was definite right sided weakness, sensory loss, mixed dysphasia and right sided hemianopia. National Institutes of Health Stroke Scale (NIHSS) was 14. Later on she was also noted to have new loss of vision of her left eye, and a diagnosis of left retinal artery occlusion was made.
Method: Initial CT head did not show any haemorrhage or evidence of infarct; however a CT perfusion scan demonstrated hypoperfusion of the left anterior cerebral artery (ACA) and middle cerebral artery (MCA) territory without evidence of a large core infarct. There was also lack of contrast in the left internal carotid artery (ICA).
Results: The patient received thrombolysis. Symptomatically she made a good recovery, NIHSS reducing to 6 initially and after 24 hours had reduced to 3.
Further imaging of the intracranial and neck vessels demonstrated that the left ICA was completely occluded from its origin, and the ipsilateral MCA and ACA were patent and filling from collateral vessels from the contralateral side. Furthermore, there was an absent left posterior communicating artery, and a dominant left vertebral artery.
Conclusion: This case demonstrates the potential benefit of perfusion imaging in the context of 'wake-up stroke', and highlights the reliance on collateral circulation in a patient with an occluded ICA.

AS31-108

CASE REPORTS

CAN WE REPEAT A MECHANICAL THROMBECTOMY IN 3 WEEKS? YES WE CAN

L. López-Mesonero[1], S. Martinez Peralta[2], S. Marquez Batalla[3], M.D. Calabria[2], M. Alvarez Alvarez[2] and B. Perez Perez[4]
[1]Salamanca, Spain
[2]University hospital, Neurology, Salamanca, Spain
[3]University Hospital, Radiology, Salamanca, Spain
[4]University Hospital, Family medical, Zamora, Spain

Background and Aims: We report a case of recurrent thrombectomy within 3 weeks.
Method: A 50-years-old woman presented to our hospital with left-sided hemiplegia, hipoesthesia and dysarthria, punctuation according to the National Institute of Health Stroke Scale (NIHSS) was 14. She was diagnosed of acute ischemic stroke and neuroimaging techniques showed proximal occlusion in right middle cerebral artery. About 3 hours after symptoms onset, mechanical thrombectomy was performed, previous endovenous thrombolysis, obtaining a succesful result with complete recanalization. Within the next days the patient followed a comprehensive study trying to determine the etiology of the event, but all tests showed normal results. After an early programme of rehabilitation, clinical recovery was progressive and once she was discharged, NIHSS score was 3. The etiology of the stroke remained uncertain, so a close follow up was stablished.
Results: 20 days after first stroke, the same patient was seen again at the emergency room presenting similar acute symptoms in left side (NIHSS:13) and a new image of proximal occlusion was confirmed. Mechanical thrombectomy was carried out, with complet extraction of the thrombus. Functional outcome was satisfactory again but this time, a subcutaneous Holter was installed for detecting any arrhytmia and oral anticoagulation was commenced, given the high risk of embolic etiology.
Conclusion: Recurrent stroke is an important cause of morbimortality, and mechanical thrombectomy is an effective technique in this cases of early recurrence. However, further investigations are need to prove safety of repeating thombectomy in shorts periods of time.

AS02-004

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

CONTRALATERAL HEMISPHERIC BRAIN ATROPHY AFTER HEMORRHAGIC STROKE

S. Joo[1]
[1]Chonnam National University Hospital, Gwangju, Republic of Korea

Background and Aims: Brain atrophy occurs on the ipsilateral hemisphere in patients with intracerebralhematoma (ICH). This study aimed to investigate contralateral hemispheric volume change in patients with ICH and related factors.
Method: In surgically treated 312 patients with ICH between January 2010 and December 2015, 44 patients were included in this study. We measured contralateral hemispheric brain area in three different level of axial brain computed tomography (CT) images using CT based software. Proportion of contralateral hemispheric parenchyma to intracranial area was measured to adjust individual difference in head size. We analyzed relationship between various possible factors and the contralateral hemispheric volume change.
Results: The median follow up interval between preoperative and postoperative brain CT was 89.5 days (range, 30–180). The average volume ratios of preoperative and postoperative contralateral hemispheric parenchyma were 92.3% *vs.* 88.8%, 90.3% *vs.* 85.3% and 86.9% *vs.* 82.5% in the level of third ventricle, septum pellucidum and lateral ventricle, respectively. The declination of contralateral parenchymal volume ratio had all statistical significance in three different levels through paired t-test (p-value <0.001). In various possible factors, presence of intraventricular hematoma (IVH) was the most significant factor for contralateral parenchymal volume ratio decrease (p-value $= 0.006$). Glasgow coma scale (GCS) on arrival and smoking were independent factors in multivariate analysis (p-value $= 0.016$, 0.039).
Conclusion: Contralateral parenchymal volume ratio was decreased significantly on the 3 months follow up brain CT scan. The mechanism of this morphological change might be associated with neuroinflammation and diaschisis.

AS02-005

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

SURGICAL TREATMENT OF TRAUMATIC INTRACRANIAL ANEURYSMS: EXPERIENCES AT A SINGLE CENTER OVER 30 YEARS

S. Joo[1]
[1]Chonnam National University Hospital, Gwangju, Republic of Korea

Background and Aims: Traumatic intracranial aneurysms (TIAs) are rare and associated with high rates of morbidity and mortality. We describe our experiences with TIAs at our institution.
Method: We retrospectively reviewed records from patients who underwent treatment for TIAs between January 1986 and December 2015. For each patient, clinical data, including age, sex, type of trauma, location of aneurysms, clinical presentation, time elapsed between trauma and operation, treatment, and outcome were reviewed.
Results: Data from 5,532 patients diagnosed with cerebral aneurysms were reviewed. Of these, 13 cases (0.23%) were TIAs. Most occurred after blunt brain trauma (12/13, 92%). The most common locations were the distal anterior cerebral artery (7/13, 53%) followed by the internal carotid artery (ICA) (5/13, 38%). One patient had a TIA in the distal middle cerebral artery (MCA). Delayed intracerebral hemorrhage (ICH) was the major presentation at the time of aneurysmal rupture (70%). Most patients underwent surgical treatment (10/12, 83.3 %), which included clipping (5/10), trapping (3/10), aneurysmal excision and bypass (1/10), and aneurysmal excision and coagulation (1/10). Two TIA cases that were located in the ICA were treated with coil embolization and detachable balloon occlusion, respectively. Most cases had good recovery (5/12, 41.7 %); three and one had moderate and severe disability, respectively; one was in a vegetative state; and two patients died.
Conclusion: TIAs should be considered when unexpected new symptoms develop in patients with head trauma. Early diagnosis and prompt treatment could help to improve final clinical outcomes.

AS02-007

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

EXCESSIVE DAYTIME SLEEPINESS IN ACUTE ISCHEMIC STROKE: ASSOCIATION WITH RESTLESS LEGS SYNDROME AND SLEEP-DISORDERED BREATHING

P. Siarnik[1], M. Sivakova[1], M. Jakusova[1], Z. Goldenberg[1], K. Klobucnikova[1], B. Kollar[1] and P. Turcani[1]
[1]Comenius Univeristy in Bratislava, 1st Department of Neurology, Bratislava, Slovak Republic

Background and Aims: Sleep disorders are frequent in stroke patients. Sleep-disordered breathing (SDB) is present in 72%, restless legs syndrome (RLS) in 12–14% and excessive daytime sleepiness (EDS) in 20% of stroke patients. Although the association of EDS with SDB is well known, there are insufficient data regarding the association of EDS with RLS. The aim of this study was to explore the association of EDS with SDB and RLS in acute ischemic stroke.
Method: We enrolled 152 patients with acute ischemic stroke. Epworth Sleepiness Scale (ESS) was used to assess EDS. SDB was assessed using standard polysomnography. All patients filled in a questionnaire focused on RLS. Clinical characteristics and medication were recorded.
Results: EDS was present in 16 patients (10.5%), SDB in 90 patients (59.2%) and RLS in 23 patients (15.1%). EDS was significantly more frequent in patients with RLS compared to the rest of study population (26.1% vs. 7.8%, $p = 0.008$). ESS was significantly higher in the population with RLS compared to population without RLS [7 (0–14,IQR:8) vs. 3 (0–12,IQR:4), $p = 0.032$]. We failed to find any significant difference in frequency of EDS in populations with the presence and absence of SDB (10.0% vs. 11.3%, $p = 0.799$). Similarly, there was no significant difference in the values of ESS in population with SDB compared to the rest of the population [4 (0–13;IQR:5) vs. 4 (0–14;IQR:5.25), $p = 0.821$]. Presence of RLS was the only independent variable significantly associated with ESS in regression analysis (beta = 0.236, $p = 0.003$).
Conclusion: Our results suggest significant association of EDS with RLS in acute ischemic stroke.

AS02-010

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

RESISTANCE INDEX IN CEREBRAL ARTERIES AND STROKE SEVERITY

T. Lepic[1], D. Veljancic[1], Z. Krsmanovic[1], B. Labovic[1], M. Lepic[2] and R. Raicevic[1]
[1]Military Medical Academy, Clinic of neurology, Belgrade, Serbia
[2]Military Medical Academy, Clinic of neurosurgery, Belgrade, Serbia

Background and Aims: Resistance index (RI) as relationship between systolic and diastolic blood flow velocity reflects peripheral vascular resistance. It is increased not only in vascular occlusive changes, but in increased intracranial pressure, too. Our hypothesis is that large cerebral ischemic infarctions with peri focal brain oedema as space occupying processes correlate with increased RI in both internal carotid and vertebral arteries.
Method: Duplex sonography examination of neck arteries was performed using a 7–11 MHz transducer of a computed sonography system. We analyzed relationship between RI and volume of brain ishemic lesion based on computed tomography examination.
Results: Study was performed in 221 consecutive patients with ischemic stroke, aged 20 to 85 years, 121 men and 100 women. Average RI value was 0,65. Older patients had significant higher RI then younger. Increased RI at least in one of arteries had 65% of patients, 64% in vertebral and 37% in carotid arteries. Increased RI in both carotid and vertebral arteries was in 10% of patients. Unilateral increased RI in internal carotid artery correlates with site of infarction in 35%. Patients with increased RI in all neck arteries had massive ischemic lesions with peri focal oedema in 88%.
Conclusion: Our results suggest significant correlation of the Increased RI, with space occupying ischemic brain lesions and brain oedema after acute stroke.

AS02-014

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

DOUBLE-LAYERED SIGN IS A NOBLE MARKER OF HEMATOMA EXPANSION IN INTRACEREBRAL HEMORRHAGE

K. Sakuta[1], T. Komatsu[1], K. Sakai[1], Y. Terasawa[1], H. Mitsumura[1] and Y. Iguchi[1]
[1]Jikei University School of Medicine, Neurology, Tokyo, Japan

Background and Aims: Our aim is to investigate the novel imaging marker named "Double-layered sign", which could be obtained in plain CT imaging, as predictor of hematoma expansion (HE) in patients with intracerebral hemorrhage.
Method: We performed retrospective review of consecutive patients with primary intracerebral hemorrhage, who performed initial plain CT scan within 24 hours from symptom onset, admitting to our hospital in 2012 to 2016. The double-layered sign was defined as relatively hypodensity layer around the hyperattenuating hematoma, and the hematoma should have at least a 20 Hounsfield unit (HU) difference between the different density regions. We compared the clinical characteristics of patients with and without HE.
Results: A total of 118 patients (78 men and 40 women, median age 63 [IQR 54–73]) were included in this study. The median NIHSS was 8 (IQR 3–14), and the median baseline ICH volume was 9.7 mL (IQR 4.2–19.2). Double-layered sign was 33 (28%) patients and HE was 30 (25%) patients. Double-layered sign was frequently observed in patients with HE (43% vs. 23%, $P = 0.029$). There were three factors independently associated with HE; Anticoagulants use (OR 19.67, 95% CI, 3.30–117.15, $P = 0.001$), Baseline NIHSS (OR 1.07, 95% CI, 1.01–1.14, $P = 0.020$), and double-layered sign (OR 2.81, 95% CI, 1.03–7.61, $P = 0.043$).
Conclusion: Double-layered sign could be a simple and useful predictor of HE in patients with intracerebral hemorrhage.

AS02-015

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

COMPLICATIONS AND CLINICAL OUTCOME AFTER INDUCED HYPERTENSION AS TREATMENT FOR DELAYED CEREBRAL ISCHAEMIA IN ANEURYSMAL SUBARACHNOID HAEMORRHAGE: A RANDOMISED CLINICAL TRIAL

C. Gathier[1], W. Van den Bergh[2], M. Van der Jagt[3], B. Verweij[4], J.W. Dankbaar[5], M. Müller[6], A. Oldenbeuving[7], G. Rinkel[1], A. Slooter[8] and H. studygroup[9]
[1]University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands
[2]University Medical Center Groningen, Department of Critical Care, Groningen, The Netherlands
[3]Erasmus Medical Center Rotterdam, Department of Intensive Care and Erasmus MC Stroke Center, Rotterdam, The Netherlands
[4]University Medical Center Utrecht, Department of Neurology and Neurosurgery- Brain Center Rudolf Magnus, Utrecht, The Netherlands
[5]University Medical Center Utrecht, Department of Radiology, Utrecht, The Netherlands
[6]Academic Medical Center, Department of Intensive Care, Amsterdam, The Netherlands
[7]St. Elisabeth Hospital Tilburg, Department of Intensive Care, Tilburg, The Netherlands
[8]University Medical Center Utrecht, Department of Intensive Care, Utrecht, The Netherlands
[9]University Medical Center Utrecht, -, Utrecht, The Netherlands

Background and Aims: Induced hypertension is widely used to treat delayed cerebral ischaemia (DCI) after aneurysmal subarachnoid haemorrhage (aSAH), but its presumed effectiveness is based on uncontrolled case-series only. We investigated the effect of induced hypertension in treatment of DCI on serious adverse effects (SAE) and clinical outcome in a multi-centre randomised trial.
Method: Patients with aSAH and an occluded aneurysm who developed DCI were randomised to either induced hypertension or no induced hypertension. Risk ratio's (RR) with corresponding 95% confidence intervals (CI) for occurrence of SAE and poor outcome (modified Rankin Scale score >3) at three months were calculated, adjusted for possible confounders (Poisson regression-analysis). A substudy was performed on the effect of induced hypertension on cerebral perfusion (published previously).
Results: The trial was ended prematurely, because of lack of effect on cerebral perfusion and slow recruitment, when 21 patients had been randomised to induced hypertension, and 20 patients to the control-group. The MAP was 11.1 mmHg (95% CI 7.1↔15.1) higher in the hypertension-group ($n = 21$) compared to the no hypertension-group ($n = 20$) over the first 24 hours. With induced hypertension, the RR for serious adverse events was 2.3 (95% CI 1.0↔5.3) and the aRR for poor outcome was 1.0 (95% CI 0.6↔1.8).
Conclusion: As we found a neutral effect on outcome and more clinically relevant complications in the hypertension-group, our findings do not support the use of induced hypertension.

AS02-016

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

HUMAN URINARY KALLIDINOGENASE REDUCES ISCHEMIC PENUMBRA IN ACUTE CEREBRAL INFARCTION PATIENTS WITH CRITICAL CAROTID STENOSIS

J. Miao[1], Y. Zhang[2], Y.Y. Sun[1], D. Ma[1] and J.C. Feng[1]
[1]First Hospital of Jilin University, Neurology, Changchun, China
[2]People's hospital of jilin province, neurology, Changchun, China

Background and Aims: To study the effects of Human urinary kallidinogenase (HUK) on ischemic penumbra in acute cerebral infarction (ACI) with critical carotid stenosis (stenosis ratio $\geq$70%).
Method: In a non-randomized controlled clinical trial, 50 patients diagnosed with ACI associated with critical carotid stenosis were enrolled and divided manually into 2 groups. The experimental group, consisting of 30 patients, was treated with HUK (0.15 PNA unit/day) for 7 consecutive days. The control group was treated with routine medication. The participants underwent magnetic resonance perfusion (MRP), magnetic resonance angiography (MRA) and diffusion weighted imaging (DWI) examinations on the first and fourteenth day after onset. The National Institutes of Health Stroke Scale (NIHSS) score, cerebral blood flow (CBF), cerebral blood volume (CBV), mean transit time (MTT), time to peak (TTP), ischemic penumbra (IP) volume (TTP-DWI mismatch volume) and morphological changes of the cerebral artery on MRA were compared between the groups.

Results: After undergoing therapy, the experimental HUK-treated group had lower NIHSS scores and IP volumes than the control group ($p < 0.01$). The ratio of collateral circulation on MRA was higher in the HUK-treated group (40%) than in the control group (10%). The CBF improved more in the HUK-treated group than in control group ($p < 0.05$). Additionally, MTT and TTP were shorter in the HUK-treated group than in the control group ($p < 0.05$).
Conclusion: HUK can reduce IP volume, ameliorate CBF and neurological deficits. HUK is an effective treatment approach for treating patients with ACI.

AS02-017

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

REAL-WORLD USE OF THE GUGGING SWALLOWING SCREEN ON A STROKE-UNIT

Y. Teuschl[1], M. Trapl[2], P. Ratajczak[1], K. Matz[1,2] and M. Brainin[1,2]
[1]Danube University Krems, Department for Clinical Medicine and Preventive Medicine, Krems, Austria
[2]University Hospital Tulln, Department of Neurology, Tulln, Austria

Background and Aims: There is unequivocal evidence from various registries that formal screening for dysphagia following acute stroke is strongly recommended. In contrast, there is surprisingly little evidence how this affects the rate of aspiration pneumonia. Our study reports the results from a large single centre cohort.
Method: Retrospective, prospective database analysis of all patients (n = 1510) admitted with acute stroke or TIA from 2012 to 2014 at the acute stroke-unit at the University Clinic Tulln, Austria. In 2007, we have developed and implemented the GUgging Swallowing Screen (GUSS). Dietary modification was performed according to the recommendations from the GUSS Score. Patients evaluated with GUSS within 7 days were compared to the unscreened patients including a binary logistic regression analysis.
Results: Overall, 1051 (69.6%) patients were screened with GUSS; of these 50 (4.8%) developed stroke associated pneumonia (SAP). Of the 459 patients, not tested within 7 days with GUSS, the same SAP rate was observed: 22 (4.8%). Multivariable analysis showed a bimodal distribution of patients not undergoing a screen and showed that either mild to very mild strokes or very severe strokes were less likely to get screened. Older age, higher NIHSS on admission, hypertension, cardiological complications, urinary catheter and nasogastric tubes were significant markers for the occurrence of SAP. Interestingly, men had a higher risk to develop SAP.
Conclusion: In real-world use, the routine use of the GUSS is less often applied in mild strokes and very severe strokes. The comparatively low rate of SAP is probably due to dietary modifications recommended by the GUSS.

AS02-021

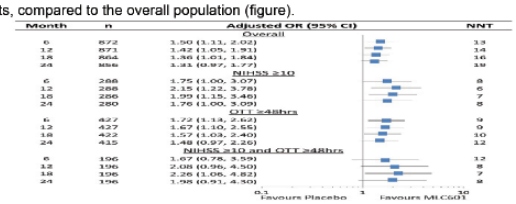
CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

TARGETING STROKE PATIENTS WITH A HIGHER POTENTIAL OF LONG-TERM BENEFIT FROM TREATMENT: INSIGHTS FROM THE CHIMES-E STUDY

N. Venketasubramanian[1], C.F. Lee[2], S.H. Young[3], S.S. Tay[3], T. Umapathi[4], A.Y. Lao[5], H.H. Gan[6], J.C. Navarro[7], H.M. Chang[8], J.M. Advincula[9], S. Muengtaweepongsa[10], B.P.L. Chan[11], C.L. Chua[12], H.A. de Silva[13], J.H.B. Hiyadan[14], N.C. Suwanwela[15], K.S.L. Wong[16], N. Poungvarin[17], G.B. Eow[18] and C. Chen[19]
[1]Raffles Neuroscience Centre, Neurology, Singapore, Singapore
[2]The University of Hong Kong, School of Public Health, Hong Kong, China
[3]Changi General Hospital, Rehabilitation Medicine, SIngapore, Singapore
[4]National Neuroscience Institute – Tan Tock Seng Campus, Neurology, Singapore, Singapore
[5]Davao Medical School Foundation Hospital, Neurology, Davao City, Philippines
[6]Jose Reyes Memorial Medical Center, Neurology, Manila, Philippines
[7]University of Santo Tomas Hospital, Neurology, Manila, Philippines
[8]National Neuroscience Institute - Singapore General Hospital Campus, Neurology, Singapore, Singapore
[9]West Visayas State University Medical Center, Neurology, Iloilo City, Philippines
[10]Thammasat University, Neurology, Pathum Thani, Thailand
[11]National University Health System, Neurology, Singapore, Singapore
[12]University of the Philippines- Philippine General Hospital, Neuroscience, Manila, Philippines
[13]University of Kelaniya, Pharmacology, Ragama, Sri Lanka
[14]Baguio General Hospital and Medical Center, Neurology, Baguio City, Philippines
[15]King Chulalongkorn University, Neurology, Bangkok, Thailand
[16]Chinese University of Hong Kong- Prince of Wales Hospital, Neurology, Shatin- New Territories, China
[17]Siriraj Hospital, Neurology, Bangkok, Thailand
[18]Penang Hospital, Neurology, Penang, Malaysia
[19]National University of Singapore, Pharmacology, Singapore, Singapore

Background and Aims: Patient-, disease- and treatment-related factors, e.g. age, sex, stroke severity, treatment window, are important variables to consider in clinical practice and trials.
We aimed to assess the effect of patient/disease-related (baseline National Institutes of Health Stroke Scale, b-NIHSS) and treatment-related (stroke onset to treatment time, OTT) factors on statistical power in a stroke recovery trial.
Method: CHIMES-E evaluated the 2-year outcome of subjects aged ≥18 years with ischemic stroke, b-NIHSS 6–14, and pre-stroke modified Rankin Scale (mRS) ≤1 included in a randomized, double-blind, placebo-controlled trial of MLC601 given for 3 months. Standard stroke care and rehabilitation were allowed throughout the study. mRS was assessed at months 6, 12, 18 and 24.
Results: Baseline characteristics were similar between treatment groups (n = 880, mean age 61.8 ± 11.3 years, 36% women, mean b-NIHSS 8.6 ± 2.5). Predictors of mRS ≥ 2 were age >60 years ($p < 0.01$), b-NIHSS score 10–14 ($p < 0.01$), OTT >48 h ($p < 0.01$) and female sex ($p = 0.06$). Adjusted odds ratios for achieving mRS ≤1 among subjects with higher b-NIHSS and/or longer OTT, increased with reduced numbers needed to treat for all time points, compared to the overall population (figure).

points, compared to the overall population (figure).



Conclusion: Selecting patients with persistent deficits in the subacute phase increases MLC601 treatment effect size. Targeting such subjects with more potential to benefit in stroke recovery trials may increase the power of demonstrating treatment efficacy.

AS02-022

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

ASSOCIATION BETWEEN CYP2C19 GENETIC POLYMORPHISMS AND CLINICAL OUTCOME IN ACUTE ATHEROTHROMBOTIC STROKE: A SUB-ANALYSIS OF THE PRAISE STUDY

K. Fukuma[1], H. Yamagami[2], K. Kamiyama[3], Y. Enomoto[4], E. Furui[5], Y. Manabe[6], M. Ezura[7], K. Toyoda[8], T. Miyata[8] and K. Nagatsuka[9]

[1]Kohnan Hospital, Department of Stroke Neurology, Sendai, Japan
[2]National Cerebral and Cardiovascular Center, Division of Stroke Care Unit, Suita, Japan
[3]Nakamura Memorial Hospital, Department of Neurosurgery, Sapporo, Japan
[4]Gifu University Graduate School of Medicine, Department of Neurosurgery, Gifu, Japan
[5]Konan Hospital, Departments of Stroke Neurology, Sendai, Japan
[6]National Hospital Organization- Okayama Medical Center, Department of Neurology, Okayama, Japan
[7]Sendai Medical Center, Department of Neurosurgery, Sendai, Japan
[8]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita, Japan
[9]National Cerebral and Cardiovascular Center, Department of Neurology, Suita, Japan

Background and Aims: We aimed to clarify the association between CYP2C19 gene polymorphism and clinical outcome in acute atherothrombotic stroke patients treated with clopidogrel.
Method: Patients with acute atherothrombotic stroke or transient ischemic attack within 7 days after the onset who were treated with antiplatelet agents including clopidogrel were enrolled. The primary outcomes was evaluated as a composite of neurological deterioration (NIHSS $\geq$ 4 points) within 30 days and recurrent ischemic stroke within 90 days. Patients were classified into three clopidogrel metabolizing groups inferred from the CYP2C19 genotypes: extensive (EM: *1/*1), intermediate (IM: *1/*2 or *1/*3), and poor metabolizers (PM: *2/*2, *2/*3, or *3/*3). Associations between genetic polymorphisms and primary outcome events were evaluated.
Results: Among the 239 participants in this study, CYP2C19 genetic polymorphisms were analyzed in 195 patients (mean age 72.1 years, 140 males). The primary outcomes were developed in 32 patients (16.4%), including 11 deterioration and 21 recurrence. The distribution of clopidogrel metabolizing groups was 55 (28%) of EM, 111 (57%) of IM, and 29 (15%) of PM, and incidence of the primary outcome differed among the groups (10.9%, 15.3%, and 31.0%, respectively, P = 0.03). In a Cox proportional hazards model, higher glucose levels (HR 1.08/10 mg/dL, 95% CI 1.01–1.15, P = 0.02), P2Y12 reaction unit at 24 h (HR 1.07/10 units, 95% CI 1.01–1.13, P = 0.03), and PM (HR 2.50 vs EM/IM, 95% CI 1.12–5.61, P = 0.03) were the predictive factors of the primary outcome.
Conclusion: CYP2C19 variants are the predictor of clinical outcome in acute atherothrombotic stroke patients treated with clopidogrel.

AS02-024

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

DUAL VERSUS MONO-ANTIPLATELET THERAPY FOR PREVENTING RECURRENCE: RESULTS FROM THE CONTROL GROUP OF THE TRIPLE ANTIPLATELETS FOR REDUCING DEPENDENCY IN ISCHAEMIC STROKE (TARDIS) TRIAL

L.J. Woodhouse[1], K. Flaherty[1], J.P. Appleton[1], N. Sprigg[1] and P.M. Bath[1]

[1]University of Nottingham, Stroke- Division of Clinical Neuroscience, Nottingham, United Kingdom

Background and Aims: Risk of recurrence following an ischaemic stroke (IS) or transient ischaemic attack (TIA) is high, especially immediately after the event. Both combined aspirin and dipyridamole (AD), and clopidogrel alone (C), are effective antiplatelet strategies after cerebral ischaemia.
Method: TARDIS was an international multicentre prospective randomised open-label blinded-endpoint trial that assessed the safety and efficacy of short-term intensive antiplatelet therapy versus guideline treatment in acute IS or TIA. Patients randomised to guideline received (investigator's choice) either dual (AD) or mono (C) antiplatelet therapy; these two approaches arose because of a change in the UK National Institute for Health and Care Excellence clinical guidelines in 2010. Data are adjusted odds ratio (OR) or mean difference (MD) with 95% confidence intervals (CI).
Results: Of 3096 patients enrolled into TARDIS, 1540 (49.7%) were assigned to guideline antiplatelet therapy (AD 691, C 849): mean age 69 (10) years, 62.5% male. In comparison with AD patients, those on C were more likely to have been recruited with IS (76.1% vs 65.7%) and recruited later (median 30.4 vs 27.5 hours). By day 90, patients receiving AD had slightly lower cognition scores (TICS-M MD -1.0, 95% CI -1.7 to -0.3), but were less likely to be dependent (mRS OR 0.78, 95% CI 0.65 to 0.95). Neither therapy showed benefit over the other in reducing either recurrence and its severity (primary outcome) or death.
Conclusion: Dual and mono antiplatelet therapy (based on aspirin/dipyridamole and clopidogrel respectively) did not differ in the frequency and severity of recurrent cerebral events.

AS02-025

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

COMPARISON OF OUTCOMES BETWEEN ACUTE ISCHAEMIC STROKE AND TRANSIENT ISCHAEMIC ATTACK: DATA FROM THE 'TRIPLE ANTIPLATELETS FOR REDUCING DEPENDENCY AFTER ISCHAEMIC STROKE' (TARDIS) TRIAL

L.J. Woodhouse[1], K. Flaherty[1], J.P. Appleton[1], N. Sprigg[1] and P.M. Bath[1]
[1]University of Nottingham, Stroke- Division of Clinical Neuroscience, Nottingham, United Kingdom

Background and Aims: Patients with transient ischaemic attack (TIA) are expected to have a better outcome and return to normal as compared to those with ischaemic stroke (IS). We compared baseline characteristics and outcomes for IS and TIA patients.
Method: 3096 patients (IS 2143, TIA 953) were enrolled into the TARDIS trial. TARDIS compared short term intensive vs guideline antiplatelet therapy. Data are adjusted odds ratio (OR) or mean difference (MD) with 95% confidence interval (CI).
Results: Overall patients had a mean age of 69.0 (10.1) years and 62.8% were male. More TIA patients had a history of hyperlipidaemia (48.7% vs 42.5%) than IS patients, but fewer were smokers (16.7% vs 29.7%). By day 90, TIA patients were less dependent (modified Rankin Scale: OR 0.59, 95% CI 0.49, 0.70), but were slightly more disabled (Barthel Index: MD -2.29, 95% CI -3.96, -0.63). There was no difference in recurrence rates and their severity between IS and TIA patients. Although TIA patients were less dependent, many had not returned to normal by day 90. Those with TIA who were independent prior to their event (79.3%) were less likely to suffer a recurrent TIA (OR 0.32, 95% CI 0.10, 0.99), but saw no improvement in functional outcome, compared with other TIA patients.
Conclusion: Although outcome after TIA is better than IS, many patients do not make a full recovery. TIA patients may need monitoring of functional outcome, cognition, disability, quality of life and mood to ensure that they receive support where necessary.

AS02-026

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

RUPTURED INTRACRANIAL WIDE-NECKED ANEURYSMS TREATED WITH STENT ASSISTED COIL EMBOLIZATION

K. Lee[1] and I. Park[1]
[1]Gyeongsang National University Hospital, Neurosurgery, Jinju, Republic of Korea

Background and Aims: Use of the intracranial stents to treat ruptured intracranial aneurysms is controversial. Our aim was to evaluate the safety and efficiency of stent assisted coil embolization of ruptured intracranial wide-necked aneurysms.
Method: Consecutive patients who underwent stent assisted coiling for ruptured wide necked intracranial aneurysm were retrospectively reviewed April 2012 to March 2016. Patients' demographics, including Hunt and Hess grade, Fisher scale, WFNS grade and aneurysmal profiles were collected. Complications such as rupture of aneurysm, thromboembolic events, hemorrhagic event were recorded. Additionally, outcome measurement at discharge was obtained using modified Rankin Scale. Radiologic follow-up was performed at 6 months, 1 year and 2 years.
Results: Fifty-one aneurysms in 50 patients were treated. Mean age of Patients was 64.9 years old. Eighteen patients (34%) were WFNS grade 4 and 5. Mean size of aneurysms was 8.8 mm. Mean dome-to-neck ratio was 1.0. There was no intraoperative rupture of aneurysm and four (8%) episodes of stent asymptomatic thrombosis. Three patients suffered delayed thromobo-embolic events and 2 patients suffered delayed hemorrhagic events. Immediately radiologic outcome was Complete occlusion in 29, residual neck in 19, residual sac in 3. Four patients (8%) was expired. Poor outcome (modified Rankin scale $>$ 2) was 24%. Mean duration of clinical follow up was 19 months. Mean duration of angiographic follow up was 18 months. 2 aneurysms were recanalization of coiled aneurysms during follow-up.
Conclusion: The outcome of ruptured intracranial wide-necked aneurysms treated with stent assisted coil embolization was relatively safe and efficient.

AS02-027

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

ON-TREATMENT REMOTE PLATELET FUNCTION TESTING USING MEASUREMENTS OF P-SELECTIN: DATA FROM THE TRIPLE ANTIPLATELETS FOR REDUCING DEPENDENCY IN ISCHAEMIC STROKE (TARDIS) TRIAL

L.J. Woodhouse[1], S. Heptinstall[1], N. Dovlatova[1], J. May[1], K. Flaherty[1] and P.B. Bath[1]
[1]University of Nottingham, Division of Clinical Neuroscience, Nottingham, United Kingdom

Background and Aims: Platelet activity may be measured remotely as surface P-selectin expression and varies between antiplatelet agents and patient response to them.
Method: In TARDIS, patients with acute non-cardioembolic ischaemic stroke or transient ischaemic attack were randomised to intensive (combined aspirin, clopidogrel and dipyridamole) or guideline antiplatelets (combined aspirin and dipyridamole; AD, or clopidogrel alone; C). Platelet function, assessed as surface P-selectin expression, was measured remotely at baseline and 7 days post randomisation. The tests used were specifically developed to determine the effects, on platelet activity, of administration of aspirin and of clopidogrel (Platelet Solutions Ltd). Data are mean difference (MD) with 95% confidence intervals (CI).
Results: 749 patients (Intensive 376, Guideline AD 168, C 205) had P-selectin taken at baseline and/or day 7: mean age 68.6 (10.3), 66.4% male. In a comparison of on-treatment P-selectin, the aspirin test showed that platelet reactivity was lower in the intensive arm than the AD group (MD -59.2, 95% CI -95.2, -23.2). Intensive treatment didn't suppress P-selectin levels below 500 units in 13 (4.4%) patients. Conversely, the clopidogrel test demonstrated that platelet reactivity was higher in patients receiving intensive rather than C (MD 58.5, 95% CI 7.0, 110.0). However, treatment with C didn't suppress P-selectin levels below 625 units in 74 (43.3%) patients.
Conclusion: The aspirin test indicated that intensive therapy was more effective in supressing stimulated platelet surface P-selectin than treatment with AD. However, the clopidogrel test showed treatment with C to be more effective than intensive, although 43.3% of patients had high residual platelet reactivity ("resistance").

AS02-028

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

TELEMEDICAL EXAMINATION OF A THREE-COMPONENT OCULOMOTOR TESTING BATTERY: A PHASE I DIAGNOSTIC STUDY

N.D. Hubert[1], P. Müller-Barna[2], Y. Schombacher[1], S. Greck[1], R.L. Haberl[1] and G.J. Hubert[1]
[1]Städtisches Klinikum München GmbH, Department of Neurology - TEMPiS, Munich, Germany
[2]Department of Analysis, Concept and Consulting, Medical Services of Compulsory Health Insurance Funds, Munich, Germany

Background and Aims: Acute vestibular syndrome (AVS) can result from peripheral or central causes. A combination of three oculomotor tests known as HINTS (head impulse test, test for nystagmus, test of skew) has been shown to be more sensitive in detecting strokes in patients with isolated AVS than early MRI. Many patients with suspected stroke in rural areas depend on telemedical support to ensure correct diagnosis. However, existing videoconferencing systems are not suited for subtle eye movement tests.
Aim of the study is to assess feasibility and safety of a telemedical supported HINTS protocol using a video-oculography device and an extended teleconferencing system.
Method: The battery of three oculomotor tests was executed on 30 healthy subjects using video goggles connected to a mobile wireless-workstation for bidirectional audiovisual communication in a clinical environment. Examination was guided by a remote physician using the help of a trained assistant attending to the subject. Results were rated by two independent experts blinded to previous bedside tests.
Results: All 90 individual oculomotor tests were rated as fully interpretable. All 30 subjects had negative results in head impulse and nystagmus tests, 29 had negative test of skew, 1 had pathological skew deviation (inter-rater agreement kappa = 1.0). No major adverse events occurred during or after examination. Technical difficulties prolonged or complicated examination in 9 subjects, none of them impeded interpretation.
Conclusion: Telemedical examination of the HINTS protocol is feasible and safe in healthy subjects. Further research is needed to evaluate sensitivity and specificity of the telemedical testing battery in patients with isolated AVS.

AS02-030

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

IS HEPARINE OR NADROPARINE ADMINISTRATION IN THE ACTUTE PHASE OF ISCHEMIC STROKE SAFE AND EFFECTIVE? A PILOT STUDY

J. Dluha[1], V. Nosal[1], S. Sivak[1], J. Michalik[1], E. Kantorova[1], K. Zelenak[2] and E. Kurca[1]
[1]University Hospital Martin, Neurology Clinic, Martin, Slovak Republic
[2]University Hospital Martin, Radiology Clinic, Martin, Slovak Republic

Background and Aims: Treatment optionts, especially pharmacological, of the acute ischemic stroke are very limited. Despite improved stroke management, there are still a lot of patients who cannot be treated because of missed therapeutic window.
The aim of our pilot study was to show, that administration of the heparine or nadroparine >4.5 - <24 hours from the stroke onset is safe and effective.
Method: Patients >4.5 - <24 hours from ischemic stroke onset were enrolled prospective randomized placebo controlled study if they met inclusion/exclusion criterias, which were, exccept time, identical with NINDS criterias.
Results: 87 patients were enrolled in the study. Safety analysis showed no bleeding complications (intracranial or any other hemorhage). 2 patients died within first 30 days from the initial treatment (1 in heparine and 1 in placebo group), however we do not suspect relationship with the acute treatment. At the Day90 26 heparine ($p = 0.069$), and 18 nadroparine ($p = 0.011$) patients had NIHSS 0–2 compared to 11 placebo patients. There was a statistically significant difference in good clinical outcome mRS (0–2) at Day90 between the heparine and placebo group (21 (80%) vs 13 (50%), $p = 0.0350$) and between the nadroparine and placebo group (29 (85%) vs 13 (50%), $p = 0.0031$).
Conclusion: The results of our pilot study showed that the treatment with heparine and nadroparine is safe and effective in the therapeutic window >4.5 - <24 hours from the ischemic stroke onset.

AS02-031

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

THE STROKE OXYGEN STUDY- THE EFFECT OF ROUTINE OXYGEN SUPPLEMENTATION ON OUTCOMES IDENTIFIED AS IMPORTANT BY STROKE PATIENTS AND THEIR CARERS

C. Roffe[1], T. Nevatte[2], J. Sim[3], J. Bishop[4], N. Ives[4], B. Helliwell[5], N. Phillips[6], R. Gray[7] and A. SO2S Collaborators[8]
[1]Keele University, Stroke Research, Stoke-on-Trent, United Kingdom
[2]Keele University, Engagement and Partnerships, Stoke-on-Trent, United Kingdom
[3]Keele University, Institute for Applied Clinical Studies, Stoke-on-Trent, United Kingdom
[4]University of Brimingham, Clinical Trials Unit, Birmingham, United Kingdom
[5]None, Patient Representative, Birmingham, United Kingdom
[6]None, Patient Representative, Coventry, United Kingdom
[7]University of Oxford, Clinical Trials Unit, Oxford, United Kingdom
[8]Collaborators from 136 Hospitals, Stroke, 136 Cities in the UK, United Kingdom

Background and Aims: The Stroke Oxygen Study (SO_2S) showed that routine oxygen supplementation for 72 h post stroke did not improve survival or long-term disability. When designing the protocol we consulted stroke patients and their carers about which outcomes they would like to add to the standard assessments. They suggested problems with, sleep, speech, and memory. These are reported here.
Method: Patients within 24 h of hospital admission with no definite indications for or contraindications to oxygen treatment were eligible for inclusion in SO_2S. Participants were randomised 1:1:1 to continuous oxygen, oxygen at night (between 21:00–06:00) only, or to control (room air) for 72 h. Oxygen was given at a rate of 3L/min if the baseline oxygen saturation was ≤93% and at 2L/min if it was >93%. Follow-up was at 3 months by postal questionnaire with telephone follow-up for non-responders.
Results: 8003 participants were recruited from 136 UK hospitals between April 2008 and June 2013. Of these, 6584, 6716, and 6646 responded to the sleep, speech, and memory questions respectively. 1407 (64%), 1436 (65%), and 1419 (65%) in the continuous oxygen, the

nocturnal oxygen and the control groups respectively reported that their sleep was as good as before the stroke. 1957 (88%), 1957 (88%), and 1939 (87%) reported no significant speech problems, and 981 (44%), 1000 (45%), and 971 (44%) reported that their memory was as good as before the stroke.
Conclusion: Routine oxygen therapy had no effect on patient-rated assessment of sleep, speech or memory, outcomes considered important to patients and their carers.

AS02-033

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

ENDOVASCULAR INTERVENTION FOR INTRACRANIAL ARTERY DISSECTION: A MONO-ARM TRIAL

E. Sharifipour[1], H. Seyed Amir[2] and R. Mohammadian[3]
[1]Neurology & Neuroscience Research Center Of Qom University Of Medical Sciences, Neurology, Qom, Iran
[2]Neurology And Neurosciences Research Center Of Qom University Of Medical Sciences, Neurology, Qom, Iran
[3]Neurosciences Research Center Of Tabriz University Of Medical Sciences, Neurology, Tabriz, Iran

Background and Aims: There are controversies about the treatment of Intracranial artery dissections. The aim of this study was to evaluate the efficacy and safety of the endovascular approach in patients with an intracranial dissection presenting with different symptoms.
Method: We prospectively evaluated the clinical features and treatment outcomes of 30 patients who had angiographically confirmed nontraumatic intracranial dissections over 4 years. Patients were followed up for 20 months, and their final outcomes were assessed by the modified Rankin Score (mRS) and angiography.
Results: Sixteen (53.3%) patients had a dissection of the anterior circulation, whereas 14 (46.7%) had a posterior circulation dissection. Overall, 83.3% of the patients suffered a subarachnoid hemorrhage (SAH). Grade IV Hunt and Hess score was seen in 32% of the SAH presenting cases. Parent artery occlusion (PAO) with coil embolization was used in 70% of the cases. The prevalence of overall procedural complications was 23.3%, and all were completely resolved at the end of follow-up. No evidence of in-stent occlusion/stenosis or rebleeding was observed in our cases during follow-up. Angiography results improved more frequently in the PAO with coil embolization group (100%) than in the stent-only-treated group (88.9%) ($P = 0.310$) and the unruptured dissection group (5/5, 100%) in comparison with the group that presented with SAH (95.8%) ($P = 0.833$)
Conclusion: Favorable outcomes were achieved following an endovascular approach for symptomatic ruptured or unruptured dissecting aneurysms. However, the long-term efficacy and durability of these procedures remain to be determined in a larger series.

AS02-034

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – NEITHER THROMBOLYSIS NOR ROMBECTOMY

THE STROKE OXYGEN STUDY- HEALTH ECONOMIC OUTCOMES

C. Roffe[1], C. Penaloza[2], S. Jowett[2], J. Bishop[3], N. Ives[3], J. Sim[4], R. Gray[5] and A. SO2S Collaborators[6]
[1]Keele University, Stroke Research, Stoke-on-Trent, United Kingdom
[2]University of Birmingham, Health Economics, Birmingham, United Kingdom
[3]University of Birmingham, Clinical Trials Unit, Birmingham, United Kingdom
[4]Keele University, Institute for Applied Clincal Sciences, Stoke-on-Trent, United Kingdom
[5]University of Oxford, Clinical Trials Unit, Oxford, United Kingdom
[6]136 Hospitals, Stroke, 136 Cities, United Kingdom

Background and Aims: The Stroke Oxygen Study (SO_2S) showed that routine oxygen supplementation for 72 h post stroke did not lead to better survival or long-term disability. The aim of this analysis is to assess whether oxygen treatment affected health economic outcomes.
Method: Patients within 24 h of hospital admission with no definite indications for, or contraindications to, oxygen treatment were eligible for inclusion to SO_2S. Participants were randomised to three groups: routine oxygen supplementation (either continuous or at night only) (ROS) or control (no ROS) for 72 h. A within-trial economic evaluation was conducted reporting both cost-effectiveness analysis (CEA) and cost-utility analysis (CUA) over 12 months follow-up. The CEA calculated the cost per additional day home-time gained, with days at home taking into account length of stay in hospital, discharge destination and readmissions. The CUA calculated the cost per quality-adjusted life year (QALY) gained.
Results: 8003 participants were recruited from 136 hospitals in the UK between April 2008 and June 2013. A total of 7898 were included in the health economic analysis. There was no difference in length of hospital stay (mean (SD) 18.6 (50.9), 18.6 (52.0) and 18.0 (56.4) days for continuous ROS, nocturnal ROS, and no ROS respectively). There was almost no difference in readmissions, the rate of institutionalization, home–time and QALYs. Costs were higher in the ROS groups. The CUA gave an incremental cost-effectiveness ratio of £463,388 per QALY gained for the comparison of ROS vs. no ROS.
Conclusion: Routine oxygen supplementation is not cost-effective after acute stroke.

AS01-001

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

INCREASED RISK FOR UNFAVORABLE OUTCOME IN PATIENTS WITH PRE-EXISTING DISABILITY UNDERGOING ENDOVASCULAR THERAPY

R. Leker[1], P. Gavriliuc[2], N.E. Yagmur[2], J.M. Gomori[3] and J. Cohen[4]
[1]Israel
[2]Hadassah-Hebrew University Medical Center, Neurology, Jerusalem, Israel
[3]Hadassah-Hebrew University Medical Center, Radiology, Jerusalem, Israel

[4]Hadassah-Hebrew University Medical Center, Neurolsurgery, Jerusalem, Israel

Background and Aims: Background and Objectives: Most studies evaluating endovascular therapy for large vessel occlusions (ELVO) only included patients without pre-existing disability. However, in real life many patients have pre-existing disability and whether they can benefit from ELVO remains unknown.
Method: Patients with large vessel anterior circulation stroke were prospectively enrolled. Patients with no or mild disability (modified Rankin Scale [mRS] 0–2) were compared with patients presenting with pre-existing moderate disability (mRS $\geq$ 3) that received either ELVO or intravenous thrombolysis (IVT). Baseline demographics and risk factors, stroke severity, imaging data including pre-treatment ASPECTS and ASPECTS collateral scores, as well as procedure related variables were accrued. Unfavorable outcome was defined as mRS $\geq$ 4 at day 90.
Results: Out of 100 enrolled patients that had ELVO, 85 had baseline mRS $\leq$ 2 and 15 had pre-stroke mRS $\geq$ 3. Compared with mRS $\leq$ 2 ELVO-treated patients, ELVO-treated patients with pre-existing mRS $\geq$ 3 were significantly older (79.0 $\pm$ 6 vs. 66.6 $\pm$ 14, p = 0.001), more often had previous strokes (47% vs. 19%, p = 0.04) and ASPECTS $\leq$ 7 (33% vs. 12%, p = 0.03) and were more likely to have poor outcome or death (OR 4.4 95%CI 1.3–15.0). A similar proportion of ELVO-treated patients with pre-existing disability maintained their mRS level compared to a group of previously disabled patients that received IVT (n = 23, 27% vs. 24%).
Conclusion: Patients with pre-existing moderate disability have higher chances for sustaining unfavorable outcomes despite ELVO. Their chances of preserving the same level of moderate disability are similar to those observed with IVT suggesting that such patients may not be ideal candidates for ELVO.

AS01-002

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

FACTORS ASSOCIATED WITH ACUTE URINARY RETENTION IN THROMBOLYSED ACUTE STROKE PATIENTS - A RESTROSPECTIVE COHORT STUDY

B. Madigan[1], L. Lockyer[2] and I. Bray[2]
[1]Royal United Hospitals Bath NHS Foundation Trust, Acute Stroke Unit, Bath, United Kingdom
[2]University West of England, Health and Social Sciences, Bristol, United Kingdom

Background and purpose: Urinary Retention is a common complication after stroke. Treatment of acute urinary retention (AUR) requires an indwelling urinary catheter which is linked to worse outcome post stroke. This study examines the incidence of AUR in thrombolysed patients and evaluates which factors may predispose patients to develop this condition, and whether the more frequent use of labetalol in this patient group is associated with the timing of AUR.
Method: This is a retrospective cohort study of 144 consecutively thrombolysed stroke patients at a district general hospital in England. Data were analysed using logistic regression and multivariate Cox regression.
Results: Of 144 patients, 35 (24.3 %) developed AUR. Increasing age (p 0.01, OR 1.07, 95 % CI 1.02 – 1.12) and history of hypertension (p 0.045, OR 2.59, 95 % CI 1.02 – 6.55) were associated with the development of AUR. Patients with benign prostate hyperplasia (p 0.002, HR 16.25, 95 % CI 2.86 – 92.30), or who received labetalol to manage high blood pressure (p. 0.004, HR 8.01, 95 % CI 1.91 – 33.59) were diagnosed with AUR significantly earlier while patients with aphasia were found to be in AUR later (p 0.0004, HR 0.1, 95 % CI 0.03 -0.36).
Conclusion: Although this study does not allow conclusions regarding causality of labetalol use and timing of AUR, identifying patients at risk of AUR in the early stroke phase is beneficial in assisting with early diagnosis and treatment of AUR and in reducing patient discomfort.

AS01-006

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

FAVORABLE REVASCULARIZATION THERAPY IN PATIENTS WITH LOW ASPECT SCORE $\leq$ 5 ON DWI IN ANTERIOR CIRCULATION STROKE

T. Sacagiu[1], E. Abergel[2], D. Mantilla[3], I. Mourand[4], A. Bonafe[1], O. Eker[1], C. Dargazanli[1], C. Riquelme[1], G. Gascou[1] and V. Costalat[1]
[1]CHU montpellier GDC, neuroradiology, Montpellier, France
[2]Rambam hospital, neuroradiology, Haifa, Israel
[3]CHU Montpellier GDC. FOSCAL, Neuroradiology, Montpellier Bucaramanga, France
[4]CHU Montpellier GDC, Neurology, Montpellier, France

Background and Aims: Selection criteria for revascularization therapy exclude patients with large infarction, usually based on ASPECT score, which is an indicator of very poor prognosis. Our aim was to evaluate the efficacy and safety of revascularization therapy in patient with low ASPECT score (0–5) in the anterior circulation.
Method: We retrospectively analyzed 108 consecutive patients presenting low pretreatement ASPECT score on DWI (on ADC cartography)
Sixty patients were treated by mechanical thrombectomy including 34 patients who received simultaneously intravenous thrombolysis (as bridging therapy). A control group of forty-eight patients no eligible for reperfusion therapy gives us a perspective of natural history.
Clinical outcome was evaluated at 90 day by using mRS. Hemicraniectomy after malignant infarction, mortality and symptomatic intracranial haemorrhage were also reported.
Results: Mean ASPECTS score was significantly higher in the treatment group (4.37 vs 3.02, p < 0.005) without significant difference for mean initial NIHSS score between the 2 group (20 vs 22). Successful recanalization (TICI 2b-3) was assessed in 75% of treated patients.
Number of symptomatic intracranial hemorrhage occured in 5% of patients treated compared with 6.3% in the control group.
Reperfusion therapy led to significantly reduced disability at 90 days compared with control (31.7% vs 4.2%) as well as hemicraniectomy after malignant infarction (3.3% vs 22.9%) and death rate at 90 days (23.3% vs 47.9%).
Conclusion: In patients with acute stroke in the anterior circulation and low ASPECT score (0–5) revascularization therapy led to a favorable clinical outcome at 90 days and reduce malignant infarction, hemicraniectomy and death.

AS01-008

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

DIFFERENTIAL ANGIOGRAPHIC AND CLINICAL OUTCOME AFTER MECHANICAL THROMBECTOMY IN ACUTE ISCHEMIC STROKE DUE TO INCOMPLETE VERSUS COMPLETE CEREBRAL LARGE VESSEL OCCLUSION

V. Maus[1], S. You[1], A. Kalkan[1], J. Borggrefe[1], C. Kabbasch[1], C. Dohmen[2], T. Liebig[3], G. Fink[2] and A. Mpotsaris[1]
[1]University Hospital of Cologne, Radiology, Cologne, Germany
[2]University Hospital of Cologne, Neurology, Cologne, Germany
[3]Charite, Neuroradiology, Berlin, Germany

Background and Aims: Cerebral large vessel occlusion (LVO) in acute ischemic stroke (AIS) may be complete (CLVO) or incomplete (ILVO). The influence of ILVO on clinical outcome after mechanical thrombectomy (MT) remains unclear. We investigated primarily the clinical outcome in patients with AIS due to ILVO or CLVO.
Method: Five hundred and three consecutive AIS patients with LVO treated with stent-retriever or direct aspiration based MT between 2010 and 2016 were analyzed. Primary endpoint was favorable clinical outcome (mRS ≤ 2) at 90 days, secondary endpoints were periprocedural parameters.
Results: Fortynine patients (11.3%) with a median NIHSS of 11.0 presented with ILVO, the remainder with CLVO and median NIHSS of 15 ($p < 0.001$). Median groin puncture to reperfusion time was 30 vs. 67 minutes respectively ($p < 0.001$). Successful reperfusion was reached in 47/49 ILVO (95.9%) vs. 298/381 CLVO (78.2%) ($p < 0.005$) with less retrieval-maneuvers (1.7 ± 2.2 vs. 3.0 ± 2.5) ($p < 0.001$). Favorable outcome at 90 days was 81% in patients with ILVO vs. 29.1% in CLVO ($p < 0.001$); respective all-cause mortality rates were 6.4% vs. 28.5% ($p < 0.001$). Complications (sICH, ENT, iatrogenic dissections and perforations) were observed exclusively in CLVO patients (6.9%). In multivariable logistic regression ILVO was associated with favorable clinical outcome independent of age and NIHSS both in the anterior (odds ratio, 3.6; 95% CI, 1.8–6.9; $p < 0.001$) and posterior circulation (odds ratio, 3.5; 95% CI, 1.8–6.9; $p < 0.001$).
Conclusion: AIS due to ILVO is frequent and associated with a nearly three-fold higher chance of favorable clinical outcome at 90 days compared to CLVO independent of age and initial NIHSS.

AS01-009

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

PREHOSPITAL STROKE SCALE TO PREDICT LARGE VESSEL OCCLUSION IN GENERAL EMERGENCY MEDICAL SERVICE: FACE2-AD SCALE

Y. Okuno[1], H. Yamagami[1], H. Kataoka[2], Y. Tahara[3], S. Tonomura[4], D. Matsui[5], T. Imahori[6], J.C. Takahashi[2], H. Imamura[7], K. Toyoda[8], H. Tokunaga[9], M. Kobayashi[5], N. Sakai[7], K. Nagatsuka[1] and M. Ihara[1]
[1]National Cerebral and Cardiovascular Center, Neurology, Suita- Osaka, Japan
[2]National Cerebral and Cardiovascular Center, Neurosurgery, Suita- Osaka, Japan
[3]National Cerebral and Cardiovascular Center, Cardiovascular Medicine, Suita- Osaka, Japan
[4]Nara City Hospital, Neurology, Nara, Japan
[5]Tajima Emergency & Critical Care Medical Center- Toyooka Hospital, Emergency & Critical Care Medicine, Toyooka- Hyogo, Japan
[6]Toyooka Hospital, Neurosurgery, Toyooka- Hyogo, Japan
[7]Kobe City Medical Center General Hospital, Neurosurgery, Kobe- Hyogo, Japan
[8]National Cerebral and Cardiovascular Center, Cerebrovascular Medicine, Suita- Osaka, Japan
[9]Nara City Hospital, Neurosurgery, Nara, Japan

Background and Aims: Patients with acute ischemic stroke (AIS) due to large vessel occlusion (LVO) should be directly transferred to the endovascular capable stroke center. We aimed to develop a prehospital stroke scale with which emergency medical services (EMS) can easily identify LVO.
Method: Using the derivation cohort of 1419 patients transferred to our hospital by EMS with suspicion of stroke, we developed the prehospital stroke scale to predict patients with LVO. LVO was diagnosed by MRA or CTA, and was defined as occlusion of internal carotid artery, middle cerebral artery (M1, M2), or basilar artery. Thereafter, we prospectively validated this scale in the EMS of four stroke centers.
Results: In the derivation cohort, 437 patients were diagnosed as AIS and 130 patients had LVO. We developed FACE2-AD scale based on factors associated with LVO in EMS records: Facial palsy, Arm palsy, disturbance of Consciousness, Atrial fibrillation and Diastolic blood pressure $\leq$85 mmHg (each scored 0 or 1), and Eye deviation (scored 0 or 2). FACE2-AD Scale $\geq$3 had sensitivity of 0.88, specificity of 0.76, positive predictive value of 0.27 and negative predictive value of 0.98 for detecting LVO. In validation cohort with 382 patients, 136 patients were AIS including 53 LVO. FACE2-AD Scale $\geq$ 3 had sensitivity of 0.77, specificity of 0.80, positive predictive value of 0.39 and negative predictive value of 0.96 for detecting LVO.
Conclusion: FACE2-AD scale is a simple tool that can detect AIS patients with LVO in EMS.

AS01-011

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

PREDICTORS OF HEMORRHAGIC INFARCTION AFTER INTRAVENOUS RT-PA

R. Ohtani[1], M. Nakamura[1], Y. Kawabata[2], S. Nirengi[3], N. Murase[1], M. Sainouchi[1], Y. Kuwata[1], M. Takata[1], Y. Masuda[1], T. Tsukahara[2] and N. Sakane[3]
[1]National Hospital Organization- Kyoto Medical Center, Neurology, Kyoto, Japan
[2]National Hospital Organization- Kyoto Medical Center, Neurosurgery, Kyoto, Japan
[3]National Hospital Organization- Kyoto Medical Center, Division of Preventive Medicine- Clinical Research Institute, Kyoto, Japan

Background and Aims: Hemorrhagic infarction (HI) is one of the most feared complications after administration of intravenous recombinant tissue plasminogen activator (rt-PA). The aim of the study was to determine risk factors of hemorrhagic infarction after rt-PA treatment.
Method: We analyzed 109 patients form the stroke registries (January 2009 – June 2016) in our hospital. We confirmed hemorrhagic infarction by computed tomography or magnetic resonance imaging. Patients group

were classified into HI group or non-HI group. A p-value <0.05 were considered statistically significant.
Results: Among 109 patients, 62 patients (56.9%) developed HI. Patients in HI group had a significantly higher systolic blood pressure on admission and just before rt-PA treatment, a higher incidence of atrial fibrillation, coronary heart disease, cardioembolic stroke, poor neurological outcomes, and lower ASPECT-DWI scores compared those in non-HI group. Also, Patients with HI group had a significantly higher incidence of internal carotid artery (ICA) occlusion, but they had a lower incidence of occlusion in the middle cerebral artery (perforating branches). There was no difference in age, gender, the timing of rt-PA treatment (within <3 or 3–4.5 h of stroke onset) between groups.
Conclusion: Atrial fibrillation, higher blood pressure, occluded vessels, poor neurological outcomes, and infarct size were significantly associated with HI. Therefore, these factors should be considered for treatment strategies to prevent HI.

AS01-014

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

ANALYSIS OF FACTORS INFLUENCING THE OUTCOME IN PATIENTS UNDERGOING A REVASCULARIZATION PROCEDURE FOR ISCHEMIC STROKE

V. Procházka[1], T. Jonszta[1], D. Czerný[1], J. Krajča[1], J. Mačák[2], J. Gumulec[3], M. Roubec[4], I. Lochman[5] and A. Vrtková[6]
[1]University hospital Ostrava, Radiology department, Ostrava, Czech Republic
[2]University hospital Ostrava, Pathology department, Ostrava, Czech Republic
[3]University hospital Ostrava, Hematooncology clinic, Ostrava, Czech Republic
[4]University hospital Ostrava, Neurology clinic, Ostrava, Czech Republic
[5]SPADIA LAB- a.s, Imunology department, Ostrava, Czech Republic
[6]Technical university Ostrava-VSB, Department of applied mathematics, Ostrava, Czech Republic

Background and Aims: The AIM of our study with 605 patients (347M and 258F) was to compaire the group of patients with mechanical revascularisation and previous IVT, against the group without IVT and mechanical revascularisation alone.
Method: A total of 605 patients underwent endovascular treatment (EVT) for acute ischemic stroke with large vessel occlusion. Mechanical thrombectomy (MT) alone was done in 206 patients or followed by stent implantation for residual occlusion or significant stenosis in 63 patients. Cerebral angioplasty plus stenting was necessary in 67 patients, angioplasty alone in 42 patients and intracranial stenting alone in 65 patients. Local intraterial thrombolysis in 27, combination procedure in 58 patients was donne. EVT with previous IVT was donne in 358 cases and without IVT in 247 patients
Results: No significant difference ($p=0.111$) was observed between the group coming directly to our centre for MT with received IVT (26) against the group without IVT prior MT (48). But significant difference ($p=0.08$) has been found in the patient transferred to our center for MT with applied IVT (51) against the group without IVT (48). There was no significant difference ($p=0.958$) in 3M-mRS between the group of patients with Penumbra procedure (42) against the stent retriever procedures (258).
Conclusion: The efficacy for large vessel occlusion recanalisation is 10% in IVT, but IVT has additional effect on collateral flow in patients transfered for EVT from other centres to the interventional centre on 3M-mRS. No difference on 3M-mRS has been found in directly admitted patients with applied IVT or not before EVT.

AS01-016

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

OUTCOMES FOR ENDOVASCULAR THERAPY FOR LARGE VESSEL OCCLUSION IN PATIENTS 80 YEARS AND OLDER

N. Wilson[1], J. Conners[2], S. Song[2] and L. Cherian[2]
[1]Rush University Medical Center, Medical College, Chicago, USA
[2]Rush University Medical Center, Vascular Neurology, Chicago, USA

Background and Aims: Seven trials have shown effectiveness of endovascular thrombectomy for patients with acute ischemic stroke, but patients 80 years and older were excluded from trials or enrolled in small numbers. The $\geq$80 cohort represents a growing demographic for acute stroke, and more data is needed for Intra-Arterial Therapy (IAT) outcomes. This study aims to examine outcomes for patients $\geq$80 who underwent IAT compared to patients $<$80.
Method: We examined patients at Rush University Medical Center from July, 2010 to August, 2016 who underwent IAT. Patients were grouped by age: $<$80 years ($n=188$) vs $\geq$80 years ($n=29$). Outcomes included discharge disposition and modified Rankin Scale (mRS).
Results: Comparing patients $<$80 to those $\geq$80, respectively, there was no significant difference in percentage receiving IV-tPA (58.5% vs 58.6%, $p=0.99$), initial Thrombolysis in Cerebral Ischemia (TICI) grading ($p=0.34$), hemorrhagic complications (10.1% vs 10.3%), mean initial NIHSS score (19.2, $sd=5.86$ vs 20.48, $sd=6.04$, $p=0.28$), or average time (minutes) from last known well to groin catheterization (268 vs 246, $p=0.35$). Discharge disposition rates: Home 13.9% vs. 6.9%, Acute Rehab 56.68% vs. 41.38%, Skilled Nursing Facility 3.21% vs. 17.24%, Long Term Acute Care 8.02% vs. 10.34%, Hospice 5.35% vs. 17.24%, Expired 12.83% vs. 6.9% ($p=0.007$). Median 90 day mRS: 3 ($n=80$) vs. 6 ($n=11$), ($p=0.05$).
Conclusion: Despite similar stroke severity, initial TICI grading, likelihood of receiving IVtPA, and time from last known well to intervention, patients $\geq$80 years who underwent IAT showed significantly less likelihood of discharge home or to acute rehab and had worse functional outcomes at 90 days.

AS01-019

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

PROGNOSTIC VALUE OF INFARCT DEMARCATION ON BASELINE T2 AND FLAIR WEIGHTED MR IMAGING IN ACUTE STROKE TREATMENT

M. Julia[1], K.G. Pascal[2], L. Lars[3], L. Mathias[3], S. Gerhard[3], M. Pascal[3], H. Mirjam[4], M. Marie-Luise[4], F. Urs[4], A. Marcel[4], G. Jan[3], M. Heinrich[4], E.K. Marwan[3] and S. Jung[5]
[1]Inselspital, Neurology, Bern, Switzerland
[2]University Basel, Neuroradiology, Basel, Switzerland
[3]University Hospital Bern, Neuroradiology, Bern, Switzerland
[4]University Hospital of Bern, Neurology, Bern, Switzerland
[5]Switzerland

Background and Aims: Patients have been selected for stroke treatment studies based on FLAIR hyperintensity within the infarcted area, but the effect of FLAIR hyperintensity on outcome and bleeding complications has been addressed in only few studies with conflicting results.
Method: Patients with anterior circulation stroke examined with MRI before intravenous or endovascular treatment were included. Baseline data and 3 months outcome were recorded prospectively. Bleeding complications were rated as symptomatic or asymptomatic according to the PROACT II classification on follow up imaging. Focal T2 and FLAIR hyperintensity within the infarcted area was rated by two raters. Logistic regression analysis was used to determine predictors of bleeding complications and outcome and to analyze the influence of T2 or FLAIR hyperintensity within the infarcted area.
Results: Focal hyperintensities were found in 142 of 307 (46.3%) patients with T2 weighted imaging and in 89 of 159 (56%) patients with FLAIR imaging. Hyperintensity in the basal ganglia region, especially in the lentiform nucleus, on T2 weighted imaging was the only independent predictor of any bleeding after stroke treatment (33.8% in patients with vs. 18.2% in those without; $p = 0.003$) and there was a trend for more bleedings in patients with basal ganglia hyperintensity in FLAIR imaging ($p = 0.069$). Hyperintensity on T2 weighted or FLAIR imaging was not associated with symptomatic bleeding or worse outcome.
Conclusion: Focal T2 or FLAIR hyperintensity within the infarct area should not lead to exclusion of patients from therapy, but thrombolytic agents may be used with more caution in case of basal ganglia involvement.

AS01-020

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

IMPACT OF ANEMIA AND TREATMENT ASSOCIATED HEMODILUTION IN ACUTE STROKE TREATMENT

S. Jung[1], B. Sebastian[2], B. Rupashani[2], N. Michael[3], B. Meret[2], F. Samuel[2], H. Arsany[4], D. Tomas[4], H. Mirjam[2], W. Roland[4], M. Marie-Luise[4], E.K. Marwan[4], M. Pasquale[4], F. Urs[2], G. Jan[4], M. Heinrich[2] and A. Marcel[2]
[1]Switzerland
[2]University Hospital of Bern, Neurology, Bern, Switzerland
[3]University Hospital Bern Hematology, Hematology, Bern, Switzerland
[4]University Hospital Bern, Neuroradiology, Bern, Switzerland

Background and Aims: Anemia has been found to be associated with worse outcome and survival in conservatively treated ischemic stroke patients. The reason for the negative impact on outcome and the impact in acute stroke treatment has hardly been addressed yet.
Method: 1158 patients treated between 2011 and 2015 were included. Baseline data and 3 months outcome were recorded prospectively. Baseline DWI lesion volumes were measured semi-automatically in 345 patients and final infarct volumes in 135. Multivariable regression analysis was used to determine predictors of outcome and survival and linear regression analysis to determine predictors of infarct growth.
Results: 712 patients were treated with endovascular treatment and 446 with intravenous thrombolysis. Low hemoglobin at baseline, at 24 h, and nadir until day 5 predicted poor outcome and higher mortality, independently from therapy. The Number Needed to Harm for suffering unfavorable outcome due to newly developed anemia was 7.4. Decrease of hemoglobin after hospital arrival, which is mainly derived by hemodilution, predicts poor outcome and has a linear association with final infarct volumes and the amount and velocity of infarct growth. Patients with newly derived anemia had twice as large final infarcts and 30times faster infarct growth velocities. Theoretically, infusion of 1000 ml NaCl 0.9% might result in an expansion of the final infarct by 7%.
Conclusion: Anemia and hemoglobin decrease have large impact on outcome in acute stroke treatment by enlarging and accelerating infarct growth. Our results imply a probable devastating effect of hemodilution, which should be addressed in prospective trials.

AS01-021

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

DO MECHANICAL PROPERTIES OF THROMBI INFLUENCE EFFECTIVNESS AND SAFETY OF STENT RETRIEVER THROMBECTOMY? MECHANICAL THROMBECTOMY OF CALCIFIED EMBOLI IN STROKE

T. Dobrocky[1], E. Piechowiak[1], A. Cianfoni[2], F. Zibold[1], S. Jung[3], U. Fischer[3], P. Mordasini[1] and J. Gralla[1]
[1]University of Bern, Diagnostic and Interventional Neuroradiololgy, Bern, Switzerland
[2]Neurocenter of Italian Switzerland, Department of Neuroradiology, Lugano, Switzerland
[3]University of Bern, Department of Neurology, Bern, Switzerland

Background and Aims: Thrombus composition have been postulated to affect the success of endovascular therapy. Calcified clots are composed of large amounts of calcium-phosphate which influence their mechanical properties and may serve as a role model for this hypothesis. The aim of this study was to evaluate the recanalization and complication rates of calcified thromboemboli in patients with acute ischemic stroke undergoing thrombectomy.
Method: Retrospective analysis of all calcified intracranial thromboemboli in patients suffering an acute ischemic referred for endovascular therapy at two centers between January 2013 and July 2016 was performed.
Results: Eight patients with a calcified intracranial clot underwent stent retriever thrombectomy (5 women; mean age 80 years). Mean embolus attenuation was 305 HU (range: 150–640 HU). Successful reperfusion defined as TICI 2b-3 was achieved in only one case (12.5 %). Two periprocedural adverse events occurred: one peripheral vessel perforation which was coiled and one inadvertent stent retriever detachment due to fracture of the stent retriever wire.
Conclusion: Stent retriever thrombectomy of calcified thromboemboli seems less effective compared to other types of clots. Different mechanical properties of calcified clots may render them stiffer and less accessible for stent retrievers. When faced with a calcified intracranial thromboembolus in clinical practice a more contained approach may be warranted in view of low recanalization rates and potential to peri-procedural adverse events.

AS01-022

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

STENT RETRIEVER THROMBECTOMY WITH THE MINDFRAME CAPTURE LP IN PERIPHERAL ANTERIOR CEREBRAL CIRCULATION OCCLUSIONS

T. Dobrocky[1], R. Kurmann[2], E. Piechowiak[1], F. Zibold[1], S. Jung[2], U. Fischer[2], M. Arnold[2], J. Gralla[1] and P. Mordasini[1]
[1]University of Bern, Diagnostic and Interventional Neuroradiololgy, Bern, Switzerland
[2]University of Bern, Department of Neurology, Bern, Switzerland

Background and Aims: Mechanical thrombectomy has been shown effective in large vessel occlusions in acute ischemic stroke. New devices have been introduced intended for thrombectomy in peripheral cerebral vessels. The purpose of this study was to review the application of the Mindframe Capture LP stent retriever for thrombectomy in distal, intracranial vessel occlusions.
Method: We performed a retrospective review to identify all patients in whom the Mindframe Capture LP was used for treatment of peripheral occlusions. Technical aspects of the recanalization procedure, recanalization rate, complication rate and clinical outcome were analyzed.
Results: Mechanical thrombectomy with the Mindframe Capture LP was performed in 30 patients (mean age 69 years) with a peripheral vessel occlusion of the anterior circulation (M2 and A2 segment), 14 of those occurring isolated, and 16 in the setting of a complex occlusion pattern with additional down-stream embolus. For isolated peripheral occlusions and for complex occlusion patterns the mean NIHSS score on admission was 10.9 and 17.9, respectively, with good reperfusion defined as TICI 2b/3 of 57 % and 88 %, respectively. Good outcome at three months (mRS 0–2) was observed in four patients in the isolated and three patients in the complex occlusion group.
Conclusion: The Mindframe Capture LP is an effective device for thrombectomy in small caliber intracranial vessels of the anterior circulation including the M2 and A2 segment. It is useful for peripheral occlusions occurring isolated and in the setting of complex stroke patterns with additional down-stream occlusions and peri-procedural embolic events.

AS01-025

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

FACTORS ASSOCIATED WITH THE VASCULAR WALL COMPONENT IN THE ENDOVASCULARLY–RETRIEVED THROMBI IN ACUTE STROKE PATIENTS

N. Funatsu[1], M. Hayakawa[1], T. Hashimoto[2], K. Fujita[1], Y. Iwasaki[1], H. Yamagami[3], T. Satow[4], J.C. Takahashi[4], M. Ihara[5], H. Ishibashi-Ueda[6], T. Iwama[7] and K. Toyoda[1]
[1]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita, Japan
[2]Kokura Memorial Hospital, Department of Neurology, Kitakyushu, Japan
[3]National Cerebral and Cardiovascular Center, Department of Stroke Care Unit, Suita, Japan
[4]National Cerebral and Cardiovascular Center, Department of Neurosurgery, Suita, Japan
[5]National Cerebral and Cardiovascular Center, Department of Neurology, Suita, Japan
[6]National Cerebral and Cardiovascular Center, Department of Pathology, Suita, Japan
[7]Gifu University Graduate School of Medicine, Department of Neurosurgery, Gifu, Japan

Background and Aims: Vascular wall components (VWCs) are sometimes identified as collagen fibers in specimens retrieved by thrombectomy from acute stroke patients. However, their clinical significance and related factors remain unclear. The purpose of this study was to clarify the factors associated with VWCs in retrieved thrombi.
Method: We retrospectively reviewed consecutive acute stroke patients endovascularly-treated using the Penumbra device or stent retrievers (SR) at our institute from December 2010 to April 2016 and evaluated the retrieved thrombi histopathologically. VWCs were defined as collagen fibers observed at the rim of retrieved thrombi except for thrombus organization. Factors associated with the presence and area of VWCs in specimens were studied.
Results: A total of 162 specimens (85 specimens retrieved by the Penumbra, 77 by SR) from 113 patients were investigated. VWCs were observed in 27 specimens (17%). Successful recanalization (TICI $\geq$ 2B) was less frequent in patients with VWC-positive thrombi than those without (68% vs. 86%, $p = 0.03$). While no inter-device difference was shown in the frequency of VWCs (the Penumbra vs. SR; 14% vs. 19%), the area of VWCs tended to be smaller in thrombi retrieved by the Penumbra than in those by SR (median 3389 [IQR, 1920–64108] μm^2 vs. 54148 [6247–163948] μm^2, $p = 0.06$).
Conclusion: The presence of VWCs may be associated with unsuccessful recanalization. Furthermore, the area of VWCs tended to be different among the types of thrombectomy device.

AS01-026

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

ENDOVASCULAR THERAPY BEYOND 6 HOURS FOR ACUTE ISCHEMIC STROKE; AN ANALYSIS OF THE ACUTE STROKE DUE TO INTRACRANIAL ATHEROSCLEROTIC OCCLUSION AND NEUROINTERVENTION KOREAN RETROSPECTIVE REGISTRY

S.I. Sohn[1], J.H. Hong[1], H.W. Chang[2], C.H. Kim[3], J.M. Hong[4], S.J. Lee[4], J.W. Choi[4], Y.W. Kim[5], D.H. Kang[6], Y.S. Kim[7], B. Ovbiagele[8], A.M. Demchuk[9], Y.H. Hwang[10] and J.S. Lee[4]
[1]Keimyung University Dongsan Medical Center, Neurology, Daegu, Republic of Korea
[2]Keimyung University Dongsan Medical Center, Radiology, Daegu, Republic of Korea
[3]Keimyung University Dongsan Medical Center, Neurosurgery, Daegu, Republic of Korea
[4]Ajou University Medical Center, Neurology, Suwon, Republic of Korea
[5]Kyungpook National University School of Medicine and Hospital, Neurology and Radiology, Daegu, Republic of Korea
[6]Kyungpook National University School of Medicine and Hospital, Neurosurgery and Radiology, Daegu, Republic of Korea
[7]Kyungpook National University School of Medicine and Hospital, Radiology, Daegu, Republic of Korea
[8]Medical University of South Carolina, Neurolgy, Charleston- South Carolina, USA
[9]Hotchkiss Brain Institute- University of Calgary, Clinical Neurosciences and Radiology, Calgary- Alberta, Canada
[10]Kyungpook National University School of Medicine and Hospital, Neurology, Daegu, Republic of Korea

Background and Aims: We investigate the efficacy and safety of EVT between 6 and 12 hours after the onset of a stroke
Method: Multicenter consecutive patients (n = 721) who received EVT for AIS were enrolled into the Acute Stroke due to Intracranial Atherosclerotic occlusion and Neurointervention Korean Retrospective (ASIAN KR) registry (January 2011 and Mar 2016), where imaging data was blindly evaluated in core lab. Patients were included in the study if they had ASPECTS 6–10, acute large arterial occlusion in the anterior circulation, and ≤12 hours of onset to puncture time (OPT). We compared clinical and imaging outcomes between 'Standard' group (OPT 0–6 h) and 'Extended' group (OPT 6–12 h).
Results: Of 351 patients, 90 (25.6%) patients were included in the Extended group. In univariate analysis, age (median 70, IQR [60–78] vs. 72, [62.5–77.0]), female sex (47.5% vs. 41.1%), initial NIHSS score (16, [12–20] vs. 15, [11–19]), ASPECTS (8, [7–9] vs 8, [6.5–10]), occlusion locations, puncture to final angiography time (61 min., [44–86] vs. 60, [40–87]), mTICI 2b-3 recanalization rate (76.8% vs. 80.0%), frequency of postprocedural PH2 and/or subarachnoid hemorrhage (8.4% vs.5.6%), 3-month mRS 0–2 (60.4% vs 63.3% common odds ratio 1.13, 95% confidence interval 0.69–1.86) did not differ. Extended group had higher initial glucose levels (135 mg/dL, [112.5–175.5] vs. 121, [107–141] , p = 0.008 and higher frequency of large atherosclerotic disease on underlying etiology than Standard group (34.4% vs 19.2%, p = 0.004).
Conclusion: We demonstrated that EVT beyond 6 hours after symptom onset, based on favorable ASPECTS, is effective and safe in patients with acute anterior circulation occlusion.

AS01-027

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

DWI-ASPECTS, NIHSS AND EARLIER ARRIVAL PREDICT GOOD RECOVERY BY MECHANICAL ENDOVASCULAR THROMBECTOMY AFTER THROMBOLYSIS FOR ACUTE ISCHEMIC STROKE

S. Nogawa[1], T. Abe[1], Y. Chin[1], T. Nakayama[1], H. Shigematsu[2], T. Yasuda[1], K. Tokuoka[1], S. Oda[2] and M. Shimoda[2]
[1]Tokai University Hachioji Hospital, Department of Neurology, Tokyo, Japan
[2]Tokai University Hachioji Hospital, Department of Neurosurgery, Tokyo, Japan

Background and Aims: There is increasing evidence that mechanical endovascular thrombectomy (EVT) may improve functional outcome in patients with large cerebral artery occlusion, although intravenous infusion of rt-PA (IV rt-PA) is still the golden standard for acute ischemic stroke. However, it has not been determined which types of patients are most ameliorated by EVT after IV rt-PA. The aim of the present study is to clarify determinants of functional outcome in patients treated with the additional EVT.
Method: Sequential 27 patients (66.2 + 14.1 year old) with acute ischemic stroke who underwent IV rt-PA followed by EVT were enrolled retrospectively. According to modified Rankin Scale (mRS), we divided these subjects into good recovery (GR) group (mRS 0, 1, 2; n = 8) and poor recovery (PR) group (>3; n = 19), and compared these two groups in various measures.
Results: 1) Duration from the onset to the door in the GR group (0:54 + 0:51) was shorter by 30 min than that in the PR group. 2) NIHSS at initiation of IV rt-PA or EVT in the GR group (14.8 + 5.9, 14.3 + 5.6) was lower than that in the PR group (21.3 + 7.5, 19.1 + 7.2). 3) DWI-ASPECTS in the GR group (9.0 + 1.6) was significantly (P < 0.01) higher compared with that in the PR group (5.6 + 2.2). 4) The recanalization rate (>TICI 2b) in the GR group was 100%, while that in the PR group was 52.6%.
Conclusion: DWI-ASPECTS at the baseline >6 and NIHSS at the initiation of IV rt-PA <20 as well as earlier arrival may predict good recovery by the mechanical EVT after thrombolysis.

AS01-030

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

CANDIDATES FOR ENDOVASCULAR TREATMENT IN A HOSPITAL-BASED COHORT OF ACUTE ISCHEMIC STROKE PATIENTS: RESULTS FROM THE BERNE STROKE PROJECT

M.L. Mono[1], R. Balasubramaniam[1], U. Fischer[1], M. Zwahlen[2], K. Nedeltchev[3], M. Arnold[1], A. Galimanis[1], O. Findling[4], N. Meier[1], C. Brekenfeld[5], J. Gralla[6], R. Heller[7], H. Schaad[8], G. Waldegg[9], A. Ronsdorf[10], T. Zehnder[11], G. Brunner[12], G. Schroth[13] and H. Mattle[14]
[1]University Hospital of Berne, Neurology, Berne, Switzerland
[2]Institute of Social and Preventive Medicine, University of Berne, Berne, Switzerland
[3]Kantonsspital Aarau, Neurology, Berne, Switzerland
[4]Kantonsspital Aarau, Neurology, Aarau, Switzerland
[5]University Hospital Hamburg-Eppendorf, Neuroradiology, Hamburg, Germany
[6]Universit Hospital of Berne, Neurology, Berne, Switzerland
[7]ANQ – Nationaler Verein für Qualitätsentwicklung in Spitälern und Kliniken, Akutsomatik, Berne, Switzerland
[8]Spital Interlaken, Internal Medicine, Interlaken, Switzerland
[9]Spital Emmental, Internal Medicine, Burgdorf, Switzerland
[10]Ärztegemeinschaft Breite, Internal Medicine, Basel, Switzerland
[11]Spital STS, Angiology, Thun, Switzerland
[12]Ärztezentrum Jegenstorf AG, Internal Medicine, Jegenstorf, Switzerland
[13]University Hospital of Berne, Neuroradiology, Berne, Switzerland
[14]University Hospital of Berne, Neurology, Neurology, Switzerland

Background and Aims: Endovascular treatment of acute ischemic stroke due to large vessel occlusion was proven to be safe and effective superior to standard medical care including intravenous thrombolysis within a 6(-8) hours time window, Since the number of potentially eligible patients for endovascular treatment (EVT) is unknown, we analyzed candidates for EVT in a hospital-based cohort.
Method: We prospectively assessed demographic data including stroke severity (NIHSS), time windows from symptom onset to diagnosis, therapy and outcome of 807 stroke patients admitted within 48 hours to Bernese hospitals during 12 months. Of them, 389 patients with known symptom onset admitted within 8 hours after symptom onset were included. The number of patients with large vessel occlusion was deduced from the study of Heldner et al.(Stroke 2013).
Results: Of the 389 patients, 207 (53%) were admitted within 0–2,99 hours, followed by 87 (22%) within 3–4,49 hours, 56 (14%) within 4.5–5,99 hours and 39 (10%) within 6–7,99 hours. The estimated number of patients with a large vessel occlusion was 161 (41%) in the time window from 0–7,99 hours, corresponding to 102 (49%) within 0–2,99 hours, 30 (35%), 20 (36%) and 9 (23%) in the following time windows. Of these potential candidates, 60 (37%) patients (39%) received EVT, i.e. 38 (37%) within 0–2,99hours, 16 (53%), 4 (20%) and 2(22%) in the following time windows.
Conclusion: In our study, more than 60% of patients with large vessel occlusion and therefore potential candidates for EVT were finally not treated. A faster evaluation and a nationwide implementation of EVT is urgently needed.

AS01-031

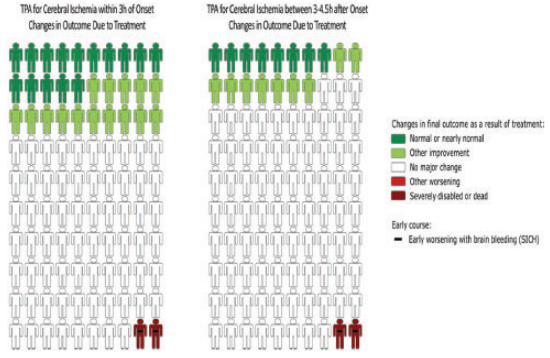
CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

HARMONIZED VISUAL DECISION AIDS TO EXPEDITE PHYSICIAN, PATIENT AND FAMILY DECISION-MAKING REGARDING INTRAVENOUS TPA FOR ACUTE ISCHEMIC STROKE IN DIFFERENT TIME WINDOWS

M. Vales Montero[1], I. Tokunboh[2], L. Sharma[2], S. Starkman[2], V. Szeder[2], D. Liebeskind[2], A.M. Demchuk[3], M.G. Lansberg[4], H. Lutsep[5], L.H. Schwamm[6] and J.L. Saver[2]

[1]Hospital General Universitario Gregorio Marañón, Neurology, Madrid, Spain
[2]UCLA Comprehensive Stroke Center, Neurology, Los Angeles, USA
[3]University of Calgary, Clinical Neurosciences, Calgary, Canada
[4]Stanford University Medical Center, Stanford Stroke Center, Palo Alto, USA
[5]Oregon Health & Science University, Neurology, Portland, USA
[6]Massachusetts General Hospital- Harvard Medical School, Neurology, Boston, USA

Background and Aims: Rapid decision-making optimizes outcomes from intravenous tPA for acute cerebral ischemia. Visual displays facilitate swift review of potential outcomes with different interventions. Harmonized displays using modern definitions of symptomatic intracerebral hemorrhage (SICH) would be helpful for intravenous tPA in <3 h and 3–4.5 h time windows.
Method: We used data from pivotal registration trials (NINDS tPA Trials 1/2, and ECASS3) to generate 100 person-icon arrays (Kuiper-Marshall personographs) showing beneficial and adverse therapy effects. Joint outcome table specification disambiguated number needed to treat to benefit and to harm. SICH required parenchymal hematoma with $\geq$4 NIHSS worsening.
Results: Joint outcome table specification indicated the following effects among 100 treated patients: IV tPA under 3 h: 30 patients with better disability outcome as a result of therapy, including 15 more normal or near normal (mRS 0–1). IV tPA 3–4.5 h: 17 patients with a better disability outcome, including 8 more normal or nearly normal outcomes. In both time windows, 2 of 100 treated patients were harmed as a result of therapy, mediated by increased symptomatic hemorrhage. New visual displays efficiently conveyed this information to patients and family (figure).



Conclusion: Harmonized visual decision aids are now available to rapidly educate healthcare providers, patients, and families about the benefits and risks of intravenous thrombolysis for acute ischemic stroke in the under 3 h and 3–4.5 h time windows.

AS01-032

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

THROMBUS PERMEABILITY CORRELATES TO HISTOLOGY OF RETRIEVED INTRACRANIAL THROMBI IN ACUTE ISCHEMIC STROKE

M. Berndt[1], J. Kaesmacher[1], S. Prothmann[1], L. Schirmer[2], C. Zimmer[1], H. Poppert[2] and T. Boeckh-Behrens[1]

[1]Klinikum rechts der Isar- TU Muenchen, Department of Neuroradiology, Muenchen, Germany
[2]Klinikum rechts der Isar- TU Muenchen, Department of Neurology, Muenchen, Germany

Background and Aims: Intracranial thrombi can be characterized according to their permeability, as measured by penetration of contrast agent. Thrombus permeability is supposed to influence functional outcomes. However, factors underlying the diversity in thrombus permeability remain uncertain. We aimed to find a possible correlation between histological composition and thrombus perviousness.
Method: Thrombus densities were measured in thin-slice non-contrast CT and automatically aligned CT-angiography images of 30 patients with acute M1-occlusions within the proximal thrombus (3 mm behind the occlusion site) and the contralateral artery. Thrombus attenuation increase (Δ) and corrected void fraction (ε) were calculated. A pervious thrombus was defined as either $\Delta \geq 10.9$ HU or $\varepsilon \geq 6.5\%$ as previously suggested. Thrombus permeability measures were correlated with fractions of fibrin-platelet accumulation (F/P) and fractions of red blood cells (RBC) within the thrombus. Additionally, association with TOAST criteria was evaluated.
Results: Pervious thrombi had higher fractions of F/P (median 59% vs 48%, $p=0.025$) and lower fractions of RBC (median 33% vs 47%, $p=0.017$). Correlation with both thrombus perviousness estimates was positive for F/P (Δ:0.44, $p=0.016$/ε:0.43, $p=0.018$) and inverse for RBC (Δ: -0.47, $p=0.009$/ε: -0.46, $p=0.011$). All pervious thrombi were found to be of cardioembolic origin (100% cardioembolic origin vs 0% of other or unknown origin, $p=0.045$).
Conclusion: Permeable thrombi consist of lower RBC and more F/P. In previous histological studies, these thrombi were shown to represent more organized cardioembolic thrombi, which fit our association with higher perviousness. Thus, primary radiological assessment could aid in the planning of mechanical recanalization.

AS01-033

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

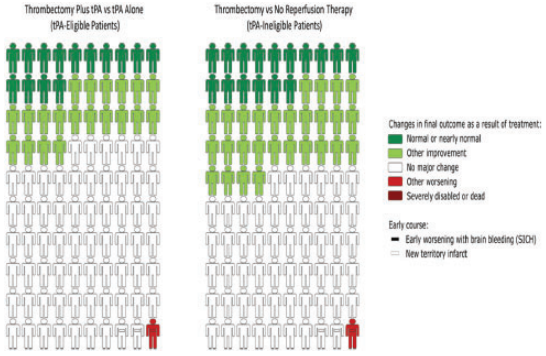
VISUAL DECISION AIDS TO EXPEDITE PHYSICIAN, PATIENT AND FAMILY DECISION-MAKING REGARDING ENDOVASCULAR THROMBECTOMY FOR ACUTE ISCHEMIC STROKE

M. Vales Montero[1], I. Tokunboh[2], M.F. Zopelaro Almeida[3], L. Sharma[2], S. Starkman[2], V. Szeder[2], R. Jahan[2], D. Liebeskind[2], N. Gonzalez[4], A. Demchuk[5], M.T. Froehler[6], M. Goyal[5], M.G. Lansberg[7], H. Lutsep[8], L.H. Schwamm[9] and J.L. Saver[2]

[1]Hospital General Universitario Gregorio Marañón, Neurology, Madrid, Spain
[2]UCLA Comprehensive Stroke Center, Neurology, Los Angeles, USA
[3]Federal University São João del Rei, Neurology, São João del Rei, Brazil

[4]UCLA Comprehensive Stroke Center, Neurosurgery/Interventional Neuroradiology, Los Angeles, USA
[5]University of Calgary, Clinical Neurosciences, Calgary, Canada
[6]Vanderbilt University Medical Center, Neurology- Neurosurgery and Radiology, Nashville, USA
[7]Stanford University Medical Center, Stanford Stroke Center, Palo Alto, USA
[8]Oregon Health & Science University, Neurology, Portland, USA
[9]Massachusetts General Hospital-Harvard Medical School, Neurology, Boston, USA

Background and Aims: Rapid decision-making optimizes outcomes from endovascular thrombectomy (ET) for acute cerebral ischemia. Visual displays facilitate swift review of potential outcomes and can accelerate decision processes.
Method: Pooled randomized trial data (HERMES) were used to generate 100 person-icon arrays (Kuiper-Marshall personographs) showing beneficial and adverse effects of ET for patients with acute cerebral ischemia and large vessel occlusion. Joint outcome table specification disambiguated number needed to treat to benefit and to harm for: 1) ET added to pharmacologic reperfusion therapy (tPA-eligible patients), and 2) ET compared to no reperfusion therapy (tPA-ineligible patients).
Results: Joint outcome table specification indicated among 100 treated patients: Thrombectomy added to IV tPA alone: 34 patients with better disability outcome as a result of ET therapy, including 14 more normal or near normal (mRS 0–1). Thrombectomy for patients ineligible for IV tPA: 44 patients with a better disability outcome, including 16 more normal or nearly normal. Harm (increased mRS final disability) occurred in 1 of 100 patients in both populations, mediated by increased new territory infarcts. New visual displays efficiently conveyed this information (figure).



Conclusion: Harmonized visual decision aids are now available to rapidly educate healthcare providers, patients, and families about the benefits and risks of endovascular thrombectomy, both when added to IV tPA in tPA-eligible patients and as the sole reperfusion treatment in tPA-ineligible patients.

AS01-035

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

TIME-TO-TREATMENT AND OUTCOME IN PATIENTS TREATED WITH ENDOVASCULAR THERAPY IN A NATIONWIDE REGISTRY: THE NATIONAL ACUTE STROKE ISRAELI REVASCULARIZATION (NASIS-REVASC) REGISTRY

D. Tanne[1], D. Orion[2], G. Raphaeli[3], A. Horev[4], R. Leker[5], G. Telman[6], H. Hallevi[7], S. Mausbach[2] and N. Bornstein[8]
[1]Israel
[2]Sheba Medical Center, Neurology, Tel Hashomer, Israel
[3]Rabin Medical Center, Neurology, Petah Tikvah, Israel
[4]Soroka Medical Center, Neurology, Beer Sheva, Israel
[5]Hadassah-Hebrew University Medical Center, Neurology, Jerusalem, Israel
[6]Rambam Medical Center, Neurology, Haifa, Israel
[7]Sourasky Medical Center, Neurology, Tel Aviv, Israel
[8]Shaare Zedek Medical Center, Neurology, Jerusalem, Israel

Background and Aims: We aimed to assess time-to-treatment and its association with outcome among patients with emergent large vessel occlusion (ELVO) treated with endovascular therapy (EVT) included in a nationwide registry.
Method: Clinical and radiological data of consecutive, prospectively enrolled patients, with ELVO treated with EVT included in the National Acute Stroke ISraeli Revascularization (NASIS-REVASC) registry in 6 comprehensive stroke centers were analyzed. Stroke subtypes were categorized according to TOAST criteria. Neurological deficits assessed using the NIH stroke scale (NIHSS), vessel recanalization using the final thrombolysis in cerebral infarction (TICI) scale, and functional outcome using the modified Rankin scale (mRS).
Results: Among 272 patients treated with EVT ($\pm$t-PA) time of symptom onset to groin puncture was <2 hrs in 11%, 2–3 hrs in 15%, 3–4.5 hrs in 30%, 4.5–6 hrs in 20% and over 6 hrs in 24%. In multivariable adjusted models the odds ratio per-hour delay were 0.85 (0.72–1.0) for mRS ≤ 3 at hospital discharge, 0.83 (0.62–1.1) for NIHSS < 2 at day-1 and 0.80 (0.66–0.95) for home discharge. Time-to treatment was not associated with final TICI score or in-hospital mortality. As compared to time-to-treatment >6 hrs the OR for mRS ≤ 3 at hospital discharge were 0.48 (0.18–1.25) for 4.5–6 hrs, 0.74 (0.31–1.79) for 3–4.5 hrs, 1.62 (0.59–4.59 for) for 2–3 hrs and 2.85 (0.90–9.85) for <2 hrs and for home discharge 1.05 (0.30–3.53) for 4.5–6 hrs, 1.82 (0.64–5.41) for 3–4.5 hrs, 3.33 (1.03–11.43) for 2–3 hrs and 5.08 (1.56–17.80) for <2 hrs. Similar trends were observed for excellent outcome (mRS 0–1).
Conclusion: In a nationwide registry of "real-life" EVT early time-to-treatment is achievable and is associated with improved clinical outcomes.

AS01-036

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

DWI - FLAIR MISMATCH AND REPERFUSION THERAPY IN WAKE-UP STROKE

S. Kolieskova[1], J. Ferrari[2], W. Lang[2] and M. Sykora[2]
[1]St. Anne's University Hospital, Neurology, Brno, Czech Republic
[2]St. Johns Hospital Vienna, Dept. of Neurology, Vienna, Austria

Background and Aims: DWI-FLAIR mismatch has been proposed to triage patients with wake-up stroke for thrombolysis. We aimed to examine the efficacy and safety of reperfusion therapy in wake-up stroke using DWI-FLAIR mismatch selection.
Method: We prospectively collected consecutive patients with wake-up stroke triaged for tPA/embolectomy using DWI-FLAIR mismatch. The control group consisted of wake-up stroke patients not treated with reperfusion therapy. The efficacy outcomes were an improvement of ≥ 4 in NIHSS between admission and discharge, mRS score of 0–1 at discharge and at 3 months. The safety outcome was symptomatic intracranial hemorrhage (sICH) as defined by ECASS III.
Results: 52 wake-up stroke patients were treated with tPA and/or embolectomy (age 78 $\pm$ 12 years, admission NIHSS 10, IQR 8) and 111 served as controls. Neurological improvement of ≥ 4 in NIHSS score was more frequent in the treatment group (38.5% vs 14%; adjusted OR 3.2; CI 1.4–7; $p = 0.005$). No difference in sICH was found between treatment group and controls (0.9 vs 3.8% $p = 0.23$). The rate of mRS score of 0–1 at discharge was 83% among treated patients and 71% in the control

group ($p = 0.08$). 80% treated patients achieved mRS score 0–1 after 3 months compared to 67% in the control group ($p = 0.07$).

Conclusion: Our study suggests that reperfusion therapy might be effective and safe in wake-up stroke patients with positive DWI-FLAIR mismatch.

AS01-037

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

SAFETY OF SP-8203 IN STROKE PATIENTS REQUIRING RTPA STANDARD OF CARE: A MULTICENTER, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED PHASE IIA STUDY

J.S. Kim[1], J.H. Park[2], K.B. Lee[3], K. Oh[4], S.M. Sung[5], E.G. Kim[6], D.I. Chang[7], Y.H. Hwang[8], W.K. Kim[9] and C. Ju[10]

[1]University of Ulsan Asan Medical Center, Department of Neurology, Seoul, Republic of Korea
[2]Seonam University Myongji Hospital, Department of Neurology, Goyang, Republic of Korea
[3]Soonchunhyang University School of Medicine, Department of Neurology, Seoul, Republic of Korea
[4]Korea University Guro Hospital, Department of Neurology, Seoul, Republic of Korea
[5]Pusan National University Hospital, Department of Neurology, Busan, Republic of Korea
[6]Inje University Busan Paik Hospital, Department of Neurology, Busan, Republic of Korea
[7]Kyung Hee University Hospital, Department of Neurology, Seoul, Republic of Korea
[8]Kyungpook National University School of Medicine and Hospital, Department of Neurology, Daegu, Republic of Korea
[9]Korea University College of Medicine, Department of Neuroscience, Seoul, Republic of Korea
[10]Shin Poong Pharm. Co. Ltd, R&D Center, Ansan, Republic of Korea

Background and Aims: Although early rtPA therapy improves the outcome of stroke patients, it increases the risk of cerebral haemorrhage. In addition to its neuroprotective action, SP-8203 greatly reduced rtPA-induced haemorrhages and mortality when given up to 6 hour after stroke in experimental animal models. The safety in healthy volunteers was ensured in Phase I trial when up to 120 mg/day was used for 7-days. The current study is a randomized, double-blind Phase IIa trial, aiming at evaluating the safety of SP-8203 in stroke patients requiring rtPA.

Method: The study was designed in two stages and conducted in 8 centres in Korea. The primary endpoint is the incidence CT-identified parenchymal haemorrhage on Day 1. Stage I was a single arm, open-label study for 14-days in 11 patients with initial NIHSS 4 to 10. Patients received rtPA within 4.5 hours, followed by 160 mg SP-8203 within 30-minutes, which is repeated 6 times at 12-hour intervals. A subject undergoes initial MRI/MRA, CT on Day 1, and follow-up MRI/MRA on Day 5. Stage II is conducted in 69 subjects with ≥ 4 point on NIHSS for 90 days, allocated to low-dose (80 mg/day) and high-dose (160 mg/day) SP-8203, and placebo groups.

Results: In Stage 1, no drug-related adverse events were reported. No significant cerebral haemorrhages were observed on Day 1. Two haemorrhagic infarction type I and one type II were detected on Day 5.

Conclusion: SP-8203 appears to be safe when administered in patients receiving rtPA. Based on DSMB approval, Stage II was initiated and is now on-going.

AS01-038

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

PREARRIVAL RACE SCORE BASED HOSPITAL BYPASS PROTOCOL IMPROVES STROKE TREATMENT TIME EFFIENCIES

S.F. Zaidi[1], J. Shawver[2], S. Panjwani[1] and M. Jumaa[1]

[1]University of Toledo College of Medicine, Neurology, Toledo, USA
[2]Promedica Toledo Hospital, Neurology, Toledo, USA

Background and Aims: Early stroke identification and treatment with mechanical thrombectomy (MT) increases likelihood of favorable outcome. We compared our MT time efficiencies before and after Rapid Arterial oCclusion Evaluation Alert (RACE) bypass protocol (RA) implementation in Lucas County (LC) Ohio.

Method: Our protocol mandates direct EMS transfer to comprehensive stroke center for patients with RACE score >4. We compared MT cases for RA patients ($N = 58$) from Jul 2015-Dec 2016 with procedures performed on Stroke Alerts [(SA) $N = 56$] from preceding 2 years (Jul 2013-Jun 2015). Transfers from outside LC, private transport and in-hospital strokes were excluded and only patients brought via LC-EMS were included in the analysis. Basic demographics, risk factors, 911 call to treatment, and outcomes were compared.

Results: Of the 56 SA patients, 33 (59%) were brought directly to CSC while the remaining 23 (41%) were taken to closest ER prior to CSC transfer. Treatment times including 911 call to IV tPA treatment, groin puncture, and recanalization were all significantly faster in the RA cohort (see table 1). Overall RA patients achieved recanalization and favorable outcomes at higher rate, although the latter was not statistically significant.

Table 1

	RACE ALERT (RA) N=58	STROKE ALERT (SA) N=56 33/56 Direct to CSC 23/56 IHT*	p
Median Age	71 (61-83)	71.5 (56.5-82.5)	0.5
Gender – Female (%)	16 (43.2)	27 (48.2)	0.6
Median NIHSS (IQR)	16 (13-20)	18 (13-21)	0.15
Median ASPECT (IQR)	9 (8-9)	9 (8-9)	0.1
IV tPA - N (%)	21 (56.7)	22 (39)	0.09
Median Minutes (IQR)			
911 to Outside ER Arrival	NA	32 (28-43)	
911 to Outside ER to CSC – IHT*	NA	205 (94-235)	
911 to Direct CSC Arrival	34 (26-48)	39 (34-146)	0.1
911 to IV tPA	64 (49-81)	88 (77-97)	<0.05
911 to groin puncture	106 (90-136)	173 (126-209)	<0.01
911 to recanalization	120 (133-167)	220 (190-267)	<0.01
TICI 2b, 3 Recanalization, N (%)	49 (85.9)	36 (67.9)	0.02
90 days mRS 0-2, N (%)	30 (54.9)	21 (38.9)	0.1
90 days Mortality, N (%)	8 (14.3)	12 (21.4)	0.16

*IHT - Interhospital transfer 1

Conclusion: Our experience indicates that RA protocol is highly effective in enhancing overall time efficiency for MT and may contribute to improved outcome. Further prospective studies are warranted.

AS01-039

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

IMPLEMENTATION OF A THROMBECTOMY SERVICE AT A NORWEGIAN UNIVERSITY HOSPITAL

G. Rohweder[1], A. Ødegård[2], T. Idicula[3], C. Drewes[4], K.A. Kvistad[5] and B. Indredavik[1]

[1]Institute for Neuromedicine- NTNU and Stroke Unit- St Olavs hospital, Department of Medicine, Trondheim, Norway
[2]St Olavs hospital, Department of Radiology, Trondheim, Norway
[3]St Olavs hospital, Department of Neurology, Trondheim, Norway
[4]St Olavs hospital, Department of Anesthesia, Trondheim, Norway
[5]St Olavs hospital, Department of Neuroradiology, Trondheim, Norway

Background and Aims: In 2011, a thrombectomy service covering Central Norway was implemented, together with an observational study with the purpose of monitoring its safety and efficacy. A team of vascular interventional radiologists underwent training in intracranial endovascular techniques and a network of 7 referral hospitals was established.
Method: Patients were consecutively included, if they were independent in daily activities, had National Institutes of Health Stroke Scale (NIHSS) >10, CT angiography showed a proximal occlusion of the anterior or posterior circulation, and the procedure could be started within 6 hours. Retrievable stents were used. Radiological outcomes were assessed after the procedure and at 24 hours. Functional outcome was assessed with the modified Rankin scale (mRS) at 90 days.
Results: 40 of the first 50 patients received IV alteplase; 15 were started at referral hospitals prior to transport. Time from onset to IV alteplase was 119 min (SD 49), from onset to arterial puncture 212 min (SD 94). 62% of patients had Thrombolysis In Cerebral Infarction (TICI) perfusion grade 2b or 3. 48% of patients had an mRS of 1–3; 50% of patients were living at home at 90 days. 16% of patients died within 90 days. 3 patients (6%) developed a symptomatic intracranial hemorrhage after the intervention.
Conclusion: A thrombectomy service using a drip-and-ship protocol for patients presenting to referring hospitals and employing a team of vascular interventional radiologists shows similar safety, degree of perfusion and patient functional outcome to results obtained in the intervention-arm of published randomized trials.

AS01-041

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

DRIP-AND-SHIP, A COMPREHENSIVE VIEW. ANALYSIS OF PATIENTS TRANSFERRED FOR ENDOVASCULAR TREATMENT WITHIN A STROKE-NETWORK

C. Adamczyk[1], W. Heidger[1], K. Huettemann[1], S. Tiedt[2], M. Herzberg[3], F. Dorn[4] and L. Kellert[1]

[1]Department of Neurology- Klinikum der Universität München- Ludwig-Maximilians University, NEVAS, München, Germany
[2]Institute for Stroke and Dementia Research- Klinikum der Universität München- Ludwig-Maximilians University, ISD, Munich, Germany
[3]Department of Neuroradiology - Klinikum der Universität München-Ludwig-Maximilians University, NEVAS, Munich, Germany
[4]Department of Neuroradiology- Klinikum der Universität München-Ludwig-Maximilians University, NEVAS, Munich, Germany

Background and Aims: While endovascular thrombectomy (ET) has been shown to be effective in large vessel occlusion (LVO), stroke patients treated with ET in recent trials were highly selected. Here we analyse all patients transferred to an endovascular capable centre for ET and compare the treated (ET-group) with the not treated patients (noET-group).
Method: Patients with acute ischemic stroke due to LVO who were transferred to the Munich University Hospital via the neurovascular-stroke-network-south-west-Bavaria (NEVAS) for ET were prospectively collected in 2015–2016. Clinical and imaging data, time intervals, and modified Rankin Scale (mRS) at discharge were recorded.
Results: Of 90 patients 54 underwent ET (60%) and 36 did not (40%). ET-group and noET-group were not different with respect to age (71y vs. 69y, $p = 0.46$), NIHSS on admission (20 vs. 19, $p = 0.51$), LVO in anterior circulation (85.2% vs. 86.1%, $p = 0.60$), rtPA treatment (75.9% vs. 69.4%, $p = 0.64$), and onset to rtPA (122 min vs. 113 min, $p = 0.70$). Onset to final decision for or against ET (213 min vs. 277 min., $p = 0.09$) showed a trend for delayed time window in the noET-group. Reasons to withhold ET were reperfused LVO n = 11 (30.6%), significant neurological improvement n = 6 (16.7%), exclusion for ET based on imaging findings n = 19 (52.8%). MRS at discharge was 4 in the ET-group and 4 in the noET-group. Within the noET-group mRS was 2 in the "to-good-to-treat-group" and 5 in the "excluded-by-imaging-group".
Conclusion: A substantial proportion of patients transferred for ET have not been treated. The decision to "drip-and-ship" could not be done by the parameters investigated in this work.

AS01-042

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

REPERFUSION THERAPY IN ACUTE STROKE: MECHANICAL THROMBECTOMY VS COMBINED TREATMENT

S. Sabeļņikova[1], K. Stirāns[1], R. Valante[1], A. Millers[1], Z. Priede[1], E. Miglāne[1] and K. Kupčs[2]

[1]Pauls Stradins Clinical University hospital, Department of Neurology, Riga, Latvia
[2]Pauls Stradins Clinical University hospital, Institute of Radiology, Riga, Latvia

Background and Aims: Mechanical thrombectomy (TE) has shown efficacy in the treatment of acute cerebral infarction. It is not known whether combination of it with intravenous thrombolysis improves the stroke outcome.
Method: The study was carried out in Pauls Stradins Clinical University Hospital in Department of Neurology and Institute of Radiology including all 212 patients who received reperfusion therapy during year 2016. TE was performed in 85 patients, out of them 64 patients underwent only TE but 21 – TE in combination with intravenous thrombolysis. The stroke severity was evaluated using National Institutes of Health Stroke Scale (NIHSS) whereas stroke outcome – by modified Rankin scale (mRS). Groups were similar according to age, stroke severity and median NIHSS score at the admission – 16.
Results: Median NIHSS score on discharge was better in combined treatment group, 4 [2 – 13], versus 7 [1 – 19] in TE alone group. The NIHSS score had greater improvement in combined treatment group, by 10 [2–13] points, versus only by 5 [3–10] points in TE alone group. Satisfactory stroke outcome (0 – III by mRS) was observed in 42 (65.6%) patients in combined treatment group and only in 9 (42.6%) in TE alone group. Mortality was almost twice higher in TE alone group (14.3%), than in

combined treatment group (7.8%). Unfortunately, statistically significance result was not achieved, that can be explained by small patient pool.
Conclusion: Combined treatment using intravenous thrombolysis in combination with TE is more effective in acute stroke treatment than TE alone.

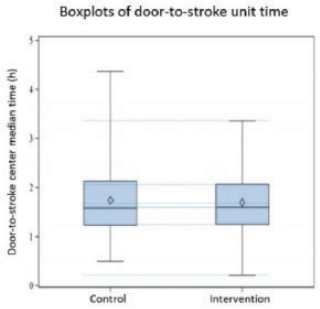
AS01-044

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

APPROPRIATE OUTCOME CRITERIA TO ASSESS THE EFFICIENCY OF INTERVENTION AIMING AT IMPROVING ACUTE STROKE MANAGEMENT

A.M. SCHOTT[1], J. HAESEBAERT[2], C. MERCIER[3], S. CAKMAK[4], A. TERMOZ[2], N. PERRETON[2], M. RABILLOUD[5], L. DEREX[6], O. DETANTE[7], K. BLANC-LASSERRE[8], S. MARCEL[9], G. RODIER[10], F. PHILIPEAU[11] and A.E. VALLET[12]
[1]University of Lyon1, Pôle IMER, Lyon, France
[2]Hospices Civils de Lyon, Pôle IMER, Lyon, France
[3]Hospices Civils de Lyon, Laboratoire de Biostatistiques, Lyon, France
[4]Hopital de Villefranche, Unité neuro-vasculaire, Villefranche, France
[5]University of Lyon1, Laboratoire de Biostatistiques, Lyon, France
[6]Hospices Civils de Lyon, Unité neuro-vasculaire, Lyon, France
[7]Centre Hospitalier universitaire de Grenoble, Unité neuro-vasculaire, Grenoble, France
[8]Centre hospitalier de Valence, Unité neuro-vasculaire, Valence, France
[9]Centre hospitalier de Chambéry, Unité neuro-vasculaire, Chambéry, France
[10]Centre hospitalier de la région d'Annecy, Unité neuro-vasculaire, ANNECY, France
[11]Centre hospitalier de Bourg en Bresse, Unité neuro-vasculaire, Bourg en Bresse, France
[12]Centre hospitalier Lucien Hussel, Unité neuro-vasculaire, Unité neuro-vasculaire, France

Background and Aims: In the AVC69 cohort study, we observed that almost 80% of patients with stroke suspicion were going to an emergency unit instead of being directly transferred to a stroke unit (SU). Overall, less than 10% had a thrombolysis.
Method: We developed a comprehensive training program designed for emergency units staff to increase thrombolysis rate and reduce intra-hospital management times within a randomized stepped wedge controlled trial. The intervention was an interactive training based on videos and simulation towards emergency nurses and practitioners. The effect of the intervention was assessed through a randomized cluster stepped-wedged trial.
Results: 691 patients were enrolled, 363 in the postintervention-period and 328 in the control-period. After adjustment for the period, age, night vs day, and "115" call, the intervention was associated with a significant increase in thrombolysis probability which was almost doubled adjOR 1.9 (95%CI 1.3 - 2.7); ($p = 0.0006$).
Surprisingly, although there was a significant decrease of 1h20mn in imaging-SU time in the post-intervention period, there was no difference in the overall median door-to-imaging time between pre and postintervention-period.
The boxplots show that median door-to-SU time is similar in the pre and postintervention period but that the first and fourth quartile are decreased in the post-intervention period.



Conclusion: We thus question the appropriateness of median door-to-SU time as a unique marker of effectiveness of acute stroke management.

AS01-047

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

CARDIOGENIC THROMBOEMBOLI ARE LESS VISIBLE ON NON-CONTRAST CT AND MORE DIFFICULT TO MECHANICALLY REMOVE

O. Francois[1], P. Vanacker[2], T. Dewaele[1], F. Denorme[3], S. De Meyer[3] and T. Andersson[4]
[1]AZ Groeninge, Interventional NeuroRadiology, Kortrijk, Belgium
[2]AZ Groeninge, Neurology, Kortrijk, Belgium
[3]KU Leuven Campus KULAK Kortrijk, Laboratory for Thrombosis Research, Kortrijk, Belgium
[4]Karolinska Institutet, Clinical Neuroscience, Stockholm, Sweden

Background and Aims: Stroke remains a leading cause for death and permanent disability. In addition to treatment availability and delayed care seeking, failed and futile revascularization due to prolonged procedures may prove to be important negative predictors. The aim of this study was to evaluate thrombus visibility on non-contrast computed tomography (NCCT) and relate this to difficulties in mechanical removal and to known clot origin and composition.
Method: All stroke patients treated at our centre are included in a quality database (EVAS-BE) approved by the local ethical committee. Data on stroke etiology according to TOAST-criteria have previously been extracted and correlated with thrombus composition as presented in a separate abstract (Denorme et al, Abstract, ESOC, 2017). For this study, clot hyperdensity was measured in Hounsfield units on NCCT and difficulties in clot removal were estimated by number of thrombectomy attempts and the clot extraction time.
Results: 75 patients were included in this study. Thrombi with cardiogenic origin, proven to contain a higher percentage of fibrin (Denorme et al, 2017), were less dense in Hounsfield units and more difficult to mechanically remove requiring significantly more thrombectomy attempts and longer extraction times.
Conclusion: Cardioembolic thrombi having high fibrin content in relation to red blood cells revealed less hyperdensity in Hounsfield units on NCCT and were more difficult to mechanically remove as compared to thrombi with atherosclerotic or other known origin. These results highlight the necessity for suitable thrombectomy techniques and development of devices capable of removing also such firm thrombi.

AS01-049

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

THE RESULTS OF INTRAVENOUS THROMBOLYTIC TREATMENT IN CARDIOEMBOLIC AND NON CARDIOEMBOLIC STROKES

M. Cetiner[1], M. Cam[2], S. Canbaz Kabay[1], H.E. Aydın[3] and O. Temel[1]
[1]Dumlupinar University Faculty of Medicine- Kutahya- Turkey., Department of Neurology, KÜTAHYA, Turkey
[2]Denizli State Hospital, Department of Neurology, KÜTAHYA, Turkey
[3]Dumlupinar University Faculty of Medicine- Kutahya- Turkey., Department of Neurosurgery, KÜTAHYA, Turkey

Background and Aims: Intravenous thrombolytic therapy for acute ischemic stroke is an effective and safe treatment. Whether the results are different from other stroke types in cardioembolic stroke is controversial. We compared the results of intravenous thrombolytic therapy with cardioembolic and noncardioembolic stroke.
Method: Clinical data of 88 patients retrospectively reviewed between May 2014 and October 2016, whom were diagnosed with ischemic stroke and who were referred to us within the first 4,5 hours after onset of stroke symptoms, and had treated with intravenous thrombolytic therapy. Patients were grouped according to the etiological classification of TOAST. Cardioembolic and non-cardioembolic stroke groups were classified. The national health institute stroke score (NIHSS) and modified Rankin scale (mRS) scores 3 months before and after treatment were evaluated.
Results: According to TOAST,40(45.5%) of 88 patients were cardioembolic, 48(54.5%) non-cardioembolic stroke group. There wasn't statistically significant difference between the two groups for stroke risk factors and pre-treatment NIHHSS averages. There was no statistically significant difference ($p > 0.05$) between mean NIHSS scores of the patients after 24 hours of treatment also in patients with mRS ≤ 2 after 3 months in both groups. In the cardioembolic group, 8 patients (20%) were asymptomatic, 3(7.5%) had symptomatic hemorrhage,7 patients (17.5%) died and 21(45.5%) patients had mRS ≤ 2 after 3 months. In the non-cardioembolic group, 2(4,2%) were asymptomatic, 1(2%) had symtomatic hemorrhage, 10 patients (20,8%) died and 23(47,9%) patients had mRS ≤ 2 after 3 months.
Conclusion: Although the effect of intravenous thrombolytic therapy on acute ischemic stroke wasn't statistically significant in both groups, hemorrhagic complication rates in the cardioembolic group were much higher.

AS01-054

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

ARTIFICIAL STROKE CLOTS: HOW GOOD IS THE APPLICABILITY TO THE REAL WORLD?

M. Berndt[1], S. Prothmann[1], P. Oberdieck[2], C. Zimmer[1], B. Hegge[3], H. Poppert[4] and T. Boeckh-Behrens[1]
[1]Klinikum rechts der Isar- TU Muenchen, Department of Neuroradiology, Muenchen, Germany
[2]Munich University Clinic- LMU München, Department of Cardiology, Muenchen, Germany
[3]Acandis GmbH u. Co. KG, Acandis GmbH u. Co. KG, Pforzheim, Germany
[4]Klinikum rechts der Isar- TU Muenchen, Department of Neurology, Muenchen, Germany

Background and Aims: Especially after the establishment of mechanical thrombectomy as part of standard stroke therapy, man-made thrombi are important to train interventionalists and to develop devices. So far, these artificial clots lack direct comparisons to real thrombi. Therefore, we compared the histological appearance of dynamically produced clots with stroke thrombi acquired during mechanical recanalization.
Method: Real thrombi of 145 consecutive stroke patients with large-vessel occlusions were histologically compared to ten artificial clots, dynamically created out of human and pig blood using an artificial circulating system (Chandler Loop ®). Quantified FP/RBC ratios (fibrin/platelets divided by red blood cell fraction) and WBC (white blood cell) fractions were compared between artificial and real thrombi, especially regarding similarities to clots of different stroke etiologies.

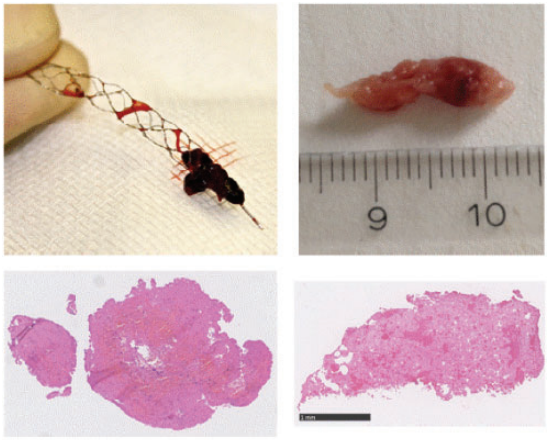


Figure: macroscopic (top row) and histological (bottom row) pictures of an in vivo thrombus (on the left) and an artificial thrombus (on the right)

Results: No significant differences between artificial and real thrombi were found in the analysis of FP/RBC ratios ($p = 0,42$), as well as in the more precise analyses looking at etiologic subgroups. Distinct differences could be seen for the WBC fraction with lower values in artificial thrombi (median 1,34%) in comparison to real ones (median 5%) ($p < 0,001$).
Conclusion: As the main clot components, FP and RBC presumably are the most influential factors for clot stability and mechanical resistance. Their congruency in artificially produced and real stroke clots supports the benefit of these artificial thrombi in the pre-evaluation of thrombus extracting devices and as appropriate training material.

AS01-055

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

EVOLUTION OF STROKE PATIENTS OVER 80 YEARS OF AGE TREATED WITH INTRAVENOUS FIBRINOLYSIS USING THE EXTENDED THERAPEUTIC TIME WINDOW

B. Yerga Lorenzana[1], A. Barragán Prieto[1], M. Duque Holguera[1], V. Romero Cantero[1], F. López Espuela[1], J.C. Portilla Cuenca[1] and I. Casado Naranjo[1]
[1]Hospital San Pedro de Alcántara, Neurology, Caceres, Spain

Background and Aims: The use of rTPA in stroke patients over 80years with an evolution of more than 3hours is controversial. Our

goal is to evaluate the early and medium-term evolution of patients treated in the extended therapeutic time window.

Method: Consecutive cohort of stroke patients treated with rTPA. We distinguished two groups:GA $\leq$80 years and GB $>$ 80 years. In GB, we analyzed the results according to symptom-needle interval (S-N), distinguishing between less than 3 hours and more than 3 hours. Demographic and stroke-associated variables were included at the study. Early evolution was defined as hemorrhagic transformation (HT), difference of NIHSS in first 24hours and mortality at seven days. Medium-term evolution (90 days) such as mortality and Independence (mRS $\leq$ 2). Chi-square test were used to compare categorical variables and T-student to quantitative ones. We used multivariable regression with prognostic factors.

Results: There were 296stroke patients included (GB:47). We found differences in age (GA 65.5 vs GB 82.2), male (58.5% vs 34.1%) and systolic blood pressure before rTPA(147.4 vs 162.2). The univariate analysis at 90 days showed significant difference in mRS $\leq$ 2 score: 55.2% vs 36.2%, p = 0.016 and mortality: 12.5% vs 23.4%, p = 0.05, without differences after the adjusted analysis [mSR $\leq$ 2 OR 0.53, (IC95% 0.23–1.20); Mortality OR 2.19(IC95% 0.87–5.51)]. We did not observe differences in early evolution. In GB, considering S-N interval, differences between early-evolution or medium-term evolution were not found in the univariate analysis, but differences in mortality at 90 days were observed in the adjusted analysis [OR 1.05, (IC95%:1.01–1.09)]

Conclusion: In our study,the intravenous rTPA treatment in patients over 80years and more than three hours of evolution was associated with a higher medium-term mortality. Short-term evolution and Independence were similar to those stroke patients treated early than 3hours.

AS01-058

CLINICAL TRIAL RESULTS – ACUTE MANAGEMENT – THROMBOLYSIS OR THROMBECTOMY

OBSERVATIONAL STUDY OF A REGIONAL INTER-HOSPITAL TELESTROKE NETWORK IN THE THROMBECTOMY ERA

R. Varela[1], G. Santo[2], E. Machado[3], J. Coelho[4], A. Gonçalves[5], R. Saraiva[6], D. Sá[7], A. Gomes[8], N. Costa[9], V. Branco[10], E. André[11], J. Sargento-Freitas[2], A. Almeida[12], R. Pimentel[13], F. Costa[13] and L. Cunha[2]

[1]Centro Hospitalar e Universitário de Coimbra, Serviço de Neurologia, Coimbra, Portugal
[2]Centro Hospitalar e Universitário de Coimbra, Neurologia, Coimbra, Portugal
[3]Centro Hospitalar e Universitário de Coimbra, Neurorradiologia, Coimbra, Portugal
[4]Coimbra, Portugal
[5]Neurologia, Hospital DIstrital da Figueira da Foz, Figueira da FOz, Portugal
[6]Centro Hospitalar de Leiria, Neurologia, Leiria, Portugal
[7]Neurologia, Centro Hospitalar do Baixo Vouga, Aveiro, Portugal
[8]Neurologia, Centro Hospitalar de Tondela Viseu, Viseu, Portugal
[9]Unidade Local de Saúde da Guarda, Neurologia, Coimbra, Portugal
[10]Centro Hospitalar de Cova da Beira, Neurologia, Covilhã, Portugal
[11]Unidade Local de Saúde Castelo Branco, Neurologia, Castelo Branco, Portugal
[12]Instituto Nacional de Emergência Médica, Instituto Nacional de Emergência Médica, Lisboa, Portugal
[13]Administração Regional de Saúde, Administração Regional de Saúde, Coimbra, Portugal

Background and Aims: Endovascular treatment in ischemic stroke with major vessel occlusion has been recently proved to be unequivocally beneficial. This progress has settled the need for an articulation between different level stroke units across the central region of Portugal, leading to the development of the first national structured telemedicine network for direct assessment of acute stroke patients.

AIM: To describe an acute stroke network system involving 1 tertiary and 7 secondary hospitals and its clinical decisions.

Method: Retrospective descriptive study enrolling patients evaluated by telemedicine at a tertiary center during the period between September 1stst 2015 and November 30th th 2016. Cerebral hemorrhages were excluded.

Results: From 479 telemedicine appointments, 448 patients were included: mean age 65.5 $\pm$ 12.9 years; 50.1% male sex; mean presenting NIHSS 12.9 $\pm$ 7.9 points. 98 patients (21.8%) were proposed to start intravenous fibrinolysis and urgently transferred for eventual endovascular treatment. 49 (10.9%) had some contraindication to rt-PA treatment and were transferred for primary thrombectomy benefit assessment. In 138 (30.8%) patients it was suggested to perform thrombolysis without further transfer. The remaining 163 (36.4%) which encompassed 24 (5.4%) with stroke mimics, stayed at the origin facility for clinical surveillance without any (retirei other) reperfusion therapy. During this period, 63 (32.5%) of the 194 patients submitted to endovascular treatment were referred from this telestroke network

Conclusion: The articulation between stroke units using telemedicine is feasible and effective. It also seems to optimize clinical resources usage by transferring potential thrombectomy candidates acutely and avoiding the unnecessary transportation of the remaining.

AS04-002

CLINICAL TRIAL RESULTS – PREVENTION

SUB-ANALYSIS OF JAPANESE PATIENTS AS COMPARED TO NON-JAPANESE PATIENTS WITH TIA OR MINOR STROKE, WHO WERE RECRUITED IN TIAREGISTRY.ORG, AN INTERNATIONAL PROSPECTIVE COHORT STUDY

S. Uchiyama[1], T. Hoshino[2], L. Sissani[2], K. Kamiyama[3], T. Nakase[4], K. Kitagawa[5], K. Minematsu[6], K. Todo[7], Y. Okada[8], J. Nakagawara[9], K. Nagata[10], H. Yamagami[11], T. Yamaguchi[6] and P. Amarenco[12]

[1]Sanno Hospital and Sanno Medical Center, Center for Brain and Cerebral Vessls, Tokyo, Japan
[2]Bichat Hospital, Department of Neurology and Stroke Center, Paris, France
[3]Nakamura Memorial Hospital, Department of Neurosurgery, Sapporo, Japan
[4]Research Institute for Brain and Blood Vessels Akita, Department of Neurology and Stroke Science, Akita, Japan
[5]Tokyo Women's Medical University, Department of Neurology, Tokyo, Japan
[6]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita, Japan
[7]Kobe City Medical Center General Hospital, Department of Neurology, Kobe, Japan
[8]National Hospital Kyushu Medical Center, Department of Cerebrovascular Medicine and Neurology, Fukuoka, Japan
[9]National Cerebral and Cardiovascular Center, Integrative Cerebral and Cardiovascular Imaging Center, Suita, Japan
[10]Yokohama Genreral Hospital, Clinical Research Institute, Yokohama, Japan
[11]National Cerebral and Cardiovascular Center, Department of Neurology, Suita, Japan

[12]Bichat Hospital, Department of Neurology and Stroke Center, Paris, France

Background and Aims: We compared patient characteristics, triage, and 1-year outcomes between Japanese and non-Japanese patients with TIA or minor stroke within 7 days after the onset, who were recruited in TIAregistry.org (N Engl J Med 2916;374:1533–42).
Method: All comparisons in variables between the two groups were adjusted on age, sex, and mRS. One-year event rates were analyzed by Cox proportional hazard models.
Results: 345 (7.5%) of 4,583 patients were Japanese. Hypertension (65% vs 70%, $p < 0.001$), dyslipidemia (51% vs 74%, $p < 0.001$), and coronary artery disease (9% vs 13%, $p = 0.005$) were fewer, while current smoker (27% vs 21%, $p = 0.02$) and regular alcohol drinker (39% vs 19%, $p < 0.001$) were more common in Japanese patients. Diffusion weighted imaging (DWI) was performed in 99% of Japanese and 55% of non-Japanese patients ($p < 0.001$). The proportion of first contact by an emergency physician was lower (31.0% vs 44.0%, $p < 0.001$) and that of patients examined in a stroke unit was higher in Japanese patients (59.4% vs 41.5%, $p < 0.01$). Japanese patients had higher prevalence of small vessel occlusion in TOAST classification (38.3% vs 22.0%, $p < 0.001$). Nonfatal stroke risk was higher (7.5% vs 4.4%, $p = 0.008$), and TIA risk was lower (3.2% vs 7.7%, $p = 0.006$) for Japanese patients at one year of follow up.
Conclusion: There were considerable differences in risk factors, use of DWI, triage and site flow, stroke subtype, and outcome events between Japanese and non-Japanese patients.

AS04-006

CLINICAL TRIAL RESULTS – PREVENTION

SMOKING CESSATION IMPROVES OUTCOME AFTER ISCHEMIC STROKE OR TIA

K. Epstein[1], C. Viscoli[1], J.D. Spence[2], A. Dixit[3], K. Furie[4], S. Inzucchi[1], M. Gorman[5], P. Guarino[6] and W. Kernan[1]
[1]Yale University School of Medicine, Medicine, New Haven, USA
[2]University of Western Ontario, Clinical Neurological Sciences, London, Canada
[3]Newcastle University, Geriatric Medicine, Newcastle upon Tyne, United Kingdom
[4]Alpert Medical School of Brown University, Neurology, Providence, USA
[5]Maine Medical Center, Neurology, Portland, USA
[6]Fred Hutchinson Cancer Research Center, Statistical Center for HIV/AIDS Research Prevention SCHARP, Seattle, USA

Background and Aims: Patients who smoke cigarettes at the time of an ischemic stroke are at increased risk for recurrence or death. However, it is uncertain if quitting smoking after an ischemic stroke, compared to continuing, will improve outcome. The aim of this study was to quantify the health benefits of smoking cessation after an ischemic stroke or transient ischemic attack (TIA).
Method: Patients were 3876 non-diabetic men and women from the Insulin Resistance Intervention after Stroke (IRIS) trial who were randomized to pioglitazone or placebo within 180 days of a qualifying stroke or TIA and followed for a median of 4.8 years. A tobacco use history was obtained at baseline and updated during annual interviews. The primary outcome for this analysis, which was not pre-specified in the IRIS protocol, was recurrent stroke, myocardial infarction (MI), or death.
Results: At the time of their index event, 1072 (28%) patients were current smokers. By randomization, 450 patients had quit smoking. Quitters and continuing smokers were similar at baseline on key prognostic features. Among quitters, the 5-year risk of stroke, MI, or death was 15.7%, compared to 22.6% for continuing smokers (adjusted hazard ratio [AHR], 0.66; 95% confidence interval [CI], 0.48–0.90). Quitters had non-significant reductions in stroke alone and MI alone, and a significant reduction in all-cause death (AHR, 0.49; 95% CI, 0.30–0.79), with the largest cause-specific difference observed for cancer mortality (1.8% vs 3.7%; $p = 0.06$).
Conclusion: Cessation of cigarette smoking after ischemic stroke or TIA was associated with important health benefits.

AS04-009

CLINICAL TRIAL RESULTS – PREVENTION

ASPIRIN FOR SECONDARY STROKE PREVENTION: POOLED DATA REANALYSIS OF ASPIRIN FOR CEREBRAL INFARCTION PREVENTION : PORCELAIN STUDY

T. Nagao[1]
[1]Nippon Medical school Tamanagayma Hospital, Neurology, Tokyo, Japan

Background and Aims: Although aspirin is globally known as a first-line drug for secondary stroke prevention, differences of its effectiveness among patients are not well established. We combined and analyzed the aspirin treatment arms from three large scale randomized double-blinded antiplatelet trials conducted in Japan.
Method: S-ACCESS study (2008; aspirin vs sarpogrelate), CSPS 2 study (2010; aspirin vs cilostazol) and JASAP study (2011; aspirin vs Aggrenox) were included in this analysis. All trials are randomized double-blinded prospective studies and enrolled only patients with non-cardioembolic stroke. The dosage of aspirin was 81 mg/day. The patients' profiles from aspirin arms of each trial are combined and compared between patients with ischemic stroke recurrence and those without.
Results: Total 2726 patients (752, 1315, 639, respectively; mean age 64.5 y/o, 28.5% were female) were included. The average follow-up period was 715 days. The average distance from onset of index stroke to aspirin initiation was 60 days. The patients with recurrent ischemic stroke ($n = 206$; 3.86%/patient-year) were more elder (66.3 vs 64.4 y/o; $p = 0.04$) and more male predominant (8.7 vs 4.6%; $p = 0.0002$). The prevalence of hyperlipidemia was significantly lower (5.7 vs 9.3%; $p = 0.004$) among patients with recurrence whereas the prevalence of hypertension, diabetes, obesity, history of smoking and blood pressure on enrollment were not significant.
Conclusion: For secondary non-cardioembolic stroke prevention, the effectiveness of aspirin is prominent in patients with hyperlipidemia and limited in elderly or male.

AS04-017

CLINICAL TRIAL RESULTS – PREVENTION

THE NORWEGIAN STROKE IN THE YOUNG STUDY - NORSYS STAGING OF THE ARTERIES AND EARLY DEATH

B.A. Chaudhry[1], A. Fromm[2], H. Næss[1], L. Thomassen[1], G. Neckelmann[3] and U. Waje-Andreassen[1]
[1]Department of Neurology- Haukeland University Hospital, Bergen, Norway
[2]Clinical Institute 1, University of Bergen, Bergen, Norway
[3]Department of Radiology- Section of Neuroradiology- Haukeland University Hospital, Bergen, Norway

Background and Aims: Stroke at a young age has high mortality rates in long-term follow-up studies. Death within the first year is a combination of death in the acute phase, mainly from malign edema or basilar occlusion and of ongoing increased rates of death compared to controls in long-term follow-ups. NOR-SYS was designed for prospective

evaluation of patients by "staging of the arteries" after acute ischemic stroke. This analysis is about arterial pathology among patients that died within the first year.

Method: Patients 15–60 years with documented acute cerebral infarction between 2010 and 2015, admitted to the Neurological Department at Haukeland University Hospital, were invited to participate. After CT- or MRI-angiography, they followed a standardized ultrasound protocol on carotid arteries, the abdominal aorta, femoral arteries and measurements of the ankle-arm index (AAI).

Results: Among the 385 included patients, 12 patients (3.1%), 9 males and 3 females, died within the first year. Five patients died in the acute phase during the first hospital stay after study inclusion.

Nine (75%) of these 12 patients had occlusion and/or marked atherosclerosis in cerebral arteries, carotid arteries, the abdominal aorta or in femoral arteries. Six patients had had symptomatic coronary heart disease or peripheral artery disease before the stroke.

Three male patients that died of basilar occlusion, were not eligible for inclusion due to early death and missing written consent.

Conclusion: Serious cardiovascular disease dominated among patients who died within the first year after acute cerebral infarction.

AS04-018

CLINICAL TRIAL RESULTS – PREVENTION

ASSOCIATION OF SYSTOLIC BLOOD PRESSURE WITH PROGRESSION OF SYMPTOMATIC INTRACRANIAL ATHEROSCLEROTIC STENOSIS

J.H. Park[1], B. Ovbiagele[2], K.S. Hong[3] and S.U. Kwon[4]

[1]Seonam University Myongji Hospital, Neurology, Goyang-si, Republic of Korea

[2]Medical University of South Carolina, Neurology, Charleston, USA

[3]Ilsan Paik Hospital- Inje University, Neurology, Goyang-si, Republic of Korea

[4]Asan Medical Center- University of Ulsan, Neurology, Seoul, Republic of Korea

Background and Aims: Elevated blood pressure (BP) is associated with severity of intracranial atherosclerotic stenosis (ICAS) and increased risk of ischemic stroke. Progression of symptomatic ICAS (sICAS) is related to an increased risk of recurrent stroke. We evaluated the independent association of systolic BP (SBP) maintained low level vs. high level with lower risk of sICAS progression.

Method: We conducted an analysis of Trial of cilOstazol in Symptomatic intracranial Stenosis 2 dataset of 402 stroke patients with sICAS (mean age, 64.5 ± 11.3; male, 52.2%). Study participants were categorized into four groups according to their mean SBP level: low-normal (<120 mm Hg), normal to high-normal (120 to 139 mm Hg), high (140 to 159 mm Hg), and very-high (≥160 mm Hg). Progression of sICAS was defined as worsening in the degree of stenosis by ≥1 grade on the 7 month follow-up MRA.

Results: sICAS progression was recorded in 52 (12.9%) subjects. Percentages of sICAS progression by mean SBP category showed J-shape patterns (21.4%, 10.7%, 11.4%, and 38.9%, respectively). Compared to the normal to high-normal SBP group, the increased risk of sICAS progression with increasing SBP was observed, particularly in the very-high SBP group (adjusted OR 7.57; 95% CI, 2.20 to 26.02). Very-high SBP level showed a trend toward higher risk of ischemic stroke (OR 4.73; 0.88 to 25.34).

Conclusion: Among individuals with a recent ICAS stroke, SBP level during short-term follow-up in the very-high (≥160 mm Hg) range was associated with increased risk of sICAS progression.

AS04-019

CLINICAL TRIAL RESULTS – PREVENTION

THE EFFECTIVENESS OF MOTIVATIONAL INTERVIEWING ON LIFESTYLE BEHAVIOR CHANGE AFTER TIA OR MINOR ISCHEMIC STROKE: A RANDOMIZED CONTROLLED OPEN LABEL PHASE II TRIAL

D. Brouwer- Goossensen[1], L. Genugten[2], H. Lingsma[2], D. Dippel[1], P. Koudstaal[1] and H. Hertog[3]

[1]Erasmus MC University Medical Center, Neurology, Rotterdam, The Netherlands

[2]Erasmus MC University Medical Center, Public Health, Rotterdam, The Netherlands

[3]Medisch Spectrum Twente, Neurology, Enschede, The Netherlands

Background and Aims: Modification of health behavior is an important part of stroke risk management. However, the majority of people with cardiovascular disease fail to sustain lifestyle modification in the long-term. We aimed to assess the effectiveness of motivational interviewing (MI) to encourage lifestyle behavior changes after TIA or minor ischemic stroke.

Method: We performed a randomized controlled open label phase II trial with blinded endpoint assessment. The intervention consisted of three 15-minute visits in three months by a MI-trained nurse practitioner. Patients in the control group received standard consultation after one and three months by a physician assistant untrained in MI. Primary outcome was lifestyle behavior change, defined as smoking cessation or increased physical activity (30 minutes/day) or healthy diet improvement (change in Food Frequency Questionnaire score of ≥5) at 6 months. We adjusted for age, sex and baseline self-efficacy with multivariable logistic regression.

Results: Between January 2014 and February 2016, we included 136 patients of whom 68 were assigned to the intervention group. Twenty-five of 55 patients in the intervention group (45%) and 27 of 61 patients in the control group (44%) had changed their lifestyle at six months. We found no effect of MI on lifestyle behavior change after six months (aOR 0.97; 95% CI 0.44–2.11).

Conclusion: Our results do not support the effectiveness of MI in supporting lifestyle behavior change after TIA or minor ischemic stroke. However, overall lifestyle behavior change was high and might be explained by the key role of specialised nurses in both groups.

AS04-023

CLINICAL TRIAL RESULTS – PREVENTION

STROKE PREVENTION: COMMUNITY BASED REMOTE SCREENING FOR THE DETECTION OF ATRIAL FIBRILLATION IN HIGH RISK PATIENTS

R. Collins[1], T. coughlan[1], C. Burke[1], M. John[2], D.R. Ryan[1] and R. kelly[3]
[1]The Adelaide and Meath Hospita, Age Related Health Care/Stroke-Service, Dublin 24, Ireland
[2]Beaumont Hospital, Dublin Centre for Clinical research RCSI, Dublin 7, Ireland
[3]The Beacon Hospital, Cardiology, co dublin, Ireland

Background and Aims: Atrial fibrillation (AF) is a factor in one third of Irish. It represents a considerable cost-burden to the health system. As an asymptomatic 'pre-disease' state, AF is a common modifiable risk factor for stroke. It fulfills WHO Wilson-Jungner criteria for a health screening programme.
Method: Patients invited to participate through family doctors, outpatient diabetes and heart failure clinics. Informed consent obtained. Baseline clinical details recorded on anonymised digital database. Patients fitted with 5-day external ECG recorder (Zensor ©Intelsens). Recordings uploaded and reviewed by both cardiologist and stroke physician. Any atrial fibrillation was defined as six consecutive beats. Patients and GPs informed of result within 2 weeks. Anticoagulation recommended where appropriate. Study had full ethics approval.
Results: 320 patients completed the 5 day screen. 35% >75 years. 47% male. Any AF detected in 46 (14.3%) All were asymptomatic and 27 (57%) male. In 60–75 age group with two risk factors 31 (14.9%) patients had atrial fibrillation. In the >75 years 15 (13.3%) had atrial fibrillation. 25 (54%) of those with atrial fibrillation had a combination of hypertension and diabetes. In this sample, risk factors hypertension and diabetes was not associated with detection of atrial fibrillation but heart failure conferred an odds ratio of 3.5 for the presence of atrial fibrillation ($p = 0.002$).
Conclusion: Our findings provide data indicating a targeted screening approach to atrial fibrillation with 5-day monitoring, would need only screen seven participants to identify one case of atrial fibrillation and a national screening programme should be considered as per WHO guidelines for screening.

AS04-027

CLINICAL TRIAL RESULTS – PREVENTION

PROPHYLACTIC TREATMENT WITH DIAZEPAM LOWERS SEIZURE RISK IN A SUBGROUP OF STROKE PATIENTS

J. van Tuijl[1,2], E. Van Raak[2], J. Lodder[2], R. van Oostenbrugge[2,3,4], A. Aldenkamp[2,3,4] and R. Rouhl[2,3,4]
[1]ETZ Tilburg, Neurology, Tilburg, The Netherlands
[2]Maastricht University Medical Center, Neurology, Maastricht, The Netherlands
[3]Maastricht University, School for Mental Health and Neurosciences, Maastricht, The Netherlands
[4]Academic Center for Epileptology, Epileptology, Heeze, The Netherlands

Background and Aims: Post-stroke seizures have a detrimental effect on quality of life and may increase impairment. We assessed the effect of a three day treatment with diazepam on the prevention of post-stroke seizures.
Method: This is a substudy on seizure prevention based on clinical data from the EGASIS, a study into the neuroprotective effects of diazepam in acute stroke. Stroke patients were randomized to diazepam or placebo with a total treatment duration of three days. Follow-up was after three months.
Results: 784 patients out of 879 patients from the EGASIS were included. We excluded patients with another diagnosis than stroke, patients lost to follow-up, and patients with a prior history of seizures. After three months follow-up 19 patients (2.4%) had reported at least one seizure, of which 6 patients received diazepam and 13 patients placebo (1.5% vs. 3.3%, IRR 0.45, CI 0.18–1.16, p. 0.107). The occurrence of at least one seizure showed no significant difference in either the total stroke group, nor in a subgroup of patients with an intracerebral haemorrhage or ischemic stroke. However, in a subgroup of 408 ischemic stroke patients with a total or partial anterior circulation infarction (211 on diazepam) the occurrence of at least one seizure was significantly lower in the diazepam group (0.9% vs. 4.6%, IRR 0.2, CI 0.05–0.78, p. 0.024).
Conclusion: Our study demonstrates that prophylactic treatment with diazepam after acute stroke prevents seizures in the first three months after stroke, although only significantly in ischemic stroke patients with a total or partial anterior circulation infarction.

AS03-001

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

CORRECTION OF STATO-LOCOMOTOR FUNCTIONS BY MEANS OF A ORIGINAL METHOD IN ATACTIC PATIENTS AFTER STROKE

S. Kaygorodceva[1], S. Prokopenko[1], M. Abroskina[1], V. Ondar[1] and I. Saikal[1]
[1]Prof. V.F. Voino-Yasenetsky Krasnoyarsk State Medical University, Department of Neurological Diseases with a Teaching Course on Medical Rehabilitation of the Institute of Post-Diploma Education, Krasnoyarsk, Russia

Background and Aims: Impairment of static and locomotor functions in patients with stroke develop in 38–46% of cases. The existing methods of balance correction is based on the training and targeted shift of the center of gravity in the frontal and horizontal planes.
The article presents the results of the research on the effectiveness of the original method of balance correction by using the dosed vertical oscillation procedure in patients with vestibular-atactic syndrome in the ischemic stroke recovery period.
Method: Inpatients ($n = 48$) diagnosed with post-stroke ataxia were randomly divided into 2 groups. In the main (1) group ($n = 24$) patients received traditional rehabilitation treatment & balance correction training using the original method. The originality of method is based on activating the vestibular analyzer and postural synergies by shifting the center of gravity in the vertical plane. Group II ($n = 24$) used the training on biofeedback (BFB) platforms alongside the traditional restorative treatment.
Methods: Computer stabilometry (CS), laser analyzer of kinematic gait parameters (LA-1), Berg Balance Scale (BBS), ICARS, Dynamic Gait Index (DGI).
Results: In both groups a statistically significant decrease in the main parameters of the CS and LA-1, and statistically significant improvement of the DGI, BBS and ICARS were observed after the course of treatment. When comparing the data of CS, BBS & DGI no statistically significant differences were found between group I and II.
Conclusion: The original method effectively improves patients' balance while standing or walking, and decreases the risk of falls during walking in patients with vestibular-atactic syndrome in the stroke recovery period.

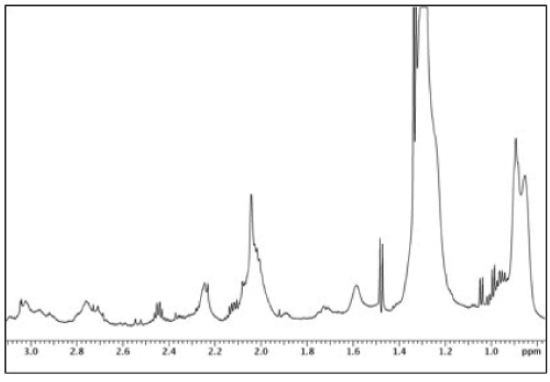
AS03-003

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

SERUM H-NMR SPECTROSCOPY OF TRANSPLANTED BONE MARROW DERIVED STEM CELLS - IS IT INDICATIVE OF NEURORESTORATION POST STROKE ?

A. Bhasin[1], P. srivastava[1], S. kumaran[2], P. Kumar[2] and S. Mohanty[3]
[1]All India Institute of Medical Sciences, Department of Neurology, Delhi, India
[2]All India Institute of Medical Sciences, Department of NMR, Delhi, India
[3]All India Institute of Medical Sciences, stem cell facility, Delhi, India

Background and Aims: Stem cells as regenerative medicine are hope in resistant neurological diseases like Stroke. The current study investigates the paracrine mechanisms of intravenous stem cell infusion in patients with chronic stroke using invitro H-NMR serum spectroscopy, for measuring the metabolite concentration.
Method: This ongoing randomized controlled trial recruited 20 stroke patients from 3 months to 1.5 years of index event. Bone marrow derived mononuclear stem cells (MNC) were infused in one group followed by 8 weeks of physiotherapy and the other group was administered physiotherapy only. Serum venous samples were subjected to H-NMR spectroscopy along with assessments with Fugl Meyer (FM), modified Barthel Index (mBI) and MRC for power at baseline, 8, 24 weeks and 1 year. H-NMR spectroscopy was performed with 2D, CPMG spectra using NOESY-based pulse sequence. 340 microlitres of serum, 30 microlitre of trimethylsilylpropionate (TSP) and formate in 200 mL of deuterium oxide (D2O) were added in NMR tubes for analysis.
Results: No adverse reactions were observed with stem cells infusion. Mean 55.3 x 10^6 with 0.34% CD34+ mononuclear cells were infused intravenously. There was no significant difference in both the groups on clinical scores at 8 weeks: mBI (65.4 versus 63.2; $p = 0.72$) & FM (39.4 vs 41; $p = 0.53$). Elevated peaks of glutamate, glutamine (2.32 ppm) and acetone (1.9 ppm) in one group and glucose (4.0 ppm)/lactate peaks were observed in the other group ($p > 0.05$) (fig1).
Conclusion: H- NMR spectroscopy provides indirect evidence of release of neurotrophic growth factors infused by the stem cells and physiotherapy in chronic stroke.



AS03-005

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

AN EDUCATIONAL AND OBSERVATIONAL LEARNING INTERVENTION TO SUPPORT COMMUNITY-BASED STROKE RECOVERY – RESULTS FROM AN INTERNATIONAL RANDOMIZED CONTROLLED PILOT STUDY

K. Jones[1], R. Bhattacharjee[1], R. Krishnamurthi[1], S. Blanton[2], A. Theadom[1], S. Barker-Collo[3], P. Parmar[1], A.G. Thrift[4], A. Maujean[5], A. Ranta[6], M. MacKay-Lyons[7], R.O. Obiako[8], J.D. Pandian[9], D. Arora[9], D. Cadilhac[4], S.L. Wolf[2], B. Norving[10], S. Balalla[1], E.O. Sanya[11] and V. Feigin[1]
[1]Auckland University of Technology, National Institute for Stroke and Applied Neurosciences, Auckland, New Zealand
[2]Emory University, Division of Physical Therapy- Department of Rehabilitation Medicine, Atlanta- GA, USA
[3]University of Auckland, School of Psychology, Auckland, New Zealand
[4]Monash University, Department of Medicine- School of Clinical Sciences at Monash Health, Victoria, Australia
[5]Griffith University, Recover Injury Research Centre- Menzies Health Institute Queensland, Gold Coast, Australia
[6]University of Otago, Department of Neurology- Wellington Regional Hospital, Wellington, New Zealand
[7]Dalhousie University, School of Physiotherapy, Halifax- Nova Scotia, Canada
[8]Ahmadu Bello University Teaching Hospital, Department of Medicine, Shika Zaria, Nigeria
[9]Christian Medical College, Stroke Unit- Department of Neurology, Ludhiana, India
[10]Lund University, Department of Clinical Neuroscience, Lund, Sweden
[11]University of Ilorin, Department of Medicine, Ilorin, Nigeria

Background and Aims: Stroke is a major cause of long-term adult disability with many survivors relying on family for ongoing support. One highly sustainable strategy to support self-rehabilitation is the utilization of an instructional DVD-based educational and observational learning tool aimed at improving functional outcomes for survivors of stroke.
Method: A multi-centre, international pilot trial with survivors of stroke and nominated informal caregivers randomized to either an educational and observational learning (DVD) intervention or usual care. The primary endpoint was the implementation of all study processes from May 2013 to October 2014 (i.e., recruitment, screening, randomization, and intervention delivery). Secondary endpoints included process measures about strengths of the intervention, barriers to protocol adherence and suggestions for improvements from intervention participants. Preliminary efficacy in terms of disability, quality of life and mental well-being was also assessed at 2-months after randomization.
Results: Among the 66 eligible participants recruited (median age 63.5 years, 71% male), follow-up was achieved in 82%. All study processes were successfully implemented across 9 international sites. Nearly half of those in the intervention group reported at least one benefit of the intervention (44%), including all content (23%), physical exercises (18%), and practical tips for daily living (15%). The most common barrier was the content was not always relevant (20%). No significant group differences in health outcomes at 2-months were found ($p > 0.05$).
Conclusion: A self-management strategy is feasible worldwide. However, to better meet patient needs, and to maximize uptake, self-management programs require an individualized approach that can be adapted to meet people's changing needs post-stroke.

AS03-007

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

THE EFFECTS OF TREADMILL WALKING COMBINED WITH OBSTALCE-CROSSING ON WALKING ABILITY IN AMBULATORY PATIENTS AFTER STROKE: A PILOT RANDOMIZED CONTROLLED TRIAL

J.W. Koo[1] and Y.G. Jeong[2]
[1]Seoul St. Mary's Hospital, Occupational & Environmental Medicine, Seoul, Republic of Korea
[2]Sangji University, Department of Physical Therapy, Wonju, Republic of Korea

Background and Aims: Treadmill walking training (TWT) provides greater amount and intensity of stepping practice than conventional walking training in patients with chronic stroke. However, there is not any conclusive evidence regarding the effects of TWT for ambulatory post-stroke patients. This study investigated the effects of treadmill walking combined with obstacle-crossing on the walking ability of ambulatory post-stroke patients.
Method: Twenty-nine subjects from a university hospital-based rehabilitation center were randomly assigned to one of the following: experimental group (15 subjects) or control group (14 subjects). All subjects underwent 30 min of actvie/passive exercises and 30 min of gait training in the form of treadmill walking. The subjects in the experimental group underwent simultaneous training in obstacle-crossing while walking on the treadmill for 30 min/day, 5 times/week, for 4 weeks. Main measures were the 10-m walk test (10 MWT), 6-min walk test (6 MWT), Berg Balance Scale (BBS), timed "Up & Go" (TUG) test, and Activities-specific Balance Confidence (ABC) scale used before and after the intervention.
Results: The changed values of the 6 MWT and BBS were significantly higher in the experimental group than in the control group after adjusting for each baseline value, with large effects of 1.12 and 0.78, respectively, but not in the 10 MWT, TUG, and ABC scale scores.
Conclusion: Treadmill walking combined with obstacle-crossing training may help improve the walking ability of patients with hemiplegic stroke and can possibly be used as an adjunct to routine rehabilitation therapy as a task-oriented practice based on community ambulation.

AS03-008

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

CAN SARCOPENIA AFFECT POST STROKE REHABILITATION OUTCOME? - POST 6 MONTH FOLLOW UP STUDY

G.Y. Park[1], S. Im[1], Y.M. Choi[1], Y. Jang[1] and B.S. Jo[2]
[1]Bucheon St. Mary's Hospital- College of Medicine- The Catholic University of Kor, Rehabilitation Medicine, Bucheon-si, Republic of Korea
[2]Seoul St. Mary's Hospital- College of Medicine- The Catholic University of Korea, Occupational and Environmental Medicine, Seoul, Republic of Korea

Background and Aims: Prevalence of malnutrition and sarcopenia in physically disabled elderly patients in rehabilitation department is high. However, the amount of research focused on nutrition and sarcopenia in rehabilitation medicine is very low. Therfore to explore effect of sarcopenia on post stroke rehabilitation and to validate and find factors associated with sarcopenia among acute stroke patients.
Method: Medical charts of 238 admitted stroke patients between 2012 to 2015 were retrospectively reviewed. Based on the grip strength in non-hemiplegic side, patients were divided into 2 groups where Group A contained patient with sarcopenia and Group B with non-sarcopenia patients. Cut off value for grip strength were set as <30 kg for male and <20 kg for female. Primary outcome was patients' functional score by using K-MBI at within 1, 3, and 6 months from the stroke onset. Secondary outcome measures were 1) blood nutritional status parameters 2) functional and neurocognitive status parameters.
Results: Total of 199 patients were allocated in Group A and 39 in Group B. As for the functional evaluations, sarcopenia had weaker grip strength of non-hemiparetic upper extremity and lower K-MBI score. Serum level of hemoglobin, albumin, prealbumin, globulin, and folate were lower in sarcopenia group. Proportion of L-tube feeding was higher in sarcopenia group. These trend remained until 3 consecutive clinical follow up.
Conclusion: Grip strength is one of reliable measures in evaluating patients' initial sarcopenia status. Sarcopenia in acute stroke leads to poor functional motor outcome and it can be used as one of prognostic factors in acute stroke patients.

AS03-009

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

TRANSCATHETER CEREBRAL REVASCULARIZATION IN THE TREATMENT OF ISCHEMIC STROKE

I. Maksimovich[1]
[1]Clinic of Cardiovascular Diseases named after Most Holy John Tobolsky, iterventional neuroangiology, Moscow, Russia

Background and Aims: The research investigates the possibility of interventional restoration of cerebral perfusion in patients after ischemic stroke.
Method: We examined 1282 patients aged 29–81 (average age 74) with various types of atherosclerotic disorders of cerebral vessels: 948 male (73.95%), 334 female (26.05%).
Of these, 798 patients after ischemic stroke were selected.
Examination plan: CT, MRI, SG, REG, MUGA, laboratory diagnostics, CDR, MMSE, IB.
Test group: 487 (61.03%) patients. For revascularization of the main intracranial arteries high-energy lasers were used; for revascularization of distal intracranial branches and stimulation of angiogenesis low-energy lasers were used.
Control group: 311 (38.97%) patients underwent therapeutic treatment.
Results: Test group.
477 (97.95%) patients had a good immediate angiographic outcome manifested in therestoration of lumen and patency of the affected vessels.
In 12–24 months the following positive tendency wasobserved:- good clinical outcome - IB90-100 - 175 (35.93%) patients;
- satisfactory clinical outcome - IB75-85 - 228 (46.82%) patients;
- relatively satisfactory clinical outcome - IB60-70 - 84(17.25%) patients;
- relatively positive clinical outcome - IB below 60 - wasnot obtained in any case.
Control group.
In 12–24 months the following was observed:
- good clinical outcome was not obtained any case;
- satisfactory clinical outcome was obtained in 46 (14.79%) patients;
- relatively satisfactory clinical outcome - 96 (30.87%) patients;
- relatively positive clinical outcome - 169 (54.34%) patients.
Conclusion: Transcatheter laser revascularization of cerebral blood vessels is a significantly more effective treatment for the effects of ischemic stroke than the therapeutic treatment. Restoration of intracerebral blood

flow can significantly reduce the level of cognitive, motor disorders and return patients to their active daily life.

AS03-010

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

TOPIC 5% LIDOCAINE PATCH FOR POST STROKE PAIN IN SHOULDER-HAND SYNDROME (SHS)

F. Corea[1], D. Carducci[1], F. Scarponi[1], S. Micheli[1], M. Berloco[2] and M. Zampolini[1]
[1]Ospedale San Giovanni Battista, Rehabilitation, Foligno, Italy
[2]Ospedale San Giovanni Battista, Ortopedics, Foligno, Italy

Background and Aims: Shoulder pain is a well-known complication after stroke, but data on prevalence, predictors, and outcome in unselected stroke populations are limited. Most studies have speculated about the etiology of shoulder pain in hemiplegia but have failed to establish a single cause. Some of the most frequently suspected factors contributing to shoulder pain include subluxation, complex regional pain syndrome, cuff injury, and spasticity.
Method: This study aimed at reporting and evaluating the use of topic 5% lidocaine patch during rehabilitation for stroke. From July 2015 to October 2016 ten patients were enrolled. At day 1 pain intensity was evaluated with visual scoring scale (T_0), lidocaine patch was applied, and pain was again evaluated 10 days after (T10). All patients admitted in Rehabilitation ward of our hospital were eligible.
Results: The prevalence oh SHS in our cohort was 18%. Patients with clinical signs of SHS were selected. In the 10 enrolled patients the median value of pain using a visual scale was 8 at T0. After 10 days of lidocaine patch the median value of the visual scale was 3. Pain intensity was significantly decreased ($p < 0.05$) in all patients between T_0 and T10.
Conclusion: In elderly patients with major strokes SHS may seriously compromise the benefit of rehabilitation. Post stroke patients can't undergo to invasive procedures, also systemic drugs may be contraindicated. Lidocaine patch may modify the natural history of SHS minimizing the risk of tertiary complications and reducing pain with better compliance to physiotherapy.

AS03-011

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

CILOSTAZOL SHOWS THE POSSIBILITY OF ANTIDEPRESSANT EFFECT ON POST-STROKE DEPRESSION

H. Itoh[1], Y. Toyohira[2], Y. Matsushima[1], N. Yanagihara[2] and S. Saeki[1]
[1]University of Occupational and Environmental Health, Department of Rehabilitation Medicine- School of Medicine, Kitakyushu, Japan
[2]University of Occupational and Environmental Health, Department of Pharmacology- School of Medicine, Kitakyushu, Japan

Background and Aims: Introduction: Depressive disorder is considered to be a common and important neuropsychiatric post-stroke complication. Monoamine transporters including the norepinephrine transporters (NET), the serotonin transporter (SERT), and the dopamine transporter are located in the plasma membrane of the presynaptic nerve terminals. Most inhibitors of the monoamine transporters, especially of the norepinephrine transporter and serotonin transporter, are clinically important antidepressants. Cilostazol is a selective phosphodiesterase III inhibitor that was originally prescribed as an anti-platelet agent, and increases cerebral blood flows in the cerebral infarction. Additionally, it acted as a neuroprotective agent by increasing cyclic adenosine monophosphate levels. The antidepressive effects of cilostazol on post-stroke depression have been reported, but the exact mechanism of this action is unknown.
Aims: In this study, we examined the direct effects of cilostazol on NET and SERT function.
Method: Methods: SK-N-SH and SERT-transfected COS-7 cells were incubated with [^{3}H]norepinephrine (NE) or [^{3}H]serotonin (5-HT) in the presence or absence of cilostazol to assess the monoamine uptake.
Results: Results: Cilostazol decreased the [^{3}H]NE uptake by SK-N-SH cells and the [^{3}H]5-HT uptake by SERT-transfected COS-7 cells in a concentration-dependent manner.
Conclusion: Conclusions: The blood concentration of cilostazol in treating patients with cerebrovascular disease has been reported to be 13.8 mM after a single oral dose of 100 mg. These results indicate that cilostazol inhibit NET and SERT function at clinically relevant concentration, which is likely to show the antidepressant effect on post-stroke depression.
Source of findings: This study is supported by JSPS KAKENHI Grant Number 16K16456.

AS03-012

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

POST-STROKE CHECKLIST (PSC)- A TOOL TO DETECT UNMET NEEDS/EVALUATION IN A SWEDISH POPULATION

E. Kjörk[1], Å. Lundgren-Nilsson[2] and K. Stibrant Sunnerhagen[2]
[1]Neuroscience and physiology, Gothenburg, Sweden
[2]Neuroscience and physiology, Sahlgrenska Academy, Gothenburg, Sweden

Background and Aims: The Post-Stroke Checklist (PSC) is a tool to identify unmet needs after stroke. The PSC consists of eleven long-term problem areas with specific referrals. The aim of the study was to evaluate feasibility and usefulness of the Swedish version.
Method: The PSC was tested with patients in outpatient clinic; specialized stroke care 18 (39%) and primary care 28 (61%). Data from 46 patients (13 women, median age 70, range 41–85) were collected. Items were scored by nurses, occupational therapists or physicians. Satisfaction-ratings were collected at each follow-up.
Results: Time since stroke was 1–3 months 30 (65%), 4–10 months 7 (15%), >1 year 9 (20%). Problems were identified in 40 (87%) of the patients. The most common items were: life after stroke 28 (60%), cognition 26 (56%), mood 19 (41%) and ADL 18 (39%). An average of 4 items per patient (range 0–9, IQR 1–5). The time taken to administer the checklist was ≤15 minutes (52 %), ≤30 minutes (43 %), ≥45 min (4,5 %). The overall satisfaction with the PSC was estimated after each follow-up by clinicians (median 3, range 1–5) and patients (median 5, range 1–5).
Conclusion: Several problems might not have been addressed without using the PSC, such as the item Life after stroke. The PSC provides a structure to ensure that problems will not be missed. Clinicians' satisfaction with the PSC varied, whilst patients generally reported a high degree of satisfaction. Clinicians might underestimate the value a structured follow-up may bring to the patients.

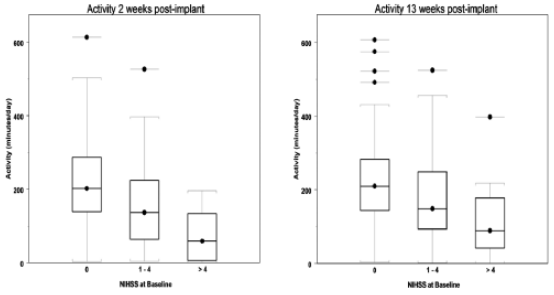
AS03-015

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

NIH STROKE SCALE PREDICTS PATIENT ACTIVITY LEVELS MEASURED CONTINUOUSLY BY INSERTABLE CARDIAC MONITORS FOLLOWING CRYPTOGENIC STROKE

V. Thijs[1], T. Kaffenberger[2], J. Koehler[3], J. Bernhardt[2] and P. Ziegler[3]
[1]Austin Health, Neurology, Heidelberg, Australia
[2]Florey Institute of Neuroscience, Neurology, Heidelberg, Australia
[3]Medtronic, Diagnostics and Monitoring Research, Mounds View, USA

Background and Aims: The NIH Stroke Scale (NIHSS) is used to quantify the degree of impairment caused by a stroke. Whether this parameter correlates with a continuous measure of patient activity in cryptogenic stroke patients is not well understood.
Method: We studied patients in the CRYSTAL-AF trial who were randomized to receive an insertable cardiac monitor (ICM) capable of continuously and remotely monitoring patient activity via an embedded accelerometer. Patients who received the device within 14 days of randomization and had activity data available at 2 and 13 weeks post-implant were included. We correlated NIHSS scores at baseline with patient activity levels during week 2 and week 13 post-implant after adjusting for age, gender, CHADS2 score, and days from the stroke event.
Results: A total of 187 patients (61.4 ± 11.2 years, 67% male, 39 ± 28 days from stroke) were included. Median patient activity (minutes/day) at week 2 and week 13 was inversely correlated with NIHSS scores (figure). NIHSS score remained a significant predictor of activity level at week 2 ($p < 0.001$) and week 13 ($p = 0.006$) after adjusting for age, gender, CHADS2 score, and days from the stroke event.



Conclusion: Activity levels monitored by ICMs are an objective measure of functional status which correlate well with baseline NIHSS scores in cryptogenic stroke patients. Measuring activity remotely may provide an opportunity to assess ongoing functional status without need for in-person evaluation.

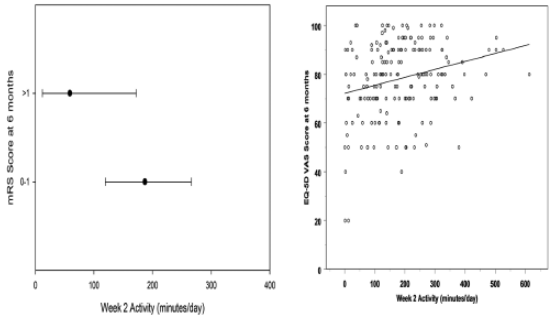
AS03-016

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

EARLY ASSESSMENT OF PATIENT ACTIVITY PREDICTS FUNCTIONAL OUTCOME AND QUALITY OF LIFE AT 6 MONTHS FOLLOWING CRYPTOGENIC STROKE

V. Thijs[1], T. Kaffenberger[2], J. Bernhardt[2], J. Koehler[3] and P. Ziegler[3]
[1]Austin Health, Neurology, Heidelberg, Australia
[2]Florey Institute of Neuroscience, Neurology, Heidelberg, Australia
[3]Medtronic, Diagnostics and Monitoring Research, Mounds View, USA

Background and Aims: Long-term outcomes following ischemic stroke are assessed via modified Rankin Scale (mRS) or quality of life (QOL) instruments. Whether earlier assessment of continuously monitored activity is predictive of these outcome parameters remains unknown.
Method: We studied patients in the CRYSTAL-AF trial who were randomized to receive an insertable cardiac monitor (ICM) with continuous and remote activity monitoring capabilities by means of an embedded accelerometer. Patients who received the device within 14 days of randomization and had activity data available at 2 weeks post-implant were included. We correlated activity during week 2 post-implant with mRS scores and QOL (EQ-5D) at 6 months after adjusting for NIHSS, age, gender, CHADS2 score, and days from stroke.
Results: A total of 187 patients (61.4 ± 11.2 years, 67% male) were included. Median patient activity (minutes/day) at week 2 was inversely correlated with mRS scores and directly correlated with EQ-5D scores at 6 months (figure). Week 2 activity remained a significant predictor of mRS score ($p = 0.001$) and EQ-5D ($p = 0.035$) at 6 months after adjusting for the aforementioned variables.



Conclusion: Early assessment of patient activity monitored by ICMs is an objective measure which predicts longer-term outcomes. Having an earlier indicator of long-term outcomes may be a valuable tool for adapting rehabilitation therapies and directing heathcare resources and follow-up care. Further studies are needed to investigate causality.

AS03-017

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

VERY EARLY, MINIMAL ACTIVE THUMB/INDEX FINGER MOVEMENTS PREDICT FULL UPPER LIMB RECOVERY AFTER STROKE: A VALIDATION STUDY OF THE RULE OF THUMB (ROT)

T. Henneken[1] and M. Brainin[2]
[1]University Hospital Tulln, Department of Neurology, Vienna, Austria
[2]Donau-Universität Krems, Department of Clinical Neurosciences, Vienna, Austria

Background and Aims: Very early, minimal activity of upper limb function after stroke can indicate full motor recovery. The aim of this study was to test the usefulness of this paradigm for prediction of recovery when compared to the prognostic potential of diffusion tensor imaging and transcranial magnetic stimulation.
Method: For this pilot study, we designed a simple bedside test called Rule of Thumb (RoT) which indicates minimal activity of willed flexion/extension of digit 1 or 2 in the first 72 hours post stroke. We postulated that RoT is able to identify those who will reach full recovery, defined as ARAT 45–57 at 12 weeks post stroke. These results were compared to the Predicting REcovery Potential Algorithm (Stinear et al. 2012) which consists of the Shoulder Abduction Finger Extension (SAFE) score and TMS and diffusion-weighted MRI and diffusion tensor MR-imaging.
Results: PREP predicted full recovery for one patient, a potential for notable recovery in three patients, and one patient had a potential for a limited recovery. Those were rated as 4 PREP positive and 1 PREP negative. RoT predicted 3 patients positive and 2 patients negative. All RoT predictions correlated with ARAT outcomes.
Conclusion: This study shows that an individual prognosis for upper limb function using a simple test is possible. RoT as a simple bedside examination rates a patient's positive or negative recovery potential by assessing very early, minimal willed motor action of thumb and forefinger. A study with a larger sample size is needed.

AS03-022

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

ALLEVIATING FATIGUE IMPROVES HEALTH RELATED QUALITY OF LIFE IN STROKE SURIVORS

T. Lillicrap[1], E. Holliday[2], C. Levi[3] and A. Bivard[1]
[1]Hunter Medical Research Institute, Stroke and Brain Injury, New Lambton, Australia
[2]Hunter Medical Research Institute, CReDITS, New Lambton, Australia
[3]John Hunter Hospital, Neurology, New Lambton Heights, Australia

Background and Aims: Fatigue is a common, and at times debilitating, symptom in stroke survivors. The MIDAS study was a phase-II clinical trial that tested the efficacy of modafinil for alleviating fatigue in patients at least 3 months post-stroke. In addition to successfully alleviating fatigue, it was found that modafinil improved quality of life in the patient cohort. This substudy aimed to determine whether the changes in fatigue and quality of life were correlated, and whether a future trial could expect to detect an improvement in quality of life.
Method: Fatigue was measured using the multi-dimensional fatigue inventory (MFI) a 100 point self-assessment where higher scores indicate more severe fatigue. Quality of life was measured using the Stroke-specific quality of life scale (SSQoL), a 270 point scale where higher scores indicate better quality of life. Interactions between baseline MFI and SSQoL and change in scores during the trial were tested using linear regression.
Results: The correlation between baseline MFI and baseline SSQoL was broadly linear (Pearson's -0.541, $p < 0.001$). Each 1 point increase in MFI correlated with a 1.975 decrease in SSQoL (95% CI 0.869–3.082, $p < 0.001$). Change in SSQoL during treatment was also correlated with change in MFI (Pearson's -0.459, $p < 0.001$). During treatment each point of reduction in MFI was associated with a mean improvement of 1.054 in the SSQoL (95% CI 0.553–1.556).
Conclusion: These results, while not proving causality, do indicate that a phase-III trial could expect to detect improvements in SSQoL scores if fatigue is successfully alleviated in trial participants.

AS03-024

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

PILOT STUDY: THE USE OF THE FYSIOGAME® DURING REHABILITATION IN THE ACUTE PHASE AFTER A STROKE

B. Helin[1], D. Hemelsoet[2], V. De Herdt[2] and L. Sabbe[3]
[1]Ghent University Hosptial, Rehabilitation Sciences and Physiotherapy, Gent, Belgium
[2]Ghent University Hosptial, Neurology, Gent, Belgium
[3]Ghent University Hosptial, Occupational Therapy, Gent, Belgium

Background and Aims: The use of virtual reality in rehabilitation following stroke has increased. One of the new devices is the Fysiogame®, using the Kinect® sensor. With this pilot study we wanted to check if the Fysiogame® has an added value to early rehabilitation following acute stroke, and how reliable, user friendly and patient friendly it is.
Method: Acute stroke patients ($n = 103$) were screened at the Stroke Unit of the Ghent University Hospital for 9 weeks and 5 eligible patients could be included. Participants first were evaluated by the Fysiogame® followed by clinical evaluation using the Motricity Index and the 6 minutes walking test (MWT). After 1 week of therapy with the Fysiogame® patients were retested and a questionnaire about their personal experiences had to be filled in.
Results: In all participating patients motor function recovered as evaluated with the Fysiogame® and clinical testing. The walking distance covered with the 6 MWT was considerably higher (minimum 100 meter, clinical relevance $\geq$70 meter). All patients confirmed that the Fysiogame® had a motivating effect during the rehabilitation period. Despite these good results, therapy was sometimes limited by technical problems of the device.
Conclusion: The first results of this pilot study on the use of the Fysiogame® are promising with regard to user friendliness, patient motivation and gait speed. Further research on the use of the Fysiogame® in the early rehabilitation of acute stroke patients is necessary.

AS03-027

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

THE RESULTS OF EARLY MULTIDISCIPLINARY REHABILITATION OF STROKE PATIENTS IN THE SPECIALIZED STROKE CENTER IN UKRAINE

G. Maryna[1], Y. Flomin[1], M. Romanyshyn[1], N. Piontkivska[1] and M. Piontkivskiy[1]
[1]Universal Medical Center "Oberig", Comprehensive Stroke Unit, Kiev, Ukraine

Background and Aims: Data on efficacy of multidisciplinary rehabilitation in acute stroke patients in Ukraine is lacking. In 2010 the first comprehensive Stroke Unit in Ukraine was set up. We set out to analyze the outcomes of stroke patients managed at the Stroke Unit.
Method: Most patients were transferred from other institutions, usually after unsuccessful attempts of rehabilitation of even without any previous rehabilitation. The scores of functional measures at admission and discharge were retrospectively assessed in all patients (totally 265) with acute or subacute stroke (0–2 months) during years 2010–2016, using modified Rankin scale (mRS), Barthel index (BI), and Rivermead mobility index (RMI). Statistical significance of functional changes was assessed by means of McNemar test with Yates correction, using the software "Biostatistics 2 for iOS".
Results: Comparison of pre- and postrehabilitation functional measures scores revealed clinically and statistically significant improvements. Proportion of patients without disability (mRS 0–1) increased from 9,7% to 29,7% ($p < 0,0001$). The proportion of patients with severe limitation of activities of daily living (BI 0–40)decreased from 53,8% to 26,1% ($p = 0,0012$), whereas proportion of patients with minimal or no limitation (BI 86–100) – increased from 18,6% to 47,2% ($p < 0,0001$). The proportion of patients unable to walk independently (RMI ≤ 5) decreased from 58,9% to 31% ($p = 0,1108$), whereas proportion of patients able to walk unassisted on uneven surface and manage stairs (RMI ≥ 11)increased from 26,4% to 52,8% ($p = 0,0009$).
Conclusion: Accessibility of multidisciplinary rehabilitation is likely to improve functional outcomes and reduce disability in stroke patients in Ukraine.

AS03-028

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

DOES RESPIRATORY MUSCLE AFFECT QUALITYOF LIFE IN STROKE PATIENTS?

A. Yıldız[1], R. Mustafaoglu[2] and A.N. Bardak[1]
[1]Istanbul Physical Therapy And Rehabilitation Training And Research Hospital, Physical Therapy, Istanbul, Turkey
[2]Istanbul University- Faculty Of Healthsciences, Department Of Physiotherapy And Rehabilitation, Istanbul, Turkey

Background and Aims: Paralysis of the respiratory-related muscles, which provide postural control, limits the expansion of the thorax, leading to oxygen deficiency and increased metabolic demand. In the literature, reported that improvement of the respiratory muscle strength reduce pulmonary complications in stroke. The aim of study was to investigate the effects of respiratory muscle strength on the quality of life in stroke.
Method: A total of 72 volunteer stroke patients were enrolled with a meanage of 58.7 ± 12.8 years. The maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP) of patients was evaluated by Carefusion Micro RPM device and the quality of life was assessed by using Stroke Impact Scale of 3.0.
Results: There was a statistically significant relationship between patients MIP values and strength ($r = 0.70$, $p = 0.000$), daily living activities ($r = 0.36$; $p = 0.04$) and participation ($r = 0.35$; $p = p = 0.04$) subscales of the Stroke Impact Scale 3.0. And also, there was a statistically significant relationship between MEP and strength ($r = 0,442$; $p = 0,018$) and daily life activities ($r = 0,335$; $p = 0,049$) subscales of the Stroke Impact Scale 3.0.
Conclusion: It has been concluded that respiratory muscle strength is related to important parameters of quality of life. We think that the respiratory muscle training should be added to the stroke rehabilitation. Improving the respiratory muscles strength of the patients may reduce of developing pulmonary complications and independence level and improved participation in daily life activities and quality of life.

AS03-030

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

INFLUENCE OF REPETITIVE PERIPHERAL MAGNETIC STIMULATION ON NEUROPHYSIOLOGICAL MARKERS OF BRAIN PLASTICITY IN PATIENTS WITH SUBACUTE SUBCORTICAL STROKE

D. Muresanu[1], M. Balea[2], A. Stan[3], T. Lupescu[4], O. Rosu[5] and D. Slavoaca[2]
[1]Cluj Napoca, Romania
[2]RoNeuro Institute for Neurological Research and Diagnostic, Neurology, Cluj Napoca, Romania
[3]"Iuliu Hatieganu" University of Medicine and Pharmacy, Neurosciences, Cluj Napoca, Romania
[4]"Agrippa Ionescu" Military Hospital, Neurology, Bucharest, Romania
[5]"Iuliu Hat¸ieganu" University of Medicine and Pharmacy, Neurosciences, Cluj Napoca, Romania

Background and Aims: Objective: The hypothesis of this study was that repetitive peripheral magnetic stimulation (rPMS) can enhance the neurophysiological and behavioral effect of comprehensive neurorehabilitation program upon patients with post stroke hemiparesis.
Design: Monocentric, randomized, open-control, pilot study.
Patients: 20 patients with subacute subcortical stroke, with mild to moderate hemiparesis – NIH item 5 between 1 and 3.
Method: Interventions: 10 patients underwent comprehensive neurorehabilitation program alone and 10 patients underwent comprehensive neurorehabilitation program preceded by 30 minutes of rPMS, over a 2 week period. rPMS was applied over flexor and extensor muscles of upper and lower arm and upper trapezius muscle and consisted in 4.800 pulses applied with an intensity of 150% motor threshold and a frequency of 25 Hz.
Outcome assessment: before therapy and after at the end of 10 days sessions. The clinical evaluation was performed by finger tapping test (FTT), grip strength and NIH- test arm motor drift. The neurophysiological evaluation was performed by single pulse transcranial magnetic stimulation (TMS) - motor evoked potential (MEP) recruitment curve, interhemispheric resting motor threshold (rMT) asymmetry and triple stimulation technique (TST).
Results: Compared to comprehensive neurorehabilitation program alone group, rPMS added to physiotherapy proved to enhance behavioral outcome, and to modulate cortical reorganization, with a significant effect upon both cortical excitability and motor fiber recruitment.
Conclusion: rPMS can be an effective, easy–to–use tool in post stroke rehabilitation that enhances the effect of comprehensive neurorehabilitation program alone.

AS03-031

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

THE COMPARISON OF DIFFERENT DYSPNOEA SCALES IN STROKE PATIENTS

A. Yıldız[1], R. Mustafaoglu[2] and A.N. Bardak[1]
[1]Istanbul Physical Therapy And Rehabilitation Training And Research Hospital, Physical Therapy, Istanbul, Turkey
[2]Istanbuluniversity- Faculty Of Healthsciences, Department Of Physiotherapy And Rehabilitation, Istanbul, Turkey

Background and Aims: After a stroke paralysis of the diaphragma and respiratory muscles prevents adequate expansion of the thorax. As a result, during respiration chest wallex pansion can be reduced. Dyspnea is not influenced only by spirometric flows but also by other clinical factors such as lung volume, airway resistance and respiratory muscle strength. The aim of current study was to compare respiratory muscle strength and different dyspnea scales in stroke patients.
Method: Ninety eight stroke patients meanage 60,78 ± 14,8 years were participated in the study. The severity of dyspnoea was assessed with different four scales Visual Analogue Scale (VAS), Oxygen Cost Diagram (OCD), Baseline Dyspnoea Index (BDI) and Modifiye Medical Research Council Scale (MMRC). Respiratory muscle strength (PImax and PEmax) was measured by the Carefusion Micro RPM device. As physical parameters; age, duration after stroke, and functional ambulation scale score (FAS) was recorded.
Results: Patient's dyspnoea severities were1.35 ± 1.94, 3.37 ± 1.92, 8.10 ± 3.41, 0.71 ± 1.01 for VAS, OCD, BDI, MMRC, respectively. There were significant correlations were found between PImax and VAS ($r = -0.51$, $r = 0.01$), BDI ($r = 0.67$, $r = 0.00$) and MMRC ($r = -0.48$, $r = 0.01$) and PEmax and VAS ($r = -0.40$, $r = 0.03$), BDI ($r = 0.55$, $r = 0.00$) and MMRC ($r = 0.38$, $r = 0.05$). In addition to these determinations VAS, BDI, and MMRC had a strong correlation defining their relationship swith each other ($p < 0.05$).
Conclusion: In stroke patients, MMRC and VAS dyspnoea scale save associated with respiratory muscle strength. Based on these findings, were commend using the MMRC and VAS scales first and secondly the BDI scale to assess dyspnoea in stroke patients.

AS03-032

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

POST-ACUTE STROKE CARE - A NATIONAL AUDIT OF REHABILITATION UNITS

P. McElwaine[1,2], J. McCormack[3] and J. Harbison[1,2,3]
[1]Dublin Midlands Hospital Group, Medical Gerontology, Dublin, Ireland
[2]University of Dublin- Trinity College, Medical Gerontology, Dublin, Ireland
[3]Royal College of Physicians Ireland, National Clinical Programme for Stroke, Dublin, Ireland

Background and Aims: A recent audit of stroke services in Ireland demonstrated that services have improved over the last ten years. However as the clock moves away from the early hours of stroke management, deficiencies in services become apparent.
Method: A review of post-acute stroke inpatient rehabilitation services was undertaken, with 29 sites identified as managing patients in the post-acute phase of stroke nationally. Rehabilitation units were defined as sites accepting patients from acute hospitals services and providing inpatient rehabilitation prior to a patient being discharged. Each site was surveyed using elements of the validated questionnaire from the Sentinel Stroke National Audit Programme (SSNAP) audit on post-acute services, with adjustments for the Irish context.
Results: Twenty-six self-reported surveys were returned, representing services between March-June 2016. A total of 559 beds were available for rehabilitation, including 104 dedicated stroke beds. 27% (7/26) had a dedicated stroke unit or ward, compared with 73% (85/116) in SSNAP audit. Bed access to rehabilitation units was age restricted in 46% (12/26) of sites. 42% (11/26) had a stroke specialist responsible for stroke rehabilitation, compared with 60% (70/116) in SSNAP UK. Patients had access to physiotherapy, OT and SLT on all sites, three-quarters of sites felt their patients were not to receiving the recommended levels of therapy. Psychology services were accessible in less than a third of sites. Only 19% (5/26) had access to an early supported discharge (ESD) team.
Conclusion: The survey highlighted the heterogeneity of service provision nationally and the deficits that exist in the context of best international practice.

AS03-034

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

RELATIONSHIP BETWEEN FALL FREQUENCY AND FEAR OF FALL, MOTOR FUNCTION AND DISABILITY IN GERIATRIC AND NON-GERIATRIC STROKE PATIENTS

E. Goz[1], V. Ozturk[2] and A. Genc[3]
[1]İZMİR, Turkey
[2]Dokuz Eylul University, Faculty of Medicine- Department of Neurology, İZMİR, Turkey
[3]Dokuz Eylul University, School of Physical Therapy and Rehabilitation, İZMİR, Turkey

Background and Aims: Falls are common problem that can occur after stroke. Stroke is primarily disease of older people and one of the most important causes of disability in the elderly is falls. To investigate the relationship between fall frequency, fear of fall, motor function and disability in geriatric and non-geriatric stroke patients.
Method: This study was carried out on 68 stroke patients. The patients were divided into two groups, over (Group 1) and under (Group 2) 65 years of age and comparisons were made between groups in terms of assessment outcomes. Demographic characteristics of patients, fall frequency and fear of fall were questioned (Activity Specific Balance and Confidence Scale). Motor function was assessed with The Stroke Rehabilitation Assessment of Movement (STREAM) Test and disability with Functional Independence Measurement (FIM).
Results: The mean age of Group 1 was 74,21 ± 7,43 and 54,25 ± 9,40 year in Group 2. Motor functions in Group 1 were significantly lower and fear of fall and disability was significantly higher than Group 2 ($p < 0.05$). There was no significant difference between groups in fall frequencies ($p = 0.27$) . While, there was a significant weak negative correlation between age, motor fuction and disability, there was no significant correlation between age fear of fall (respectively; $R = -0,26$, $p = 0,004$; $R = -0,24$, $p = 0,006$; $R = -0,13$, $p = 0,13$).
Conclusion: Geriatric patients had worse motor function so their fear of fall was found high and they were less independent in daily life. So, exercises which increase motor function and prevent falls in stroke rehabilitation may increase independence of daily life.

AS03-038

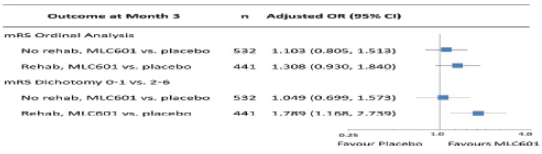
CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

SYNERGISTIC EFFECT OF COMBINING MLC601 AND REHABILITATION ON POST-STROKE RECOVERY - THE CHIMES STUDY

N.C. Suwanwela[1], N. Venketasubramanian[2], C.F. Lee[3], C. Chen[4] and CHIMES Study Investigators[5]

[1]King Chulalongkorn University, Neurology, Bangkok, Thailand
[2]Raffles Neuroscience Centre, Neurology, Singapore, Singapore
[3]The University of Hong Kong, School of Public Health, Hong Kong, China
[4]Singapore, Singapore
[5]Philippines- Thailand- Malaysia- Hong Kong- Sri Lanka, Singapore

Background and Aims: MLC601 has been shown to enhance inherent neuro-repair mechanisms after stroke. Similarly, neuroplasticity and neurogenesis have been implicated as among the mechanisms of action of rehabilitation in reducing impairment.
We aimed to assess the effect of MLC601 and concomitant rehabilitation on stroke recovery in the CHIMES Study in order to test the hypotheses that there would be an additive effect.
Method: The CHIMES study recruited 1099 subjects aged ≥18 years with ischemic stroke, National Institute of Health Stroke Scale (NIHSS) 6–14, and pre-stroke modified Rankin Scale (mRS) ≤1 in a multicenter, randomized, double-blind, placebo-controlled trial of MLC601 given for 3 months in addition to standard stroke care and rehabilitation prescribed by the treating physicians. mRS was assessed at three months (M3).
Results: The overall study population had a mean age of 61.4 ± 11.3 years, with 406 (37%) women. Treatment groups were balanced in baseline characteristics. Data on rehabilitation and mRS at M3 were available in 973 (89%) subjects. Stratification of subjects according to rehabilitation status showed higher treatment effect of MLC601 on mRS shift and dichotomy analyses among subjects who received rehabilitation compared to subjects who did not, after adjusting for age, sex, baseline NIHSS, and stroke onset to treatment delay (figure).



Conclusion: Rehabilitation appears to amplify the treatment effect of MLC601 in improving functional recovery at M3, supporting a synergistic or additive effect on brain neuro-repair processes after an acute ischemic stroke.

AS03-039

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

EFFECT DUAL-MODE-NONINVASIVE BRAIN STIMULATION FOR MOTOR RECOVERY IN STROKE PATIENTS

Y.H. Kim[1,2], E. Park[1], A. Lee[2], H.G. Kim[2] and W.H. Chang[1]

[1]Center for Prevention and Rehabilitation- Heart Vascular and Stroke Institute- Samsung Medical Center- Sungkyunkwan University School of Medicine, Department of Physical and Rehabilitation Medicine, Seoul, Republic of Korea
[2]Samsung Advanced Institute for Health Science and Technology Sungkyunkwan University, Department of Health Sciences and Technology, Seoul, Republic of Korea

Background and Aims: Noninvasive brain stimulation, both repeatitive transcranial stimulation (rTMS) and transcranial direct current stimulation (tDCS), is widely used for enhancing motor function of the stroke patients. In this study, the effect of dual-mode stimulation using rTMS and tDCS on cortical activation and motor recovery of stroke patients were investigated using functional near-infrared spectroscopy (fNIRS).
Method: Twenty-three subacute ischemic stroke patients were recruited. In the dual stimulation group, the 1 Hz rTMS was applied over the contralesional primary motor cortex (M1) and the anodal tDCS over the ipsilesional M1 for 20 minutes per day, five days per week during the consecutive 2 weeks. The single group underwent 1 Hz rTMS over the contralesional M1 with sham tDCS over the ipsilesional M1. Motor function was asseed by Fugl-Meyer assessment (FMA) score before intervention (T0), immediately (T1) and 2 months (T2) after the intervention. The cortical activation before and after stimulation were acquired from bilateral motor regions in twelve stroke patients using the fNIRS.
Results: The improvement in FMA scores at T1 was significantly higher in the dual stimulation group than the single stimulation group. However, there was no significant difference in FMA scores at T2 between two groups. In fNIRS measurement, oxyhemoglobin concentration was increased in the ipsilesional motor regions at T1 in the dual stimulation group.
Conclusion: These results revealed that dual-stimulation of 1 Hz rTMS and anodal tDCS over bilateral M1s was safe and superior to single rTMS to improve motor function immediately after NBS(Supported by the Korea government (MSIP) (NRF-2014R1A2A1A01005128).

AS03-040

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

MULTI-FACET ASSESSMENT OF FUNCTIONAL RECOVERY AFTER FIRST-EVER STROKE: INTERIM RESULTS OF THE KOREAN STROKE COHORT FOR FUNCTIONING AND REHABILITATION (KOSCO)

Y.H. Kim[1], W.H. Chang[1], M.K. Sohn[2], J. Lee[3], D.Y. Kim[4], S.G. Lee[5], Y.I. Shin[6], G.J. Oh[7], Y.S. Lee[8], M.C. Joo[9], E.Y. Han[10] and J. Han[11]

[1]Samsung Medical Center, Physical and Rehabilitation Medicine, Seoul, Republic of Korea
[2]Chungnam National University School of Medicine, Department of Rehabilitation Medicine, Dajeon, Republic of Korea
[3]Konkuk University School of Medicine and Konkuk University Medical Center, Department of Rehabilitation Medicine, Seoul, Republic of Korea
[4]Yonsei University College of Medicine, Department and Research Institute of Rehabilitation Medicine, Seoul, Republic of Korea
[5]Chonnam National University Medical School, Department of Physical and Rehabilitation Medicine, Gwangju, Republic of Korea
[6]Pusan National University School of Medicine- Pusan National University Yangsan Hospital, Department of Rehabilitation Medicine, Yangsan, Republic of Korea
[7]Wonkwang University School of Medicine, Department of Preventive Medicine, Iksan, Republic of Korea
[8]Kyungpook National University School of Medicine- Kyungpook National University Hospital, Department of Rehabilitation Medicine, Daegu, Republic of Korea
[9]Wonkwang University School of Medicine, Department of Rehabilitation Medicine, Iksan, Republic of Korea

[10]Jeju National University Hospital- Jeju National University- School of Medicine, Department of Rehabilitation Medicine, Jeju, Republic of Korea
[11]Research Institute of Convergence for Biomedical Science and Technology- Pusan National University Yangsan Hospital, Research and Statistical Support, Yangsan, Republic of Korea

Background and Aims: This study report multi-facet functional recovery by face-to face assessment of first-ever stroke patients until 1 year after onset as an interim report of the KOSCO (Korean stroke cohort for functioning and rehabilitation), a multi-center prospective stroke cohort study in Korea.
Method: This study was designed as a 10-year, longitudinal follow-up investigating the residual disabilities, activity limitations, mood status, and quality of life in patients suffering from first-ever stroke using a standardized comprehensive assessment battery. Out of 7,858 patients who agreed with participation, 5,129 participants completed face-to-face assessments at 1 year after onset.
Results: Functional assessment demonstrated that significant proportion of stroke survivors suffered from residual disabilities; motor disorder 46.0%, cognitive disorder 29.7%, language disorder 44.1%, and swallowing disorder 19.4%. Thirty-nine percent of stroke survivors needed assistance of caregivers for their activities daily of living. Factors influencing on functional independence of stroke survivors were age, diabetes mellitus, functional level before stroke, medical complication such as pneumonia, neurologic aggravation, initial hospitalization period, and functional status at 3 months after onset. The functional gain and quality of life measured at 1 year after stroke was significantly higher in patients who received intensive subacute rehabilitation therapy.
Conclusion: Significant proportion of stroke survivors suffered from functional impairments at 1 year after onset. Intensive rehabilitation therapy during subacute period of stroke can be an optimum strategy of enhancing late functional independence for stroke survivors (Supported by the Research Program funded by the Korea Centers for Disease Control and Prevention (2016-E33003-00)).

AS03-044

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

EFFECT OF EARLY USE OF ABOBOTULINUMTOXINA AFTER STROKE ON MUSCLE TONE AND SPASTICITY PROGRESSION: RESULTS OF A PILOT STUDY

K.J. Goh[1], K.H. Kong[2], W. Kumthornthip[3], M. Mazlan[4], L. Abdul Latif[4], M.M.D. De Los Santos[5], C. Chotiyarnwong[3], P. Tanvijit[3], O. Nuez[2], J. Balcaitiene[6], P. Maisonobe[6] and R.L. Rosales[5,7]
[1]University of Malaya Medical Centre, Division of Neurology-Department of Medicine, Kuala Lumpur, Malaysia
[2]Tan Tock Seng Hospital, Department of Rehabilitation Medicine, Tan Tock Seng Hospital, Singapore
[3]Siriraj Hospital- Mahidol University, Department of Rehabilitation Medicine- Faculty of Medicine, Bangkok, Thailand
[4]University of Malaya Medical Centre, Department of Rehabilitation Medicine, Kuala Lumpur, Malaysia
[5]Metropolitan Medical Centre, Centre for Neurodiagnostic and Therapeutic Services, Manila, Philippines
[6]Ipsen Group, Medical Affairs, Boulogne-Billancourt, France
[7]University of Santo Tomas, Department of Neurology & Psychiatry-Faculty of Medicine and Surgery, Manila, Philippines

Background and Aims: Muscle tone changes may appear within 2-weeks of stroke. However, limited data exist on timeframes for spasticity presentation. The ONTIME pilot study assessed impact of early post-stroke (2–12 weeks) abobotulinumtoxinA (aboBoNT-A; Dysport®) intramuscular injections on upper limb symptomatic spasticity progression.
Method: ONTIME (NCT02321436) was a 28-week, phase 4, randomized, double-blind, placebo-controlled study. Primary endpoint was time between first injection and fulfilment of reinjection criteria (Modified Ashworth Scale [MAS] ≥ 2 and one additional symptom: pain, involuntary movements, impaired active or passive function).
Results: 42 patients were randomized (2:1 aboBoNT-A [n = 28]:placebo [n = 14]; 78.6% male; mean[SD] age, 59.8[12.3] years). At baseline, 76.2% had symptomatic spasticity and median[range] time since stroke was 5.8[2.3–11.7] weeks. Most common symptom at baseline was impaired passive function (n = 27[64.3%]) followed by active function (n = 24[57.1%]), involuntary movements (n = 20[47.6%]) and pain (NPRS > 4; n = 16[38.1%]; Table 1). Median[95%CI] time to reinjection criteria was 156[86.0–206.0] days for aboBoNT-A versus 32[29.0–114.0] days for placebo ($p = 0.0176$, LogRank test). MAS LS mean change[SE] from baseline to Week 4 and 12 were −1.27[0.17] and −0.86[0.18] for aboBoNT-A, versus −0.26[0.22] and −0.03[0.24] for placebo ($p = 0.0005$; $p = 0.0052$, ANOVA).

Table 1. Presence of symptomatic spasticity at baseline

Symptom		aboBoNT-A 500 U (N=28)	Placebo (N=14)	All subjects (N=42)
Likert scales at baseline:				
Passive function, n (%)	0 – No impact	8 (28.6)	7 (50.0)	15 (35.7)
	1 – Mild impact	6 (21.4)	4 (28.6)	10 (23.8)
	2 – Moderate impact	11 (39.3)	1 (7.1)	12 (28.6)
	3 – Severe impact	3 (10.7)	2 (14.3)	5 (11.9)
Active function, n (%)	0 – No impact	11 (39.3)	7 (50.0)	18 (42.9)
	1 – Mild impact	3 (10.7)	1 (7.1)	4 (9.5)
	2 – Moderate impact	10 (35.7)	3 (21.4)	13 (31.0)
	3 – Severe impact	4 (14.3)	3 (21.4)	7 (16.7)
Involuntary movements, n (%)	0 – No impact	15 (53.6)	7 (50.0)	22 (52.4)
	1 – Mild impact	6 (21.4)	3 (21.4)	9 (21.4)
	2 – Moderate impact	6 (21.4)	3 (21.4)	9 (21.4)
	3 – Severe impact	1 (3.6)	1 (7.1)	2 (4.8)
NPRS, n (%)	≤4	16 (57.1)	10 (71.4)	26 (61.9)
	>4	12 (42.9)	4 (28.6)	16 (38.1)

NPRS, Numeric Pain Rating Scale

Conclusion: Median time between first injection and appearance or reappearance of symptomatic spasticity (reinjection criteria) was significantly longer with aboBoNT-A than placebo. Improvements in MAS were significantly greater with aboBoNT-A compared with placebo at Week 4 and 12.
Study sponsored by Ipsen.

AS03-047

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

TRIAL PROGRESS AND THERAPY FIDELITY MONITORING IN THE VERY EARLY REHABILITATION IN SPEECH (VERSE) AFTER STROKE STUDY

E. Godecke[1], E. Armstrong[1], T. Rai[2], S. Middleton[3], N. Ciccone[1], A. Holland[4], A. Whitworth[5], M. Rose[6], F. Ellery[7], D. Cadilhac[8], G. Hankey[9] and J. Bernhardt[10]
[1]Edith Cowan University, School of Medical and Health Science, Perth, Australia
[2]University of Technology Sydney, School of Mathematical and Physical Sciences, Sydney, Australia
[3]St Vincent's & Mater Health Sydney and Australian Catholic University, Nursing Research Institute, Sydney, Australia
[4]University of Arizona, Speech and Hearing, Tucson, USA
[5]Curtin University of Technology, School of Psychology and Speech Pathology, Perth, Australia
[6]La Trobe Univserity, Speech Pathology, Melbourne, Australia
[7]Neuroscience Trials Australia, Clinical Trials Unit, Melbourne, Australia
[8]Monash University, Translational Public Health and Evaluation Division, Melbourne, Australia
[9]University of Western Australia, School of Medicine and Pharmacology, Perth, Australia
[10]The Florey Institute of Neuroscience and Mental Health, Stroke, Melbourne, Australia

Background and Aims: The recent Cochrane Review for aphasia therapy in stroke indicates limited available evidence to support very early intensive aphasia rehabilitation in clinical best-practice. The lack of therapy fidelity reporting in aphasia rehabilitation studies serves to underwrite poor aphasia therapy efficacy. VERSE is a PROBE trial designed to determine whether two different types of intensive aphasia therapy, provided for 20 sessions, beginning within 14 days of acute stroke, provides greater efficacy and cost-effectiveness than usual care. VERSE therapy fidelity processes underpin important rehabilitation factors.
Method: 246 participants with acute post-stroke aphasia are required. Participants are stratified by aphasia severity and randomised to receive usual care (usual ward based aphasia therapy), usual care-plus (usual ward based therapy provided daily) or VERSE therapy (a prescribed aphasia therapy provided daily). The primary outcome is the Aphasia Quotient of the Western Aphasia Battery at three months. One therapy session per week for all trial patients is video-recorded and an independent evaluator assesses therapy fidelity.
Results: Since July 2014, 5846 people with confirmed stroke have been identified;1489 patients had aphasia (25%) and 293 (19%) were trial eligible. Of those, 155 have been recruited (December 2016). 342 therapy sessions have been reviewed for protocol adherence (90%) and treatment differentiation (100%).
Conclusion: The post-stroke aphasia rate is lower than predicted. Therapy fidelity data shows high protocol adherence and strong treatment differentiation. When complete, this trial will provide high quality evidence to support stroke clinical practice guidelines.

AS03-048

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

AUTOMATED LESION PREDICTION USING NEUROIMAGING AND MACHINE LEARNING: IMPACT OF THE PREDICTED LESION LOAD ON CLINICAL OUTCOME

S. Habegger[1], W. Krammer[1], R. McKinley[1] and R. Wiest[1]
[1]Bern University Hospital, Neuroradiology, Bern, Switzerland

Background and Aims: Stroke imaging is essential for the stratification of patients being candidates for i.v. thrombolysis or mechanical thrombectomy. However, postprocessing methods are still restricted to the quantification of the tissue at risk (i.e. the penumbra) and omit the lesion mapping to eloquent regions under emergency conditions. We have recently proposed a computer assisted method (FASTER, McKinley et al., 2016) to predict tissue at risk for permanent damage using structural T2w, perfusion and diffusion imaging. Here, we aimed to address the question, how the predicted lesion load within distinct networks of the brain is finally reflected by permanent clinical impairment after 3 month of follow up.
Method: For reference, we calculated the final lesion load on T1w images after 3 months of follow up and calculated the relation between focal lesion load on the somatosensory, default mode, left and right attentional, visual executive and auditory/language networks of the brain and the mRS. The same analysis was conducted also for regions of interest defined by a gray matter and white matter atlas.
Results: We identified high correlations between the predicted lesion load on the functional networks as calculated by FASTER and the final lesion volumes after 3 month. We found that these correlations of the functional networks were superior to the ones of the regions defined by the gray matter and white matter atlas.
Conclusion: We conclude that automated image analysis can be used to determine the extent and location of tissue damage and that this damage is related to clinical outcome after 3 months.

AS03-049

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

SAFETY AND EFFICACY OF BI-HEMISPHERIC REPETITIVE TRANSCRANIAL MAGNETIC STIMULATION WITH H-COIL OVER THE MOTOR CORTICES ON PARETIC UPPER LIMB MOTOR FUNCTION IN CHRONIC STROKE

R. Chieffo[1], G. Scopelliti[1], E. Houdayer[1], G. Di Maggio[1], M. Fichera[1], A. Nuara[1], S. Guerrieri[1], R. Santangelo[1], A. Zangen[2], G. Comi Giancarlo[1] and L. Leocani[1]
[1]San Raffaele Hospital, Neurological Department- Experimental Neurophysiology Unit- INSPE - Institute of Experimental Neurology, Milan, Italy
[2]Ben-Gurion University, Department of Life Sciences, Beer-Sheva, Israel

Background and Aims: to assess safety and efficacy of bi-hemispheric repetitive transcranial magnetic stimulation (rTMS) with H-coil over the motor areas associated to motor training (MT) on upper limb (UL) motor function.
Method: ad interim analysis on 16 chronic stroke patients. Subjects were included in this study double-blind, sham-controlled trial. Eleven sessions of rTMS (20 Hz at 90% of RMT) were delivered with the H-coil over the motor areas bilaterally. Subjects were randomly allocated to the real rTMS + MT or the sham rTMS + MT. UL function was evaluated by the Fugl-Meyer assessment (FMA), hand grip and pinch strength at baseline-T0, one day after treatment-T1 and at one-month follow-up-T2) Motor evoked potential (MEPs) at 120% of RMT on the first dorsal interosseoum were also measured
Results: no participant reported adverse effects. At T1 both groups showed a significant improvement in FMA (sham + MT $p = 0{,}015$; real + MT $p = 0{,}002$) while at T2 the difference with baseline persisted only for the real + MT group ($p = 0{,}001$). The improvement obtained for the real + MT was higher than that observed for the sham + MT group ($p = 0.03$). Patients more impaired at T0 who underwent real stimulation showed better recovery at T2 ($r = -0{,}69$ $p = 0{,}003$). Grip and pinch straight improved after treatment without significant differences between groups. MEPs amplitude over the affected side increased in the real + MT than the sham + MT group at T2 ($p = 0.01$).
Conclusion: bilateral rTMS with H-coil associated with MT is safe and enhances the effect of MT alone on FMA. Our data suggest that subject with a more sever motor impairment may mainly benefit from this stimulation protocol.

AS03-050

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

UNRECOGNIZED POST-STROKE DEPRESSION IS ASSOCIATED WITH NON-ADHERENCE TO MEDICATION

I. Padberg[1], B. Hotter[2], A. Liebenau[3], P. Knispel[4], S. Zöllner[5], I. Wellwood[6] and A. Meisel[7]
[1]Center for Stroke Research Berlin CSB - Charité - Universitätsmedizin Berlin, Research Group "Clinical Epidemiology and Health Services in Stroke" CEHRiS, Berlin, Germany
[2]Center for Stroke Research Berlin CSB- Charité - Universitätsmedizin Berlin, Research Group AG Meisel, Berlin, Germany
[3]Center for Stroke Research Berlin- Charité - Universitätsmedizin Berlin-2. Berliner Schlaganfall-Allianz e.V.- Berlin- Germany, Management Team, Berlin, Germany

[4]Center for Stroke Research Berlin- Charité - Universitätsmedizin Berlin- 2. Berliner Schlaganfall-Allianz e.V.- Berlin- Germany, Stroke Servicepoint, Berlin, Germany
[5]Center for Stroke Research Berlin- Charité - Universitätsmedizin Berlin- 2. Berliner Schlaganfall-Allianz e.V.- Berlin- Germany, Stroke Servicepoint, Berlin, Germany
[6]Center for Stroke Research- Charité - Universitätsmedizin Berlin 2. University of Cambridge- UK, Research Group "Clinical Epidemiology and Health Services in Stroke" CEHRiS- 2. Cambridge Institute of Public Health, Berlin, Germany
[7]Center for Stroke Research Berlin- 2. Neurocure Clinical Research Center- Department of Neurology Charité -Universitätsmedizin Berlin, Research Group AG Meisel, Berlin, Germany

Background and Aims: Depression is common in stroke-survivors and has a profound impact on long-term stroke outcome.
Aims: We wanted to investigate the frequency of screening and manifestation of this post-stroke complication, as well as its potential association with adherence to medication, which has not been investigated in stroke aftercare (after discharge from rehabilitation).
Method: Patients were assessed in a cross-sectional study 2 to 3 years after their first stroke (initial median NIH-SS was 10 (range 1–18)). Depression was diagnosed using the Hamilton Depression Rating Scale (HDRS) and medication adherence was assessed using the Morisky Medication Adherence Scale. Patients were asked whether they had previously been screened for depression.
Results: We included 57patients; 10 (17.5%) were depressed. Of all depressed patients 90% had never been screened for depression, while this was the case for only 57.8% of the patients without depression (Figure1). Regarding medication adherence, 70% of all depressed patients and 41.3% of non-depressed patients were in the "medium to low" adherence group (p-value = 0.099) and non-adherence to medication was significantly correlated with unrecognized and therefore untreated, post-stroke depression ($r^2 = 0.274$, p-value = 0.041).
Item 2 (feelings of guilt) and item 7 (interest in work) of the Hamilton scale furthermore had high negative predictive values and reasonably high positive predictive values for detecting depression in our sample (Table 1).
Conclusion: Post-stroke depression is under diagnosed. However, efficient screening and treatment of depression as part of stroke aftercare might increase patients' adherence to medication and has potential to thereby improve patients' long-term outcome and quality of life after stroke.

AS03-051

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

THE EFFECTS OF CIRCADIAN LIGHT ON FATIGUE AND SUBJECTIVE SLEEP QUALITY IN STROKE PATIENTS ADMITTED FOR REHABILITATION

A. West[1], S.A. Simonsen[1], P.J. Jennum[2], B.A. Sander[3], N. Cyril Hansen[1], M. Schønsted[1], A. Zielinski[1] and H. Klingenberg Iversen[1]
[1]Rigshospitalet Glostrup- University Hospital of Copenhagen, Unit of Clinical Stroke Research, Glostrup, Denmark
[2]Rigshospitalet Glostrup- University Hospital of Copenhagen, Danish Center for Sleep Medicine, Glostrup, Denmark
[3]Rigshospitalet Glostrup- University Hospital of Copenhagen, Department of Ophthalmology, Glostrup, Denmark

Background and Aims: The blue light spectrum is an essential part in the natural ambient light known to stabilize the circadian rhythm. Patients admitted for rehabilitation often lacks sufficient blue light in daytime.
Hypothesis: In post stroke patients admitted for rehabilitation, circadian light (naturalistic light) during admission will improve subjective sleep quality and fatigue.
Method: The study is a prospective parallel longitudinal quasi randomized controlled study. Stroke patients were randomized to either the intervention rehabilitation unit (IU) (circadian lighting, company Cromaviso, Denmark) or the control rehabilitation unit (CU) (standard lighting).
Examinations were done at inclusion and at discharge after at least 2 weeks admission. Subjective sleep quality was measured by the Pittsburgh Sleep Quality Index (PSQI), while Fatigue was measured by Epworth Sleepiness Scale (ESS), Multidimensional Fatigue Inventory questionnaire (MFI-20), a Rested Statement and Visual Analog Scala for fatigue (fVAS).
Results: During one year 90 patients were included.
At discharge patients from the IU scored less fatigue than the CU patients in 3 scales (antidepressant medication was included as a confounder in SAS, ANCOVA): Rested Statement, *P = 0.041(IU:n = 28;CU:n = 30)*, MFI-20, *P = 0.029 (IU:n = 28; CU:n = 30)*. The ESS showed decreased fatigue during the admission in the IU *(n = 26, p = 0.017)*, and no change in the CU group *(n = 30, p = 0.183)* (paired t-test). No differences were observed in fVAS *(IU:n = 20; CU:n = 19)* and PSQI *(IU:n = 27; CU:n = 30)* by SAS ANCOVA.
Conclusion: Without affecting subjective sleep quality, the circadian light decreases fatigue in stroke patients in a real hospital rehabilitation setting. Circadian light should be considered an integrated segment in the rehabilitation unit environment.

AS03-052

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

THE EFFECTS OF CIRCADIAN LIGHT ON MELATONIN AND CORTISOL BLOOD LEVELS IN STROKE PATIENTS ADMITTED FOR REHABILITATION

A. West[1], H.P. Sennels[2], S.A. Simonsen[1], P.J. Jennum[3], B.A. Sander[4], M. Schønsted[1], A. Zielinski[1], N. Cyril Hansen[1] and H. Klingenberg Iversen[1]
[1]Rigshospitalet Glostrup - University Hospital of Copenhagen, Unit of Clinical Stroke Research, Glostrup, Denmark
[2]Rigshospitalet Glostrup - University Hospital of Copenhagen, Department of diagnostic. Clinical Biochemistry, Glostrup, Denmark
[3]Rigshospitalet Glostrup - University Hospital of Copenhagen, Danish Center for Sleep Medicine, Glostrup, Denmark
[4]Rigshospitalet Glostrup - University Hospital of Copenhagen, Department of Ophthalmology, Glostrup, Denmark

Background and Aims: The blue light spectrum is an essential part in the natural ambient light known to stabilize the circadian rhythm. Patients admitted for rehabilitation often lack sufficient blue light in daytime.
Hypothesis: In stroke patients admitted for rehabilitation, circadian light (naturalistic light) during admission will stabilize the rhythm of melatonin and cortisol circadian blood levels.
Method: The study is a prospective parallel longitudinal quasi randomized controlled study. Stroke patients were randomized to either the intervention (IU) (circadian lighting, company Cromaviso, Denmark) or control rehabilitation unit (CU) (standard lighting). Melatonin and cortisol blood levels were measured for a 24-hour period every 4 hours, at inclusion and at discharge after at least 2 weeks admission. Cosinor-rhythmometry and mean values (paired t-test) were calculated.
Results: Over a year 90 patients were included.

There was no significant circadian rhythm of melatonin levels at admission and discharge in either of the patient groups. During admission, the melatonin levels increased significantly in patients in the IU *($n = 23$, $p = 0.030$)* and was unchanged in the CU *($n = 19$, $p = 0.418$)*.Cortisol showed significant circadian rhythms in both patient groups. During the admission, Daycortisol mean levels decreased significantly in patients in the CU *($n = 20$, $p = 0.003$)*, and was unchanged in the IU *($n = 22$, $p = 0.945$)*.

Conclusion: Based on the findings, we assume that circadian light acts as a modifying intervention on the circadian parameters melatonin and cortisol levels in long-term hospitalized patients in a real hospital setting.

AS03-053

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

INVESTIGATION OF FACTORS AFFECTING THE SIX-MINUTE WALK TEST RESULTS IN STROKE PATIENTS

R. Mustafaoglu[1], I. Yeldan[2], B. Erhan[3] and B. Gunduz[4]
[1]Istanbul University, Faculty of Health Science- Division of Physiotherapy and Rehabilitation-Department of Neurological Physiotherapy and Rehabilitation, Istanbul, Turkey
[2]Istanbul University, Faculty of Health Sciences- Division of Physiotherapy and Rehabilitation- Department of Physiotherapy and Rehabilitation, Istanbul, Turkey
[3]Istanbul Aydın University, Faculty of Health Sciences- Division of Physiotherapy and Rehabilitation- Okmeydani Training Hospital- Physical Medicine and Rehabilitation Clinic, Istanbul, Turkey
[4]Istanbul Physical Medicine and Rehabilitation Training Hospital, Physical Medicine and Rehabilitation Clinic, Istanbul, Turkey

Background and Aims: The average value of six minute walking distance in stroke patients is range from 209 to 300 meters, which is less than the required 267 to 332 meters to participate in important basic daily life activities such as going to pharmacy, hospital and shopping. The distance obtained in this test has an important role in determining how the various factors that cause physical impairment influence the functional capacity in stroke patients. Therefore, the purpose of current study was to investigate the factors that affect the six-minute walking distance in patients with stroke.

Method: Forty-three (12 women) ambulatory patients with a mean age of 52.8 ± 13.2 years, who had a stroke onset at least 3 months ago were enrolled in this study. Smoking habits, time since stroke onset, spasticity (Modified Ashworth Scale), Functional Ambulation Scale (FAS), lower extremity motor development (Fugle-Meyer-L), Borg Rating of Perceived Exertion Scale, Single Leg Stance Test (SLST), Barthel Index (BI), Timed Up and Go Test (TUG), Falls Efficacy Scale-International (FES-I) and Six- Minute Walk Test were evaluated.

Results: There were statistically significant correlation between patients' six minute walking distance and FAS ($r = 0.42$; $p = 0.04$), BI ($r = 0.35$; $p = 0.02$), SLST ($r = -0.37$; $p = 0.01$), TUG ($r = -0.63$; $p = 0.00$) and FES-I ($r = -0.30$; $p = 0.04$).

Conclusion: Six-minute walking distance was associated with level of functional ambulation, participation in daily living activities, static and dynamic balance and fear of falling. We believe that attempts to improve these factors will increase the functional capacities by increasing the six-minute walking distance in stroke patients.

AS03-054

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

ATTITUDES OF PATIENTS AND RELATIVES TOWARDS DISABILITY AND TREATMENT IN MALIGNANT MCA INFARCTION

H. Neugebauer[1], M. Schnabl[2], L. Dorothée[3], P. Heuschmann[4] and E. Jüttler[5]
[1]University of Ulm, Neurology, Ulm, Germany
[2]Community Hospital Kliniken Nordoberpfalz AG Klinikum Weiden, Department of Trauma Surgery and Orthopedics- Community Hospital Kliniken Nordoberpfalz AG Klinikum Weiden- Germany, Weiden, Germany
[3]University Ulm, Neurology, Ulm, Germany
[4]University of Würzburg, Institute for Clinical Epidemiology and Biometry, Würzburg, Germany
[5]Ostalb-Klinikum Aalen, Department of Neurology, Aalen, Germany

Background and Aims: Attitudes among patients and relatives towards the degree of acceptable disability and the importance of aphasia are critical in deciding on decompressive hemicraniectomy (DHC) in malignant middle cerebral artery infarction (MMI). However, most MMI patients are not able to communicate their will. Furthermore, attitudes of healthy individuals and relatives may not correspond to those of stroke patients.

Method: This is a multicenter survey among 355 patients and 199 relatives during treatment for acute minor or moderate severe ischemic stroke in Germany. Questions address the acceptance of disability, importance of aphasia and the preferred treatment in the hypothetical case of future MMI.

Results: mRS scores of 2 or better were considered acceptable by the majority of all respondents (72.9% – 88.1%). A mRS of 3, 4, and 5 was considered acceptable by 56.0%, 24.5%, and 6.8%, respectively. Except for a mRS of 1, relatives indicated each grade of disability significantly more often acceptable than patients. Differences regarding acceptable disability and treatment decision were depending on family status, housing situation, need of care and disability. The presence of aphasia was considered important for treatment decision by both patients (46.5%) and relatives (39.2%). Older respondents more often refrained from DHC ($p < 0.001$).

Conclusion: There is substantial heterogeneity in patients and relatives regarding acceptable disability, aphasia and treatment decision in the hypothetical case of MMI. Relatives significantly overestimate the degree of disability that is acceptable to stroke patients. Further studies are warranted to determine if differences in attitudes impact on the decision to undergo DHC.

AS03-055

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

A RANDOMIZED CONTROLLED STUDY ON NATURE-BASED REHABILITATION FOR POST-STROKE FATIGUE - "THE NATURE STROKE STUDY" (NASTRU)

A.M. Pálsdóttir[1,2], K. Stigmar[2,3], B. Norrving[4,5], P. Grahn[1], I.F. Petersson[6], M. Åström[3] and H. Pessah-Rasmussen[2,4]
[1]Swedish University of Agricultural Sciences SLU, Work Science-Business Economics and Environmental Psychology AEM, Alnarp, Sweden
[2]Lund University, Dept. Health Sciences, Lund, Sweden
[3]Epidemiology and Register Centre South, -, Lund, Sweden

[4]Skåne University Hospital, Dept. Neurology and Rehabilitation Medicine, Lund, Sweden
[5]Lund University, Dept. of Clinical Sciences- Neurology-, Lund, Sweden
[6]Lund University, Dept. of Clinical Sciences- Orthopaedics, Lund, Sweden

Background and Aims: The objective of NASTRU was to examine if a 10-week nature-based rehabilitation, as add-on to standard care, improves post-stroke fatigue and perceived values of everyday occupations (primary endpoints) (Clinical Trial.gov Identifier: NCT02435043).
Method: NASTRU was conducted as an evaluator blinded, two-armed randomized controlled prospective trial with assessments at baseline and two follow ups (FU) (see Table 1). The nature-based intervention was performed in a designed enriched garden environment and supported by a multimodal rehabilitation team. The intervention lasted for ten weeks, two days week each day session lasting three and a half hours.
Results: A total of 101 participants were included, and 51 were randomized to the intervention. The study population consisted of 73 sub-acute patients (three-month post stroke) and 28 chronic patients (more than two years post stroke). There were more men than women in the chronic group (54%) compared to the sub-acute (33 %). Data on Primary outcome for the whole population was presented at ESOC in Barcelona 2016. The final results on the primary endpoints (FU1) for the subacute and chronic group and secondary endpoints (FU2) will be presented at the conference.
Conclusion: The results from this study may add to the scientific knowledge on stroke rehabilitation and possible new rehabilitation alternatives for individuals suffering from post-stroke fatigue.

AS03-058

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

A SINGLE-BLIND RANDOMISED CONTROLLED TRIAL OF MINDFUL MUSIC LISTENING TO ENHANCE COGNITIVE RECOVERY AND MOOD AFTER STROKE (MELLO): FEASIBILITY AND ACCEPTABILITY

S. Baylan[1], C. Stiles[1], M. MacDonald[1], J. Easto[1], M. McGinlay[1], B. Cullen[1], T. Quinn[2], D. Stott[2], N. Broomfield[3], S. Mercer[4], H. Murray[5], C. Haig[5] and J. Evans[1]
[1]University of Glasgow, Mental Health and Wellbeing, Glasgow, United Kingdom
[2]University of Glasgow, Institute of Cardiovascular and Medical Sciences, Glasgow, United Kingdom
[3]NHS Greater Glasgow and Clyde, Stroke Psychology, Glasgow, United Kingdom
[4]University of Glasgow, General Practice and Primary Care, Glasgow, United Kingdom
[5]University of Glasgow, Robertson Centre for Biostatistics, Glasgow, United Kingdom

Background and Aims: Low mood and cognitive deficits are common but under-recognised consequences of stroke. Music listening is suggested to have a beneficial effect on cognition, while mindfulness has been shown to benefit the treatment of mood disorders. Combining these may enhance cognitive recovery and improve mood post-stroke. The feasibility and acceptability of a novel mindful music listening intervention were investigated.
Method: Ischaemic stroke survivors were recruited from acute stroke units and randomised to an 8-week intervention of: 1) music listening, 2) mindful music listening, or 3) audiobook listening (control). Cognition and mood were assessed at baseline, 3-months and 6-months post-stroke and feedback on feasibility and acceptability obtained.
Results: 80.9% (n = 72) of those who consented were randomised. Overall retention to 6-month follow up was 83.3%. Treatment fidelity was high (94.4% fully consistent with study protocol) and 96.9% of all treatment sessions were rated fully feasible by the therapist. 68.1% completed >6 treatment visits. Median listening time across groups was 50 hours. Based on variance of change score obtained for a key outcome measure of cognition (Delayed Story Recall), a full-scale three-arm trial would require 312 participants to detect a clinically substantial difference in improvement (z score difference = 0.66, p = 0.017, two-tailed, 80% power). This would also provide 87% power to detect a modest (two point) difference in mood measured using the Hospital Anxiety and Depression Scale (HADS).
Conclusion: The results support the feasibility and acceptability of mindful music listening in a randomised trial context post-stroke. Progression to a full scale trial to investigate efficacy is warranted.

AS03-060

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

PRELIMINARY RESULTS OF LARGE CLINICAL TRIAL "DEVELOPMENT OF MEDICAL REHABILITATION IN RUSSIA" (DOME): REHABILITATION IN STROKE UNITS AND REHABILITATION CENTERS

G. Ivanova[1], E. Melnikova[2], A. Shmonin[3], N. Shamalov[4], D. Khasanova[5], R. Bodrova[6], S. Prokopenko[7], A. Belkin[8] and A. Suvorov[9]
[1]Pirogov Russian National Medical Research University, Chair of medical rehabilitation- Department of medical and social rehabilitation- Chief specialist for medical rehabilitation of the Ministry of Health of Russia, Moscow, Russia
[2]First Saint-Petersburg I.P. Pavlov State Medical University, Chief specialist for medical rehabilitation of Northern-West district of Russia- professor-chief of stroke center, St. Petersburg, Russia
[3]First Saint-Petersburg I.P. Pavlov State Medical University, Department of neurology- Department of physical methods of treatment and sports medicine, Санкт-Петербург, Russia
[4]Research Institute for cerebrovascular pathology and stroke of Pirogov Russian National Medical Research University, Chief specialist for medical rehabilitation in Central District of Russia, Moscow, Russia
[5]Kazan Medical University, Professor of Neurology and Neurosurgery at Kazan Medical University and Head of the Republican cerebral vascular center, Kazan, Russia
[6]Kazan Medical University, Assistent Professor of Neurology and Neurosurgery at Kazan Medical University, Kazan, Russia
[7]Krasnoyarsk State Medical University named after Prof. V.F. Voino-Yasenetsky, Chair of neurology and medical rehabilitation, Krasnoyarsk, Russia
[8]Clinical Institute of brain, Rector, Ekaterinburg, Russia
[9]Pirogov Russian National Medical Research University, Department of medical and social rehabilitation, Moscow, Russia

Background and Aims: Our aim: to compare "old" and "new patient-oriented, multidisciplinary and problem-focused" model of rehabilitation patients with stroke in Russian large clinical trial "Development Of MEdical rehabilitation in Russia" (DOME).
Method: At present moment, we have enrolled 625 patients with acute stroke in large clinical trial "Development Of MEdical rehabilitation in Russia (DOME)" (ClinicalTrials.gov Identifier: NCT02793934). Software "ICF-reader" was used as CRF. Primary Outcome Measures: Recovery of functions, activity and participation assessed with modified Renkin scale (mRS) at the end of first (stroke unit) and second (rehabilitation centers) stages.

Results: Patients with stroke, who received rehabilitation at the "New Model", had significantly lower degree of disability than patients rehabilitated by "habitual patterns". More effective rehabilitation of patients with stroke, which had higher levels of disability (mRS - 3–5 points) at admission to the 1st and 2nd stages. In patients with low levels of disability (mRS - 0, 1 and 2 points) for admission to the 1st and 2nd stages of rehabilitation was not observed significant improvement by the end of hospitalization. At the 1st stage of the rehabilitation there was a significant improvement than on the 2nd phase of rehabilitation, which was determined by the greater willingness of patients to recover in the first days after stroke.
Conclusion: "New patient-oriented, multidisciplinary and problem-focused" model of rehabilitation patients with stroke have significantly lower degree of disability than patients rehabilitated by "old" model.

AS03-061

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

PRECEDING ISCHEMIC EVENTS DECREASE ACUTE STROKE SEVERITY BUT DO NOT ACCELERATE EARLY RECOVERY

P. Correia[1], I. Meyer[1], A. Eskandari[1], M. Amiguet[2], L. Hirt[1] and P. Michel[1]
[1]Centre Hospitalier Universitaire Lausanne, Clinical Neurosciences, Lausanne, Switzerland
[2]Centre Hospitalier Universitaire Lausanne, Institute of Social and Preventive Medicine, Lausanne, Switzerland

Background and Aims: Acute ischemic stroke (AIS) severity and dynamics can be influenced by a variety of clinical and etiological factors. We aimed to analyse whether preconditioning by a preceding ischemic event (PIE) could influence acute stroke severity and 24 hour improvement in humans.
Method: Using consecutive AIS from the Acute STroke Registry and Analysis of Lausanne (ASTRAL) we searched associations between initial stroke severity (admission NIHSS) or early improvement (delta-NIHSS : NIHSS24h-admissionNIHSS) with demographics, risk factors, past medical history, PIE and stroke features. Both outcomes was analysed with a seprate multivariate linear regression models (MRM).
Results: Of 3501 consecutive AIS patients (43% females, median age 73 y), 996 (28.4%) had preceding PIEs (15.7% TIA, 12.9% ischemic stroke, 2.4% retinal ischemia, 8.8% multiple events). Admission NIHSS was lower in patients with PIE, independently of other factors (ESOC 2016 abstract ESOC6-0969; results not shown). Associations with delta-NIHSS over 24 h are shown in the forest plot below.
Conclusion: In patients with AIS, we found that the presence of PIE was independently associated with a significant reduction in stroke severity at admission, but not with early NIHSS improvement over 24 hours. Analysis of long-term outcome will show whether this potential preconditioning effect will translate in positive effects in humans.

AS03-062

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

OUTCOME OF THROMBECTOMY AT 12 MONTHS

I. Šarbochová[1], M. Horejsi[1], H. Magerova[1], P. Kesnerova[1], J. Palasova-Swabova[1], P. Jánský[1] and A. Tomek[1]
[1]2nd School of Medicine - Charles University and University Hospital Motol, Neurology, Prague, Czech Republic

Background and Aims: Recent clinical trials have shown a significant reduction of disability and mortality at 3 months after ischemic stroke with large vessel occlusion treated with thrombectomy. The data concerning longer time frame of functional outcome are less known. The aim was to compare outcome of thrombectomy patients after 3 and 12 months.
Method: A single comprehensive stroke centre retrospective study analysing data of patients treated with thrombectomy from January 2014 to January 2016. Patients were clinically assessed at admission and after 3 and 12 months. Functional outcome was classified as good - modified Rankin Scale 0–2 or poor 3–6.
Results: 69 patients, 39 (56.6%) men, mean age 69.1 (SD 11.6) years were included. Mean NIHSS on admission was 15.5 (SD 5.5), bridging thrombolysis was given to 43 (62.3%) patients. Good outcome at 3 months occurred in 26 (36.8 %) of patients, at 12 months in 32 (45.6 %). 8 (18.6%) out of 43 patients with poor outcome at 3 months were assessed with good outcome at 12 months. The proportion of patients with good outcome in 12 months compared to 3 months differed significantly ($p < 0.001$). Statistically significant differences between patients with good and poor outcome at 12 months were age (62.1 vs. 75.1, $P < 0.001$), admission NIHSS (13.6 vs. 17.1, $P = 0.01$). There were no differences in the use of thrombolytic bridging therapy or length of stay in hospital.
Conclusion: The outcome of thrombectomy is not definite at 3 months, there is still a chance for a good outcome.

AS03-063

CLINICAL TRIAL RESULTS – REHABILITATION & RECOVERY

MIRROR-BOX THERAPY ENABLES RE-ORGANIZATION OF NEURONAL PATHWAYS

A. Sharma[1], C. Law[2], S. Shah[3], P. Harman[4], B. Fashanu[5], M. Johnson[6], R. Aspinall[7] and I. Grunwald[8]
[1]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Rehabilitation Department, Southend, United Kingdom
[2]Stanford University, Systems Neuroscience and Pain Lab, Stanford, USA
[3]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Stroke Medicine, Southend, United Kingdom
[4]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Research and Development, Southend, United Kingdom
[5]Southend University Hospital NHS Foundation Trust, Rehabilitation Department, Southend, United Kingdom
[6]Southend University Hospital NHS Foundation Trust, Radiology, Southend, United Kingdom
[7]Anglia Ruskin University, Anglia Ruskin University, Chelmsford, United Kingdom
[8]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Stroke Medicine and Radiology, Southend, United Kingdom

Background and Aims: Mirror-box therapy is already being used in stroke rehabilitation. A mirror is placed between the patient's arms or legs so that the image of the non-affected limb gives the illusion of normal movement in the affected limb. Although, motor function recovery after a stroke is often observed, the underlying mechanisms remain unknown.
Method: We are presenting interim results ($n = 4$) of a cross-over randomized study, where patients received either a conventional therapy or mirror-box therapy for three weeks, followed by switching the therapy. We used a repetitive, task specific approach lasting for 15 minutes, three times per day, 5 days per week. Patients performed forearm, wrist and hand exercises over a period of 6 weeks. Resting-state-functional MRI (fMRI) was performed at baseline, cross-over and at six weeks.
Results: First findings demonstrate that mirror-box therapy specifically correlated with reduction in spasticity which again correlated with

specific activation of the temporal gyrus, precuneus and the posterior cingulate gyrus.
Conclusion: It appears that alterations in functional brain networks are interrelated to the structural plasticity. This plasticity was also present in the elderly brain, regardless of damage. In our first cases, Mirror-box therapy seemed to stimulate creation of new networks and correlated with a reduction in spasticity.

AS01-017

Clinical Trials

GOOGLING SERVICE BOUNDARIES FOR ENDOVASCULAR CLOT RETRIEVAL (ECR) HUB HOSPITALS IN A METROPOLITAN SETTING: PROOF OF CONCEPT STUDY

T. Phan[1], R. Beare[2], J. Chen[3], B. Clissold[1], J. Ly[1], S. Singhal[1], H. Ma[1] and S. Velandai[2]
[1]Monash Health, Neurosciences, Clayton, Australia
[2]Monash University, Medicine, Clayton, Australia
[3]MCRI, MCRI, Melbourne, Australia

Background and Aims: There is great interest in how endovascular clot retrieval (ECR) hubs provide services to a population. We applied a computational method to objectively generated service boundaries for such ECR hubs, defined by traveling time to hub.
Method: Stroke incidence data merged with population census to estimate numbers of stroke in metropolitan Melbourne, Australia. Traveling time from randomly generated addresses to four ECR capable hubs [Royal Melbourne Hospital/RMH, Monash Medical Centre/MMC, Alfred Hospital/ALF, Austin Hospital/AUS] estimated using Google Map application program interface (API). Boundary maps generated based on traveling time at various times of day for combinations of hubs.
Results: In a 2-hub model, catchment was best distributed when RMH was paired with MMC (model 1a, RMH 1765 km2 and MMC 1164 km2) or with AUS (model 1c, RMH 1244 km2 and AUS 1685 km2), with no statistical difference between models ($p = 0.20$). Catchment was poorly distributed when RMH was paired with ALF (model 1b, RMH 2252 km2 ALF 676 km2), significantly different from both models 1a and 1 c (both $p < 0.05$). Model 1a had the greatest proportion of patients arriving within ideal time of 30 minutes followed by model 1c ($p < 0.001$) [see Figure 1 attached; the figures for all models can be accessed at https://gntem2.github.io/Google-Map-to-Victorian-ECR-Hospitals/]. In a 3-hub model, the combination of RMH, MMC and AUS was superior to that of RMH, MMC and ALF in catchment distribution and travel time.
Conclusion: We provide proof-of-concept for a novel computational method to objectively designate service boundaries for ECR hubs.

AS01-043

Clinical Trials

COST-EFFECTIVENESS OF MECHANICAL THROMBECTOMY COMPARED WITH STANDARD TREATMENT IN PATIENTS WITH ACUTE ISCHAEMIC STROKE

R. Heggie[1], O. Wu[1], K. Muir[2], P. White[3], G. Ford[4], M. Brown[5], A. Clifton[6] and J. Wardlaw[7]
[1]University of Glasgow, Health Economics and Health Technology Assessment HEHTA, Glasgow, United Kingdom
[2]University of Glasgow, Queen Elizabeth University Hospital, Glasgow, United Kingdom
[3]Newcastle University, Institute of Neuroscience and Newcastle University Institute for Ageing, Newcastle, United Kingdom
[4]Oxford University Hospital NHS Trust, Institute for Aging and Health, Oxford, United Kingdom
[5]University College London, National Hospital for Neurology and Neurosurgery, London, United Kingdom
[6]St George's- University of London, Neuroradiology, London, United Kingdom
[7]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Aim: To determine the cost-effectiveness of mechanical thrombectomy, compared with standard treatment, from the perspective of the UK NHS and PSS.
Method: We undertook a cost-effectiveness analysis alongside the Pragmatic Ischaemic Stroke Thrombectomy Evaluation (PISTE). In addition, a decision-analytic model was developed to estimate the long-term cost-effectiveness of thrombectomy using all available trial evidence. Meta-analysis was used to estimate the clinical effectiveness; resource use and costs were sourced from the PISTE study and the broader literature. Value of information and value of implementation analyses were used to estimate the potential value of further research and of implementing this treatment into routine clinical practice.
Results: Compared with standard treatment, thrombectomy was not shown to be cost-effective within-trial/90-day period. However, the reverse was observed with the long-term model (ICER £5,668 per QALY gained). Based on a case study of the Scottish population, 4,303 patients are potentially eligible to receive this treatment over a ten year period. At a willingness-to-pay of £20,000 per QALY, further research exceeding £4.5 million would not be considered a cost-effective use of resources. The expected value of perfect implementation is £243 million; this represents the maximum value that could be achieved if thrombectomy were implemented with perfect adherence. The cost of implementation was estimated at £24 million.
Conclusion: Based on a lifetime horizon, mechanical thrombectomy is cost-effective compared with standard care. At perfect adherence, the value of implementation is greater than the cost of implementation.

AS02-008

Clinical Trials

VERY URGENT CAROTID ENDARTERECTOMY IS ASSOCIATED WITH AN INCREASED PROCEDURAL RISK, THE CAROTID ALARM STUDY

A. Nordanstig[1] and K. Jood[1]
[1]Neuroscience and Physiology, Neurology, Göteborg, Sweden

Background and Aims: The aim of the Carotid Alarm Study was to analyze the per- and postoperative outcome of carotid endarterectomy (CEA) performed within 48 hours compared to CEA 48 hours – 14 days after onset of ischemic event.
Method: The Carotid Alarm Study was a prospective study of consecutive patients with symptomatic carotid stenosis undergoing CEA. Time to surgery was calculated as time between the latest ischemic event proceeding surgery and time for surgery. Patients were examined by a neurologist before, two days after and 30 days after CEA. All data were prospectively documented in electronic case record forms and compiled in a predefined database. *A fast track* was introduced to enable CEA within 48 hours for patients seeking care within 24 hours from an ischemic event. Primary endpoint was the composite endpoint of death and/or any stroke within 30 days of the surgical procedure.
Results: A total of 418 patients were included, of which 75 patients were operated within 48 hours from the onset of the latest ischemic event. The overall 30-day rate for mortality and any stroke was 3.8%. Patients undergoing CEA within 48 hours had a higher risk of the primary

endpoint compared with the group treated 48 hours – 14 days after an ischemic event, 8.0% versus 2.9%. (OR of 2.90; 95% CI, 1.02–8.23).
Conclusion: Very urgent CEA performed within 48 hours from onset of an ischemic event is associated with a higher complication risk compared with surgery performed 48 hours to 14 days after onset of ischemic event.

AS02-011

Clinical Trials

PERSISTENT METABOLIC DISTURBANCE DESPITE A NORMALIZED CEREBRAL BLOOD FLOW IN THE PERIHEMORRHAGIC ZONE FOLLOWING SURGERY FOR INTRACEREBRAL HEMORRHAGE

L. Tobieson[1], P. Zsigmond[1], J. Hillman[1], S. Rossitti[1] and N. Marklund[2]
[1]Linköping University, Department of Neurosurgery- Department of Clinical Experimental Medicine, Linköping, Sweden
[2]Lund University, Department of Clinical Sciences, Lund, Sweden

Background and Aims: The clinical benefit of surgery for spontaneous, supratentorial intracerebral hemorrhage (ICH) remains uncertain. We hypothesized that cerebral blood flow (CBF) and the ICH-related energy metabolic disturbances are positively influenced by surgical ICH evacuation.
Method: We used dual microdialysis (MD) catheters, placed in the perihemorrhagic zone (PHZ) and in seemingly normal cortex (SNX) tissue, at time of surgical ICH evacuation in 13 patients (age 57.2 +/- 13.0 years). Xenon-enhanced computed tomography (Xe-CT; $n = 9$) or Perfusion Computed Tomography (CTP; $n = 2$) was used to estimate CBF at a median of 21 and 65 h post-surgery.
Results: In the hemisphere ipsilateral to the ICH, CBF improved between the investigations (28.78 +/- 17.6 mL/100g/min vs 35.09 +/- 17.1 mL/100g/min). In total, 1164 MD samples were analyzed for regional energy metabolic alterations (glucose, lactate, lactate/pyruvate ratio, glycerol and glutamate). The lactate/pyruvate ratio (LPR) was persistently elevated in the PHZ compared to the SNX region ($p < 0.05$). In contrast to the SNX region, LPR elevations in the PHZ were predominately type II (defined as LPR > 25 and pyruvate > 70) as opposed to type I (73% type II vs 27% type I) at 4–48 hours that persisted at 49–84 hours (81% type II vs 19% type I; $p < 0.05$).
Conclusion: Despite normalization of CBF over time post-surgery, the tissue surrounding an ICH displays persisting metabolic disturbances suggestive of mitochondrial dysfunction, indicating an area-at- risk of secondary insults. This ongoing mitochondrial dysfunction may lead to subsequent cell death and neurodegeneration and could be a possible novel therapeutic target for ICH.

AS02-029

Clinical Trials

MANAGEMENT OF DYSPHAGIC PATIENTS WITH ACUTE STROKE – A PROSPECTIVE VALIDATION OF CURRENT RECOMMENDATIONS

H. Neugebauer[1], B. Lindner-Pfleghar[2], S. Stösser[3], J. Kassubek[3], A. Ludolph[3], R. Dziewas[4], M. Prosiegel[5] and A. Riecker[6]
[1]University of Ulm, Neurology, Ulm, Germany
[2]University hospital Ulm - RKU, Department of speech therapy, Ulm, Germany
[3]University Ulm, Neurology, Ulm, Germany
[4]University Münster, Neurology, Münster, Germany
[5]n.a., n.a., Munich, Germany
[6]RehaNova GmbH, Neurology and Rehabilitation, Cologne, Germany

Background and Aims: The German expert recommendations on the management of patients with acute stroke suggest an algorithm of clinical and instrumental investigations to identify patients at risk of aspiration and, thus, reduce the rate of aspiration pneumonia. The effectiveness of this algorithm has, however, not been validated prospectively yet.
Method: 144 consecutive stroke patients were assessed with a full bedside swallowing assessment including the screening procedures "Standardized Swallowing Assessment (SSA)" and "2 out of 6". In all patients flexible endoscopic evaluation of swallowing (FEES) was performed.
Results: Aspiration was diagnosed in 25 patients (17,4%) during FEES. SSA predicted aspiration with a sensitivity of 76% and specificity of 55,5%. "2 out of 6" predicted aspiration with a sensitivity of 68,0% and specificity of 61.0%. 7 patients with negative screening "2 out of 6" and 6 patients with negative SSA showed silent aspiration (PAS 8) during FEES (28% of all aspirators). Significant predictors for aspiration were dysarthria, dysphonia, abnormal volitional cough and cough with swallow. However, in multivariable analysis only dysarthria and cough with swallow were identified as independent predictors for aspiration. Rate of aspiration pneumonia was 2.8%.
Conclusion: Clinical screening alone is not sufficient to identify patients at risk for aspiration pneumonia. FEES should be used at a low threshold in case of severe stroke as well as in minor clinical abnormalities, especially concerning isolated dysarthria and cough with swallow. Therefore, current recommendations should be modified.

AS32-003

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

THERAPEUTIC CHALLENGES IN OCCULT MALIGNANCY PRESENTING AS STROKE

S. Samarasinghe[1], C. Owen[1], A. Merwick[1] and R. Morgan[1]
[1]Chelsea & Westminster Nhs, Stroke, london, United Kingdom

Background and Aims: Ischaemic stroke is a rare first presentation of occult malignancy. Malignancy related hypercoagulability can manifest as acute arterial infarction, non-bacterial thrombotic endocarditis and/or thrombophlebitis.
Method: N/A
Results: We report three cases of acute ischaemic stroke all presenting within a four-month period. The first patient presented with multiple acute cerebral infarcts. Following an episode of acute hypoxia, the patient had CT pulmonary angiography - this confirmed the presence of multiple bilateral pulmonary emboli. Further imaging showed evidence of metastatic ovarian cancer and renal infarction.
The second patient presented with dense left-sided weakness and MRI confirmed right middle cerebral artery (MCA) infarct. CT scan performed for deranged blood tests confirmed bilateral pulmonary emboli, likely hepatic metastases, renal and splenic infarcts and gastrointestinal outflow tract obstruction. Both patients showed progression of their hypercoagulability state despite therapeutic low molecular weight heparin (LMWH) monotherapy. LMWH is the current preferred choice of anticoagulation for venous thromboembolism (VTE) in oncology patients.
The third patient presented with an acute stroke on a background of non-rheumatic atrial fibrillation - which is an independent risk factor for stroke. She was on a direct Factor Xa inhibitor at presentation. The patient had a CT scan for an abdominal mass which showed metastatic pancreatic malignancy. Currently, no studies have specifically addressed treatment of malignancy related VTE using direct inhibitors.
Conclusion: Possible occult malignancy should be considered in patients with on going hypercoagulability state despite appropriate

anticoagulation. Currently, there is limited data for this patient subgroup and further studies examining anticoagulant choice is needed.

AS32-006

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

THROMBUS AGE AND COMPOSITION REFLECT STROKE ETIOLOGY

F. Denorme[1], O. François[2], L. Desender[1], H. Deckmyn[1], K. Vanhoorelbeke[1], T. Andersson[3] and S.F. De Meyer[1]
[1]KU Leuven Campus Kulak Kortrijk, Laboratory for Thrombosis Research, Kortrijk, Belgium
[2]AZ Groeninge Kortrijk, Department of Medical Imaging, Kortrijk, Belgium
[3]Karolinska Institutet, Department of Clinical Neuroscience, Stockholm, Sweden

Background and Aims: Currently, little information is available regarding the composition of stroke thrombi. This knowledge is however indispensible to improve stroke treatment and reduce stroke risk. Therefore, our aim was to better understand stroke thrombus composition and correlate histological findings with stroke etiology.
Method: Eighty-one stroke patient thrombi were collected after thrombectomy procedure. Patient clinical data were collected and stroke etiology was determined according to the TOAST criteria. Thrombus specimens were stained with H&E, MSB or antibodies against von Willebrand factor (VWF). Red blood cell (RBC), fibrin and VWF content were quantitatively analyzed. Thrombus age was estimated based on histopathological classification.
Results: Thrombi contained on average $44.7 \pm 23.5\%$ RBCs; $37.6 \pm 19.7\%$ fibrin and $22.7 \pm 10.2\%$ VWF. Cardioembolic thrombi contained significantly less RBCs compared with emboli originating from an atherosclerotic plaque or thrombi from other known etiology ($p = 0.01$). Correspondingly, cardioembolic thrombi contained more fibrin compared with atherosclerotic emboli and thrombi from other known etiology ($p = 0.02$). Thrombi originating from the heart contained almost twice as much VWF compared with emboli from an atherosclerotic lesion ($p = 0.004$) or thrombi from other known etiology ($p = 0.005$). Moreover, cardioembolic thrombi were significantly older when compared with either atherosclerotic emboli or thrombi from other known etiology ($p = 0.016$). Finally, fresh thrombi contained significantly less VWF compared with lytic thrombi ($p = 0.003$) and organized thrombi ($p < 0.0001$).
Conclusion: Thrombi originating from the heart were older and less rich in RBCs, but more rich in fibrin and VWF. Furthermore, older thrombi contained higher amounts of VWF, suggesting a role for VWF in thrombus organization.

AS32-007

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

MICROBLEEDS AND PEAK SYSTOLIC VELOCITY OF MCA ARE ASSOCIATED WITH THE SIZE OF LACUNAR INFARCTION

Y. Terasawa[1], K. Sakai[2], K. Sakuta[2], H. Mitsumura[2] and Y. Iguchi[2]
[1]Jikei university school of medicine, Depertment of neurology, Tokyo, Japan
[2]Jikei university school of medicine, Department of Neurology, Tokyo, Japan

Background and Aims: The aim of this study is to identify the factor associated with enlargement of ischemia in patients with supratentrial lacunar infarcts on final neuroimaging.
Method: We studied consecutive patients with acute supratentorial lacunar infarction. Patients were classified into two groups (L: larger group; 15 mm and 3 slices, S: smaller group; small vessel occlusion based on TOAST classification). We evaluated the clinical informations, MRI findings include the presence of microbleed and ultrasonography findings, and compared each value between two groups.
Results: One hundred twenty patients (81 male, mean 67 years old) were enrolled. L group included 22 patients (18%) and S group did 98 patients (82%). Neurological deterioration was tend to be seen more frequently in L group than in S group (32% vs. 14%, $p = 0.064$). Concerning about neuroimaging, microbleeds were seen less frequently in L group than in S group (23% vs. 53%, $p = 0.017$) and peak systolic velocity (PSV) by TCCS was faster in L group than in S group (121 ± 39.8 cm/s vs 83.4 ± 25.4 cm/s, $p = 0.002$). According multivariate logistic regression analysis, no evidence of microbleeds (odds ratio; 4.4, 95%CI; 1.41 to 13.68, $p = 0.011$) and PSV over 92 cm/s (odds ratio; 3.1, 95%CI; 1.007–9.719, $p = 0.049$) were found to be independently associated with larger size.
Conclusion: We have concluded that no microbleeds and MCA PSV > 92 cm/s may have predicted the final ischemic size in supratentrial lacunar infarcts.

AS32-008

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

STROKE MIMICS VARY BY NATIONALITY

S. Schantz Wilkins[1], P. Bourke[2], A. Salam[1], N. Akhtar[2], A. D'Souza[2], S. Kamran[3], Z. Bhutta[4] and A. Shuaib[1]
[1]Hamad General Hospital, Neuroscience, Doha, Qatar
[2]Hamad General Hospital, Neurology/Stroke, Doha, Qatar
[3]Hamad General Hospital, Neurology, Doha, Qatar
[4]Hamad General Hospital, Emergency Medicine, Doha, Qatar

Background and Aims: Stroke mimics (SM) are common, and are diagnosed in 26–38% of patients with initial stroke presentations. It is critical to understand stroke mimics to optimize patient care and reduce systemic costs. Nationality and ethnic background may impact stroke mimics, and this presentation assesses the prevalence of stroke mimics in the multi-national country of Qatar.
Method: Patients presenting to Hamad General Hospital over a 16 month period with an initial diagnosis of stroke were included in a stroke database. Based on discharge diagnosis we compared strokes and SM to determine SM prevalence and the relationship between demographics, stroke risk factors and stroke symptoms.
Results: 1410 strokes and 551 stroke mimics were identified. 28% of cases were stroke mimics, 50% ischemic strokes, 10% TIAs and 12% intracerebral hemorrhages. The most common SM diagnosis was functional (29.4%), followed by infection/inflammatory (14.3%) and structural (14.2%). The rate of stroke mimics varied by nationality, with significantly higher mimic rates found in patients from Arabic countries (35–41%), Qatar, Africa and Western countries versus Southeast Asia (19.5%) and the Far East (16.2%) $p < .001$. 9.9% of functional mimics received tpa versus 16.4% of ischemic strokes.
Conclusion: 28% of initial stroke presentations were stroke mimics. Arabic, Qatari, African and Western patients had twice the SM rate of Southeast Asian and Far Eastern patients. This is the first study to find a difference in mimic rate based on national or ethnic differences within the population. The most common stroke mimic type was functional; with culture and income proposed as possible explanations.

AS32-010

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

THE ROLE OF VWF, FVIII, ADAMTS13 AND INFLAMMATORY RESPONSE IN THE OUTCOME OF ACUTE ISCHEMIC STROKE MECHANICAL THROMBECTOMY PROCEDURE

V. Procházka[1], T. Jonszta[1], D. Czerný[1], J. Krajča[1], M. Roubec[2], J. Gumulec[3], J. Mačák[4], I. Lochman[5] and A. Vrtková[6]
[1]University hospital Ostrava, Radiology department, Ostrava, Czech Republic
[2]University hospital Ostrava, Neurology clinic, Ostrava, Czech Republic
[3]University hospital Ostrava, Hematooncology clinic, Ostrava, Czech Republic
[4]University hospital Ostrava, Pathology department, Ostrava, Czech Republic
[5]Spadia Lab a.s., Immunology department, Ostrava, Czech Republic
[6]Technical university Ostrava-VSB, Department of applied mathematics, Ostrava, Czech Republic

Background and Aims: VWF, fVIII and ADAMTS13, in conjunction with inflammatory response, are the major determinants of platelet adhesion and thrombi or thromboemboli creation. Higher levels of VWF, fVIII and lowering of ADMATS13 enzyme are important risk factors that can be found in patients with acute ischemic stroke and may influence the 3M-mRS outcome in patients with acute mechanical thrombectomy procedure.
Method: 50 patients with acute ischemic stroke were recanalised by mechanical thrombectomy, using either Penumbra or stent-retriever procedure. Blood levels of VWF, FVIII, Fibrinogen, D-Dimers, ADAMTS13 and inflammatory markers were correlated with procedure length, NIHSS at admission, Day 7 and 3M-mRS outcome.
Results: Significant correlations ($p < 0.05$) were found between vWF, FVIII versus diminishing the levels of ADAMTS13 enzyme, which is responsible for thrombus dissolution in patients with higher NIHSS at the Day 7 after the procedure. Other significant correlations between D-dimers and VWF, procedure duration and NIHSS at Day 7 were observed. Also inflammatory response between VWF and neutrophils showed significant correlation.
Conclusion: Platelets adhesion factors VWF, FVIII and ADAMTS13, in conjunction with inflammatory response (leukocytes, neutrophils), are important risk factors influencing the procedure length and thereby the patient's outcome in NIHSS at Day7 and 3M-mRS. These adhesion factors are responsible for resistance to Actilyse thrombolytic effect in large vessel occlusion. Thrombi and thromboemboli platelets retraction with inflammatory cells (granulocytes, neutrophils) adhered are the main factors responsible for the clinical outcome of the procedure.

AS32-011

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

HIGH FREQUENCY OF RECENT ISCHEMIC STROKE IN PATIENTS WITH PULMONARY EMBOLISM AND PATENT FORAMEN OVALE SUGGESTS THAT PARADOXICAL EMBOLISM IS A FREQUENT MECHANISM

S. Timsit[1], E. Le Moigne[2], Y. Jobic[3], D. Ben Salem[4], F.M. Merrien[1], A. Jourdain[1], L. Bressollette[5], A. Tirel-Badets[1], A. Dion[6], A. Pavy-Le Traon[7] and D. Mottier[2]
[1]Chru Brest, Stroke Unit and Neurology, Brest, France
[2]Chru Brest, Department of Pneumology and Internal Medicine, Brest, France
[3]Chru Brest, Cardiology department, Brest, France
[4]Chru Brest, Radiology Department, Brest, France
[5]Chru Brest, Pneumology and internal medicine - Vascular Medicine unit, Brest, France
[6]Chru Brest, Centre d'Investigation Clinique-INSERM CIC 1412, Brest, France
[7]CHU Toulouse, Centre de référence maladies rares Atrophie Multi Systématisée, Toulouse, France

Background and Aims: The mechanism of ischemic stroke in patients with patent foramen ovale (PFO) is still a subject of debate. Recent RCT did not show benefit of PFO closure compared to medical treatment alone. The aim of this study was to compare, in patients with pulmonary embolism (PE), the risk of recent ischemic stroke in absence or presence of PFO.
Method: Diagnosis of PE was based on clinics and imaging. Cerebral MRI sequences included DWI, ADC, T2 Flair and T2*. To be considered recent ischemic stroke patients had to have an MRI within 15 days from PE onset, and a hypersignal on DWI and a restricted ADC coefficient. All had a trans-thoracic echocardiography with shunt analysis. Primary endpoint included patients with either a recent symptomatic ischemic stroke or TIA or an asymptomatic ischemic stroke.
Results: 324 consecutive patients were prospectively included, 84% ($n = 272$) had their diagnosis on CT-angioscan, 43 patients had a PFO and 281 no-detected PFO. One patient from the PFO group and 8 from the non-PFO group were excluded because either MRI was not performed or MRI's delay. More patients with recent symptomatic or asymptomatic ischemic stroke were observed in the PFO group compared to the non-PFO group respectively [(21.43% ($n = 9/42$) versus 5.49% ($n = 15/273$), Fisher exact Test, $p = 0.0016$]
Conclusion: Ischemic stroke is observed in about one fifth of patients with PFO and PE. Paradoxical embolism therefore represents a frequent mechanism in this population. Whether paradoxical embolism is also a frequent mechanism in general population with stroke and PFO remains to be determined.

AS32-013

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

CAROTID ARTERY DISSECTION CONFIRMED BY DANTE-SPACE MRI IN A PATIENT WITH ATHEROMA-LOOKING LESION: A CASE OF MARFAN SYNDROME

H. Jung[1], K. Lee[1], H.S. Choi[2], S. Park[1], J.H. Kim[1], A.R. Hong[1], A.K. Ahn[1] and J. Koo[1]
[1]The Catholic University - Seoul St. Mary's Hospital, Neurology, Seoul, Republic of Korea
[2]The Catholic University - Seoul St. Mary's Hospital, Radiology, Seoul, Republic of Korea

Background and Aims: Acute ischemic stroke due to carotid artery dissection is relatively rare manifestation of Marfan syndrome. Diagnosis of carotid artery dissection can be uncertain when the patient has other risk factors of stroke. Here we present a patient with acute ischemic stroke whose etiology was confirmed as carotid artery dissection by DANTE-SPACE MRI, otherwise atheroma looking lesion.
Method: We used conventional MRI and DNATE-SPACE MR image to confirm carotid artery dissection.
Results: A 56 year old man presented global aphasia. He has history of Marfan syndrome and aortic aneurysm previously repaired by Bental operation. Diffusion weighted image showed left middle cerebral artery

infarction. MR angiography showed 90% stenosis of left proximal internal carotid artery (ICA) without any typical finding of carotid artery dissection such as intimal flap or intramural hematoma. Carotid doppler examination showed homogenous isoechoic atheroma-like lesion. Because he denied any kind of trauma and had many risk factors of atherosclerosis, we consider revascularization therapy. the patient underwent DANTE-SPACE MR image, a sequence suppresses blood signal and emphasizes hemorrhage, which visualized intramural hematoma by excellent contrast. The transfemoral cerebral angiography taken at 12nd day showed 55% stenosis of left ICA stenosis, which suggests rapid healing of the carotid artery dissection.

Conclusion: For the patients with connective tissue disease like Marfan syndrome, evaluation for the cause of ICA stenosis is important. Conventional MR angiography has limitation to differentiate carotid artery dissection from atherosclerosis because it cannot evaluate characteristics of vessel wall. DANTE-SPACE MRI can be a better option which can diagnose the carotid dissection.

AS32-014

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

IMPROVING ADMISSION DIAGNOSTICS OF PATIENTS WITH SUSPECTED ACUTE STROKE: EXTERNAL VALIDATION OF TWO CLINICAL STROKE MIMIC SCORES

S. Pihlasviita[1], O.S. Mattila[1,2], J. Ritvonen[1], H. Harve[3], G. Sibolt[2], S. Curtze[2], M. Pystynen[3], D. Strbian[2], T. Tatlisumak[2,4,5], M. Kuisma[3] and P.J. Lindsberg[1,2]

[1]University of Helsinki, Molecular Neurology- Research Programs Unit, Helsinki, Finland

[2]University of Helsinki and Helsinki University Hospital, Neurology-Clinical Neurosciences, Helsinki, Finland

[3]University of Helsinki and Helsinki University Hospital, Emergency Medical Services- Department of Emergency Care, Helsinki, Finland

[4]Sahlgrenska University Hospital, Department of Neurology, Gothenburg, Sweden

[5]Sahlgrenska Academy at University of Gothenburg, The Institute of Neuroscience and Physiology, Gothenburg, Finland

Background and Aims: Clinical scores could improve the identification of stroke mimics (SM) during initial evaluation of stroke thrombolysis candidates, especially for patients with no findings on admission head computed tomography. In addition to estimating the likelihood of a SM diagnosis, scoring could be used for selecting patients for additional rapid magnetic resonance imaging. We set out to evaluate performance of two recently described SM scales in our comprehensive stroke center in Helsinki.

Method: Score components of the FABS- and TeleStroke mimic (TM)-scores were extracted from electronic patient records in a cohort of 1015 thrombolysis candidates enrolled in a prospective prehospital biomarker study.

Results: Out of 1015 patients admitted with suspected acute stroke, 632 (62.3%) had a negative noncontrast CT scan. Score components were available for 586 (92.7%) of these patients. In receiver-operating characteristic curve (ROC) analysis the scores showed equal albeit moderate performance, which was weaker than in the original derivation cohorts (FABS: area under the curve [AUC] = 0.70; 95% confidence interval [CI], 0.65–0.74; TM-score: AUC = 0.72; 95% CI, 0.67–0.76). Compared to the original score cohorts, our SM rate was low (28.7% of CT negative patients), patients were elderly (mean age 67 ± 15 years), and admission NIHSS scores were lower (median 3; interquartile range 1–5).

Conclusion: Performance of SM scores seems to depend on prehospital selection criteria of thrombolysis candidates, with performance weakening when the rate of SM patients is low, and the rate of mild neurological deficits is high. Efficient implementation of SM scores may therefore require local recalibration.

AS32-015

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

HIGH FREQUENCY OF OCCULT NEOPLASIA IN PATIENTS WITH ATHEROTHROMBOTIC STROKE

P. Camps-Renom[1], A. Fernández-León[2], L. Prats-Sánchez[1], I. Castrillón[1], J.M. González de Echavarri[1], P. Marrero-González[1], R. Delgado-Mederos[1], A. Martínez-Domeño[1], D. Guisado-Alonso[1] and J. Martí-Fàbregas[1]

[1]Hospital De La Santa Creu I Sant Pau, Neurology, Barcelona, Spain

[2]Hospital De La Santa Creu I Sant Pau, Nuclear Medicine, Barcelona, Spain

Background and Aims: Cancer related deaths among stroke survivors are frequent during the follow-up. Detection of occult neoplasia during hospitalization varies according to different screening methods. We determined the frequency of occult neoplasia in a cohort of atherothrombotic stroke patients studied with Positron Emission Tomography (PET).

Method: We reviewed the PET scans with ^{18}fluorodeoxyglucose in a prospective cohort of patients with atherothrombotic stroke and no prior known malignancy included in an observational study of carotid inflammation currently ongoing in our centre. In this study a head and neck PET scan is performed to assess carotid inflammation, and a second whole body acquisition is performed subsequently. An experienced nuclear medicine radiologist assessed the PET images.

Results: We included 33 patients with a mean age of 74 ± 10.4 years and 23 (69.7%) were men. The PET-CT revealed a highly suggestive malignancy lesion in seven patients (21.2%): three were located in the colon, two in the lung, one in the uterus and one in the breast. Histological analyses confirmed two colon adenocarcinomas, one squamous cell carcinoma of the uterus, one squamous cell carcinoma of the lung and one high grade dysplasia of the colon. One patient died before histological confirmation and one patient denied undergoing a biopsy. Only one patient presented metastasis.

Conclusion: The rate of occult neoplasia in patients with acute atherothrombotic stroke was high in our cohort (15.2% histologically confirmed and 21.2% including highly suggestive lesions). Further studies are warranted to confirm this rate and to test a possible relationship between cancer and vulnerability of carotid plaques.

AS32-016

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

DELAYS TO CORRECT DIAGNOSIS AND TREATMENT AFTER INITIAL MISDIAGNOSIS OF STROKE MIMICS

O.S. Mattila[1,2], S. Pihlasviita[2], J. Ritvonen[2], H. Harve[3], G. Sibolt[1], S. Curtze[1], M. Pystynen[3], D. Strbian[1], T. Tatlisumak[1,4,5], M. Kuisma[3] and P.J. Lindsberg[1,2]

[1]University of Helsinki and Helsinki University Hospital, Neurology-Clinical Neurosciences, Helsinki, Finland

[2]University of Helsinki, Molecular Neurology- Research Programs Unit, Helsinki, Finland

[3]University of Helsinki and Helsinki University Hospital, Emergency Medical Services- Department of Emergency Care, Helsinki, Finland

[4]Sahlgrenska University Hospital, Department of Neurology, Gothenburg, Sweden
[5]Sahlgrenska Academy at University of Gothenburg, The Institute of Neuroscience and Physiology, Gothenburg, Sweden

Background and Aims: The majority of stroke thrombolysis candidates present without imaging findings on admission computed tomography, and initial misdiagnosis is common. Although accidental thrombolysis of stroke mimics is relatively safe, failure to recognize these alternative neurological emergencies on admission may lead to dangerous treatment delays.
Method: Diagnostic and therapeutic delays were investigated in a prospective observational cohort of 1015 thrombolysis candidates transported by ambulance to our comprehensive stroke center, operated by neurologists and neurology residents.
Results: Out of 1015 patients with suspected acute stroke, 234 (23.1%) had a stroke mimic. After initial evaluation (CT imaging and clinical examination) the working diagnosis was undecided (stroke vs. mimic), or stroke was incorrectly suspected in 90 (38.5%) stroke mimic cases, of which 13 required specific acute treatment. In 6 cases correct treatment was established directly after admission with further clinical reasoning or tests. Initial misdiagnosis led treatment onto an incorrect path in 7 cases, for which mean $\pm$ SD delay to diagnosis was 38 ± 24 hours (range 8–80) and delay to treatment 45 ± 32 hours (range 1–95). Treatments included: acyclovir for encephalitis, antihypertensives for PRES, nimodipine for RCVS, anticonvulsives for epileptic symptoms, surgery for cervical trauma, methylprednisolone for vestibular neuronitis, and plasmapheresis for Guillain–Barré syndrome. Overall, 4.5% of patients receiving thrombolysis were stroke mimics.
Conclusion: Difficulty differentiating stroke mimics from stroke caused significant treatment delays in 3.0% of stroke mimic patients in a well-established neurological emergency department. Further improvements in ultra-acute diagnostics are needed, as time is brain also for many patients with stroke mimics.

AS32-017

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

CEREBROVASCULAR DISSEMINATION IN TIME AND SPACE AS A PREDICTOR OF CARDIOEMBOLISM

M. Mendes-Pinto[1], J. Sousa[2], J. Sargento-Freitas[3], F. Silva[3], J. Beato-Coelho[3], C. Cecilia[3], C. Macário[4], A. Gouveia[3], C. Machado[3], B. Rodrigues[3], G. Santo[3], R. Veiga[1], L. Cunha[3] and A. Freire-Gonçalves[3]
[1]Centro Hospitalar e Universitário de Coimbra, Neuroradiology, Coimbra, Portugal
[2]Faculdade de Medicina da Universidade de Coimbra, Faculdade de Medicina da Universidade de Coimbra, Coimbra, Portugal
[3]Centro Hospitalar e Universitário de Coimbra, Neurology, Coimbra, Portugal
[4]Centro Hospitalar e Universitario de Coimbra, Neurology, Coimbra, Portugal

Background and Aims: Cardioembolism is known for its tendency to recurrence and capacity to originate lesions in distinct vascular territories in the brain. Diagnosing this stroke etiology is demanding and cardiac work up is often delayed or inconclusive. We aimed to study the association between cardioembolic stroke and cerebrovascular dissemination in time and space in the search of an accurate diagnostic tool.
Method: Consecutive patients with acute stroke of various etiologies based on the Trial of ORG 10172 in Acute Stroke Treatment classification admitted in a cerebrovascular disease nursery from a tertiary center were enrolled in a retrospective cohort study. Every CT scan at admission was studied and, in cases with no acute lesion visible, control CT scan was also analyzed. Cerebrovascular territory was divided in three areas: right anterior, left anterior and posterior. Localization of the acute vascular lesion (s), existence of previous vascular lesions and their respective area were analyzed. The presence of dissemination in time, space or time and space was determined.
Results: We included 662 patients, mean age 74.05 years (SD: 12.998). Age ($p < 0.001$), Atrial Fibrillation ($p = 0{,}005$), Coronary Artery Disease ($p = 0.032$), Previous stroke ($p < 0.001$) were associated with cardioembolic stroke. Relationship between stroke etiology and patterns of cerebrovascular dissemination showed a statistically significant difference for patients with dissemination in time and space ($p < 0.001$). Dissemination in time and space has high specificity (81.73%), yet low sensitivity (30.47%), for the identification of cardioembolic stroke.
Conclusion: Dissemination in time and space is a specific diagnostic predictor of cardioembolic stroke and may be helpful in a timely intervention.

AS32-018

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

ACUTE ISCHEMIC STROKE MANAGEMENT IN LEBANON

R. Abdo[1], H. Hosseini[2], P. Salameh[3] and H. Abboub[4]
[1]Lebanese University, Laboratory of Clinical and Epidemiology Research-Doctoral School of Sciences and Technology, Beirut, Lebanon
[2]Henri MondorHospital AP-HP, Department of Neurology, Creteil, France
[3]Lebanese University, Faculty of Medicine, Beirut, Lebanon
[4]Hotel Dieu de France Hospital- Saint Joseph University, Department of Neurology, Beirut, Lebanon

Background and Aims: Management of acute stroke varies greatly within and between different countries. This study assesses the current practices of doctors in Lebanon routinely involved in the treatment of stroke.
Method: We conducted a prospective observational study, included patients who were hospitalized from August 1, 2015 to July 31, 2016, at 8 different Lebanese hospitals with a diagnosis of acute stroke. Baseline characteristics, diagnostic studies, treatments during hospitalization and at discharge were collected and analyzed.
Results: 203 strokes were recorded with 57.6% males. The mean age was 68.8 years. The average hospital stays was 11.7 ($\pm$13.8) days. 81.3% of the patient had brain CT scan at admission and 158 (77.8%) were diagnosed with ischemic stroke.
Brain CT scan, brain MRI/MRA, cervical MRA/carotid duplex scanning, TTE, TEE, EKG, 24 hour Holter monitoring, lipid panel, were done in 80.1%, 75.9%, 86.7%, 94.8%, 8.7%, 98.8%, 20.4%, 50.9%, respectively of all ischemic stroke. Only 4 patients (2.5% of ischemic strokes) received thrombolytic therapy. 89.0% of patients were discharged on at least one anti-hypertensive drug, 89.0% on statin and 36.7% on anti-diabetic medications.
Conclusion: Despite good progress in the management of ischemic stroke in Lebanon, reperfusion therapy, are still largely underused and remains a major challenge in achieving guideline-based reperfusion goals.

AS32-019

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

ASSOCIATION BETWEEN ERYTHROCYTE CRITICAL SHEAR STRESS AND STROKE SEVERITY IN PATIENTS WITH ACUTE ISCHEMIC STROKE

D. Kim[1], J. Ha[1,2,3], J. Yoo[1], K. Kim[1], E. Park[4], Y.D. Kim[1], J.H. Heo[1] and H.S. Nam[1]
[1]Yonsei University College of Medicine, Department of Neurology, Seoul, Republic of Korea
[2]Yonsei University Health System, Severance Integrative Research Institute for Cerebral & Cardiovascular Disease, Seoul, Republic of Korea
[3]Yonsei University, Brain Korea 21 Plus Project for Medical Science, Seoul, Republic of Korea
[4]Yonsei University College of Medicine, Cardiovascular Research Institute, Seoul, Republic of Korea

Background and Aims: Ischemic stroke are associated with rheological abnormalities including elevated plasma viscosity, impaired red blood cell (RBC) deformity, and RBC aggregation. However, it is unknown the association between stroke severity and RBC aggregability. Critical shear stress (CSS), a new hemorheological index, is the shear stress which is needed to keep RBC aggregate dispersed, and reported as a reliable index of RBC aggregation. We sought the factor associated with initial stroke severity including clinical and rheological parameters.
Method: Consecutive acute stroke patients were evaluated with clinical, image, and laboratory studies. Blood samples was drawn within two days after admission. We tested CSS, aggregation index, and deformity of RBC using RheoScan-AnD300 (RheoMeditech., Inc, Korea). CSS were trichotomized as normal (<280 mPa), borderline (280 – 380 mPa), and strong RBC aggregation (>380 mPa) according to manufacturer's instruction.
Results: Thirty-one consecutive patients were enrolled. Mean age was 68 ± 11 years old. CSS was correlated with initial NIHSS score ($r = 0.40$, $p = 0.032$), whereas aggregation index and deformity index were not. Initial NIHSS score was higher in strong RBC aggregation group (10.80 ± 10.56) than borderline (5.86 ± 5.43), or normal group (3.05 ± 3.30) ($p = 0.026$). Multiple linear regression analysis showed that initial NIHSS score was independently associated with CSS (OR 3.69, 95% CI 1.08 – 6.28) after adjusting covariates.
Conclusion: We found that initial stroke severity was correlated with CSS. Along with occurrence of ischemic stroke, RBC aggregability was one of determinant of neurological deficits in acute ischemic stroke patients.

AS32-020

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

PERCENTAGE OF PATIENTS REFERRED FOR CARDIAC MONITORING THAT MEET CRITERIA FOR NAVIGATE ESUS TRIAL (EMBOLIC STROKE OF UNDETERMINED SOURCE)

M. Mehdiratta[1], S. Bickford[2], I. Khomitska[2], J. Tingle[2], J. Desai[3], S. Hoosein[3] and Y. Perez[3]
[1]Trillium Brain and Spine Institute, Neurology, Mississauga, Canada
[2]Trillium Brain and Spine, Neurology, Mississauga, Canada
[3]Trillium Health Partners, Neurology, Mississauga, Canada

Background and Aims: Embolic stroke of undetermined source (ESUS) is a new clinical construct in stroke neurology for which 3 trials are recruiting patients. We aimed to determine the fraction of patients that would qualify for the NAVIGATE ESUS trial from a prospective database of patients sent for 30-day cardiac rhythm monitoring.
Method: Methods: This prospective study examined detection rates of atrial fibrillation with prolonged cardiac monitoring started within 30 days of a stroke/TIA. Patients with a suspected cardioembolic stroke/TIA that occurred in the preceding 30 days were referred for 30-day cardiac monitoring. A Spiderflash-t or Northeast DR 200 monitor, programmed for detecting AF, was used. The primary outcome was to determine the number of patients that would meet the inclusion and exclusion criteria for the NAVIGATE ESUS trial (*Euro Stroke J* 2016; (DOI 10.1177/2396987316663049). Patients under the age of 50 were deemed to be not eligible for the NAVIGATE ESUS, and patients between 50–60 with 1 stroke risk factor smoking were included as per the most recent NAVIGATE ESUS protocol.
Results: 264 patients consented to study participation. Out of these 56 (21.2%) met the strict inclusion and exclusion criteria for the NAVIGATE ESUS trial. Of the 56 patients, the mean age was 70.23 years, 48.2% were women, and the median NIH stroke scale score was 0.
Conclusion: In our prospective database of patient undergoing prolonged cardiac rhythm monitoring to detect covert paroxysmal atrial fibrillation, about one-quarter were eligible for the NAVIGATE ESUS trial. On average, these patients were relatively young with nondisabling strokes.

AS32-021

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

YIELD OF REPEATED 5-DAY CARDIAC RHYTHM MONITORING DURING FOLLOW-UP AFTER TIA AND MINOR STROKE

S. Lyons[1], G. Yiin[1], N. Lovett[1], M. Kubiak[1] and P.M. Rothwell[1]
[1]Centre for the Prevention of Stroke and Dementia, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom

Background and Aims: Ambulatory cardiac rhythm monitoring after TIA and stroke detects paroxysmal AF (pAF) in about 10–20% of patients. However, there are few published data on the repeatability of testing during subsequent follow-up. We studied the 1-year progression-rate to more prolonged pAF in patients with brief runs of pAF on initial 5-day monitoring and the longer-term durability of a normal recording.
Method: Consecutive eligible consenting patients with TIA or non-disabling ischaemic stroke in a population based study (Oxford Vascular Study) underwent 5-day ambulatory cardiac rhythm monitoring (Novacor R-Test) within 1-month of the event. Monitoring was repeated at 1-year in patients who had brief bursts of pAF (<30-seconds) on initial monitoring, or at 5-years in those with a normal initial test.
Results: 60 patients underwent repeat cardiac monitoring. Of 24 patients with brief bursts of AF (<30-seconds) at baseline, repeated monitoring at 1-year was normal in 14 (58.3%) and showed only further runs of pAF<30-seconds in the remainder, with no runs>30-seconds in any case. Of 36 patients with normal baseline monitoring, repeated monitoring at 5-years was normal in 34 (94%) but showed pAF in 2 (max durations of 84 seconds and 8 minutes).
Conclusion: Repeat cardiac rhythm monitoring during follow-up after TIA/ischaemic stroke had a relatively low detection rate for progression of pAF at 1-year or detection of new AF at 5-years.

AS32-023

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

IS THE PRESENCE OF CEREBRAL INFARCTION ESSENTIAL FOR THE DIAGNOSIS OF EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS)?

B. Chavarria Cano[1], A. García Pastor[1], M. Vales Montero[1], A.M. Iglesias Mohedano[1], F. Díaz Otero[1], E. Luque Buzo[1], N. Redondo Ráfales[1], P. Vázquez Alén[1], Y. Fernández Bullido[1] and A. Gil Núñez[1]

[1]Hospital General Universitario Gregorio Marañón, Neurology, Madrid, Spain

Background and Aims: Diagnostic criteria for ESUS include the presence of non-lacunar cerebral infarction in neuroimaging. The objective of our study was to determine if patients with transient ischemic attacks (TIA) and ESUS profile but without cerebral infarction share the same baseline characteristics and recurrence rate as patients with ESUS and established infarction.

Method: We analysed patients with ischemic stroke admitted to our institution during 2010. Patients with TIA and ESUS profile (non-lacunar neurological syndrome with no identifiable established cause) but without cerebral infarction were included in the ESUS-TIA group, while patients meeting all ESUS criteria were classified as ESUS-infarction. We defined recurrence as new ischemic stroke or TIA during follow-up.

Results: 426 stroke patients were included. 103 (24.2%) had ESUS profile, 60 (58.3%) were included in ESUS-infarction group and 43 (42.7%) in ESUS-TIA group. Risk factor distribution was similar in both groups. No significant differences in the number of minor cardioembolic sources ($p = 0.436$) or presence of non-stenotic plaques in cerebral arteries ($p = 0.23$) were observed between ESUS-infarction and ESUS-TIA groups, but were more frequent than in non-ESUS stroke patients ($p < 0.001$). The 2 year overall cumulative recurrence rate for ESUS was 16.2% (17.1% for ESUS-infarction and 15.6% for ESUS-TIA, Log rank $p = 0.729$); whereas for non-ESUS group it was significantly lower: 9.8 % (Log rank $p = 0.005$).

Conclusion: Baseline characteristics, diagnostic findings and recurrence rate were similar for ESUS-infarction and ESUS-TIA groups. Our results suggest that ESUS classification might also include stroke patients without cerebral infarction in neuroimaging. ESUS-TIA could be considered as a new entity.

AS32-026

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

PREVALENCE OF CAROTID WEBS IN PATIENTS WITH ACUTE INTRACRANIAL STROKE DUE TO INTRACRANIAL LARGE VESSEL OCCLUSION

K. Compagne[1], B. Emmer[1], A. van Es[1], O. Berkhemer[2], J. Borst[2], Y. Roos[3], R. van Oostenbrugge[4], W. van Zwam[5], C. Majoie[2], H. Marquering[6], D. Dippel[7] and A. van der Lugt[1]

[1]Erasmus University Medical Center, Radiology, Rotterdam, The Netherlands

[2]Academic Medical Center, Radiology, Amsterdam, The Netherlands

[3]Academic Medical Center, Neurology, Amsterdam, The Netherlands

[4]Maastricht University Medical Center, Neurology, Maastricht, The Netherlands

[5]Maastricht University Medical Center, Radiology, Maastricht, The Netherlands

[6]Academic Medical Center, Radiology & Biomedical Engineering and Physics, Amsterdam, The Netherlands

[7]Erasmus University Medical Center, Neurology, Rotterdam, The Netherlands

Background and Aims: Carotid webs are described as circumferential filling defects arising from the posterior wall of the carotid bifurcation and have been implicated as a cause of strokes. Identification of a carotid web in patients with no other potential cause of acute ischemic stroke (AIS) could lead to further optimization of stroke management. The aim of this study is to investigate the prevalence of carotid webs in patients with AIS due to intracranial large vessel occlusion (LVO).

Method: We included all patients ($n = 500$) of the MRCLEAN trial in whom the carotid bifurcation could be assessed ($n = 443$). The presence of a carotid web at the carotid bifurcations was evaluated on computed tomography angiography. Demographics, clinical characteristics and imaging baseline characteristics were presented by descriptive statistics for patients with an identified carotid web. Interobserver agreement in the detection of carotid webs was examined by kappa statistics.

Results: We found 11 (2.5%) carotid webs at the symptomatic side and 2 (0.5%) carotid webs at the asymptomatic side (OR 10; p 0.012). Carotid webs were mostly observed in females. Nine symptomatic carotid web patients did not have major risk factors or other causes for ischemic stroke (82%). Fair to good interobserver agreement (κ 0.72) was observed for diagnosing carotid webs on CTA.

Conclusion: Carotid webs at the symptomatic carotid bifurcation were observed in 2.5% of the patients with acute ischemic stroke due to LVO and mostly diagnosed in females with a fair to good interobserver agreement.

AS32-027

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

RISK FACTORS, ETIOLOGY AND CLINICAL FINDINGS OF ISCHEMIC STROKE PATIENTS WHICH DIAGNOSED SYSTEMIC VASCULITIS AND PRIMARY CNS VASCULITIS

Ö. Uygun[1], N. Yeşilot[1] and O. Çoban[1]

[1]Istanbul Faculty of Medicine- Istanbul University, Department of Neurology, İstanbul, Turkey

Background and Aims: Systemic vasculitis and primary central nervous system vasculitis (PCNS) generally affect young and middle aged patients and may present with arterial and venous thrombosis. Antiphospholipid Antibody Syndrome (APS) is the most common vasculitis that presents with an ischemic stroke (IS). Systemic Lupus Erythematosus (SLE), Giant Cell Arteritis (GCA), Takayasu's Arteritis (TA), Wegener Graulomatosis (WG), Microscopic Polyarteritis Nodosa (PAN), Rheumatoid Arteritis (RA), Familial Mediterranean Fever (FMF), Hypereosinophilic Syndrome (HES), Behçet's Disease (BD) and PCNS vasculitis are rare disorders associated with IS.

Method: The clinical and radiological findings, etiology of 56 patients with ischemic stroke admitted between 1995–2016 at our stroke unit who had diagnosis of vasculitis were analysed.

Results: There were 35 (62.5%) female patients, mean age was 42.7 ± 14.1 (13–69). Most common complaints were weakness of arm-leg, followed by speech difficulty, sensory loss, and lisping. Headaeche (19.6%), confusion (25%), epileptic seizure (8.9%), cranial neuropathy (3.57%) were less frequent symptoms. Neurological findings were pure motor hemiparesis (48.2%), sensory-motor hemiparesis (46.4%), aphasia (25%), ataxia (19.6%) and dysmetria (17.8%). Most frequent vasculitis were APS and SLE but TA, PCNS vasculitis, GCA, WG, BD, PAN, FMF, RA were also present. Firstly, left middle cerebral artery and secondly,

posterior circulation arterial territories were involved. In 69% of the patients diagnosis of vasculitis was established after their first IS.
Conclusion: Similar to the literature, patients who had underlying etiology of vasculitis for IS were mostly female and young. Most of the patients were diagnosed with vasculitis after their first IS. The single most common vasculitis diagnosed in this cohort was APS.

AS32-028

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

PREDICTORS OF ATRIAL FIBRILLATION AND CARDIOEMBOLISM IN ACUTE ISCHAEMIC STROKE

M.R. Heldner[1], D. Aguiar de Sousa[1], A. Lam[2], J. Gralla[3], M.L. Mono[1], U. Fischer[1], M. Arnold[1], L. Roten[2], H. Tanner[2] and S. Jung[4]
[1]Inselspital- University of Bern, Department of Neurology, Bern, Switzerland
[2]Inselspital- University of Bern, Department of Cardiology, Bern, Switzerland
[3]Inselspital- University of Bern, Institute of Diagnostic and Interventional Neuroradiology, Bern, Switzerland
[4]Inselspital- University of Bern, Department of Neurology and Institute of Diagnostic and Interventional Neuroradiology, Bern, Switzerland

Background and Aims: Our aim was to determine predictors of atrial fibrillation and cardioembolism in extended monitoring after ischaemic stroke and to search for these parameters in cryptogenic strokes.
Method: 552 acutely treated consecutive ischaemic stroke patients (July 2013-January 2015) were analysed in our prospective stroke registry. We investigated predictors of atrial fibrillation and cardioembolic stroke (according to TOAST-criteria) in monitored patients, extensively monitored after negative standard (at least 24 h-ECG, TTE) examinations, with CHA2DS2-VASc items, laboratory, echocardiography and magnetic resonance imaging parameters.
Results: During 5481 patients-months of follow-up, 51 patients with atrial fibrillation were newly identified (58.8% by continuous monitoring within 3 days, 13.7% by 7-day continuous ECG recording, median cumulative investigation time 136.5 (max. 1029) hours). D-dimer levels $>1500\,\mu l/L$ had a specificity and positive predictive value for cardioembolic stroke of 86.4%/85.7% and CHA_2DS_2-VASc Score ≥ 5 with multi-territory/different-aged ischaemic lesions of 93.2%/93%. Parameters and best cut-offs for prediction of cardioembolic strokes (90.7% with atrial fibrillation) in comparison to small-vessel occlusion/large-artery atherosclerosis strokes, were enlarged left atrium (adjusted OR 4.91, 95% CI 2.15–11.2, $p < 0.0001$), high sensitivity-(hs)-Troponin $T > 0.02\,\mu l/L$ (3.83, 1.43–10.25, $p = 0.008$) and left ventricular ejection fraction (LVEF) <40% (2.87, 1.10–7.40, $p = 0.028$). These cardioembolic parameters were significantly less frequent in cryptogenic vs. cardioembolic strokes: enlarged left atrium: 38.5% vs. 70.8%; OR 3.74; $p < 0.0001$, hs-Troponin $T > 0.02\,\mu l/L$: 23.1% vs. 42.5%; OR 2.29; $p = 0.02$, LVEF <40%: 20% vs. 41.5%; OR 2.66; $p = 0.009$.
Conclusion: We identified several predictors for detection of atrial fibrillation and cardioembolism in monitored stroke patients which may help to guide patient selection for extended investigations.

AS32-031

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

CARDIAC MAGNETIC RESONANCE STUDY OF THE LEFT ATRIUM OF ISCHEMIC STROKE PATIENTS WITH UNDETERMINED ETIOLOGY (CAIUS STUDY)

A.C. Fonseca[1], P. Alves[2], N. Inácio[2], T. Melo[2], P. Canhão[2], J.M. Ferro[2] and A.G. Almeida[2]
[1]Lisboa, Portugal
[2]Hospital de Santa Maria, Neurology, Lisbon, Portugal

Background and Aims: Patients with undetermined ischemic stroke etiology may have cardiac structural changes which are not currently considered to be associated with cardioembolism.
We aimed to compare the structure and function of the left atrium of patients with different ischemic stroke etiologies.
Method: Consecutive sample of patients, admitted from 2014–2016 for ischemic stroke, aged over 50 years. Patients with structural changes on echocardiography currently considered as causal for stroke were excluded. Strokes were classified using TOAST. A 3Tesla cardiac MRI was performed and parameters of left atrial structure and function were evaluated.
Results: We included 96 patients with a mean age (standard deviation) of 68.3(9.4) years. Seventeen patients with cardioembolism (atrial fibrillation), 47 with undetermined etiology and 32 with other causes (small or large vessels disease). There was no difference in age between groups. By MRI we further excluded 5 patients diagnosed with cardiomyopathy. The dimensions of the left atrium were significantly higher in individuals with cardioembolic stroke versus other causes. There was no statistically significant difference between atrial dimensions in individuals with undetermined stroke versus other causes. When comparing patients with undetermined stroke etiology versus other causes, median atrial ejection fraction was found to be lower in patients with undetermined etiology ($p = 0.03$) and the percentage of fibrosis was higher ($p = 0.04$) than in other causes.
Conclusion: The differences that were found in the structure and function of the left atrium of stroke patients with undetermined etiology supports the hypothesis that an atrial disease may be associated with stroke in the absence of atrial fibrillation.

AS32-032

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

IMPROVING THE ACCURACY OF PROXIMAL ARTERY OCCLUSION DIAGNOSIS: THE PERFORMANCE OF DIFFERENT TRIAGE SCALES IN A TERTIARY ACADEMIC HOSPITAL POPULATION

R.K. Martins Filho[1], M. C. Libardi[1], F. A. Dias[1], F. F. A. Alves[1], M. R. Camilo[1], K.S. Ferreira[1], G. Nakiri[1], R.S. Castro[1], C.M.A. Barreira[1], L.H.C. Afonso[1], A.P. Camargo[1], D.G. Abud[1] and O.M. Pontes-neto[1]
[1]Ribeirão Preto School of Medicine - University of São Paulo, Neuroscience and Behavioral Sciences, Ribeirão Preto, Brazil

Background and Aims: Early identification of proximal artery occlusion (PAO) at a primary stroke center may improve access to endovascular therapy by expediting transference of acute ischemic stroke (AIS) patients to comprehensive centers. We aimed to compare the accuracy

of two scores developed for quick triage of AIS patients: the FAST-ED score (based on items of the NIHSS), and the PAO Score (based on NIHSS and highest vessel attenuation on non-contrast CT-NCCT).
Method: We evaluated consecutive patients with AIS of the anterior circulation admitted to an academic tertiary center in Brazil during 2014 that had a NCCT and a CTA at admission. PAO of anterior circulation was defined by total occlusions of ICA, MCA-M1 and ACA-A1. We used ROC curve analysis and C-statistics to predict CT angiography PAO, based on NIHSS, FAST-ED and PAO Score.
Results: NIHSS, FAST-ED scale and PAO score were highly associated with the PAO. FAST-ED had comparable accuracy to the NIHSS (area under the curve (AUC) of 0.89 and 0.90, respectively). The PAO score had the highest accuracy for PAO detection (AUC = 0.92). A FAST-ED ≥ 4 had a sensitivity of 0.98, specificity of 0.73, positive predictive value of 66% and negative predictive value of 98% versus PAO Score ≥ 63 of 0.83, 0.83, 0.90 and 0.73, respectively.
Conclusion: The use of triage scales may improve and expedite the detection of proximal artery occlusion in AIS patients at primary stroke centers. Scores based on clinical and non-contrast brain CT findings provide the highest accuracy for PAO detection in these settings.

AS32-033

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

VALIDATION OF THE FABS SCORE TO IDENTIFY STROKE MIMICS IN A PORTUGUESE POPULATION

M. Vargas[1], M. Reis Costa[2], T. Pinho e Melo[2], P. Canhão[2], J.M. Ferro[2] and A.C. Fonseca[2]
[1]Hospital de Santa Maria, Unidade cerebrovascular, Lisbon, Portugal
[2]Hospital de Santa Maria, Unidade cerebrovascular- Serviço de Neurologia, Lisbon, Portugal

Background and Aims: Distinguishing between stroke or a mimic in the emergency department can be difficult. The FABS score was developed in the USA to identify patients that are more likely to be stroke mimics in the emergency department. We aimed to evaluate its performance in a cohort of Portuguese patients.
Method: FABS score consists of 6 variables, one point for each present variable: absence of facial droop, absence of atrial fibrillation, age < 50 years, systolic blood pressure < 150 mmHg at presentation, seizures and isolated sensory symptoms. The cutoff is FABS ≥ 3.
We retrospectively analyzed a stroke unit database from 2007–2013. All mimics were included. We paired mimics with stroke patients equally distributed across the years and randomly selected. ROC curve and C-statistics were obtained. Statistical significance was set at $p < 0.05$
Results: 409 patients were included, 221(54.1%) were mimics. 63% mimics had a provisional diagnostic hypothesis of posterior circulation stroke. C-statistic was 0.83(confidence interval 95%[CI],0.79–0.87). FABS ≥ 3 identified stroke mimics with a 65%(60.5%-69.5%) sensitivity and a 86%(83.8%-90.2%) specificity, positive predictive value 84%(80.6%-87.5%), negative predictive value 67.3% (65%-73.8%). After the exclusion of patients with the diagnostic hypothesis of posterior circulation stroke there was an increase in sensitivity and specificity of the score: C-statistics was 0.9(0.85–0.94) 71%(64% - 77.1%) sensitivity and 90% (86%-94%) specificity.
Conclusion: FABS had a good acuity to identify stroke patients and stroke mimics in a Portuguese patient cohort. This acuity was inferior to the one reported in the original study which can be due to the different population and context of the score application.

AS32-035

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

PREDICTORS OF OCCULT CANCER IN PATIENTS WITH ISCHEMIC STROKE

S. Quintas[1], G. Reig Roselló[1], J. Rogado[2], J. Dotor García-Soto[1], S. Trillo Senin[1], Á. Ximénez-Carrillo[1], V. Pacheco Barcia[2], P. Gullón Tosio[3] and J. Vivancos[1]
[1]Hospital Universitario de La Princesa, Neurology, Madrid, Spain
[2]Hospital Universitario de La Princesa, Oncology, Madrid, Spain
[3]Insituto de Investigación Carlos III, Public Health, Madrid, Spain

Background and Aims: Stroke is the second most frequent neurologic finding in postmortem studies of cancer patients. It has also been described as the first expression of an occult cancer. We have studied patients that, after having an ischemic stroke (IS), are diagnosed with cancer (T-P), and we analyze differences with non-tumor patients (NT-P).
Method: Single cohort longitudinal retrospective study of patients admitted to our center with IS diagnosis from 1/01/2012 to 11/30/2014. All patients were followed for 18 months. Patients with TIA or cerebral hemorrhage, active cancer or in the last 5 years, inability to follow-up or absence of complete complementary study (holter-EKG, echocardiogram, and dupplex/angiography-CT) were excluded. Demographic, clinical, analytical and prognostic characteristics were compared between T-P and NT-P.
Results: From a total of 381 IS patients with no history of cancer, 29 (7,61%) were diagnosed with cancer. The mean time from stroke onset to cancer diagnosis was 6 months. The most frequent location was colon (24%). 35% were diagnosed in a metastatic stage. Older age ($p = 0{,}003$), previous cancer >5 years ($p = 0{,}042$), chronic kidney disease (CKD) ($p = 0{,}006$) and lower hemoglobin value ($p = 0{,}004$) were predictors of occult neoplasm. No differences were found in other analytical parameters, vascular risk factors or severity, prognosis, etiology and clinical manifestations of the stroke.
Conclusion: In our study, older age, CKD, previous cancer and hemoglobine values were related to the diagnosis of cancer after IS. More studies are needed to determine which patients could benefit from a larger study on admission that allows an earlier diagnosis of the underlying neoplasm.

AS32-036

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS): SUBGROUP ANALYSIS OF 86 PATIENTS

S. Piffer[1], V. Bignamini[2], P. Poletti[3], S. Merler[3] and D.M. Bonifati[4]
[1]APSS - Ospedale Santa Chiara, Department of Neurological Disorders-Unit of Neurology, Trento, Italy
[2]APSS- Santa Chiara Hospital, Trento, Italy
[3]Fondazione Bruno Kessler, ., Trento, Italy
[4]Ca Foncello Hospital, Treviso, Italy

Background and Aims: Diagnostic criteria for embolic stroke of undetermined source (ESUS) do not include clinical aspects such as age, vascular risk factors (RFs), history of previous strokes (PreS). It is possible that these features are widely variable in ESUS patients and that they can give clues of different underlying embolic mechanisms.
Method: We prospectively evaluated, all ESUS patients ($n = 86$) admitted at our Stroke Unit over a 4-year period. RFs,

CHA2DS2VASc, severity of neurological deficit, presence of potential embolic sources, ASCOD phenotype, radiological topography of ischemic lesions, transthoracic echocardiography were recorded. Subgroup comparisons were performed comparing patients younger and older than 50 years old, with and without RFs, with and without PreS.

Results: Juvenile ESUS patients had a lower prevalence of hypertension, dyslipidaemia, left atrial enlargement, left ventricle diastolic dysfunction, a lower CHA2DS2VASc and a higher proportion of ASCOD score A0 ($p < 0,05$). ESUS patients without RFs differed from those with ≥ 3 RFs for a younger age, a lower prevalence of potential causes, a higher proportion of ASCOD combined phenotypes A0C0 and A0C2/3 and a lower of A2/3C0 and A2/3C2/3 ($p < 0,05$). ESUS patients with a PreS were older, with more RFs, higher CHA2DS2VASc, higher prevalence of left ventricle diastolic dysfunction and lower prevalence of ASCOD score A0 ($p < 0,05$).

Vascular Risk Factors	< 50 yrs n=17 N/Med (%/IQR)	> 50 yrs n=69 N/Med (%/IQR)	S	No RFs n=16 N/Med (%/IQR)	≥3 RFs n=23 N/Med (%/IQR)	S	PreS n=16 N/Med (%/IQR)	No PreS n=70 N/Med (%/IQR)	S
Age at ictus onset (years)	43,6 (36,3-46,9)	65,5 (58,5-71,4)		52,0 (44,1-65,5)	69,4 (58,5-69,2)	*	65,6 (62,6-72,4)	61,6 (50,7-69,2)	*
Hypertension	**5 (29,4)**	**46 (66,7)**	*	0 (0)	21 (91,3)		13 (81,3)	38 (54,3)	
Diabetes mellitus	0 (0)	6 (8,7)		0 (0)	6 (26,1)		2 (12,5)	4 (5,7)	
Dyslipidaemia	**5 (29,4)**	**45 (65,2)**	*	0 (0)	23 (100)		11 (68,8)	39 (55,7)	
Active smoke	4 (23,5)	17 (24,6)		0 (0)	12 (52,2)		3 (18,8)	18 (25,7)	
CHA2DS2VASc	**0 (0-1)**	**2 (1-3)**	*	0,5 (0-1)	3 (2,5-4)		4 (3,8-6)	**2 (1-2)**	*
Vascular risk factors sum = 0 §	7 (41,2)	9 (13,0)		16 (100)	0 (0)		0 (0)	16 (22,9)	*
Vascular risk factors sum =1 or 2 §	9 (52,9)	38 (55,1)		0 (0)	0 (0)		6 (37,5)	41 (58,6)	
Vascular risk factors sum ≥ 3 §	1 (5,9)	22 (31,9)		0 (0)	23 (100)		10 (62,5)	13 (18,6)	

Table 1. Vascular Risk factors. LEGEND. Med: median; IQR: interquartile range 25%-75%. S: statistically significant difference, *p-Value <0,05.
Bold: items for which it is present a statistically significant difference among the two comparison groups.
§ Sum of the following vascular *risk factors*: hypertension, dyslipidaemia, diabetes mellitus, smoke, coronaropathy or peripheral arteriopathy, previous TIA/stroke, OSAS.

Diagnostic findings	< 50 yrs n=17 N/Med (%/IQR)	> 50 yrs n=69 N/Med (%/IQR)	S	No RFs n=16 N/Med (%/IQR)	≥3 RFs n=23 N/Med (%/IQR)	S	PreS n=16 N/Med (%/IQR)	No PreS n=70 N/Med (%/IQR)	S
No evidence of potential causes of ESUS	5 (29,4)	21 (30,4)		**9 (56,3)**	**5 (21,7)**	*	3 (18,8)	23 (32,9)	
Arteriogenic emboli	0 (0)	17 (24,6)		**0 (0)**	**7 (30,4)**		6 (37,5)	11 (15,7)	
Minor-Risk Potential Cardioembolic Sources	8 (47,1)	34 (49,3)		**4 (25)**	**14 (60,9)**		12 (75)	30 (42,9)	
Patent foramen ovale	9 (52,9)	12 (17,4)		**5 (31,3)**	**5 (21,7)**		2 (12,5)	19 (27,1)	
Covert paroxysmal atrial fibrillation (detected during follow-up)	0 (0)	6 (8,7)		**1 (6,3)**	**1 (4,3)**		1 (6,3)	6 (8,6)	
ASCOD score A0C0	3 (17,6)	17 (24,6)		**7 (43,8)**	**4 (17,4)**	*	0 (0)	**20 (28,6)**	
ASCOD score A2/3C0	1 (5,9)	22 (31,9)		**1 (6,3)**	**6 (26,1)**		10 (62,5)	13 (18,6)	
ASCOD score A0C2/3	11 (64,7)	14 (20,3)		**7 (43,8)**	**9 (13,0)**		3 (18,8)	22 (31,4)	
ASCOD score A2/3C2/3	2 (11,8)	16 (23,2)		**1 (6,3)**	**10 (43,5)**		3 (18,8)	15 (21,4)	

Table 2. Diagnostic findings. LEGEND. Med: median; IQR: interquartile range 25%-75%. S: statistically significant difference, *p-Value <0,05.
Bold: items for which it is present a statistically significant difference among the two comparison groups.

Adjunctive transthoracic diagnostic findings	< 50 yrs n=17 N/Med (%/IQR)	> 50 yrs n=69 N/Med (%/IQR)	S	No RFs n=16 N/Med (%/IQR)	≥3 RFs n=23 N/Med (%/IQR)	S	PreS n=16 N/Med (%/IQR)	No PreS n=70 N/Med (%/IQR)	S
Left atrial enlargement	**2 (0)**	**29 (42,0)**	*	3 (18,8)	10 (43,5)		8 (50,0)	23 (32,9)	
Left ventricle diastolic dysfunction	**0 (11,8)**	**24 (34,8)**	*	1 (6,3)	7 (30,4)		**10 (62,5)**	**14 (20,0)**	*

Table 3. Diagnostic findings. LEGEND. Med: median; IQR: interquartile range 25%-75%. S: statistically significant difference, *p-Value <0,05.
Bold: items for which it is present a statistically significant difference among the two comparison groups.

Conclusion: ESUS patients might be distinguished in at least two phenotypes, one characterized by younger age, less amount of RFs, less evidence of non-significant atherosclerosis and of cardiac degenerative involution, the other by older age, more vascular risk factors, major evidence of non-significant atherosclerosis and cardiac degenerative involution.

AS32-038

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS): A RADIOLOGICAL ANALYSIS IN 86 PATIENTS

S. Piffer[1], V. Bignamini[1], U. Rozzanigo[1], P. Poletti[2], S. Merler[2] and D.M. Bonifati[3]
[1]APSS - Ospedale Santa Chiara, Department of Neurological Disorders-U.O. Neurologia, Trento, Italy
[2]Fondazione Bruno Kessler, Trento, Italy
[3]Department of Medicine- Unit of Neurology, Treviso, Italy

Background and Aims: By definition embolic stroke of undetermined source (ESUS) do not include lacunar strokes, however few is known about the radiological features of ischemic lesion in this subgroup of patients.

Method: We prospectively evaluated all ESUS patients ($n = 86$) admitted at our Stroke Unit over a 4-year period. We distinguished radiological features of the ischemic lesion as follow: cortical-subcortical stroke (CSS), subcortical stroke (SS), cortical stroke (CS) and multiple ischemic lesion (MS). The radiological subgroups were then compared for vascular risk factors (RFs), CHA2DS2VASc, severity of neurological deficit measured by NIH Stroke Scale (NIHSS), disability measure by modified Rankin Scale (mRS), ASCOD phenotype, presence of potential causes.

Results: Patients with CSS were 33 (38,4%): the vascular territory of the index cerebral artery was involved completely in 9 cases (10,5%), partially in 24 (27,9%); with SS were 18 (21%); with CS 21 (24,4%) and with MS 13 (15,1%). One patient (1,2%) had no clear ischemic lesion on head CT scan and it was not possible to perform MRI. CS patients differed from all other subgroups for of a lower value of NIHSS score at admission and at discharge ($p < 0.05$). MS patients had a higher prevalence of secondary haemorrhage than all other groups ($p < 0.05$).

Conclusion: CS and CSS partially involving the vascular territory of the index cerebral artery represent the majority of ischemic lesions in ESUS patients. Among the different ischemic lesions, no significant differences were present regarding age, RFs, presence of potential causes of ESUS.

AS32-039

DIAGNOSIS/INVESTIGATION OF STROKE ETIOLOGY

EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS): A FOLLOW-UP ANALYSIS IN 86 PATIENTS

S. Piffer[1], V. Bignamini[1], P. Poletti[2], S. Merler[2] and D.M. Bonifati[3]
[1]APSS - Ospedale Santa Chiara, Department of Neurological Disorders-U.O. Neurologia, Trento, Italy
[2]Fondazione Bruno Kessler, Trento, Italy
[3]Treviso, Italy

Background and Aims: Embolic stroke of undetermined source (ESUS) is a recent stroke subtype. Few follow-up studies analysing etiological and outcome features are available. Furthermore secondary prevention in patients with ESUS is unknown and clinical trials are ongoing,

Method: We prospectively evaluated 79 ESUS patients, out of 86 (92%) admitted at our Stroke Unit over a 4-year, with a median follow-up of 19 months (range 2–53). Disability was evaluated through the modified Rankin Scale (mRS). The following outcome measures were recorded: atrial fibrillation (AF), death, stroke recurrence and a composite vascular

end-point (stroke, myocardial infarct, sudden death, systemic embolism, aortic aneurysm rupture).
Results: At discharge 63% of ESUS patients had an mRS ≤ 2 while at the last control 80% of ESUS patients had an mRS ≤ 2 . 3 ESUS patients died (2 events per 100 person-years):2 for a sudden cardiac death and the other one for melanoma. A stroke recurred in 15 patients (11,9 events per 100 patient-years). The composite vascular end-point was 19 (16,5 events per 100 person-years). 6 patients had paroxysmal AF during the follow-up. In comparison with the remaining cases they had an older age, higher prevalence of premature atrial complexes at standard ECG and of left atrial enlargement ($p < 0,05$). Patients with stroke recurrence in comparison with those without had a higher prevalence of left ventricular diastolic dysfunction ($p < 0,05$).

	N	N events	%	Incidence 100 person year
Atrial fibrillation recording	79	6	7,6	4,1
Death	79	3	3,8	2
Sudden Cardiac Death	79	2	2,5	1
TIA/Stroke relapse	79	15	19,0	11,9
Myocardial infarct	79	2	2,5	
Aortic Aneurism Ropture	79	1	1,3	
Systemic Embolism	79	-	-	
Total Vascular Events §	79	19	24,1	16,5

Table. Outcome, mortality and vascular adverse events recurrence in ESUS patients. LEGEND. § Total vascular events counts the first adverse vascular event occured after index ESUS including sudden cardiac death, TIA/Stroke relapse, myocardial infarct, aortic aneurism ropture, systemic embolism.

Conclusion: ESUS patients tend to present a progressive improvement of disability during the follow-up but can present new ischemic events. Some cardiologic features might define patients with occult AF and at increased risk of stroke recurrence.

AS13-014

EPIDEMIOLOGY OF STROKE

STROKE INCIDENCE IN A COHORT OF COLOMBIAN END-STAGE RENAL FAILURE PATIENTS

J.C. Vargas-Gonzalez[1], R. Pardo[1], R. Sanchez[1], M. Sanabria[2] and J. Vesga[2]
[1]Universidad Nacional de Colombia, Instituto de Investigaciones Clinicas, Bogota, Colombia
[2]RTS Baxter, Asuntos Medicos y Clentificos, Bogota, Colombia

Background and Aims: Evidence has emerged that patients with renal failure are at increased risk of stroke. Nevertheless, most of this information has come from retrospective analysis. In consequence, our objective was to estimate the Incidence Density Rate (IDR) of stroke in a cohort of end stage-renal failure patients, and to evaluate which factors were independently associated with stroke occurrence.
Method: We included all patients with end-stage renal failure that were at follow-up in the RTS Colombia cohort and whom had not suffered an stroke prior to enrollment. The cohort started in 2013 and it is currently running and enrolling patients, all patients have been followed until death or they ceased to need dialysis. We estimated the IDR of stroke, and then we evaluated which factors were associated with stroke incidence using a multivariate cox model.
Results: Our cohort included a total of 6851 patients with a total of 11742 patients-year of follow up, with 206 patients having and stroke. Our stroke incidence density was of 1754 (CI95: 1530 – 2011) per 100000 persons-year. Multivariate cox model showed that factors significant associated with stroke were: age per year HR 1.04 (1.02–1.05), Diabetes HR 1.44 (1.09–1.91) and peritoneal dialysis HR 1.38 (1.05–1.82).
Conclusion: We found a stroke incidence of 1754 per 100000 persons-year that is higher of previously reported incidence in end-stage renal failure, and almost 10 times the estimated rate for Colombia general population. Also, we found that in our population age, diabetes and peritoneal dialysis were independently associated with stroke.

AS13-028

EPIDEMIOLOGY OF STROKE

PREVELANCE OF SUBSTANTIAL SALVAGEABLE PENUMBRA IN PATIENTS WITH LARGE VESSEL OCCLUSION WHO DO NOT UNDERGO ENDOVASCULAR THERAPY

M. Bahr Hosseini[1], W. Graham[1], B. Yoo[2], L.K. Sharma[1], S. Starkman[1], N. Rao[1], J. Hinman[1], D.S. Liebeskind[1] and J.L. Saver[1]
[1]University of California Los Angeles UCLA, Vascular neurology, Los Angeles, USA
[2]University of California Los Angeles UCLA, Radiology, Los Angeles, USA

Background and Aims: Endovascular therapy (ET) has become the standard of care for select patients with acute ischemic stroke (AIS) due to large vessel occlusion (LVO). However, many LVO patients are ineligible for ET, including some who harbor salvageable tissues. To develop complementary therapeutic interventions for these patients, it is important to delineate their prevalence, clinical features, and outcomes.
Method: We reviewed consecutive patients with AIS between Dec-2015 and Sep-2016. Based on first multi-modal CT or MR imaging, patients were categorized as having substantial salvageable penumbra, if perfusion lesion volume (Tmax >6s) exceeded ischemic core volume (relative CBF $< 30\%$ on PCT or ADC < 620 on DWI) by $\geq 20\%$.
Results: Among 181 AIS patients, 25 (13.8%) were LVO patients with substantial salvageable penumbra who did not undergo ET. Mean age was 79 (± 12), 52% were female, and median NIHSS was 10 (IQR 4–15). Reasons for not pursuing ET intervention were: distal occlusion (32%), low NIHSS (20%), large infarct core (12%), poor baseline function (12%), and tandem cervical ICA occlusion (12%). Median time from LKN to imaging was 372 min (IQR 191–681). Mismatch ratio was median 15.4 (IQR 2.5-infinite). Salvageable penumbra volume mean was 47 ml (± 64) and ischemic core volume mean was 20 ml (± 33). At discharge, 68% of patients had mRS of 3–6.
Conclusion: Even in the modern stent retriever era, one in seven acute cerebral ischemia patients presents with substantial salvageable penumbra judged not appropriate for endovascular thrombectomy treatment. This population would benefit from development of alternative therapies, including collateral enhancement, neuroprotection, and innovative recanalization techniques.

AS13-042

EPIDEMIOLOGY OF STROKE

PREVALENCE AND NATURAL HISTORY OF CARDIOEMBOLIC STROKE: THE SOUTH LONDON STROKE REGISTER (2000 TO 2013)

W. Muruet[1], O. Adeniyi[2], A. Douiri[1], A. Rudd[3] and C. Wolfe[1]
[1]King's College London, Division of Health & Social Care Research, London, United Kingdom
[2]King's College London, Primary Care & Public Health Sciences, London, United Kingdom
[3]King's College London, Guy's and St Thomas' NHS Foundation Trust, London, United Kingdom

Background and Aims: Cardioembolic stroke (CES) is largely preventable through risk factor management in primary care and controllable in

secondary care. We evaluated CES prevalence and risks between 2000–2013 using a population-based register.

Method: Data were collected from the population-based South London Stroke Register (case ascertainment $\simeq$ 88%) of first-ever strokes in an inner London area. CES was defined using TOAST criteria. Rates and 95% confidence intervals were used to estimate prevalences. Risk of death and recurrence were measured using Kaplan-Meier estimates and logistic and Cox proportional hazard regression models.

Results: 2,394 participants, 26% (95% CI [23.8–27.4]) of ischæmic strokes were CES; mean age 74.7 ± 14.1; 56% [51.9–60.0] female. Compared to large artery atherothrombotic (LAA) and small vessel (SVO), CES had a higher proportion of moderate/severe consciousness impairment (CES 33%, LAA 18%, SVO 4%, $p < 0.0001$), severe/global aphasia (31%, 22%, 2%, $p < 0.0001$), dysphagia (42%, 26%, 10%, $p < 0.0001$), and urinary incontinence (49%, 36%, 16%, $p < 0.0001$). In adjusted analyses, CES was associated with AF (OR 7.72, 95%CI [5.62–10.60]), ischæmic heart disease antecedent (1.50 [1.09–2.07]), incontinence (1.33 [1.01–1.76]), dysphagia (1.45 [1.01–2.07]), severe/global aphasia (1.80 [1.22–2.68]), and visual field deficits (1.31 [1.04–1.67]). CES 10-year survival was 21% [17–21] with an adjusted HR 1.23 [1.04–1.46] for mortality. There was no significant difference in recurrence.

Conclusion: CES has high prevalence among ischæmic stroke subtypes and tends to be more severe and associated with poor outcomes.

AS13-051

EPIDEMIOLOGY OF STROKE

FREQUENCY AND FEATURES OF EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS) IN YOUNG ADULTS

K. Perera[1], R. Hart[1], B. Swaminathan[2], S. Connolly[1] and J. Bosch[3]

[1]McMaster University, Medicine Cardiology, Hamilton, Canada
[2]Population Health Research Institute, Statistics, Hamilton, Canada
[3]Population Health Research Institute, Prevention, Hamilton, Canada

Background and Aims: There is persuasive evidence that most cryptogenic strokes are thromboembolic. Accordingly these strokes are now described as ESUS a new clinical construct. No Young-ESUS population has yet been described using the proposed criteria. We analyzed data from ESUS global registry project to characterize the frequency and features of Young-ESUS patients.

Method: Consecutive patients with recent ischemic stroke were sought at 19 stroke research centers in 19 different countries. Characteristics of ESUS patients <50years and >50years were analyzed and compared

Results: Of 323 patients <50years with recent ischemic stroke 24% met ESUS criteria.

The most prevalent risk factor among young ESUS patients was hypertension (38%). Atrial fibrillation only accounted for 5% of strokes compared to 31% in patients >50years. 77% of Young-ESUS patients were discharged on antiplatelets compared to 9% discharged on anticoagulation.

22% of ESUS patients were <50years. Vascular risk factor profile of Young-ESUS patients was significantly different from older ESUS patients (Table 1). Young-ESUS patients had lesser prevalence of potential minor risk embolic sources compared to older ESUS patients (Table 2).

Table 1: ESUS Patient Features in patients ≤ 50years vs >50years

	ESUS patients				
	Age<=50 (N=78)		Age>50 (N=273)		
	N^	% or Mean	N^	% or Mean	P-value**
Men (%)	78	67%	272	54%	0.0688
Diabetes (%)	78	21%	273	26%	0.3755
Hypertension (%)	78	36%	270	73%	<0.0001
Coronary artery disease (%)	74	7%	258	11%	0.3812
History of stroke or TIA prior to index stroke (%)	78	5%	270	21%	0.0006
Heart failure (%)	73	0%	258	2%	0.3452
Hyperlipidemia (%)	72	28%	254	43%	0.0285
Peripheral vascular disease (%)	71	0%	236	4%	0.1240
Antiplatelet therapy at the time of index stroke (%)	76	11%	270	36%	<0.0001
Anticoagulant therapy at the time of index stroke (%)	72	3%	255	8%	0.2117
Median NIHSS score near admission (IQR)	58	3 (1, 7)	228	4 (2, 9)	0.0353
i.v. tPA for index stroke (%)	78	9%	269	19%	0.0551
Death within 30 days (%)	67	1%	208	2%	>0.90
Antithrombotic theraphy at discharge					
- ASA only (%)	78	39%	263	33%	0.3689
- Clopidogrel pranugrel only (%)	78	18%	263	19%	>0.90
- Warfarin/vitamin K antagonist only (%)	78	8%	263	3%	0.0980
- rivaroxaban, dabigatran or apixaban only (%)	78	1%	263	2%	>0.90

** P-values for categorical comparison - Fisher's exact test; P-values for continuous comparison - Wilcoxon rank-sum test;

Table2: Frequency ofpotential minor risk embolic sources among ESUS patients ≤50years vs >50years

Minor risk potential embolic sources	Age<=50 N (%)	Age>50 N (%)	P-value**
Carotid artery non-stenotic plaques*	37 (69%)	171 (82%)	0.0393
Mitral Annular calcification and thickening with myxomatous changes#	0 (0%)	17 (7%)	0.0296
Aortic valve stenosis and calcification#	1 (1%)	23 (9%)	0.0367
Hypokinetic/ Akinetic left ventricle#	3 (4%)	10 (4%)	>0.90
Moderate-to-severely dilated left atrium#	6 (8%)	13 (5%)	0.3894
Aortic arch atherosclerotic plaques^	1 (3%)	34 (10%)	<0.0001
Patent Foramen Ovale#	7 (10%)	12 (5%)	0.1487
Patent Foramen Ovale^	12 (32%)	19 (22%)	0.2605
Any minor risk potential embolic sources	49 (63%)	209 (77%)	0.0197
>=2 minor-risk embolic sources	11 (14%)	72 (26%)	0.0240

* In all ESUS patients excluding POCS either on CTA, MRA or carotid ultrasonography.
# ESUS patients who had TTE
^ ESUS patients who had TEE.
** P-values for categorical comparison - Fisher's exact test;

Conclusion: This study provides a benchmark for frequency and characteristics of Young-ESUS patients across countries and shows consistent high frequency (24%) of ESUS in young adults.

Currently there is no data available on stroke recurrence and death rates or the prognosis of these patients and a study looking into this is warranted.

AS13-083

EPIDEMIOLOGY OF STROKE

TIME TRENDS OF ATRIAL FIBRILLATION PREVALENCE IN PATIENTS WITH FIRST EVER ISCHEMIC STROKE

C. Tiseo[1], R. Ornello[2], D. Degan[3], L. Evangelista[4], A.C. Landi[1], G. Pellicciari[4], G. Perrotta[1], F. Pistoia[1], A. Carolei[1] and S. Sacco[1]

[1]University of L'AQUILA, Department of Neurology and Stroke Unit-AZH, L'AQUILA, Italy
[2]University of L'Aquila, Department of Neurology and Stroke Unit- AZ, L'Aquila, Italy
[3]Univeristy of L'Aquila, Department of Neurology and Stroke Unit- AZ, L'Aquila, Italy
[4]Univeristy of L'Aquila, Department of Neurology and Stroke Unit- AZH, L'Aquila, Italy

Background and Aims: Atrial fibrillation (AF) is a relevant risk factor for ischemic stroke. The increased AF prevalence in the general population may have changed stroke epidemiology.

Method: Prospective population-based registry including all residents in the district of L'Aquila, Italy, with a first-ever ischemic stroke (FEIS) in 2011–2013. We studied the prevalence of AF in patients with a FEIS, and compared current data with those of the 1994–1998 registry.

Results: Out of 884 patients with FEIS, 285 (182 women, 63.9%) had documented AF; the arrhythmia was newly diagnosed in 64 (22.5%). There was a 32.5% increase of AF prevalence from 1994–1998 through 2011–2013 (24.6% to 32.2%; $P < 0.001$), 38.2% in women (28.5% to 39.4%; $P < 0.001$), and 20.2% in men (20.3% to 24.4%; $P = 0.064$). In

patients aged ≥80 years there was a corresponding 29.3% increase (35.2% to 45.5%; P < 0.001); the increase was 26.7% in women (33.5% to 47.5%; P < 0.001) and 56.4% in men (26.4% to 41.3%; P = 0.001), paralleled by a 80.3% increase of patients aged ≥80 years in the general population and a 11.1% decrease of the male/female ratio from 1994–1998 through 2011–2013.

Conclusion: We found an increased AF prevalence in patients with FEIS over two decades, mostly in women and in the oldest-old, partly due to aging of the resident population. The increase was higher in men than in women aged ≥80 years despite the 11.1% decrease of the male/female ratio. This gender difference needs to be further investigated as it may depend on different gender-related causes other than the occurrence of competing diseases.

AS13-005

EPIDEMIOLOGY OF STROKE

TEMPORAL TRENDS IN THE PRESENTATION OF STROKE MAY BE USED TO DIRECT RESOURCE AND STAFFING ALLOCATIONS

D. Gill[1], G. Mahir[2], A. Daunt[3] and A. Kar[4]
[1]IMPERIAL COLLEGE NHS TRUST, Postgraduate Centre, LONDON, United Kingdom
[2]IMPERIAL COLLEGE NHS TRUST, School of Medicine, LONDON, United Kingdom
[3]IMPERIAL COLLEGE NHS TRUST, St Mary's Hospital, LONDON, United Kingdom
[4]IMPERIAL COLLEGE NHS TRUST, Hyper Acute Stroke Unit- Charing Cross Hospital, LONDON, United Kingdom

Background and Aims: Appreciation of temporal fluctuations in workload may allow for optimised distribution of finite resources within a healthcare setting[1]. Awareness of when patients are likely to present to hospital may help direct staffing levels and resource allocation. We therefore sought to investigate trends in the timings that patients with stroke present to hospital.

Method: We retrospectively reviewed all stroke cases admitted to Imperial College Healthcare NHS Trust (UK) Hyper Acute Stroke Unit between 21st December 2012 and 27th May 2015 inclusive. A total of 3328 patients presented over the 30 month period; 2823 (84.8%) were diagnosed with acute ischaemic stroke (AIS) and 488 (14.7%) primary intracerebral haemorrhage (ICH). Of all AIS cases, 541 (19.2%) were thrombolysed. For 17 patients, stroke type was not recorded.

Results: Most stroke cases presented during the day, with the highest frequency seen during the 11:00–11:59 timeframe. A total of 244 patients were seen in this hour alone, representing 7.3% of all stroke admissions. Levels remained high until the 20:00–20:59 timeframe, before reducing and plateauing at 21:00. Rapid decreases followed at 02:00, and the minimum number of patients was seen during the 06:00–06:59 hour, where only 25 patients (0.75%) presented over the 30 months. This also correlated with the lowest number of thrombolysed AIS presentations: only 3 patients who presented within this hour were thrombolysed.

Conclusion: In and out-of-hours shift patterns bisect high and low frequency of stroke presentations. The patterns observed here may provide valuable insight into the temporal profile of the workload facing services.

AS13-008

EPIDEMIOLOGY OF STROKE

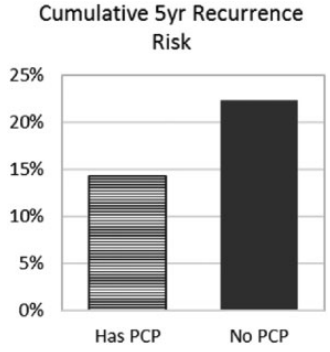
STROKE RECURRENCE IS LOWER IN PATIENTS WITH A PRIMARY CARE PROVIDER

L. Morgenstern[1], B. Sanchez[2] and L. Lisabeth[3]
[1]University of Michigan, Ann Arbor, USA
[2]University of Michigan, Biostatistics, Ann Arbor, USA
[3]University of Michigan, Epidemiology, Ann Arbor, USA

Background and Aims: Despite declining stroke incidence and mortality in developed countries world-wide, stable or increasing rates are observed in middle-aged adults. Many people do not have a routine physician to get health care. Using a population-based study we sought to determine whether having a primary care physician (PCP), also known as a general practitioner, lowers risk of stroke recurrence and mortality in middle-aged stroke patients.

Method: First-ever ischemic stroke cases aged 45–64 at stroke onset were ascertained through the Brain Attack Surveillance in Corpus Christi (BASIC, Texas, USA) project from 2000–2013. Cox proportional hazards models were used to examine the association between not having a PCP and stroke recurrence or all-cause mortality. Cases were followed for up to 5 years or until Dec 31, 2013, or at death, whichever came first. We adjusted for clinical risk factors that could be associated with having a PCP and with mortality or recurrence.

Results: There were N = 663 cases in this analysis. Of these, 77% had a PCP; 67% were MA; 43% female, and average age 55.6 years. Five-year recurrence risk was 14.6% and mortality was 19.2%. The figure shows that not having a PCP was significantly associated with 1.68 (95%CI: 1.00, 2.80) times higher recurrence risk. Having a PCP was not significantly associated with mortality.



Conclusion: Not having a PCP was significantly associated with higher stroke recurrence in middle-aged stroke patients. It is crucially important for stroke physicians to identify and work with PCPs to reduce stroke recurrence in middle-aged stroke patients.

AS13-009

EPIDEMIOLOGY OF STROKE

IMPACT OF ONSET-TO-DOOR TIME ON CLINICAL OUTCOMES IN PATIENTS WITH ACUTE ISCHEMIC STROKE: THE FUKUOKA STROKE REGISTRY

R. Matsuo[1], Y. Yamaguchi[1], T. Matsushita[2], K. Fukuda[2], F. Kiyuna[3], Y. Wakisaka[3], J. Kuroda[3], T. Ago[3], M. Kamouchi[1] and T. Kitazono[3]
[1]Graduate School of Medical Sciences- Kyushu University, Department of Health Care Administration and Management, Fukuoka, Japan
[2]St. Mary's Hospital, Department of Cerebrovascular Disease, Kurume, Japan
[3]Graduate School of Medical Sciences- Kyushu University, Department of Medicine and Clinical Science, Fukuoka, Japan

Background and Aims: This study aimed to determine whether early hospital arrival is associated with favorable outcomes in patients with

acute ischemic stroke even without reperfusion therapy or in those with minor stroke.

Method: Acute ischemic stroke patients (n = 6784, 69.9 ± 12.2 years, 63.9% men) registered in the Fukuoka Stroke Registry between July 2007 and December 2014 were enrolled in this study. Onset-to-door time was categorized as $T_{0-1} \leq 1$hour(hr), 1 hr $< T_{1-2} \leq 2$ hrs, 2 hrs $< T_{2-3} \leq 3$ hrs, 3 hrs $< T_{3-6} \leq 6$ hrs, 6 hrs $< T_{6-12} \leq 12$ hrs, 12 hrs $< T_{12-24} \leq 24$ hrs, and 24 hrs $< T_{24-}$. Main outcomes were neurological improvement (National Institute of Health Stroke Scale [NIHSS] score ≥ 4 decrease during hospitalization or 0 at discharge) and good functional outcome (modified Rankin Scale ≤ 1 at 3 months). Associations between onset-to-door time and main outcomes were evaluated after adjusting for potential confounders using logistic regression analysis.

Results: As onset-to-door time is getting shorter within 6 hours, odds ratios (95% confidence interval) for neurological improvement (T_{0-1} 2.86 [2.33–3.50], T_{1-2} 2.49 [2.01–3.07], T_{2-3} 1.52 [1.21–1.91], T_{3-6} 1.69 [1.42–2.02], in reference to T_{24-}) and those for good functional outcome (T_{0-1} 2.59 [1.99–3.38], T_{1-2} 2.06 [1.57–2.70], T_{2-3} 1.48 [1.11–1.96], T_{3-6} 1.27 [1.01–1.58], in reference to T_{24-}) significantly increased after adjusting for confounding factors including reperfusion therapy and basal NIHSS. These associations were maintained in 6221 patients without reperfusion therapy or 4797 patients with minor stroke (NIHSS score ≤ 4 on hospital arrival).

Conclusion: Early hospital arrival within 6 hours of stroke onset was associated with favorable outcomes after acute ischemic stroke irrespective of reperfusion therapy or stroke severity.

AS13-010

EPIDEMIOLOGY OF STROKE

AGE-RELATED DIFFERENCES IN STROKE RISK FACTORS: INSIGHTS FROM THE REASONS FOR GEOGRAPHIC AND RACIAL DIFFERENCES IN STROKE (REGARDS) STUDY

G. Howard[1], M. Cushman[2], M. Banach[3], B. Kissela[4], C. Moy[5], E. Soliman[6], S. Judd[7] and V. Howard[7]

[1]University of Alabama at Birmingham, Birmingham, USA
[2]University of Vermont, Medicine, Burlington- VT, USA
[3]University of Lodz, Medicine, Lodz, Poland
[4]University of Cincinnati, Neurology, Cincinnati- OK, USA
[5]NIH, NINDS, Bethesda- MD, USA
[6]Wake Forest University, Epidemiology, Winston Salem- NC, USA
[7]University of Alabama at Birmingham, Biostatistics, Birmingham- AL, USA

Background and Aims: Most stroke risk factor models were developed in populations aged less than 75 years. Despite the aging of the population, little information is available if risk factors play the same role across the age spectrum.

Method: REGARDS is a U.S. population-based longitudinal cohort study of blacks and whites aged 45+. Participants stroke and TIA-free at baseline (n = 26,695) were selected. Multivariable proportional hazards analysis assessed the role of risk traditional stroke risk factors within age strata.

Results:

	Age Strata at Baseline		
	Young (45-64)	Middle (65-74)	Older (75+)
Black Race	1.41 (1.10 - 1.81)		
Male Sex	1.55 (1.22 - 1.97)		
Hypertension	1.70 (1.30 - 2.23)	1.39 (1.10 - 1.75)	
Diabetes	1.65 (1.26 - 2.15)	1.35 (1.07 - 1.70)	
Smoking	1.55 (1.18 - 2.05)	2.08 (1.59 - 2.72)	1.78 (1.15 - 2.76)
Atrial Fibrillation	1.53 (1.04 - 2.27)	1.50 (1.09 - 2.08)	1.71 (1.26 - 2.32)
Heart disease	1.87 (1.39 - 2.52)	1.42 (1.12 - 1.81)	1.59 (1.24 - 2.04)
Left Ventricular Hypertrophy (LVH)		1.72 (1.30 - 2.26)	1.51 (1.09 - 2.07)
Poor Physical Health-Related Quality of Life			1.32 (1.03 - 1.69)
C statistic	0.689 (0.658 – 0.720)	0.623 (0.595 – 0.652)	0.600 (0.564 – 0.635)

Table: Hazard ratio (and 95% confidence limits) for incident stroke in multivariable proportional hazards model. C-statistic for each model (with 95% confidence intervals).

Over a 9-year follow-up, 1,044 (4%) participants suffered an incident stroke. For those aged 45–64, the well-accepted risk factors (black race, male sex, hypertension, diabetes, smoking, atrial fibrillation and heart disease) were all associated with higher risk (see table). For those aged 65–74, race and sex were no longer significant; hypertension, diabetes and heart disease all remained significant, but played a smaller role; the impact of smoking and atrial fibrillation persisted; and LVH became significant. For those aged 75+, hypertension and diabetes were no longer significant, while the impact of other risk factors persisted; and a poor physical quality of life became significant.

Conclusion: These data suggest that stroke risk factors may differ by age, with race, sex, hypertension and diabetes not being important risk factors in the elderly, but rather smoking, atrial fibrillation LVH, heart disease and physical functioning playing a more important role in the elderly.

AS13-012

EPIDEMIOLOGY OF STROKE

RISK OF HEMORRHAGIC STROKE IN CHILDREN AND YOUNG ADULTS WITH CONGENITAL HEART DISEASE: A CASE-CONTROL STUDY

K.W. Giang[1], Z. Mandalenakis[1], M. Delborg[1], G. Lappas[1], P. Eriksson[1], P.O. Hansson[1] and A. Rosengren[1]

[1]Institute of Medicine, Molecular and clinical Medicine, Gothenburg, Sweden

Background and Aims: The risk of ischemic stroke is shown to be increased in patients with congenital heart disease (CHD); however data on the risk of hemorrhagic stroke are lacking.

Method: The Swedish Patient Register was used to identify all patients that were born with a diagnosis of CHD between 1970 and 1993. Each patient was compared to 10 randomly selected controls from the general population, matched for age, sex, and county. Follow-up data were collected until December 2011 for both case and controls. All patients were classified according to Botto et al. hierarchic CHD classification. A subdistributional hazard risk regression (SHR) model was used to adjust for competing risk of death.

Results: Of 21,982 patients with a CHD, 162 had a hemorrhagic stroke. The absolute risk of hemorrhagic stroke was low (0.5%) but compared to the controls the risk was doubled (SHR 2.47, 95% CI 1.81–3.38). Patients with coarctation of the aortae (SHR 4.14, 95% CI, 1.25–13.6) and "other heart and circulatory system anomalies", mostly valve-related malformations (SHR 4.73, 95% CI, 3.16–7.07) had the highest risk of hemorrhagic stroke, with a cumulative incidence of 0.6% and 0.8%, respectively.

Conclusion: The overall risk of hemorrhagic stroke among children and young adults with CHD was twice that of matched controls from the general population, although the absolute risk was low. The highest risk

was found among CHD patients with coarctation of the aorta or valve-related congenital abnormalities.

AS13-016

EPIDEMIOLOGY OF STROKE

OUTCOME, PREDICTOR AND FUNCTIONAL RECOVERY OF ISCHEMIC STROKE SUBTYPES (TOAST): THE SOUTH LONDON STROKE REGISTER

H. Wafa[1], A. Rudd[1], C. Wolfe[1] and Y. Wang[1]
[1]King's College London, Division of health and social care research, London, United Kingdom

Background and Aims: We aim to estimate short and long-term outcomes and their predictors in ischemic stroke subtypes.
Method: First-ever ischemic strokes registered between 1999 and 2015 in the South London Stroke Register (n = 2541) were categorised according to modified TOAST criteria into: large artery atherosclerosis (LAA), cardio-embolism (CE), small vessel occlusion (SVO), other determined aetiologies (OTH), undetermined aetiologies (UND), and concurrent aetiologies (CONC). Baseline data included sociodemographics, case mix, prior risk factors, acute stroke processes, with outcomes up to 10 years after stroke. Multiple logistic regression was used to estimate differences in poor outcome (dead or dependent: Barthel Index <15) and associated predictors among groups; multiple linear regression was implemented to determine functional recovery on Barthel score.
Results: Age and functional status at 7 days after stroke were the best predictors of short and long-term poor outcomes for all groups. Compared with SVO, LAA had poorer outcome at 7 days (odds ratio (OR): 1.97 (95% CI: 1.33–2.94)) and 2 years (OR: 1.94 (1.25–3)). CE had significantly poorer outcome than SVO over time (OR: 1.4 to 2.6). However, the improvement of functional outcome in the first 3 months after stroke was significantly greater among CE survivors than SVO patients (adjusted regression coefficient: 0.87 (0.07–1.67)).
Conclusion: Functional outcome after stroke improves over time in all subtypes. Patients with SVO have the best outcomes. CE survivors have the greatest recovery in the first 3 months despite their poorer prognosis. Identifying predictors and trajectories of recovery are important to management of stroke recovery.

AS13-018

EPIDEMIOLOGY OF STROKE

HIGH ANKLE SYSTOLIC BLOOD PRESSURES IN SOUTH ASIANS WITH STROKE

K. Kain[1], H. Ilyas[2], T. Ishfaq[2], A. Butt[2], R. West[1] and H. Ramadan[2]
[1]University of Leeds, Leeds Institute of Cardiovascular and Metabolic Medicine, Leeds, United Kingdom
[2]Bradford Teaching Hospitals NHS Foundation Trust, neurology and stroke medicine, Bradford, United Kingdom

Background and Aims: Both increased brachial and ankle systolic-blood-pressures increase the risk of stroke. South Asians have increased risk of stroke although brachial systolic-blood-pressures are lower compared to Europeans. Post stroke ankle systolic-blood-pressure information in south Asians has not yet been reported.
Method: One hundred stroke patients (53 Europeans and 47 south Asians) were recruited, their history taken and their anthropometry and Doppler systolic-blood-pressures in all four limbs (one each arm and two on each leg) measured.
Results: On average, south Asians with stroke were 7 years younger than Europeans (66 vs 73years, p = 0.007). There were no significant differences in known hypertension, antihypertensive therapy, cholesterol-lowering agents, anti-diabetes therapy or 30-day mortality (4 Europeans and 1 south Asian) between the two groups. Diabetes prevalence was increased (p = 0.008) but smoking was decreased in south Asians (p = 0.006). There were no significant differences in body mass index or waist height ratio but median ankle systolic-blood-pressures were found to be significantly higher in south Asians. The right posterior tibial systolic-blood-pressure was seen to be 20 mmHg increased in south Asian compared with European stroke patients. Within south Asians the stroke patients who died at 30 days had higher ankle systolic-blood-pressures but within Europeans had lower ankle systolic-blood-pressures compared to those who were alive although these were not statistically significant.
Conclusion: South Asians with stroke have increased prevalence of diabetes and significantly higher ankle systolic-blood-pressures but were younger compared to Europeans. Future longitudinal studies are needed to determine value of changes in ankle systolic-blood-pressures for 30-day stroke mortality.

AS13-019

EPIDEMIOLOGY OF STROKE

THIRTY DAY STROKE MORTALITY: SMOKING AND DIABETES PARADOXES

K. Kain[1], R. West[1] and H. Ramadan[2]
[1]University of Leeds, Leeds Institute of Cardiovascular and Metabolic Medicine, Leeds, United Kingdom
[2]Bradford Teaching Hospitals NHS Foundation Trust, Neurology and Stroke Medicine, Bradford, United Kingdom

Background and Aims: South Asians generally have more visceral obesity, diabetes and higher stroke mortality than Europeans. Factors for post-stroke mortality need to be identified.
Method: A prospective 12-months study of 273,327 adults and consecutive acute stroke presentations from 01/05/2013 to 30/04/2014 was conducted in Bradford Teaching Hospital Trust. Stroke cases included Europeans n = 536 and south Asians n = 116. Statistical methods: Age, Oxfordshire Community Stroke Project (OCSP) classification, transient ischaemic attack, previous stroke, gender, smoker, alcohol, family history of stroke, obesity, diabetes, hypertension, hyperlipidaemia, delayed admission, peripheral arterial disease, ischaemic heart disease, atrial fibrillation, congestive cardiac failure, anti-hypertensive, statins, anti-platelets, anticoagulant and insulin, were used as covariates in classifying survival trees for Europeans and south Asians.
Results: Hypertension prevalence was similar in both groups but smoking prevalence was lower and diabetes prevalence was greater in south Asians. Europeans had greater 30-day mortality than south Asians (24% vs 10%, p = 0.02). OCSP, age, smoking and hyperlipidaemia were significant determinants for Europeans (Area-Under-Curve 0.79) and OCSP classification, age, diabetes and congestive cardiac failure for south Asians (AUC 0.88). Europeans with stroke who smoke and south Asians who have diabetes survive more often at 30-days.
Conclusion: Total anterior circulation infarction stroke and increasing age are principal determinants of stroke mortality at 30-days in Europeans and south Asians. Although both smoking and diabetes are risk factors for stroke there seems to be a paradox with 30-day survival in Europeans and south Asians respectively. Future studies are needed to explain the mechanisms especially for the diabetes paradox in south Asians.

AS13-020

EPIDEMIOLOGY OF STROKE

CHARACTERISTICS AND OUTCOMES OF PATIENTS PRESENTING TO AN AUSTRALIAN EMERGENCY DEPARTMENT AND DIAGNOSED WITH STROKE

N. Bernaitis[1], J. Crilly[2], A. Davey[1] and S. Anoopkumar-Dukie[1]
[1]Griffith University and Menzies Health Institute Queensland, School of Pharmacy, Gold Coast, Australia
[2]Menzies Health Institute Queensland- Griffith University and Gold Coast Health, Department of Emergency Medicine, Gold Coast, Australia

Background and Aims: Stroke, particularly haemorrhagic, is a leading cause of mortality. Many people experiencing stroke present to an emergency department (ED) for diagnosis and treatment but outcome data is limited. The aim of this study was to describe characteristics and outcomes of patients presenting to an Australian ED with stroke.
Method: A retrospective data analysis of patients presenting to Gold Coast University Hospital ED and diagnosed with stroke was conducted from June 2010 to July 2015. Data included diagnosis, gender, age, arrival mode, departure status, and length of stay (LOS) in ED.
Results: A total of 961 ED presentations were diagnosed with stroke over the five years with a 51.7% increase in presentations from 2010 to 2015. Ischaemic stroke was most common (86.2%) among patients who were 50.7% male and 49.3% female with mean age of both genders 66 years. Stroke incidence increased with age and females over 80 had significantly higher stroke incidence than men of the same age (28.1% vs 19.3%, $p = 0.0013$). Majority of patients arrived by ambulance (71.2%) and were admitted (90.9%) after a median ED LOS of 392 minutes (IQR10–1806). Death in ED occurred for 1.25% of patients, with haemorrhagic stroke associated with significantly higher mortality than ischaemic stroke (7.52% vs 0.36%, $p = 0.0019$). Mean age of patients experiencing fatality was significantly higher than stroke survival patients (80.7 ± 8.7 vs 66.2 ± 8.7 years, $p = 0.0015$).
Conclusion: Presentations of patients diagnosed with stroke to one Australian ED increased over time. The majority of presentations were ischaemic and although mortality was low, haemorrhagic stroke was associated with the highest mortality.

AS13-023

EPIDEMIOLOGY OF STROKE

SLEEP DISORDERS AND LONG-TERM RISK OF STROKE AND ACUTE MYOCARDIAL INFARCTION IN MALE POPULATION AGED 25–64 IN RUSSIA/SIBERIA: WHO EPIDEMIOLOGICAL PROGRAM MONICA-PSYCHOSOCIAL

V. Gafarov[1], E. Krymov[1], E. Gromova[1], D. Panov[2], I. Gagulin[1] and A. Gafarova[1]
[1]FSBI Institute of Internal Medicine SB RAMS, Collaborative laboratory of Cardiovascular Diseases Epidemiology, Novosibirsk, Russia
[2]FSBI Institute of Internal Medicine SB RAMS, Novosibirsk, Russia

Background and Aims: To determine the risk of stroke and myocardial infarction (MI) in men 25–64 years with sleep disorders over 14-years of follow-up.
Method: In frame of the third screening WHO program "MONICA-psychosocial" a random representative sample of men aged 25–64 who are residents of Novosibirsk city was surveyed in 1994 ($n = 657$ men, mean age - $44,3 \pm 0,4$ years, response rate - 82.1%). Testing was conducted on a scale Jenkins - sleep disturbance. Follow-up is 14 years (1994 – 2008yy). Using the WHO "Register of myocardial infarction" for the first time all the cases new onset MI (myocardial infarction) and stroke were recorded over the follow-up in those with sleep disorders but without previous CVD.
Results: The level of sleep disorders in the male population aged 25–64 was 48.3%: evaluation of sleep "fair" - 39.6%, "bad" -7.6% "very bad" 1.1%. The risk of myocardial infarction over the 5-year period in men aged 25–64 years with sleep disorders was higher in 2.4 times (95% CI 1,1–4,9; $p < 0,05$) compared to those without sleep disorders. Over 10 years from the screening risk of stroke was 8-fold higher (95% CI 2,6–14,4; $p < 0,01$) in men with sleep disorders in the age group of 55–64y.
Conclusion: A half of male population aged 25–64 years has sleep disorders. Over 5 and 10 years the risk of stroke and MI was significantly higher in those with sleep disorders.
The Research supported by the grant RGNF14-06-00227.

AS13-024

EPIDEMIOLOGY OF STROKE

EPIDEMIOLOGICAL AND CLINICAL CHARACTERISTICS OF PEDIATRIC PATIENTS DIAGNOSED WITH HEMORRHAGIC STROKE AT A BRAZILIAN ACADEMIC HOSPITAL

M.C. Braga[1], A.P.A. Camargo[1], C.M.A. Barreira[1], M.C. Libardi[1], K.T. Weber[1], L.H.S.S. Stefano[1], S.C. Mazin[1], T.E.G. Santos-Pontelli[1], R.R. Silva[1] and O.M. Pontes-Neto[1]
[1]Ribeirão Preto Medical School - USP, Department of Neurosciensce and Behavior, Ribeirão Preto, Brazil

Background and Aims: Although being relatively rare, pediatric stroke is one of the 10 main causes of childhood death. Hemorrhagic stroke accounts for approximately half of stroke in this population. Despite this, there is very little information about pediatric stroke in developing countries, especially about hemorrhagic stroke (HS). The objective was to characterize the demographic and clinical profile of children hospitalized in a tertiary academic hospital in Brazil with a confirmed diagnosis of HS, to evaluate the prognosis and in-hospital mortality related to HS.
Method: Pediatric stroke cases admitted between January 2000 and December 2013 were retrospectively assessed. Out of 135 stroke cases, 61 children between 0 to 18 years old with confirmed diagnosis of HS by neuroimaging. Variables such as sex, age, race, topography of the bleeding, etiology and in-hospital mortality were analyzed.
Results: Out of 61 patients, 31 (50,82%) were male, the mean age was $5,38 \pm 5,36$ years, 46 (75,41%) were from white ethnicity. Only 4 (6,56%) cases of perinatal strokes were found, against 57 (93,44%) infant cases. Bilateral hemispheric involvement was present in 22 events (36,06%) and the supratentorial injury was present in 54 cases (88,52%). The most common etiologies for HS in our pediatric population were arteriovenous malformation and cerebral venous trombosis. We found high In-hospital mortality (32,79%) mostly due to stroke complications.
Conclusion: We found high percentage of HS among pediatric stroke cases in our center, with high in-hospital mortality and diverse etiologies. Our results emphasize the importance of increasing awareness about stroke in the pediatric population in developing countries.

AS13-025

EPIDEMIOLOGY OF STROKE

ASSESSMENT OF THE EFFICIENCY OF STROKE AWARENESS CAMPAIGN IN HUNGARY

A. Folyovich[1], D. Biczó[2], K.A. Béres-Molnár[3], T. Jarecsny[3], N. Al-Muhanna[3], D. Jánoska[3], E. Dudás[3] and G. Toldi[4]
[1]St John's Hospital, Budapest, Hungary
[2]DRK Hospital Neuwied- University of Bonn, Cardiology, Neuwied, Germany
[3]St John's Hospital, Neurology and Stroke, Budapest, Hungary
[4]Semmelweis University, First Department of Obstetrics and Gynecology, Budapest, Hungary

Background and Aims: The efficacy of stroke prevention and acute therapy depends on the health awareness of the population and sufficient knowledge. Public campaigns solve this, but due to their substantial expenses, the assessment of their efficiency is reasonable.
Method: Our aim was to assess the efficacy of stroke awareness campaigns in Hungary (and alone in Budapest, the centre of Hungarian "Stroke Day") . The examined period was 2008–2015. We chose the thrombolytic treatment (TT) as an indicator of the campaigns' efficiency. We compared the change in the daily mean number of TTs performed on the "Stroke Day" and during the preceding and following one week and month. The data were compared to the annual mean. The statistical analysis was performed by *t-test* and the *Mann-Whitney U test*.
Results: No changes can be seen on the "Stroke Days" and the days immediately preceding or following them (a). We observed increases of TTs in the week after the campaign (b) in 5 years of the 8-year period. During the month after (c) compared with that before the Stroke Day, we found favorable results in 6 occasions. The numbers of TTs in the post-campaign months revealed a positive but statistically non-significant effect in 5 years nationwide and in Budapest (Hungary: a: $p = 0.1489$, b: $p = 0.3405$, c: $p = 0.3104$; Budapest: a: $p = 0.7627$, b: $p = 0.82759$, c: $p = 0.5290$).
Conclusion: The campaigns were not significantly effective, but is doesn't mean that they are useless. We have to search for novel strategies and elaboration of further approaches.

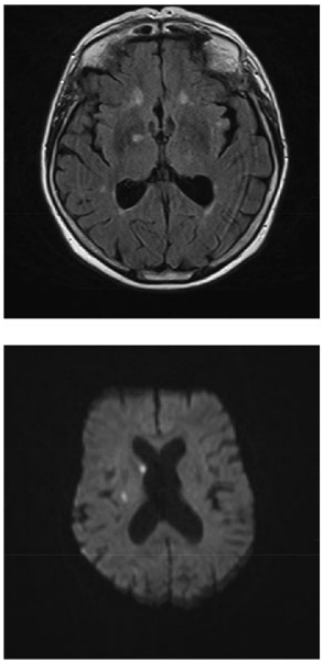
AS13-026

EPIDEMIOLOGY OF STROKE

GUSTATORY AND OLFACTORY CONSEQUENCES OF ACUTE STROKE: A CASE REPORT

C. Small[1], S. Murphy[2] and D. Murphy[3]
[1]Mater Misericordiae University Hospital, Medicine for The Elderly, Dublin, Ireland
[2]Mater Misericordiae University Hospital, Dublin Neurovascular Institute, Dublin, Ireland
[3]Mater Private Hospital, Radiology, dublin, Ireland

Background and Aims: Altered taste and smell sensation after stroke is a poorly described phenomenon. However, the impact of dysfunctional taste and smell can lead to malnutrition, low mood with resultant delayed recovery, rehabilitation and discharge.
Impaired taste perception can result from lesions in several locations including the pons, insular cortices, and specific thalamic nuclei. Several case reports have detailed altered taste as a result of isolated pontine lesions, isolated right & left insular lesions.
Outcomes may be limited because of lack of awareness among clinicians. We describe a unique case of acute stroke, with isolated loss of taste and smell as the only clinical manifestation.
Method: A 73 year old female was admitted for coronary angiogram post positive dobutamine stress echocardiogram. Day one post procedure she complained of sudden loss of sense of taste and smell. She was reviewed by ENT and fibreoptic endoscopy was normal. She was seen by the stroke service and no other neurological findings were demonstrated. An MRI brain stroke protocol was advised urgently.
Results: MRI brain revealed 3 small foci of restricted diffusion in the right basal ganglia consistent with an acute infarction of likely embolic origin.



Conclusion: This case highlights that anosmia and ageusia can be the only manifestation of an acute stroke. These deficits can result from lesions in several locations including the pons, insular cortices, and specific thalamic nuclei with a wide variety of stroke topography found in these rare cases. Better awareness among clinicians is required.

AS13-027

EPIDEMIOLOGY OF STROKE

IMPACT OF INFLUENZA EPIDEMICS ON NUMBER OF CALLS TO THE EMERGENCY MEDICAL ASSISTANCE SERVICE FOR STROKE SUSPICION, IN YVELINES, FRANCE, FROM 2004 TO 2015

C. Hirel[1], L. Berton[2], J. Labreuche[3], Y. Lambert[2] and F. Pico[1]
[1]Centre Hospitalier de Versailles, Neurology, Versailles, France
[2]Centre Hospitalier de Versailles, SAMU, Versailles, France
[3]CHRU, Biostatistics department, Lille, France

Background and Aims: The role of environmental factors, such as meteorological conditions, air pollution or viral epidemics, like precipitant factors of stroke, is currently discussed. The goal of this study was to evaluate the impact of seasonal influenza epidemics on the number of calls to the emergency medical assistance service for stroke suspicion, in the department of Yvelines, a suburb of Paris with a population of 1.5 million inhabitants, France, between 2004 and 2015.
Method: The national and regional weekly influenza data of the twelve last years were provided by the "GROG" (regional influenza surveillance

groups) and "Sentinelle" networks. Calls to the emergency medical assistance service in the department of Yvelines for influenza and stroke suspicion have been listed from January 2004 to December 2015. Poisson regression models were used to study the link between influenza epidemics and calls for stroke suspicion.
Results: A total of approximately 11000 calls for stroke suspicion was listed over a 12-year period. There were fewer calls for stroke suspicion during summer, in comparison with the other seasons ($p < 0.001$). A statistically significant relationship existed between the number of calls for stroke suspicion and seasonal influenza epidemics, during the same week, or during the previous week ($p < 0.0001$).
Conclusion: There were more calls to the emergency medical assistance service for suspicion of stroke during the influenza epidemics during the last twelve years. This preliminary work will be continued with meteorological conditions and air pollution.

AS13-029

EPIDEMIOLOGY OF STROKE

WARFARIN TREATMENT FOLLOWING HAEMORRHAGIC STROKE OR TRAUMATIC INTRACRANIAL BLEEDING IN ATRIAL FIBRILLATION PATIENTS: A NET CLINICAL BENEFIT ANALYSIS

P.B. Nielsen[1], T.B. Larsen[1], F. Skjøth[2] and G.Y.H. Lip[3]
[1]Aalborg University Hospital, Department of Cardiology, Aalborg, Denmark
[2]Aalborg University, Aalborg Thrombosis Research Unit, Aalborg, Denmark
[3]University of Birmingham, Institute for Cardiovascular Sciences, Birmingham, United Kingdom

Background and Aims: The increased risk of bleeding associated with antithrombotics causes a dilemma in atrial fibrillation (AF) patients sustaining an intracranial haemorrhage (ICH). A thrombotic risk is present, but also a risk of serious harm from recurrent bleeds by resuming anticoagulation. We investigated the net clinical benefit (NCB) for resuming warfarin treatment stratified according to type of ICH, i.e. haemorrhagic stroke or traumatic ICH.
Method: A nationwide observational cohort study of atrial fibrillation patients sustaining an incident ICH was conducted. AF patients discharged from hospital following an ICH event during warfarin treatment were included. Treatment strategies thus included no treatment or resumption of warfarin treatment, and were included as a time-dependent exposure. The patients were assumed untreated until a subsequent warfarin prescription was observed. NCB of treatment was calculated as a weighted sum of rate differences from ischemic stroke and ICH. Relative weights from previous investigations were applied; i.e. ischemic stroke had a weight of 1.0 (reference) and ICH weight was 2.4.
Results: A total of 2415 atrial fibrillation patients sustained an ICH event in this cohort. Of these 1325 were from haemorrhagic stroke and 1090 were secondary to trauma. For patients with haemorrhagic stroke the NCB was 4.38 [95%CI, -1.85 to 10.61]. For patients with ICH secondary to a traumatic event the NCB was 21.48 [95%CI, 13.12 to 29.84].
Conclusion: Resumption of warfarin following spontaneous haemorrhagic stroke was associated with a non-significant positive NCB, and among patients with a traumatic intracranial haemorrhage, there was a similar positive NCB in favour for warfarin resumption.

AS13-033

EPIDEMIOLOGY OF STROKE

VASCULAR CELL ADHESION MOLECULE-1 AND LONG-TERM OUTCOME AFTER STROKE - THE PROSPECTIVE STROKE COHORT WITH INCIDENT STROKE BERLIN (PROSCIS-B)

T. Liman[1]
[1]Center for Stroke Research Berlin CSB, Berlin, Germany

Background and Aims: Vascular cell adhesion molecule-1 (VCAM) is increased after acute ischemic stroke and serves as a surrogate marker for endothelial activation. However, data from prospective studies on VCAM serum levels and its impact on long-term outcome are scarce. We aimed to analyze the association between acute VCAM serum levels and outcome at twelve months after stroke.
Method: Data were collected from the Prospective Cohort with Incident Stroke-Berlin (PROSCIS-B; NCT01363856). We used logistic regression to examine the association between quartiles of VCAM and functional outcome defined by the modified Rankin Scale (0–2 vs 3–6) and Cox regression to examine the association between quartiles of VCAM and cardiovascular outcome defined as the combined endpoint of recurrent stroke, myocardial infarction, and death within 12 months after stroke.
Results: VCAM levels and functional outcome after one year were available for $N = 496$ patients. Patients within the highest quartile of VCAM levels (>593 ng/ml) had significantly more often poor functional outcome compared to the lowest quartile ($<= 390$ ng/ml; OR2.23; 95% CI 1.24 – 4.01). After adjustment for possible confounders (age, sex, etiology, stroke severity, and comorbidities) this effect was attenuated (OR 1.66; 95% CI 0.80–3.43).
We found a significant difference in crude survival rates between VCAM quartiles ($p = 0.040$), but there was no significant difference in hazard rates between highest and lowest quartile after adjustment for possible confounders (HR 1.57; 95% CI 0.63–3.96).
Conclusion: In this study, higher levels of VCAM had no significant impact on poor functional or cardiovascular outcome at one year after stroke after adjustment for confounders.

AS13-036

EPIDEMIOLOGY OF STROKE

DIFFERENT SUBTYPES OF ISCHEMIC STROKE IN PATIENTS OF ALL AGES IN KYRGYZSTAN: PREDICTORS OF OUTCOME IN THE MOST ACUTE PERIOD: DATA FROM SITS-KYRGYZSTAN

I. Lutsenko[1], D. Titarenko[1], S. Jumakeeva[1], A. Artykbaev[2], M. Ernisova[1], A. Shapovalova[1] and A. Ismailova[1]
[1]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan
[2]Bishkek City Civil Clinic 1, Neurology, Bishkek, Kyrgyzstan

Background and Aims: We used SITS-Kyrgyzstan data to proceed an epidemiological with nested case-control study, aiming to find a correlation between predictors of ischemic strokes and severity of condition in all TOAST subtypes.
Method: Age and baseline severity measured by NIHSS are the two most powerful prognostic factors for stroke outcome and are usually included in analyses of outcome distribution. As predictors we used systolic blood pressure, place of living (lowlands, midlands, highlands), baseline NIHSS and mRs, onset-to-needle time, gender, old age.
Results: The study group consisted of 425 patients, including 229(53,5%) men and 199 (46,5%) women. Mean age in males was 62,02 (+-11,782)

and in females 67,84 (+-14,212) y. A large artery atherosclerosis (LAA) was prevalent - 72,9% and cardiogenic embolism (CE) - 18,9%There were more highlands patients with CE (95% CI, OR 1.73 to 2.96, P = 0.0001), they also demonstrated the worst improvement in comparison with the other strokes (95% CI, OR 1.72 to 2.11, P = 0.003). Mean onset-to-needle time was 24,74 + −44,14 h, minimal 0.5 h and maximal 400,0 h, because of rurality of many regions included, hence, there were only 26,4% candidates for thrombolysis according only to the time of admission.

Conclusion: The leading role in the genesis of ischemic stroke in patients of Kyrgyzstan belongs to atherosclerosis of a large artery. The onset-to-needle time stays very long because of rurality. Untreated arterial hypertension was a severe risk factor for both atherothrombotic and lacunar strokes. OR for living in highlands was 2,8 and associated with worse outcome on NIHSS and mRs on 3 months.

AS13-037

EPIDEMIOLOGY OF STROKE

COMPARATIVE RATES OF MORBIDITY AND MORTALITY FROM STROKE IN KAZAKHSTAN FOR 2015 - 2016 YEARS

Y. Adilbekov[1], Z. Akhmetzhanova[1], A. Kudaibergenova[1], N. Aldiyarova[2] and S. Akshulakov[3]

[1]National center for Neurosurgery, Republican coordination centre for stroke problems, Astana, Kazakhstan

[2]National Center for Neurosurgery, Science and strategy, Astana, Kazakhstan

[3]National center for neurosurgery, the Chairman of the board, Astana, Kazakhstan

Background and Aims: Nowadays, stroke is considered as a global epidemic, which threatening live and health all over the world. Nevertheless, little is known about the current prevalence, morbidity and mortality from stroke at the national level and the tendency in recent years.

Aim: Epidemiological analysis of morbidity and mortality for stroke in the Republic of Kazakhstan for 2015–2016 years.

Method: Materials for the study were obtained from the official source of the National Center for Electronic Healthcare the Ministry of healthcare and social development of the Republic of Kazakhstan. We analyzed data on treated cases of stroke for the years of 2015–2016 on 16 regions of Kazakhstan.

Results: The morbidity from stroke for 2016 in Kazakhstan amounted 226,6 cases per 100 thousand population, in comparison with the same period of 2015 the morbidity from stroke increased by 2.9% (220.2 cases). Among them, ischemic stroke was 74.1% and hemorrhagic stroke was 25.9%.

The highest rates are found in the next regions: Pavlodar 312.5, Karaganda 291.3, the East Kazakhstan 281.2, Akmola 262.5.

The hospital mortality from stroke for Kazakhstan for 2016 was 12.6 and decreased by 3% in comparison with 2015 (13). At the same time, the rate of hospital mortality between ischemic and hemorrhagic stroke was 50% to 50%. The highest figures of hospital mortality from stroke for 2016 registered in the next regions: Kostanay 17.4, Karaganda 16.2, Aktobe 14.9, West-Kazakhstan 14.7.

Conclusion: The morbidity from stroke for 2016 increased by 2.9% in comparison with 2015. Whereas indicators of hospital mortality from stroke decreased by 3%.

AS13-046

EPIDEMIOLOGY OF STROKE

KNOWLEDGE OF STROKE AMONG THE POPULATION HAS IT IMPROVED OVER THE LAST 12 YEARS?

E. Palomeras[1], M.D. Palomar[1], E. Vilardell[1], E. Palomera[2], A. Ciurana[1], E. Serrano[1], V. Casado[1], A. Cano[1], P. Sanz[1], D. Muriana[1], P. Fossas[1] and M. Serra[2]

[1]Hospital de Mataró, Neurology, Mataró, Spain

[2]Hospital de Mataró, Epidemiology, Mataró, Spain

Background and Aims: Twelve years ago, a study carried out in our hospital showed a poor knowledge of stroke among the population and a little perception of emergency. During this period, many actions, at local and national level, have been performed aimed at improving this aspect. We've carried out a study with the same design as the one previously published to evaluate if the knowledge of the population in these years has increased.

Method: We prospectively included all patients consecutively admitted to our hospital with an acute stroke during a 14 months' period. As done in a previous research, we asked them: what they thought they were suffering and what they did immediately. We have compared the answers with those obtained 12 years ago. We also obtained sociodemographic, clinical and topographical data with the aim of analyzing associated factors with a better knowledge.

Results: 229 patients included, mean age 75.3 years old, 43.7% of them correctly recognized their symptoms as a stroke, while 12 years ago, 33.9% did it (p:0.02). However, only 34.5% of patients had emergency perception (12 years ago, 31.8% did, non-statistically significant difference). After multivariate analysis, the only related factor with a better knowledge was the history of previous stroke (OR:3.03, IC95% 1.49–6.19, p:0.002).

Conclusion: There is a significant improvement in the knowledge of stroke among the population, but it is still not perceived as an emergency. Therefore, it's necessary to continue informing the population by means of campaigns on the great importance of "emergency need" when they suffer from stroke symptoms.

AS13-047

EPIDEMIOLOGY OF STROKE

COST OF ACUTE STROKE IN LEBANON

R. Abdo[1], H. Abboud[2], P. Salameh[3] and H. Hosseini[4]

[1]Lebanese University, Laboratory of Clinical and Epidemiology Research-Doctoral School of Sciences and Technology, Beirut, Lebanon

[2]Hotel Dieu de France Hospital- Saint Joseph University, Department of Neurology, Beirut, Lebanon

[3]Lebanese University, Faculty of Medicine, Beirut, Lebanon

[4]Henri MondorHospital AP-HP, Department of Neurology, Creteil, France

Background and Aims: Global burden of stroke is high, inclusive of increasing economic impact, particularly in low- and middle-income countries. The aim of this study is to evaluate the costs of hospital care for acute stroke in Beirut and find out predictors of high cost care.

Method: Baseline characteristics, clinical outcome, and cost data for stroke patients admitted prospectively in 2015–2016, from eight different hospitals in Beirut were collected. Direct medical costs, cost per life saved and per life-year saved were calculated.

Results: 203 patients (57.6% male, mean age 68.8 ± 12.9 years) were included in study. Mean length of hospital stay (LOS) was 11.8 ± 13.7 days. National Institutes of Health Stroke Scale (NIHSS) mean score at admission was 10.8 ± 9.9, modified Rankin Scale (mRS) score and Barthel

Index (BI) means at discharge were respectively 3.4 ± 1.9 and 58.6 ± 38.8. The direct in-hospital cost for all stroke cases was USD 1,151,716 for a total of 2351 days (USD 490 per day). The average cost per stroke patient was USD 5,876 ± 8,664. Mean costs by stroke types were USD 1,289 ± 473 for TIA (N = 13); 4,203 ± 4,380 for ischemic strokes (N = 160); 12,846 ± 17,727 for intracerebral hemorrhage (N = 14) and 21,679 ± 15,033 for subarachnoid hemorrhage (N = 16). Cost significantly increases with a higher LOS, intensive care stay, NIHSS, and mRS scores and with a lower BI. Cost per life saved and per life-year saved were USD 6,544 and 6,817 respectively.

Conclusion: The findings may be guideline for disease-cost management of stroke in Lebanon. Cost reductions are more likely to be achieved by improving acute treatment and social conditions for early return home.

AS13-048

EPIDEMIOLOGY OF STROKE

A POPULATION BASED COHORT STUDY OF CEREBROVASCULAR DISEASE IN A SICILIAN ELDERLY COMMUNITY: "BAGHERIA COHORT STUDY"

V. Arnao[1], M. RIolo[1], G. Smorlesi[1], P. Ragonese[1] and P. Aridon[1]
[1]University of Palermo, BioNeC, Palermo, Italy

Background and Aims: Stroke is one of the most disabling and burdensome health conditions worldwide. Our aim was to assess incidence rates of cerebrovascular disease, in a Sicilian population using data from a population-based survey of elderly participants.

Method: A door-to-door survey was carried out in the city of Bagheria, Sicily (prevalence day September 30th, 2006). A cohort of 2,200 persons was randomly stratified, obtaining a 25% sample of the whole population aged 65 years or more. We obtained clinical data for the whole cohort after nine year from local Health Institution. Individuals were evaluated at baseline (2007–2008) and at the end of follow-up period (2016). We calculated crude, and age and sex specific incidence rates, as well as cause specific mortality rates, with 95% confidence intervals (CI).

Results: We identified 176 incident patients with cerebrovascular disease during the follow up giving a total incidence of 888.9/100,000 person years (CI: 888.86–888.94). Incidence rate was higher in men (1010.00, CI: 1009.94–1010.06) than women (790.30; CI: 790.24–790.36). Cause specific mortality rate for CVD was 353.54/100,000 (CI: 353.50–353.58) in the whol cohort, 420.12 in men (CI: 420.06–420.18) and 297.54 in women (CI: 297.48–297.60). Age-specific incidence rates of cerebrovascular disease increased with advancing age.

Conclusion: In the Bagheria Cohort study, incidence of cerebrovascular diseases increased with age. Stroke incidence rates and mortality were significantly higher for men compared to women. Our incidence rates provide new estimates for projection of future burden of disease in Italy and should be considered when planning prevention and stroke care services in this region.

AS13-055

EPIDEMIOLOGY OF STROKE

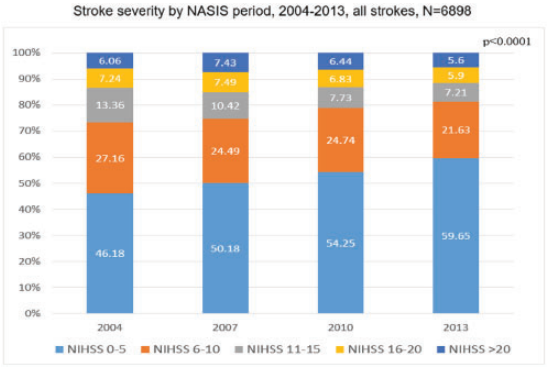
DECREASING ADMISSION STROKE SEVERITY FROM 2004 TO 2013: ANALYSIS FROM THE NATIONAL ACUTE STROKE ISRAELI (NASIS) REGISTRY

S. Koton[1], N. Bornstein[2], J. Streifler[2], O. Azrilin[3], S. Hadar[4] and D. Tanne[2]
[1]Tel Aviv University, School of Health Professions- Faculty of Medicine, Tel Aviv, Israel
[2]Tel Aviv University, Faculty of Medicine, Tel Aviv, Israel
[3]Nahariya Medical Center, Neurology, Nahariya, Israel
[4]Laniado Medical Center, Neurology, Netanya, Israel

Background and Aims: Decreasing stroke severity over time has been suggested, but national data on long-term temporal trends in stroke severity are scarce. We studied changes in stroke severity from 2004 to 2013 in a prospective national registry of hospitalized acute stroke patients in Israel.

Method: All 6698 acute stroke patients (5957 ischemic stroke- IS, 634 intracerebral hemorrhage- ICH, and 107 undetermined stroke) in the 2004–2013 National Acute Stroke Israeli (NASIS) registry periods (February–March 2004, March–April 2007 and April-May 2010, March–April 2013) were included. Stroke severity was categorized as NIHSS ≤ 5, 6–10, 11–15, 16–20, >20. Trends in stroke severity from 2004 to 2013 were studied by stroke type, gender and age-group.

Results: Rates of severe stroke (NIHSS ≥ 11) decreased from 27% in 2004 to 19% in 2013, while rates of NIHSS ≤ 5 increased from 46% in 2004 to 60% in 2013 ($p < .0001$) (Figure). From 2004 to 2013, rates of patients with NIHSS ≤ 5 increased in IS patients (from 48% to 62%), ICH (from 27% to 35%), men (from 49% to 64%) and women (from 43% to 54%). Similar trends were observed by age groups.



Conclusion: Based on national data, stroke severity on admission has decreased in Israel in the last decade. Findings were consistent by stroke type, gender and age group. The observed trend may be related to better control of risk factors.

AS13-056

EPIDEMIOLOGY OF STROKE

RESIDENTS OF THE POORER DISTRICTS OF BUDAPEST SUFFER ISCHEMIC STROKE AT STRIKINGLY YOUNGER AGES AND SHOW HIGHER LONG-TERM FATALITY

I. Szocs[1], D. Bereczki[1], A. Ajtay[1], F. Oberfrank[2] and I. Vastagh[1]
[1]Semmelweis University, Neurology, Budapest, Hungary
[2]Magyar Tudományos Akadémia, Kísérleti Orvostudományi Kutatóintézet, Budapest, Hungary

Background and Aims: Hungary is one of the leading countries regarding stroke mortality. The National Health Insurance System offers universal access to healthcare, but social cohesion is low, the country showing significant socioeconomic inequalities among its subregions.

We aimed to assess the impact of these inequalities on stroke outcome in all the 23 districts of the capital, Budapest.

Method: With the help of the National Health Insurance System we have identified all ischaemic stroke cases from 1 January 2004 to 31

December 2013 among the inhabitants of Budapest. We have followed them up for survival until 30th April, 2014.
Results: Based on the 105,173 ischaemic stroke cases identified, we have found that age at onset of infarction correlated significantly with the mean annual taxable income of the districts: the higher the income, the older the patients at the onset of infarction ($p < 0.000001$). We have found a similar correlation between age at onset and the proportion of residents on social support (p 0.0009). While hospital fatality was higher in the districts with higher income (p 0.0,25; probably due to the fact that the patients were older in these groups), long-term fatality was significantly higher in the districts with lower income (p 0.01).
Conclusion: Patients residing in the poorer districts of the capital suffer ischaemic stroke at younger ages and show a significantly higher long-term fatality. These correlations identify social groups demanding improvement in terms of both stroke prevention and long-term care.

AS13-057

EPIDEMIOLOGY OF STROKE

HIGH INCIDENCE RATE OF HEMORRHAGIC STROKES IN LA ARAUCANIA, CHILE

R. Rivas[1,2], A. Doussoulin[3], C. Sabelle[4] and C. Klapp[5,6]
[1]Clínica Alemana Temuco, Servicio Medicina Física y Rehabilitación, Temuco, Chile
[2]Universidad de La Frontera- Facultad de Medicina, Departamento de Especialidades Médicas, Temuco, Chile
[3]Universidad de La Frontera- Facultad de Medicina, Departamento de Pediatría y Cirugía Infantil, Temuco, Chile
[4]Servicio de Salud Araucanía Sur, Departamento de Estadística y Epidemiología, Temuco, Chile
[5]Clinica Alemana Temuco, Departamento de Neurología, Temuco, Chile
[6]Consultorio Miraflores, Departamento de Neurología, Temuco, Chile

Background and Aims: Stroke is the most common specific cause of death in Chile since 2008, representing roughly 10% of total death in the country.
The aím of the study is describe the stroke hospital discharges in the period 2001–2010 in the Southern Araucanía Health Service (SAHS).
Method: The research is a retrospective descriptive Cross-Sectional Study. The study considers the databases of the department of statistics and health information (DEIS) for the years 2001–2010. The population over 15 years who presented a stroke was included, which received attention in the SAHS, and whose principal diagnosis agree to the criteria of ICD-10.
Results: During the study period was obtained 6548 hospital discharges. There were no significant differences in the discharge between male and women, with a stroke ratio of 1.1 ($\chi 2 = 0.133$, $p = 0.715$). The most frequent diagnoses for both gender was ischemic or hemorrhagic stroke with 961.3 per 100,000 inhabitants per year (95% CI 950.7 to 972.4), and second was the intracranial hemorrhage 422.9 per 100,000 inhabitants per year (95% IC 417.5 to 428.5). per 100,000 inhabitants per year (95% IC 417.5 to 428.5).
Conclusion: The incidence rate for hemorrhagic strokes almost quadruples the rate in Latin America and the Caribbean and previous studies in Chile (PISCIS) and is almost 11 times higher than the global rate. This can be explained by the greater poverty, sedentarism, obesity and high rate of hypertension. The information collected, would be useful as the basis on which to apply health care strategies, in the prevention of risk factors and supplement data nationwide.

AS13-058

EPIDEMIOLOGY OF STROKE

PATIENT-LEVEL PREDICTORS OF ACUTE HOSPITAL LENGTH OF STAY VARIATIONS IN ANGLIA STROKE CLINICAL NETWORK EVALUATION STUDY

M. Tornes[1], D.J. McLernon[1], S. Musgrave[2], E.A. Warburton[3], A.K. Metcalf[4], M.O. Bachmann[2], J.F. Potter[2] and P.K. Myint[1]
[1]University of Aberdeen, Institute of Applied Health Sciences, Aberdeen, United Kingdom
[2]Norwich Medical School, Faculty of Medicine and Health Sciences, Norwich, United Kingdom
[3]Addenbrooke's University Hospital, Stroke Medicine, Cambridge, United Kingdom
[4]Norfolk & Norwich University Hospital, Stroke Medicine, Norwich, United Kingdom

Background and Aims: Annually the UK spends £866 million on stroke inpatient costs. Minimising stroke patients' acute hospital length of stay (LOS) may help reduce healthcare costs and hence is regarded as an important outcome indicator. We aim to (i) identify patient-level predictors of acute hospital LOS, and (ii) determine how much LOS variance can be explained at patient- and hospital-level, respectively.
Method: We analysed multicentre cohort data covering eight National Health Service hospital trusts within the Anglia Stroke & Heart Clinical Network between 2008 and 2011. LOS was defined as the days between date of hospital admission and discharge or death, whichever came first. Patient-level predictors of LOS were identified using multiple linear regression. Using maximum-likelihood estimation, an intercept-only variance components model was fitted with hospital trust as the random variable.
Results: A total of 1600 stroke admissions (52% female, median age (interquartile range (IQR)) 79 (71–86) years, 91% ischaemic stroke) were eligible for inclusion. Median LOS (IQR) was 8 (4–19) days. Age, dementia, previous cancer, pre-stroke disability, pre-stroke Residence, Oxford Community Stroke Project classification, lateralisation, having a complication, discharge destination and season of admission were identified as significant patient-level predictors of LOS ($R^2 = 37.5\%$, $p \leq 0.01$). 97% of the LOS variance explained by the model was attributed to differences at patient-level, with the remaining 3% variance at the hospital-level.
Conclusion: We have identified ten important patient-level predictors of LOS and shown that LOS variation is mostly explained by differences between patients rather than hospitals. Future research should explore the influence of service-level characteristics on LOS.

AS13-059

EPIDEMIOLOGY OF STROKE

COMPARISON OF RANKING OF MORTALITY AND FUNCTIONAL OUTCOME FOR COMPARING HOSPITAL PERFORMANCE

M.U. Jang[1], H.J. Bae[2], C.H. Kim[1], S. Jung[1], K.H. Yu[1], M.S. Oh[1], H.J. Choi[3], J.S. Lim[1], S.H. Lee[1], Y. Kim[1] and B.C. Lee[1]
[1]Hallym University College of Medicine, Dept of Neurology, Chuncheon, Republic of Korea
[2]Seoul National University Bundang Hospital, Dept of Neurology, Sungnam, Republic of Korea
[3]Hallym University College of Medicine, Dept of Neurosurgery, Chuncheon, Republic of Korea

Background and Aims: Medical resources are limited and should provide quality health services through the appropriate distribution. Stroke is leading cause of mortality after cancer and coronary heart disease in Korea, therefore proper outcome measurement of stroke care providers is important for policy implication.
Method: Based on a multicenter prospective stroke registry, we identified consecutive series of patients who were hospitalized due to ischemic stroke within 7 days of onset at 12 regional stroke centers between January 2011 and December 2014. We used the 30-day mortality in order to evaluate the outcomes in the traditional way, and 3-month functional outcome in alternative way. Comparison of ranking was achieved by Spearman's rankorder-correlation coefficient method.
Results: During 48 months, 22257 patients met the eligibility criteria (mean age, 67.4 years; men, 58.8%; and median baseline NIHSS, 3). The difference in 30-day mortality in the hospital ranked in 1st, and 12th was 4% (2.2% vs 6.2%). Unfavorable 3-month functional outcomes (mRS 2–6) were 35.0% in 1st positional hospital, and 62.8% in last positional hospital (Crude difference = 27.8%). The ranking of hospital 'A' was moved from 10th to 1st, and hospital 'M' was moved from 4th to 12th. Only two hospitals were stayed on same ranking (B = 2nd, C = 3rd). There was a no significant correlation between rank of 30-day mortality and 3-month functional outcome ($r_s(12) = 0.084$, $p = 0.795$).
Conclusion: In order to accurately assess hospital-level performance, adequate measurement tool is essential. When evaluating the outcomes of stroke care it will not only assess mortality rates should also consider other assessment tools.

AS13-061

EPIDEMIOLOGY OF STROKE

REGIONAL DIFFERENCES IN STROKE MORTALITY AND INCIDENCE IN THE UNITED STATES: SODIUM INTAKE, SOCIOECONOMIC STATUS AND RACE

S. Judd[1], P. Clarke[2], G. Howard[1], V. Howard[3], N. Colabianchi[4], D. Lackland[5], E. Soliman[6], S. Lakkur[1] and S. Ceclia[7]
[1]University of Alabama at Birmingham, Biostatistics, Birmingham, USA
[2]University of Michigan, Epidemiology, Ann Arbor- MI, USA
[3]University of Alabama at Birmingham, Epidemiology, Birmingham, USA
[4]University of Michigan, Kinesiology, Ann Arbor- MI, USA
[5]Medical University of South Carolina, Medicine, Charleston- SC, USA
[6]Wake Forrest University, Cardiology, Winston Salem- NC, USA
[7]University of Bordeaux, INSERM, Bordeaux, France

Background and Aims: Many hypotheses have been suggested as to why regional differences in stroke mortality exist. We hypothesized that regional differences in stroke incidence may be explained by the joint effect of home location (geographic residence) and dietary sodium intake.
Method: Data were from the REasons for Geographic and Racial Differences in Stroke (REGARDS) national cohort study of US blacks and whites. The primary outcome was incident stroke. Geographic residence and sodium intake were modeled together as the exposure to examine the joint effects of these variables. Stroke-free participants with dietary data and geographic residence were included (n = 19,316). A Block Food Frequency Questionnaire was used to assess sodium intake. County level stroke mortality (CLSM) from national statistics was modeled in quartiles and neighborhood SES was modeled using US Census tract level data. We adjusted for traditional stroke risk factors, income, education, race, age and sex in final Cox proportional hazards models.
Results: Counties with higher CLSM had lower levels of neighborhood SES, and this association was stronger in white (rho = −0.40, $p < 0.001$) than black participants (rho = −0.27, $p < 0.001$). Sodium intake differed by geography. When examining the joint effect of sodium intake and geography on incident stroke, an interaction ($p < 0.05$) was present.
Conclusion: Underlying factors behind racial and regional differences in stroke are difficult to examine due to the inter-related nature of variables like sodium intake and SES. Further, since these associations differ by race, considering the impact of sodium intake and neighborhood may require a different public health approach for different race/ethnic groups.

AS13-062

EPIDEMIOLOGY OF STROKE

PREVALENCE AND CORRELATES OF POSTTRAUMATIC STRESS DISORDER AFTER ISCHEMIC STROKE

S. Rutović[1], D. Kadojić[2], K. Šolić[3] and M. Dikanović[1]
[1]General Hospital "Dr. Josip Benčević" Slavonski Brod - School of medicine- J.J. Strossmayer University- Osijek- Croatia, Department of Neurology, Slavonski Brod, Croatia
[2]Osijek University Hospital- Osijek- Croatia- School of medicine- J.J. Strossmayer University- Osijek- Croatia, Department of Neurology, Osijek, Croatia
[3]School of Medicine- J.J. Strossmayer University in Osijek- Croatia, School of Medicine- J.J. Strossmayer University in Osijek- Croatia, Osijek, Croatia

Background and Aims: Although posttraumatic stress disorder (PTSD) commonly occurs due to traumas caused by exposures to violence and natural disasters, it can also occur after acute, life threatening medical events. The aim of this study was to establish prevalence and correlates of PTSD in patients with acute ischemic stroke (IS).
Method: We measured the prevalence of stroke-induced PTSD with the PTSD Checklist-Specific for stroke (PCL-S) in adults who had an IS. A PCL-S score of 50≥ indicated likely PTSD. We tested for potential predictors of PTSD , including age, sex, marital status, subtype of IS (using the TOAST classification), lesion localization (right or left cerebral hemisphere, brainstem and cerebellum) and disability (measured by modified Rankin Scale, score 3–5 signifying higher disability).
Results: Of 85 patients with IS 11 (12,94%) had a PCL-S score of 50≥ , mean score was 30. Mean age of participants was 63 years, 53 (62,35%) were men and 32 (37,65%) were women. Positive correlation was found between PTSD and higher degree of disability ($P < 0{,}001$ with 95% CI 0,202 do 0,563). 33.3% of patients with PTSD had lesions localised in right cerebral hemisphere and 33.3% in brainstem ($P = 0{,}013$). We found no significant correlation of PTSD with age, sex, marital status or subtype of IS.
Conclusion: Our research found high prevalence of PTSD in patients who had IS. PTSD was correlated with higher degree of disability, right sighted hemispheral lesions and brainstem lesions. We found no correlation of PTSD with subtype of ischemic stroke, age, sex, or marital status.

AS13-063

EPIDEMIOLOGY OF STROKE

HOSPITAL DISCHARGES FOR ACUTE STROKE IN IRELAND: NATIONAL DATA 2005–2015

S. Coveney[1], C. McCarthy[2], H. Smyth[2], M. Marnane[3], P.J. Kelly[4] and S. Murphy[3]
[1]University College Dublin/Mater Misercordiae University Hospital, Stroke Clinical Trials Network Ireland, Dublin, Ireland
[2]Mater Misercordiae University Hospital, Medicine for the Older Person, Dublin, Ireland
[3]Mater Misercordiae University Hospital, Stroke Medicine, Dublin, Ireland

[4]Mater Misercordiae University Hospital/University College Dublin, Stroke Clinical Trials Network Ireland, Dublin, Ireland

Background and Aims: Acute stroke is the commonest cause of acquired disability amongst community dwelling adults. In Ireland,total health care costs have been estimated at 500–800million euro per annum. Analysis of hospital discharge rates and the influence of patient age is may offer important insights on how to configure stroke prevention and clinical services. Here,we analyse hospital discharge data for Ireland for 2005–2015.
Method: National data on acute hospital discharge was obtained from the Hospital Inpatient Patient Enquiry (HIPE) database for 2005 to 2015 and was examined across 4 age groups; 15–49 years, 49–64 years, 65–80 years and >80 years. Age-specific acute stroke hospital discharge rates were calculated using Irish population census data.
Results: In the 15–49 year category: There has been a steady increase in the incidence of ischaemic stroke between 2005–2015 (0.08 v 0.13 per 1,000 patient-years). Rates of haemorrhagic stroke remained stable (0.06 per 1,000 patient-years in both 2005 and 2015).
In those over 80 the rate of ischaemic stroke has remained stable (11.4v10.97 per 1,000). Haemorrhagic stroke has been in decline in this age group (3.2v2.77 per 1000 patient-years).
Between 2005–2015, the largest decrease in total stroke incidence has been in those over 80 years (17% reduction). In contrast,there has been a 19% increase in those aged 15–49.
Conclusion: In Ireland, increasing stroke incidence in patients under age 50 contrasts to trends in older age groups. Better understanding is needed of risk factors underlying this worrying trend. Clinical service providers will need to adapt to better deal with the challenges specific to stroke at younger age.

AS13-064

EPIDEMIOLOGY OF STROKE

INCIDENCE AND NUMBER OF HOSPITAL ADMISSIONS FOR STROKE AMONG CENTENARIANS IN DENMARK 2003–2012: A NATION-WIDE POPULATION-BASED STUDY

K.K. Andersen[1] and T.S. Olsen[2]
[1]Danish Cancer Society Research Center, Section of Statistics, Copenhagen, Denmark
[2]Bispebjerg University Hospital - Copenhagen, Neurology, Copenhagen, Denmark

Background and Aims: The oldest old is the fastest growing segment in western populations. The projected increase of centenarians 2050 being 500%. Data on rate of hospitalization for stroke among centenarians do not exist. In order to estimate hospital capacity needed for centenarians with stroke now and in the future we studied rate of hospitalization for stroke among centenarians in Denmark 2003–2012.
Method: The Danish National Patient Register registers all Danes admitted with stroke. By the linkage of this register to the Register of Persons in Denmark with complete information on age and sex of all Danes we identified all persons in Denmark including those ≥100 years hospitalized for stroke 2003–2012 and calculated incidence rates of hospitalization for stroke.
Results: The number of centenarians in Denmark almost doubled from 569 centenarians in 2003 to 916 in 2012. During the study period 95 centenarians were admitted with stroke in Danish hospitals (83% women). Centenarians comprised 4 of 7743 patients (0.5 ‰) hospitalized for stroke 2003 and 18 of 7416 (2.4 ‰) 2012. Incidence of hospitalization for stroke among centenarians in Denmark 2003–2012 increased almost linearly 3-fold from 7/1000 centenarians/year 2003 to 19.5/1000 centenarians/year 2012.
Conclusion: While number of centenarians in Denmark doubled 2003–2012 rate of hospitalization for stroke among centenarians tripled reaching 19.5 admissions/1000 centenarians/year in 2012 expressing increasing tendency for hospitalization of centenarians with stroke. Projected to 2050 numbers of centenarians in Danish hospitals have increased >25-fold since 2003 occupying >1% of hospital beds used for stroke in Denmark.

AS13-065

EPIDEMIOLOGY OF STROKE

CHILDHOOD STATURE AND LINEAR GROWTH IN RELATION TO FIRST EVER ISCHEMIC STROKE OR INTRACEREBRAL HEMORRHAGE

L. Haugaard[1], T. Truelsen[2] and J. Baker[1]
[1]Frederiksberg Hospital, Clinical Epidemiology, Frederiksberg, Denmark
[2]Copenhagen University Hospital/Rigshospitalet, Neurology, Copenhagen, Denmark

Background and Aims: Adult height (genetic potential and growth-environment during childhood) is associated with stroke. Investigating childhood height and height growth may provide insights into the origins of stroke.
Method: We used information from the Copenhagen School Health Records Register on Danish schoolchildren born 1930–1989, with measured height from ages 7–13 years, to investigate associations of childhood height and of growth in height with risk of ischemic and intracerebral hemorrhagic (ICH) in adult life. Cox' regressions analyses were performed to estimate hazard ratios (HRs).
Results: Among 311,009 individuals (49% women) included in the study, 10412 (41% women) were diagnosed with an ischemic stroke and 2546 (43% women) with an ICH. We observed inverse linear and stable associations between height at all childhood ages and ischemic stroke in both sexes and ICH in men. For ischemic stroke, per unit increase in height z-score at age 7 years, the HR was 0.89 (95% CI: 0.87, 0.92) in women and 0.90 (95% CI: 0.88, 0.92) in men. For ICH, per unit increase in height z-score at age 7 years, the HR was 0.97 (95% CI: 0.91, 1.04) in women and 0.89 (95% CI: 0.84, 0.94) in men. No associations between change in height z-score from age 7–13 years were observed for ischemic or ICH among women or men.
Conclusion: Height at age 7–13 years is inversely associated with ischemic stroke in women and men and with ICH in men. Growth during this period of childhood is not associated with any of these two stroke subtypes.

AS13-066

EPIDEMIOLOGY OF STROKE

DIAGNOSIS OF CEREBRAL VENOUS THROMBOSIS: A SINGLE CENTRE EXPERIENCE

P. Mikulenka[1], T. Peisker[1], P. Vaško[1] and I. Štětkářová[1]
[1]Third Faculty of Medicine- Charles University and Hospital Kralovske Vinohrady- Prague- Czech Republic, Department of Neurology, Prague, Czech Republic

Background and Aims: Cerebral venous thrombosis (CVT) is a rare disorder with variable clinical presentation and thus remains a diagnostic challenge for clinicians. This study aims to describe a single centre experience in diagnosing CVT.
Method: Data of 39 patients with radiologically confirmed CVT were retrospectively collected and analyzed.

Results: A total of 39 patients with female predominance (32 woman) and mean age of 35 years were included in the study. Headache of various characteristic was the most common initial symptom (80%). Focal neurological symptoms and/or encephalopathy occurred in 65 % of patients. These symptoms evolved on average 4,5 days from headache onset. There was at least one prothrombogenic risk factor in 75% of the patients. Major risk factor was hormonal contraception (70% of women under 50 years), followed by localized infection such as otitis or mastoiditis in 15%. Screening of thrombophilia was carried out in 27 patients and was detected in 75% of them. D-dimer testing was performed in 25 cases and was positive in 80% of them. The average time from initial clinical presentation to confirmed diagnosis was 7 days.
Conclusion: Presentation of headache in patients with high risk factors for CVT should lead clinicians to suspicion of CVT and performing imaging studies to confirm the diagnosis as soon as possible.
Supported by the Charles University Research Project Progress Q35

AS13-067

EPIDEMIOLOGY OF STROKE

RACIAL DISPARITY IN PREVALENCE OF CEREBRAL MICROBLEED AMONG STROKE PATIENTS

S. Shahjouei[1]
[1]Tehran, Iran

Background and Aims: Data on the burden of cerebral microbleeds (CMBs) among different racial populations is limited. This study compared the number, associated factors, and topography of CMBs between African-American and Caucasian ischemic stroke patients in Mid-South United States.
Method: We evaluated consecutive ischemic stroke patients admitted to our tertiary stroke center—University of Tennessee Health Science Center, Memphis, Tennessee, in a two year period. We studied T2*-weighted MRIs for the number, location, and topography of CMBs as well as patients' demographic and clinical information.
Results: We studied a total of 760 ischemic stroke patients—mean age: 62.1 ± 13.9 years, 59.2% African American. African-American patients had a greater NIHSS, higher rate of hypertension, diabetes mellitus, history of stroke, and seizure, while Caucasians were more likely to have atrial fibrillation. Although there was a trend toward higher rate of CMBs among African-American patients ($P = 0.25$). On average, African-Americans patients had 0.7 ± 2.5 CMBs vs. 0.4 ± 1.4 CMBs in Caucasian ($P = 0.044$; CMBs ≥ 5: $P = 0.047$). Although there was no significant racial difference regarding the location of CMBs, CMBs were mostly in deep structures ($P < 0.001$). After adjusting for potential confounders, hypertension was independently associated with the presence and higher number of CMBs ($P = 0.008$ & 0.003 respectively). There was no significant difference in terms of discharge modified Rankin scale or in-hospital mortality between African-Americans and Caucasians.
Conclusion: There was a trend toward higher rate of multiple CMBs (≥ 5) among African-American stroke patients. There was no significant racial difference regarding the location of CMBs.

AS13-069

EPIDEMIOLOGY OF STROKE

INCIDENCE OF STROKE IN A HIGH CARDIOVASCULAR RISK POPULATION IN CHILE: THE NUBLE, BIOBIO CEREBROVASCULAR ATTACK INCIDENCE AND DEATH COMMUNITY SURVEILLANCE AND INTERVENTION STUDY (NANDU)

P. Lavados[1], **L. Hoffmeister**[2], **A.M. Moraga**[3], **A. Vejar**[4], **C. Gajardo**[5], **D. San Martín**[6], **C. Vidal**[2] **and B. Portales**[7]
[1]Clinica Alemana - Universidad del Desarrollo - Universidad de Chile, Departamento de Neurología y Psiquiatría, Santiago, Chile
[2]Universidad Mayor, Escuela de Salud Pública, Santiago, Chile
[3]Universidad de Concepción, Escuela de Medicina, Concepción, Chile
[4]Hospital Clínico Herminda Martin, Neurología, Chillán, Chile
[5]Hospital Clínico Herminda Martin, Enfermería, Chillán, Chile
[6]Universidad Pedro de Valdivia, Enfermería, Chillán, Chile
[7]Universidad del Desarrollo, Escuela de Medicina, Santiago, Chile

Background and Aims: Stroke is the second cause of death in Chile and with a population incidence of 94.1 per 100,000/year. National statistics show a significant regional variability in mortality and case-fatality rates, being higher in the province of Ñuble. This variability has been explained by differences in the prevalence of poverty, sedentary lifestyle, obesity and diabetes. But, these data are the result of retrospective and ecological studies with potential significant biases. Our aim is to present preliminary data of the ÑANDU community stroke project.
Method: This prospective community study is organized per the STEPS/STROKE methodology. Hot and cold pursuit using multiple overlapping sources of hospitalized, ambulatory and deceased cases, with standardized diagnostic criteria are being used to identify and follow-up all cases occurring in the resident population of Ñuble during one year. A program of community information and training of local health personnel using evidence-based protocols was implemented simultaneously. Approval for this study was obtained from the appropriate ethics committees.
Results: Cases were ascertained from March 31, 2015 to March 31 2016. 819 first-ever strokes were identified in hot pursuit. 50.2% were women and 82.9% were ischemic strokes. Mean age was 70.1 (SD 14.6) for women and 68.1 (SD 13.0) for male. The sex-age adjusted to the world annual incidence rates of first-ever stroke was 129.7/100,000. Six-month case-fatality was 19.5%.
Conclusion: These preliminary results show several differences with the previous population stroke study in Chile. Particularly a higher incidence rate, older age of onset and higher proportion if ischemic strokes.

AS13-074

EPIDEMIOLOGY OF STROKE

THE ASSESSMENT OF KNOWLEDGE LEVEL ABOUT RECOGNITION OF RISK FACTORS AND EARLY SIGNS OF STROKE IN TURKISH POPULATION

I. Yeldan[1], **G.D. Canan**[2] **and R. Mustafaoglu**[3]
[1]Istanbul University, Faculty of Health Sciences- Division of Physiotherapy and Rehabilitation- Department of Physiotherapy and Rehabilitation, Istanbul, Turkey
[2]Istanbul University, Institute of Health Sciences, Istanbul, Turkey
[3]Istanbul University, Faculty of Health Sciences Division of Physiotherapy and Rehabilitation- Department of Neurologic Physiotherapy and Rehabilitation, Istanbul, Turkey

Background and Aims: To improve community health, public education about reducing risk factors and recognizing stroke symptoms acts key role. The aim of the study was to assess the level of knowledge about the recognition of risk factors and early signs of stroke in Turkish population.
Method: Totally 1656 (894 women, aged between 20–65 years) voluntary community-based dwelling people were included in the study. Sociodemographic features of patients were recorded. Knowledge about risk factors and identification of early signs in relation to stroke were assessed. Risk factors were classified as personal (genetic, family history of stroke, age, gender), medical situations (previous stroke, prior transient iscemic attack, hypertension, hypercholesterolemia, atrial fibrillation, heart disease, obesity, diabetes mellitus, usage of orally contraseptive), habitutes (unhealthness diet, physically inactivity, smoking, excessive alcohol intake) were assessed. The awareness about early signs of stroke (face drooping, arm weakness, speech difficulty, time to call 1–1-2) were evaluated. Descriptive statistical analysis was used, $p < 0.05$ was considered significant.
Results: Mean age of the subjects was 46 years. The awareness level about personal risk factors was low (14.3%). The kowledge level about medical situation was low (6.9%). The awareness about habitutes was moderate (37.3%). In terms of early signs of stroke, knowledge level was moderate (46.4%). The knowledge of emergency call number was high (83.7%).
Conclusion: The awareness about risk factors and early signs of stroke ranged between low to moderate. To improve community health, the increased knowledge are needed on recognition of risk factors and early signs of stroke in Turkish population.

AS13-075

EPIDEMIOLOGY OF STROKE

CHANGES IN THE AGE OF STROKE ONSET IN THE LAST 18 YEARS IN AN ACADEMIC MEDICAL CENTER IN CHILE: RESULTS OF THE RECCA REGISTRY

V. Olavarría[1], A. Brunser[1], P. Muñoz-Venturelli[1] and P. Lavados[2]
[1]Clínica Alemana- Universidad del Desarrollo, Departamento de Neurología y Psiquiatría, Santiago, Chile
[2]Clinica Alemana - Universidad del Desarrollo - Instituto de Neurociencias, Servicio de Neurologia- Departamento de Medicina, Santiago, Chile

Background and Aims: Recent studies have suggested decreasing age of stroke onset, particularly in men. The aim of our study is to describe the age of stroke onset during the last 18 years in a single academic medical center in Santiago, Chile.
Method: RECCA is an ongoing prospective single center registry including all consecutive patients admitted with an acute stroke in Clínica Alemana, Santiago, Chile, from 1997. We analyzed age of stroke onset by years in total and by gender. Means were compared with ANOVA test for inequality of population means. This study has appropriate ethics committee approval.
Results: A total of 1960 patients were included, 905 (46.1%) women and 1055 (53.9%) men. The mean age in total group was 70.4 (16.3) years, 72.3 (17.3) in women and 68.8 (15.3) in men. The overall mean age varied between 70.7 (13.7) in 1998 to 69.7 (16.3) in 2016 ($p = 0.01$). In women from 68.1 (16.2) to 70.4 (18.2); $P = 0.1$ and in men from 72.6 (11.2) to 69.1 (14.7); $P = 0.001$. Linear regression showed that gender, hypertension, dyslipidemia and atrial fibrillation were independently associated with age of stroke onset.
Conclusion: The mean age of patients admitted with acute stroke has significantly decreased in the last 18 years, particularly in men. This could be due to an increase in prevalence of cardiovascular risk factors at younger ages.

AS13-076

EPIDEMIOLOGY OF STROKE

INTERNATIONAL DIFFERENCES IN RESIDUAL VASCULAR RISK AFTER STROKE WITHIN A RANDOMIZED CONTROLLED TRIAL: DATA FROM PERFORM TRIAL

T. Hoshino[1], L. Sissani[1], J. Labreuche[2], M.G. Bousser[3], A. Chamorro[4], M. Fisher[5], I. Ford[6], K.M. Fox[7], H.P. Mattle[8], P.M. Rothwell[9], P.G. Steg[10], E. Vicaut[11] and P. Amarenco[1]
[1]Bichat Hospital, Department of Neurology and Stroke Center, Paris, France
[2]Université de Lille- CHU Lille, EA 2694 - Santé publique : épidémiologie et qualité des soins, Lille, France
[3]Hôpital Lariboisière, Department of Neurology, Paris, France
[4]University of Barcelona, Hospital Clinic de Barcelona, Barcelona, Spain
[5]Harvard Medical School, Beth Israel Deaconess Medical Center, MA, USA
[6]University of Glasgow, Robertson Centre for Biostatistics, Glasgow, United Kingdom
[7]Royal Brompton Hospital, NHLI Imperial College- ICMS, London, United Kingdom
[8]Universität Bern- Inselspital, Neurologische Klinik und Poliklinik, Bern, Switzerland
[9]University of Oxford, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom
[10]Bichat Hospital, Department of Cardiology, Paris, France
[11]Hôpital Fernand Widal, Department of Biostatistics, Paris, France

Background and Aims: We aimed to explore what is attributable to the intercountry difference in residual vascular risk after stroke within a randomized controlled trial.
Method: PERFORM trial included 19100 patients from 46 countries with non-cardioembolic ischemic stroke or transient ischemic attack, randomized to receive either aspirin or terutroban and followed for 2 years. The participating countries were categorized into three groups by tertiles of 2-year major adverse cardiovascular events (MACE) risk calculated for each country (high-, intermediate-, and low-risk groups, respectively). To assess the contributions of traditional risk factors to the intercountry differences in MACE risk, we performed multinomial logistic regression analysis using the low-risk group as reference.
Results: There was a marked difference in the 2-year MACE risk by country (range, 4.2–18.5%). The HRs of MACE for intermediate-risk and high-risk groups versus low-risk group were 1.29 ($P < 0.001$) and 1.60 ($P < 0.001$), respectively. At baseline, untreated dyslipidemia (OR for intermediate-risk versus low-risk group, 1.36, $P < 0.001$; OR for high-risk versus low-risk group, 2.34, $P < 0.001$) and untreated diabetes (1.32, $P = 0.001$; 1.34, $P = 0.001$) were associated with a higher MACE risk, whereas untreated hypertension was associated with a lower risk (0.85, $P = 0.05$; 0.72, $P < 0.001$). During follow-up, LDL-cholesterol $\geq$140 mg/dL (1.13, $P = 0.07$; 1.36, $P < 0.001$), HDL-cholesterol $<$40 mg/dL (1.02, $P = 0.70$; 1.30, $P < 0.001$), and untreated diabetes (1.09, $P = 0.34$; 1.21, $P = 0.04$) was associated with a higher MACE risk, whereas blood pressure $\geq$140/90 mm Hg was not (0.91, $P = 0.03$; 0.99, $P = 0.86$).
Conclusion: The international difference in residual vascular risk was driven by undertreatments of metabolic abnormalities rather than hypertension.

AS13-080

EPIDEMIOLOGY OF STROKE

IS THERE A DIFFERENCE ON KNOWLEDGE LEVEL ABOUT RECOGNITION OF RISK FACTORS AND EARLY SIGNS OF STROKE BETWEEN HEALTHY AND PREVIOUSLY STROKE PATIENTS

I. Yeldan[1], G.D. Canan[2] and R. Mustafaoglu[3]
[1]Istanbul University, Faculty of Health Sciences Division of Physiotherapy and Rehabilitation Department of Physiotherapy and Rehabilitation, Istanbul, Turkey
[2]Istanbul University, Institute of Health Sciences, Istanbul, Turkey
[3]Istanbul University, Faculty of Health Sciences- Division of Physiotherapy and Rehabilitation- Department of Neurological Physiotherapy and Rehabilitation, Istanbul, Turkey

Background and Aims: The aim of the study was to determine whether there is a difference on knowledge level about the recognition of risk factors and early signs of stroke between healthy and previously stroke patients.
Method: Totally 1656 (894 women, 20–65 years, 1595 healthy and 61 previously stroke) voluntary community-based dwelling people were included in the study. Sociodemographic features of patients were recorded. Knowledge about risk factors and identification of early signs in relation to stroke were assessed. Risk factors were classified as personal (genetic, family history of stroke, age, gender), medical situations (previous stroke, prior transient iscemic attack, hypertension, hypercholesterolemia, atrial fibrillation, heart disease, obesity, diabetes mellitus, usage of orally contraseptive), habitutes (unhealthness diet, physically inactivity, smoking, excessive alcohol intake), and were assessed. The awareness about early signs of stroke (face drooping, arm weakness, speech difficulty, time to call 1–1-2) were evaluated. Descriptive statistical analysis was used and $p < 0.05$ was considered significant.
Results: The knowledge level was similar in both healthy and previously stroke subjects. The knowledge level about personal risk factors (11.7%,14.2%; respectively) and medical situation was low (6.9%, 6.7%). The awareness about habitutes was moderate (37.8%, 25.0%). In terms of early signs of stroke, knowledge level was moderate (46.6%, 41.7%). The knowledge of emergency call number was high (84.2%, 71.4%).
Conclusion: There was no difference on knowledge level about the recognition of risk factors and early signs of stroke between healthy and previously stroke patients. More effort is required to prevent secondarily stroke even previously stroke patients.

AS13-081

EPIDEMIOLOGY OF STROKE

CERVICAL ARTERY DISSECTION AS CAUSE OF STROKE: CLINICAL PROFILE, TREATMENT AND FOLLOW-UP

S. Lourenco[1], V. Neves[2], S. Pires-Barata[3], C. Corzo[4], P. Dionísio[5], C. Barata[6] and L. Rebocho[3]
[1]Espírito Santós Hospital, Internal Medicine2and Stroke Unit, Évora, Portugal
[2]Espírito santós Hospital, Internal Medicine 2 and stroke Unit, Évora, Portugal
[3]Espírito Santós Hospital, Stroke Unit, Évora, Portugal
[4]Évorás Hospital, Internal Medicine2 and Stroke Unit, Évora, Portugal
[5]Espírito Santós Hospital, Cardiology-Internal Medicine, Evora, Portugal
[6]Espírito Santós Hospital, Internal Medicine 2, Évora, Portugal

Background and Aims: Cervical-artery dissection (CAD) is a recognized cause of ischemic stroke among young individuals. The aim of our study was to evaluate the clinical profile, management and outcome of patients (pts) with a stroke attributable to cervical-artery dissection in a rural Portuguese community.
Method: During 13 years (2004–2016) a total of 3694 acute stroke pts were admitted in our Unit. We evaluated epidemiological, clinical and outcome data of 28 consecutive pts (mean age 48.6+/-12.9; 60.7% male) with a stroke due to CAD. The diagnosis was suspected by clinical presentation with Duplex screening and confirmed by classic or magnetic resonance angiography. Follow-up (mean 20.9+/-15.5 months) included clinical, functional and imaging data evaluation.
Results: The incidence of stroke due to CAD was 0.007%. Eighteen pts had spontaneous CAD and 10 had trauma. The carotid artery was involved in 17 pts. The clinical presentation was cerebral infarction and 12pts (42.8%) had posterior circulation infarcts (POCI-Oxfordshire Community Stroke Project Classification). The pts had few vascular risk factors (1.2+/-0.9). The accompanying symptoms were headache (9pts) and Horner's syndrome (5pts). The imaging forms of the CAD were artery occlusion in 21pts (75%). The treatment was anticoagulation in 19pts (67.9%). There was no intrahospital or follow-up mortality. At the end of the follow-up, we verified a improved functional outcome (NIHSS in admission 5.7+/-6.5 and in last evaluation 2.7+/-3.4). There were three (10.7%) recurrences.
Conclusion: In our population CAD is a rare cause of stroke, affecting middle-aged people with a good in hospital and long term prognosis.

AS13-084

EPIDEMIOLOGY OF STROKE

LACUNAR STROKE EPIDEMIOLOGY: RESULTS FROM A POPULATION-BASED REGISTRY

D. Degan[1], C. Tiseo[1], R. Ornello[2], L. Evangelista[1], A.C. Landi[1], G. Pellicciari[1], G. Perrotta[1], F. Pistoia[1], A. Carolei[1] and S. Sacco[1]
[1]University of L'Aquila, Department of Neurology and Stroke Unit- AZH, L'Aquila, Italy
[2]University of L'Aquila, Department of Neurology and Stroke Unit- AZH, L'Aquila, Italy

Background and Aims: The present study aims to provide updated information on lacunar stroke epidemiology in a population-based setting, and to compare the cardiovascular risk factors profiles of patients with lacunar and non-lacunar stroke.
Method: Incident cases of first-ever ischemic strokes were prospectively identified in a population-based registry of patients residing in the L'Aquila district, during a three-year period (2011–2013). Cardiovascular risk factors were also ascertained.
Results: Out of 884 first-ever ischemic stroke patients, we identified 110 (12.4%) lacunar strokes (68 men; 61.8%) and 774 (87.6%) non-lacunar strokes (354 men; 45.7%). Crude annual incidence rate for first-ever lacunar stroke was 12.3/100,000 (95% confidence interval [CI] 10.0–14.6): 15.6/100,000 (95% CI 10.1–21.0) in men and 9.1/100,000 (95% CI 6.26–11.9) in women ($p = 0.012$). The corresponding rate standardized to the 2011 European population was 9.6/100,000 (95% CI 7.8–11.4): 12.7/100,000 (95% CI 9.6–15.8) in men and 7.0/100,000 (95% CI 4.8–9.2) in women ($p = 0.034$). Patients with lacunar stroke had a higher rate of arterial hypertension (76.4 *versus* 63.0%; $p = 0.006$) and cigarette smoking habitus (27.3 *versus* 19.3%; $p = 0.0002$), and were younger than those with non-lacunar stroke (mean age 70.9 ± 11.8 *versus* 76.8 ± 13.2 years; $P < 0.0001$). Atrial fibrillation was more frequent in non-lacunar than in lacunar strokes (27.0 *versus* 10.9%; $p = 0.0002$), whereas diabetes mellitus, hypercholesterolemia, coronary heart disease and peripheral artery disease had similar rates.

Conclusion: Our study suggests that strategies for the prevention of lacunar stroke still need to be improved, especially in men, and particularly by targeting arterial hypertension, which is still the main risk factor for the event.

AS13-085

EPIDEMIOLOGY OF STROKE

ASSOCIATION BETWEEN ISCHEMIC STROKE, CORONARY AND PERIPHERAL ARTERY DISEASE. A POPULATION STUDY BASED ON THE EPICHRON COHORT

H. Tejada Meza[1], A. Prados Torres[2], J. Marta Moreno[1], C. Laguna Berna[2], B. Poblador Plou[2], J. Artal Roy[1] and A. Latorre Jiménez[1]

[1]Miguel Servet University Hospital, Neurology, Zaragoza, Spain
[2]Instituto de Investigación Sanitaria Aragón IIS Aragón, Grupo EpiChron de Investigación en Enfermedades Crónicas, Zaragoza, Spain

Background and Aims: Aragón is an autonomous community of Spain with 1,325,385 inhabitants in which vascular diseases are the leading cause of death. Considering that vascular disease in 1 arterial territory strongly predicts disease in other territories, we aim to ascertain the association between the three-major vascular bed (coronary, cerebral, and peripheral) diseases.
Method: This is a population-based study of all adult patients registered within the public health service of Aragón (EpiChron Cohort) with diagnosis of ischemic stroke, coronary (CAD) or/and peripheral artery disease (PAD) between 1 of January to 31 of December 2011. Baseline characteristics and incidence of each vascular disease in a three-year follow-up were obtained.
Results: 1326 with stroke, 1349 with CAD and 263 with PAD were admitted to any hospital of Aragon in 2011. Cardiovascular risk factors were more prevalent in those with PAD. At the follow-up, mortality was higher in stroke patients (40,1%), incidence of vascular diseases was 7%, 11,6% and 22% for each group respectively. In the stroke group, recurrence of a cerebrovascular disease was more common than having a new vascular disease in other arterial territory.
Conclusion: A greater emphasis on detection and management of vascular diseases in other arterial territories need to be placed in primary and secondary prevention of stroke. Our work opens a new field for early clinical identification of patients and for prevention of vascular diseases.

AS13-086

EPIDEMIOLOGY OF STROKE

THE ASSOCIATION BETWEEN THE HISTORY OF STROKE AND MYOCARDIAL INFARCTION AND SUBCLINICAL DEPRESSIVE SYMPTOM EXAMINED BY KESSLER 6 SCALE AMONG JAPANESE REPRESENTATIVE POPULATION:NIPPON DATA2010

H. Suzuki[1], A. Kadota[1], N. Okuda[2], T. Hayakawa[3], N. Nishi[4], Y. Nakamura[5], H. Arima[6], M. Yanagita[7], H. Yatsuya[8], Z. Yamagata[9], A. Sato[10], K. Kondo[1], N. Miyagawa[10], T. Ohkubo[11], T. Okamura[12], H. Ueshima[1], A. Okayama[13] and K. Miura[10]

[1]Shiga University of Medical Science, Center for Epidemiologic Research in Asia, Otsu, Japan
[2]University of Human Arts and Sciences, Health and Nutrition, Saita, Japan
[3]Ritsumeikan Univerity, The Kinugasa Research Organization, Kyoto, Japan
[4]National Institute of Health and Nutrition, Center for Collaboration and Partnership, Tokyo, Japan
[5]Ryukoku University, Food Sciences and Human Nutrition, Kyoto, Japan
[6]Fukuoka University, Faculty of Medicine, Fukuoka, Japan
[7]Doshisha University, Health and Sports Science, Kyotanabe, Japan
[8]Fujita Health University, Public Health, Toyoake, Japan
[9]Yamanashi University, Health Sciences, Kofu, Japan
[10]Shiga University of medical science, Public health, Otsu, Japan
[11]Teikyo University, Hygiene and Public Health, Tokyo, Japan
[12]Keio University, Preventive Medicine and Public Health, Tokyo, Japan
[13]Research Institute of, Strategy for Prevention, Tokyo, Japan

Background and Aims: After a cardiovascular disease event, people often have depressive symptoms with comorbidities, which may cause worse prognosis. However, there were not clear reports which showed these association. So this study focuses on the association between depressive symptoms defined by Kessler 6 scale (K6)9 and self-reported history of stroke and myocardial infarction (MI) in general Japanese.
Method: Two thousand and seven hundred and eighty-one participants (1193 men, 1588 women) without any missing data or depression medication from NIPPON DATA2010 cohort who were randomly selected from 300 sites all over Japan were included in this study. K6 9 as a depressive symptoms was dependent variable and independent variables were the history of stroke and MI. Age, sex adjusted odds ratios (OR) and 95% confidence intervals (95%CI) were calculated by logistic regression analysis.
Results: The ORs (95%CI) for depressive symptoms were 2.11 (1.09–4.01) for stroke and 0.345 (0.05–2.53) for MI with the adjustment of age and sex. The multivariable logistic regression analysis showed that the ORs (95%CI) for depressive symptoms were 2.28 (1.17–4.45) for stroke and 0.325 (0.044–2.41) for MI with the adjustment of smoking, drinking, age and sex.
Conclusion: We confirmed that subclinical depressive symptoms associated with the history of stroke. The physicians need to screen their depressive symptoms for the patients with stroke history, even if the patients don't appeal their depressive symptoms.

AS13-087

EPIDEMIOLOGY OF STROKE

STROKE DURING AFTERNOON-SLEEP OR SIESTA, FIRST CASE SERIES DESCRIPTION

A. Muñoz Lopetegi[1], P. de la Riva Juez[1], J.J. Poza Aldea[1], M. Martinez-Zabaleta[1], N. Andres-Marin[1], G. Fernández García de Eulate[1], J. Rodríguez-Antiguedad Muñoz[1], N. Díez González[1], F. González López[1], A. de Arce Borda[1], A. Bergareche Yarza[1], M.Á. Urtasun Ocáriz[1] and J.F. Martí Massó[1]

[1]H.U. Donostia, Neurology, San Sebastian, Spain

Background and Aims: The afternoon-sleep or siesta is a common habit among Spanish people, as 16% takes a nap every day. It is known that sleeping produces hemodynamic changes and cardioembolic events seem to be more frequent at awakening. We therefore hypothesized that strokes occurring during siesta may have distinctive features compared to the remainder of strokes and we describe the first case series.
Method: We conducted a retrospective analysis of patients admitted to our Stroke-Unit during 2012–2016. Strokes that occurred during the afternoon-sleep (siesta group) were compared with those occurred while awake in the same time frame, from 14 to 19 h (afternoon group), and awakening strokes occurring after the night-sleep (awakening group). We analyzed baseline characteristics (including age, sex, clinical

history and medications), stroke type, etiology, acute management and outcomes.

Results: Thirty nine patients were included in the siesta group. Mean age was 74,6 and mean NIHss at admission 7,5. 43% were cardioembolic, reperfusion therapies were used in 36% and 59% were autonomous at three months. In comparison to the other stroke groups no clinically relevant differences were found in baseline characteristics, nor in stroke type, etiology or outcomes. The siesta group received reperfusion therapies more often than the awakening group (p 0,004), and as often as the afternoon group.

Conclusion: Stroke may occur during siesta and does not seem to have a distinctive pattern. Regardless of its unknown time of onset and awakening nature, siesta-strokes do not seem to have less access to reperfusion therapies.

AS13-088

EPIDEMIOLOGY OF STROKE

SURVIVAL AND PREDICTORS OF WORSE SURVIVAL IN YOUNG ESTONIAN ISCHEMIC STROKE PATIENTS

S. Schneider[1,2], A. Kornejeva[3], R. Vibo[1] and K. Janika[1]
[1]University of Tartu, Department of Neurology and Neurosurgery, Tartu, Estonia
[2]North Estonia Medical Centre, Neurology Centre, Tallinn, Estonia
[3]University of Tartu, Faculty of Medicine, Tartu, Estonia

Background and Aims: Young stroke patients face a worse survival compared to their healthy counterparts. We aimed to find the survival rate and its short- and long-term predictors in this patient cohort.

Method: We performed a retrospective study of ischemic stroke patients aged 15–54 years treated in Tartu University Hospital and North Estonia Medical Centre from 2003 to 2012. Survival data were obtained from the Estonian Population Register. Survival rate was calculated by Kaplan-Meier method and the Cox proportional hazard model was used to identify predictors of 28-day and 5-year survival.

Results: The 28-day and 5-year survival rate among the 738 patients (mean age 46.9 ± 7.4, 67% men) was 0.95 (95% CI 0.94 - 0.97) and 0.83 (95% CI 0.81 - 0.86), respectively. Complications during the hospital stay, cardiac disease - including acute myocardial infarction, cardiomyopathy, valvular heart disease, patent foramen ovale with atrial septal aneurysm and cardiac tumors - and excessive alcohol intake predicted worse 28-day survival after adjustment for age and sex. Significant predictors of worse 5-year survival adjusted for age and sex were presence of cardiac disease, complications during the initial hospital stay, heart failure and ischemic heart disease.

Conclusion: We present the highest case-fatality and the lowest long-term survival rate for this age group described so far. The reasons for this finding need further investigation.

AS13-089

EPIDEMIOLOGY OF STROKE

PREVALENCE OF EXTRA AND INTRACRANIAL LARGE VESSEL ATHEROSCLEROSIS IN PATIENTS WITH ACUTE ISCHEMIC STROKE: A HOSPITAL BASED STUDY FROM EASTERN INDIA

S. Dey[1], A. Chatterjee[1], A. Das[1] and J. Roy[1]
[1]AMRI HOSPITAL-MUKUNDUPUR, NEUROLOGY, KOLKATA, India

Background and Aims: Large vessel atherosclerosis remains a major cause of stroke. Various studies showed that intracranial atherosclerosis is more common in Asians compared to Western population. We aimed to study prevalence and risk factors of large vessel atherosclerosis (Extra and intracranial) in patients presenting with acute ischemic stroke.

Method: We included 530 consecutive patients admitted with acute ischemic stroke over last 4 yrs. All patients underwent CT/MR brain, neck vessel Doppler and echocardiography. CT Angiography (arch to vertex), 24/48 hr holter, trans esophageal echocardiography and atypical stroke screening were done as and when required. Baseline and discharge NIHSS, vascular risk factors and patient demographics were recorded.

Results: Out of 530, large vessel atherosclerosis was found in 128 (24.15%), cardio embolism in 130 (24.52%) and small vessel disease in 110 (20.75%) patients, while 30 (5.66%) had other causes and 132 (24.90%) were undetermined . Among 128 patients , 66 (51.56%) had only extracranial atherosclerosis and 50(39.06%) had only intracranial atherosclerosis while 14(10.93%) had both extra and intracranial involvement. Among the vascular risk factors hypertension (71.87%) was commonest followed by diabetes (51.56%), smoking (31.25%) and dyslipidemia (23.43%). The median NIHSS scores at admission and discharge were 10(0–27) and 6(0–24) respectively. Recurrence of stroke symptoms was observed in 12 (18.18%) and 4 (8.00%) patients with extracranial and intracranial atherosclerosis respectively during hospital stay.

Conclusion: Though intracranial atherosclerosis seems to be more common in Asians, extracranial involvement was higher in our study. Patients with extracranial atherosclerosis appeared to have higher recurrent events compared to intracranial ones in our study.

AS13-090

EPIDEMIOLOGY OF STROKE

CHARACTERISTICS OF PATIENTS WITH ANTICOAGULANT-RELATED INTRACEREBRAL HEMORRHAGE IN A POPULATION-BASED STROKE REGISTRY

R. Ornello[1], D. Degan[1], C. Tiseo[1], L. Evangelista[2], A.C. Landi[1], G. Pellicciari[2], G. Perrotta[2], F. Pistoia[3], A. Carolei[4] and S. Sacco[3]
[1]University of L'Aquila- 67100- L'Aquila- Italy, Department of Neurology and Stroke Unit- AZH, L'Aquila, Italy
[2]University of L'Aquila- 67100 L'Aquila- Italy, Department of Neurology and Stroke Unit- AZH, L'Aquila, Italy
[3]University of L'Aquila- 67100 L'Aquila- Italy, Department of Neurology, L'Aquila, Italy
[4]University of L'Aquila- 67100 L'Aquila- Italy, Department of Neurolology and Stroke Unit- AZH, L'Aquila, Italy

Background and Aims: We compared the characteristics of patients with anticoagulant-related intracerebral hemorrhage (AR-ICH) with those not related to oral anticoagulants (nAR-ICH) in a prospective population-based registry.

Method: We included all patients with a first-ever ICH in 2011–2013, resident in the L'Aquila district. Cases were identified by active monitoring of all the available sources within the district and in nearby areas.

Results: Out of 239 patients with ICH (52.3% men, mean age 75.5 ± 12.8 years), 30 (12.6%) had AR-ICH; all were treated with warfarin; mean INR at ICH onset was 3.05 ± 0.93. AR-ICHs were deep in 13 patients, lobar in 10, and 7 in posterior fossa (PF), while in nAR-ICH 90 were deep, 87 lobar, 28 in PF, and 11 in multiple locations (P = 0.113). Mean age was higher in AR-ICH when compared to nAR-ICH patients (79.6 ± 7.2 vs 74.9 ± 13.3 years; P = 0.005). Prevalence of risk factors, including arterial hypertension, diabetes mellitus, hypercholesterolemia, alcohol abuse, and coronary heart disease was similar between AR-ICH and nAR-ICH patients. Thirty-day case-fatality was also similar between AR-ICH and nAR-ICH patients (50.0% vs 36.8%; P = 0.166).

Conclusion: We did not find any difference in vascular risk factors distribution or early case-fatality between AR-ICH and nAR-ICH. Further population-based data are needed to better understand the

role of both known and unknown determinants of ICH in patients treated with vitamin K antagonists. We did not find any direct oral anticoagulant-related ICH because those agents were still not commercialized.

AS13-091

EPIDEMIOLOGY OF STROKE

RIGHT-TO-LEFT SHUNTS, ROPE SCORE AND STROKE ETIOLOGY IN YOUNG PATIENTS WITH ISCHEMIC STROKE IN BRAZIL

M.C. Libardi[1], M.R. Camilo[1], S.R. Cabette Fabio[1], C.M.A. Barreira[1], R.K.D.V. Martins-Filho[1], F.A. Dias[1], F.F. Alessio-Alves[1], A.P.A. Camargo[1] and O.M. Pontes-Neto[1]
[1]Ribeirão Preto Medical School of University of São Paulo FMRP-USP, Department of Neuroscience and Behavioral Sciences., Ribeirao Preto, Brazil

Background and Aims: Stroke etiology remain undefined in many young stroke patients despite thorough investigation. Right-to-left shunt (RLS) is often found in young patients with cryptogenic stroke and are sometimes regarded as evidence of paradoxical embolism for stroke mechanism. RLS-related stroke is usually considered in patients with cortical strokes and high Risk of Paradoxical Embolism (RoPE) score, indicating that RLSs is not incidental. We aimed to compare the frequency of stroke risk factors in young stroke patients with and without RLS.
Method: We investigated 168 patients with ischemic stroke under 55 years-old admitted from 2004 to 2014 in a tertiary academic hospital. These patients were divided in two subgroups - RLS present versus absent. We considered RoPE score 6–10 as high risk and classifying head CT-scan lesions as cortical, subcortical-cortical and multi-circulatory. Conventional risk factors were collected. Cryptogenic stroke were classified after extending investigation.
Results: Among 168 young patients with stroke (mean age $= 40.8 \pm 9.1$-years; female sex: 58.3%), we detected a RLS in 82 (48.8%) patients ($p = 0.02$). Hypertension was the risk factor more prevalent in non-RLS patients (53 versus 30 $p < 0.001$). Fifty-two (31%) patients were classified as cryptogenic stroke, 50 on RLS group versus 2 in non-RLS ($p < 0.001$). RLS-s group had RoPE score median 7 versus 6 (IQ:5–8; $p = 0.15$). There were no differences among stroke imaging profile between sub-groups.
Conclusion: Young stroke patients in Brazil have high prevalence of conventional stroke risk factors. RoPE score may not be appropriate to define RLS-related stroke among young stroke patients in developing countries.

AS13-092

EPIDEMIOLOGY OF STROKE

INFLUENCE OF SOCIO-ECONOMIC STATUS ON HELP-SEEKING BEHAVIOUR AFTER STROKE AND TIA IN SHEFFIELD, UK

S. Ingram[1], N. Anwyll[1], A. Ali[1], A. Majid[1] and J. Redgrave[1]
[1]The University of Sheffield, Sheffield Institute of Translational Neuroscience, Sheffield, United Kingdom

Background and Aims: The socio-economic gradient in the short and long term outcomes post stroke could be addressed with improved education of more deprived subgroups. We aimed to investigate the relationship between social deprivation, awareness of the mass-media campaign "Act-FAST" (advertised annually since 2009) and help-seeking following stroke/TIA.
Method: Consecutive patients admitted with stroke/TIA to the Royal Hallamshire Hospital, Sheffield in sampling periods from 2013–2016 were interviewed (or their relatives if they had called for help on their behalf). Index of Multiple Deprivation (IMD) was derived from home postcode and related to participants' awareness of the Act-FAST media campaign, and the timing/type of medical help sought. Census data provided the IMD spread for the hospital catchment population.
Results: 508 participants were recruited (368 stroke, 140 TIA) of whom 244 (48.2%) were in the two most-deprived quintiles for the UK. The IMD distribution of the study population and hospital catchment area were similar (P het $= 0.40$). Overall, 391 (77.0%) participants were aware of FAST and 180 (35.4%) could name >1 component (from Face/Arm/Speech/Time). In total, 255 (50.2%) called for medical help within 1 hour and 268 (52.8%) called emergency services first. However none of these factors were associated with IMD quintile (adj $P = 0.30$, 0.15, 0.37, 0.88 respectively).
Conclusion: Sociodemographic status is not associated with awareness of the Act-FAST campaign in a population of recent stroke/TIA sufferers, or with faster help-seeking following stroke symptoms. Public education to reduce social inequality in stroke outcomes may be better targeted to other aspects of self-management.

AS13-093

EPIDEMIOLOGY OF STROKE

CEREBRAL VENOUS THROMBOSIS IN OLDER PATIENTS

S. Zuurbier[1], S. Silvis[1], S. Hiltunen[2], E. Lindgren[3], K. Jood[3], J. Putaala[2], T. Tatlisumak[2] and J. Coutinho[1]
[1]Academic Medical Center University of Amsterdam, Neurology, Amsterdam, The Netherlands
[2]Helsinki University Central Hospital, Neurology, Helsinki, Finland
[3]Sahlgrenska University Hospital, Neurology, Gothenburg, Sweden

Background and Aims: Cerebral venous thrombosis (CVT) rarely occurs in older patients and only one study has previously examined characteristics of CVT in this age group.
Method: We used data from a multicenter observational registry of consecutive adult patients with CVT admitted from 1987 through 2015 to three European academic hospitals. We compared sex ratio, clinical manifestations, and outcomes of patients aged <55 to those $>=55$ years.
Results: Out of 594 patients with CVT, 137 patients (23%) were $>=55$ years. Older patients less often were female than younger patients (47% versus 73%, $p < 0.01$). Headache was less common in older patients (63% versus 91%, $p < 0.01$), while focal neurological deficits occurred more frequently (71% versus 57%, $p = 0.03$). Cancer [JP1] was more frequently identified as a risk factor for CVT in older patients (17% versus 7%, $p < 0.01$). Thrombosis of the deep cerebral venous system was less common in older patients (5% versus 12%, $p = 0.03$). There was no difference in treatment between older patients and patients younger than 55. Clinical outcome at last follow-up was worse in older patients (mRS 3–6, 38% versus 17%, $p < 0.01$, mortality 12% versus 6%, $p = 0.02$), compared to patients younger than 55.
Conclusion: The sex ratio of CVT is evenly distributed in older patients, probably due to the dissipation of hormonal factors. About 1 in 6 older patients with CVT has an underlying malignancy. The prognosis of older patients with CVT is worse than those younger than 55.

AS13-094

EPIDEMIOLOGY OF STROKE

EPIDEMIOLOGY OF EXTRACRANIAL STENOSIS IN ACUTE ISCHEMIC STROKE PATIENTS IN BRAZIL: A COMPREHENSIVE COMPUTED TOMOGRAPHY ANGIOGRAPHY ASSESSMENT

M.C.Z. Zotin[1], A.C. Santos[2], L.J.A. Rocha[3], G.N. Simão[4], A.S. Melo[2], D.G. Abud[5], M.B. Cintra[4], S. Mazim[6] and O.M. Pontes-Neto[7]

[1]Clinics Hospital of Ribeirão Preto's School of Medicine, Radiology - Neurology Division, Ribeirao Preto, Brazil
[2]Clinics Hospital of Ribeirão Preto's School of Medicine, Radiology - Neurorradiology Division, Ribeirão Preto, Brazil
[3]Federal University of Alagoas, Neurology, Maceió, Brazil
[4]Clinics Hospital of Ribeirão Preto's School of Medicine, Radiology - Neuroradiology Division, Ribeirão Preto, Brazil
[5]Clinics Hospital of Ribeirão Preto's School of Medicine, Radiology - Interventional Radiology Division, Ribeirão Preto, Brazil
[6]Clinics Hospital of Ribeirão Preto's School of Medicine, Neurology, Ribeirão Preto, Brazil
[7]Clinics Hospital of Ribeirão Preto's School of Medicine, Neurology - Neurovascular Division, Ribeirão Preto, Brazil

Background and Aims: Prevalence and distribution of extracranial atherosclerosis varies widely among different ethnic groups and is essentially unknown in Brazil, a country with high ethnic miscegenation.
To determine whether the frequency and distribution of extracranial stenosis in a Brazilian symptomatic population is similar to what is described in other occidental populations.
Method: Computed Tomography Angiography exams from 106 adult acute stroke patients admitted between March-2014 and March-2015 at the Emergency Unit of Ribeirão Preto's School of Medicine were retrospectively reviewed by a blinded observer for detection and classification of extracranial stenosis. Earlier interobserver agreement assessment in our service revealed *kappa* of 0,9588 for stenosis $\geq$50% (IC 0.8782–1.0). Nineteen extracranial segments were evaluated from each patient (1992 vascular segments analyzed), and stenosis were classified as $<$50%, 50–69%, $>$70% and occlusion.
Results: Extracranial stenosis prevalence was 38.6% for stenosis $\geq$50% and 23.4% for stenosis $\geq$70% among our patients. Among patients with stenosis $\geq$50%, 48.8% were single-vessel. Vertebral artery origins were the most affected segments, followed by proximal internal carotid arteries. Vertebral stenosis $\geq$50% was seen in 24.5% of all symptomatic patients, and in 28% of patients with posterior circulation symptoms. Carotid stenosis $\geq$50% was identified in 18.5% of all symptomatic patients and in 31.6% of patient with anterior circulation symptoms.
Conclusion: Acute stroke patients in Brazil have high frequecy of extracranial stenosis, with higher prevalence of vertebral stenosis than what has been reported in other series. Among modifiable stroke risk factors, smoking and arterial hypertension are the most common predictors of extracranial atherosclerosis in Brazilian acute stroke patients.

AS12-003

EXPERIMENTAL/TRANSLATIONAL MEDICINE

DIRECT ORAL ANTICOAGULANTS MODULATE THE MICROHEMORRHAGE BURDEN IN THE MOUSE BRAIN

M. Pétrault[1], V. Bérézowski[1] and T. Ouk[1]
[1]University of Lille 2, U1171, Lille, France

Background and Aims: Direct factor Xa- or factor IIa inhibitors, named direct oral anticoagulants (DOACs) are questioned for the replacement of vitamin-K antagonist treatment in stroke patients at high risk of subsequent microhemorrhages.
Method: In an original model of disseminated cerebral microhemorrhages (CMH), apixaban, rivaroxaban and dabigatran, each at their therapeutic dose, were tested for their ability to change the microhemorrhage number and extent in the mouse brain.
Results: Treatment with the three DOACs led to a low mortality rate ($<$10%) compared to the warfarin-treated group (45%). The brain hemorrhagic score was increased by 22.6 to 49.5% depending on the nature and the dose of DOAC. The most deleterious effect was found in the warfarin-treated survivors (53%). The examination of the brain microhemorrhage burden revealed an increased proportion of medium-sized CMH in the DOACs-treated mice, whereas hematomas were present only in the mice that died upon warfarin treatment.
Conclusion: The potential long-term effects of this aggravated microhemorrhage burden on cognitive function are under study, in parallel to its toxicity towards the brain tissue.

AS12-004

EXPERIMENTAL/TRANSLATIONAL MEDICINE

NETWORK PHARMACOLOGY-BASED PREDICTION OF THE ACTIVE INGREDIENTS AND POTENTIAL TARGETS OF CHINESE MEDICINE FORMULA BY FOR APPLICATION TO STROKE TREATMENT

B. Guan[1]
[1]Hong Kong, Hong Kong S.A.R.

Background and Aims: Baoyuan decoction (BY), as a 4-herbs Chinese medicine formula, is used to treat stroke for almost 30 years. This study aims to identify the active ingredients and potential targets of BY by network pharmacology method and to explore the potential pathways and mechanisms of Chinese medicine formula BY in treating stroke.
Method: The Traditional Chinese Medicine Systems Pharmacology databases and TCM Database@ Taiwan database were used to search for the active ingredients. STITCH 5.0, HIT (Herbal Ingredients, Targets database), DrugBank, and the Comparative Toxicogenomics Database were used to search for compound-protein and compound-gene interactions. DAVID Bioinformatics Resources 6.8 and Cytoscape 3.4.0 with JEPETTO plugin APP software were used to make a network pharmacological analysis of BY.
Results: A total of 377 compounds were identified in by, of which 200 exhibited 2,328 compound-protein interactions with 1,864 associated proteins determined, and of which 93 had 29,793 compound-gene interactions with 14,103 associated genes founded. 38 compounds of BY followed the Lipinski's Rule with OB$\geq$30% and DL index $>$0.18, of which 33 related to 29 significant pathway- or 13 gene-associated with stroke.
Conclusion: Thirty-three compounds were identified by network pharmacology as potential effective ingredients of BY for treating stroke with acceptable oral bioavailability and druggability. VEGF and PPAR signaling pathways were potential pathways regulated by the active compounds in BY in stroke treatment.

AS12-006

EXPERIMENTAL/TRANSLATIONAL MEDICINE

SUPPRESSION OF ISCHAEMIA-INDUCED INJURIES IN RAT BRAIN BY A DANSHEN AND GEGEN (DG) HERBAL FORMULATION

Y. Deng[1], E.S.K. Ng[2], C.B.S. Lau[3], J.C.M. Koon[3], P.C. Leung[3], K.P. Fung[2] and F.F.Y. Lam[2]

[1]Chinese University of Hong Kong, Department of Obstetrics & Gynaecology, Shatin, Hong Kong S.A.R.

[2]Chinese University of Hong Kong, School of Biomedical Sciences, Shatin, Hong Kong S.A.R.

[3]Chinese University of Hong Kong, Institute of Chinese Medicine, Shatin, Hong Kong S.A.R.

Background and Aims: Stroke is one of the leading causes of death and disability worldwide. A Chinese herbal formulation consisting of Danshen and Gegen (DG) is known to be effective for the treatment of cardiovascular diseases, but its efficacy for the treatment of stroke is uncertain. In this study, we have examined the effects of a DG formulation (ratio 7:3) in rat models of global and focal brain ischaemia.

Method: Global ischaemia in the rat brain was induced by 10 min bilateral common carotid artery occlusion with hypotension followed by 24 h reperfusion. Focal ischaemia was induced by 90 min middle cerebral artery occlusion (MCAO) followed by 24 h reperfusion.

Results: Rat brains subjected to global ischaemia exhibited elevated levels of nitrite and malondialdehyde, while activities of the anti-oxidant enzymes superoxide dismutase, catalase, and reduced glutathione were decreased. Daily oral administrations of DG (0.3 g/kg and 3 g/kg) for 7 days prior to the induction of global ischaemia produced dose-dependent suppressions on the production of nitrite and malondialdehyde, and restored the superoxide dismutase, catalase, and reduced glutathione activities. Rat brains subjected to focal ischaemia showed increased brain infarct size, infarct weight, and neurological deficit. These detrimental changes were markedly attenuated by the same pretreatment protocol with DG (3 g/kg).

Conclusion: The present data confirmed that the present DG formulation can relieve nitrative and oxidative stress to suppress ischaemia-induced injuries in the rat brain. Further studies on its efficacy for treatments of human stroke conditions are warranted.

AS12-007

EXPERIMENTAL/TRANSLATIONAL MEDICINE

MODULATION OF GUT MICROBIOTA REDUCES ACUTE FOCAL CEREBRAL ISCHEMIA/REPERFUSION INJURY IN TYPE 2 DIABETIC MICE

K. Yamashiro[1], N. Kurita[1], T. Kuroki[1], R. Tanaka[1], T. Urabe[2], Y. Yamashiro[3], K. Nomoto[4], T. Takahashi[4], H. Tsuji[4], T. Asahara[4] and N. Hattori[1]

[1]Juntendo University School of Medicine, Department of Neurology, Tokyo, Japan

[2]Juntendo University Urayasu Hospital, Department of Neurology, Chiba, Japan

[3]Juntendo University Graduate School of Medicine, Probiotics Research Laboratory, Tokyo, Japan

[4]Yault Central Institute, Yault Central Institute, Tokyo, Japan

Background and Aims: The immune system interacts with the pathophysiology of acute ischemic stroke in complex ways, and the gut microbiota plays an important role in host immunity and metabolism.

Method: We investigated the effects of gut microbiota on acute focal ischemia/reperfusion injury in type 2 diabetic mice.

Results: *Enterobacteriaceae* counts in fecal samples, plasma glucose levels, and lipopolysaccharide (LPS) levels were significantly higher in type 2 diabetic mice (*db*/*db*) than those in lean littermates (*db*/+). Oral administration of polymyxin B reduced fecal *Enterobacteriaceae* counts and the plasma LPS level without changing the plasma glucose level in *db*/*db* mice. Infarct volume, blood-brain barrier permeability, and microglia counts at the ischemic zone border were significantly higher and the neurological severity scores were significantly worse in *db*/*db* mice than in *db*/+ mice 24 hours after transient middle cerebral artery occlusion. In contrast, cerebral injury and neurological function were significantly improved in *db*/*db* mice with polymyxin B administration compared to those without. Expression of Toll-like receptor 4 (TLR4), an LPS receptor, was significantly higher in *db*/*db* mice than in *db*/+ mice or *db*/*db* mice treated with polymyxin B. TLR4 was expressed in microglia at the ischemic zone border.

Conclusion: Our data suggests that gut dysbiosis leads to endotoxemia, which exacerbates cerebral ischemic/reperfusion injury, and that modulation of gut microbiota can improve stroke outcome by reducing the TRL4-mediated immune response.

AS12-008

EXPERIMENTAL/TRANSLATIONAL MEDICINE

ENDOTHELIAL-TO-MESENCHYMAL TRANSITION CONTRIBUTES TO THE PATHOGENESIS OF CENTRAL NERVOUS SYSTEM HEMANGIOBLASTOMAS AS WELL AS CEREBRAL CAVERNOUS MALFORMATIONS

S. Takada[1,2], M. Hojo[1,3], K. Tanigaki[2], N. Takebe[1,2] and S. Miyamoto[1]

[1]Kyoto University Graduate School of Medicine, Neurosurgery, Kyoto, Japan

[2]Research Institute- Shiga Medical Center, Research, Moriyama, Japan

[3]Shiga Medical Center for Adults, Neurosurgery, Moriyama, Japan

Background and Aims: Hemangioblastomas (HBs) are benign vascular tumors of the central nervous system and can cause hemorrhagic stroke. Histologically, they are composed of abundant capillary vessels and neoplastic stromal cells. Cerebral cavernous malformations (CCMs), which consist of capillary-like channels in a variety of size, are also vascular-rich lesions. It has been described that endothelial-to-mesenchymal transition (EndMT) contributes to the pathogenesis of CCMs. However, whether EndMT also has a crucial role in the pathogenesis of HBs has not been elucidated. The aim of our study was to investigate the characteristics of endothelial cells (ECs) of capillary vessels in central nervous system HBs.

Method: 10 central nervous system HBs and 5 CCMs were investigated immunohistochemically.

Results: CD31 (an endothelial marker) and EndMT markers, such as α-smooth muscle actin (a mesenchymal marker) and CD44 (a mesenchymal stem cell marker), were expressed in the endothelial layer of capillary vessels in all HBs and vascular sinusoids in all CCMs, suggesting that ECs have acquired mesenchymal and stem-cell-like characteristics and undergone EndMT in all HBs and CCMs. In all cases, Notch3 was expressed in the endothelial layer, indicating that ECs have acquired mesenchymal features. In all cases, both ephrin-B2 and EphB4, which are not expressed in adult normal cerebral vessels, were detected in the endothelial layer, suggesting that ECs are immature or malformed cells.

Conclusion: EndMT plays a crucial role in the pathogenesis of HBs as well as CCMs. Modulating EndMT is expected to be a new therapeutic strategy for central nervous system HBs and CCMs.

AS12-009

EXPERIMENTAL/TRANSLATIONAL MEDICINE

INTRAVENOUS VS INTRAARTERIAL TRANSPLANTATION OF HUMAN UMBILICAL CORD BLOOD MONONUCLEAR CELLS FOR BRAIN ISCHEMIA IN RATS

A.S. Alwahdy[1]
[1]Depok, Indonesia

Background and Aims: Cerebral ischemia is among the most common type of stroke seen in patient. Thrombolysis (rt-PA) is the only United States Food and Drug Administration (FDA) approved drug available. For regeneration of death neurons are remain questionable. Human umbilical cord blood mononuclear cell (cbMNC) is one of the option treatments for ischemia stroke through their various advantages; availability, pluripotency and immaturity.
Method: One group for healthy rat and three groups ($n = 6$ per group) of male wistar rats were undergone permanent middle cerebral artery occlusion (MCAO). Rats were allowed to recover for 7 days before intraarterial (IA) and intravenous (IV) injection of $3x10^5$ human cbMNC. Behavioural tests were performed before MCAO, 1 week after MCAO and at 3,9 and 14 days after cbMNC injection. Brain infarct area and neurons in hippocampus were evaluated.
Results: Behavioral test in sensorimotor evaluation revealed no significant differences between all groups. Spontaneous activity were much significantly improved compared to placebo group ($p < 0.05$). Comparing the neurons in hippocampus, IA and IV have better result compare to placebo. No effect of cbMNC implantation in decreasing Infarct area. Serious adverse effects were not found.
Conclusion: IA and IV human cbMNC implantation provides post stroke spontaneous activity recovery. Safety of xenogenic study were confirmed by this study when dosage $3x10^5$ per kg were used and showed their beneficial effects. Neurons in hippocampus were showed more in IA and IV compare to placebo respectively as a responsible area for cognitive function.

AS12-010

EXPERIMENTAL/TRANSLATIONAL MEDICINE

TSPO LIGAND 2-CL-MGV-1 REDUCES MITOCHONDRIAL APOPTOSIS IN THE IPSILATERAL THALAMUS AND HIPPOCAMPUS AND IMPROVES SPATIAL COGNITION AFTER CORTICAL INFARCTION IN HYPERTENSIVE RATS

Y. Chen[1], **F. Ouyang**[1], **W. Huang**[1], **X. Chen**[1] **and J. Zeng**[1]
[1]The First Affiliated Hospital- Sun Yat-sen University, Department of Stroke and Neurology Center, Guangzhou, China

Background and Aims: Mitochondrial apoptosis remains a vital therapeutic target of remote damage after stroke and translocator protein (TSPO) is critical in regulating mitochondrial apoptosis. This study examined the effects of TSPO ligand 2-Cl-MGV-1 on mitochondrial apoptosis and secondary damage in the ipsilateral thalamus and hippocampus after cortical infarction.
Method: Right distal middle cerebral artery occlusion (MCAO) was induced in stroke-prone renovascular hypertensive rats. 2-Cl-MGV-1 (7.5 mg/kg) or DMSO was administrated at 2 h after MCAO and then for 6 or 13 days. Motor function and spatial cognition were evaluated. Secondary degeneration, mitochondrial apoptosis pathway, and β-amyloid (Aβ) deposit were assessed with Nissl, TUNEL staining, immunohistochemistry, and immunoblot at 7 and 14 days after MCAO.
Results: Increased TSPO expression was correlated to neuronal loss and microglia proliferation in the ipsilateral thalamus and hippocampus at 7 and 14 days after MCAO. 2-Cl-MGV-1 significantly improved spatial cognitive impairment without amelioration of motor deficits compared to the DMSO group ($P < 0.05$). At 7 and 14 days post-MCAO, neuronal death and glial activation were remarkably decreased in the ipsilateral thalamus and hippocampus treated with 2-Cl-MGV-1 ($P < 0.05$). Within the thalamus, the release of AIF, Cyt *c*, Caspase-3 cleavage, and $TUNEL^+$ cells were significantly reduced by 2-Cl-MGV-1 compared to DMSO, which was accompanied by upregualtion of Bcl-2 and downregualtion of Bax ($P < 0.05$). However, Aβ accumulation within the ipsilateral thalamus were not significantly different between these two groups ($P > 0.05$).
Conclusion: 2-Cl-MGV-1 reduces mitochondrial apoptosis and secondary damage in the ipsilateral thalamus and hippocampus, which may contribute to the improvement of spatial cognitive deficits after cerebral infarction.

AS12-012

EXPERIMENTAL/TRANSLATIONAL MEDICINE

ROLES OF HIF-1A, VEGF AND NF-KB IN ISCHEMIC PRECONDITIONING-MEDIATED NEUROPROTECTION OF HIPPOCAMPAL CA1 PYRAMIDAL NEURONS AGAINST A SUBSEQUENT TRANSIENT CEREBRAL ISCHEMIA

J.H. Cho[1], **C.W. Park**[1], **J.B. Moon**[1], **T.G. Ohk**[1], **M.C. Shin**[1], **Y.S. Park**[1], **M.H. Won**[2], **K.E. Kim**[1] **and K.W. Kim**[1]
[1]Kangwon National University Hospital, Emergency Medicine, Chuncheon-Si- Gangwon-Do, Republic of Korea
[2]Kangwon National University, Neurobiology, Chuncheon-Si- Gangwon-Do, Republic of Korea

Background and Aims: Ischemic preconditioning (IPC) provides neuroprotection against subsequent severe ischemic insults by specific mechanisms.
Method: We tested the hypothesis that IPC attenuates post-ischemic neuronal death in the gerbil hippocampal CA1 region (CA1) throughout hypoxia inducible factor-1α (HIF-1α) and its associated factors such as vascular endothelial growth factor (VEGF) and nuclear factor-kappa B (NF-κB).
Results: Lethal ischemia (LI) without IPC increased expressions of HIF-1α, VEGF and p-IκB-α (/and translocation of NF-κB p65 into nucleus) in CA1 pyramidal neurons at 12 h and/or 1 day post-LI, thereafter, their expressions were decreased in the CA1 pyramidal neurons with time and newly expressed in non-pyramidal cells (pericytes), and the CA1 pyramidal neurons were dead at 5 days post-LI, and, at this point in time, their immunoreactivities were newly expressed in pericytes. In animals with IPC subjected to LI (IPC/LI)-group), CA1 pyramidal neurons were well protected, and expressions of HIF-1α, VEGF and p-IκB-α (/and translocation of NF-κB p65 into nucleus) were significantly increased compared to the sham-group and maintained after LI. Whereas, treatment with 2ME2 (a HIF-1α inhibitor) into the IPC/LI-group did not preserve the IPC-mediated increases of HIF-1α, VEGF and p-IκB-α (/and translocation of NF-κB p65 into nucleus) expressions and did not show IPC-mediated neuroprotection.
Conclusion: In brief, IPC protected CA1 pyramidal neurons from LI by upregulation of HIF-1α, VEGF and p-IκB-α expressions. This study suggests that IPC increases HIF-1α expression in CA1 pyramidal neurons, which enhances VEGF expression and NF-κB activation and that IPC may be a strategy for a therapeutic intervention of cerebral ischemic injury.

AS12-013

EXPERIMENTAL/TRANSLATIONAL MEDICINE

EFFECTS OF LONG-TERM POST-ISCHEMIC TREADMILL EXERCISE ON GLIOSIS IN THE AGED GERBIL HIPPOCAMPUS INDUCED BY TRANSIENT CEREBRAL ISCHEMIA

J.H. Cho[1], C.W. Park[1], J.B. Moon[1], T.G. Ohk[1], M.C. Shin[1], J.S. Lee[1] and M.H. Won[2]
[1]Kangwon National University Hospital, Emergemcy Medicine, Chuncheon-Si- Gangwon-Do, Republic of Korea
[2]Kangwon National University, Neurobiology, Chuncheon-Si- Gangwon-Do, Republic of Korea

Background and Aims: Therapeutic exercise is an integral component of the rehabilitation of patients with stroke. The objective of the present study was to investigate effects of post-ischemic exercise on neuronal damage or death and gliosis in the aged gerbil hippocampus after transient cerebral ischemia using immunohistochemistry.
Method: Aged gerbils (male, 22 to 24 months) induced by ischemia were subjected to treadmill exercise for 1 or 4 weeks. Neuronal death was apparently found in the stratum pyramidale of the hippocampal CA1 region and in the polymorphic layer (PoL) of the dentate gyrus (DG) using cresyl violet and Fluoro-Jade B histofluorescence staining.
Results: In addition, no significant difference in neuronal death was found after 1 or 4 weeks of post-ischemic treadmill exercise. However, post-ischemic treadmill exercise apparently affected gliosis (activation of astrocytes and microglia). GFAP immunoreactive astrocyte and Iba-1 immunoreactive microglia were activated in the CA1 and PoL of the DG of the group without treadmill exercise. However, 4 weeks after treadmill exercise significantly alleviated ischemia-induced astrocyte and microglia activation, although the gliosis was not alleviated in the animals with 1-week exercise.
Conclusion: These findings suggest that long-term post-ischemic treadmill exercise after transient cerebral ischemia could not influence neuronal protection, however, it could effectively alleviate astrocyte and microglial activation in the aged hippocampus induced by 5 min of transient cerebral ischemia.

AS12-016

EXPERIMENTAL/TRANSLATIONAL MEDICINE

PYRIDOXINE ACCELERATES THE NEWLY GENERATED IMMATURE POST-MITOTIC NEURONS IN THE HIPPOCAMPAL CA1 REGION AFTER TRANSIENT FOREBRAIN ISCHEMIA IN GERBILS

W. Kim[1], D.Y. Yoo[1], H.Y. Jung[1], J.W. Kim[1], K.Y. Yoo[2], Y.S. Yoon[1] and I.K. Hwang[1]
[1]Seoul National University College of Veterinary Medicine, Department of Anatomy and Cell Biology, Seoul, Republic of Korea
[2]Gangneung-Wonju National University College of Dentistry, Department of Anatomy, Gangneung, Republic of Korea

Background and Aims: In the present study, we investigated the restorative potentials of pyridoxine on ischemic damage in the hippocampal CA1 region of Mongolian gerbils.
Method: Gerbils were subjected to 5 min of transient ischemia, and surgical operation success was assessed by an ophthalmoscope during occlusion of common carotid arteries and spontaneous motor activity at 1 day after ischemia/reperfusion. Thereafter, the hyperactive animals were selected and pyridoxine (350 mg/kg) or its vehicle (physiological saline) was intraperineally administered to ischemic gerbils twice a day starting 4 days after ischemia/reperfusion for 30 or 60 days.
Results: The repeated administration of pyridoxine for 30 and 60 days significantly increased doublecortin-immunoreactive neuroblasts in the dentate gyrus and increased NeuN-immunoreactive mature neurons and βIII-tubulin-immunoreactive dendrites in the hippocampal CA1 region. Furthermore, brain-derived neurotrophic factor (BDNF) protein levels were significantly increased in pyridoxine-treated groups compared to those in the vehicle-treated groups.
Conclusion: These results suggest that chronic administration of pyridoxine enhances neuroblast differentiation in the dentate gyrus and induces new mature neurons in the hippocampal CA1 region by up-regulating BDNF expression in hippocampal homogenates.

AS12-017

EXPERIMENTAL/TRANSLATIONAL MEDICINE

TRANSDUCED TAT-PDIA3 FUSION PROTEIN PROTECTS NEURONAL DAMAGE AGAINST ISCHEMIC INSULT

D.Y. Yoo[1], D.W. Kim[2], K.Y. Yoo[3], J.H. Choi[4] and I.K. Hwang[1]
[1]College of Veterinary Medicine - Seoul National University, Anatomy and Cell Biology, Seoul, Republic of Korea
[2]Research Institute of Oral Science- College of Dentistry- Gangneung-Wonju National University, Biochemistry and molecular Biology, Gangneung, Republic of Korea
[3]College of Dentistry- Gangneung-Wonju National University, Anatomy, Gangneung, Republic of Korea
[4]College of Veterinary Medicine- Kangwon National University, Anatomy, Chuncheon, Republic of Korea

Background and Aims: Protein disulfide-isomerase A3 (PDIA3) is known as an ER-resident chaperone that catalyzes disulfide-bond formation in a subset of glycoproteins. In the present study, we constructed and purified the Tat-PDIA3 fusion proteins to find out their effects against oxidative damage in the hypoxic HT22 cell line and against ischemic damage in the gerbil hippocampus.
Method: We transduced the Tat-PDIA3 fusion proteins into the HT22 cell line and investigated the penetration and stability of the protein. In addition, we observed the neuroprotective effects of Tat-PDIA3 on H_2O_2-induced oxidative damage in HT22 hippocampal cells. In the animal model of forebrain ischemia, we also measured the neuroprotective effects of Tat-PDIA3 against ischemic damage in the hippocampal neurons of Mongolian gerbils.
Results: The Tat-PDIA3 fusion proteins showed effective penetration into the HT22 hippocampal cell line and stable expression 24 h after Tat-PDIA3 treatment, compared to the control-PDIA3 proteins. Further, Tat-PDIA3 significantly reduced the formation of H_2O_2-induced reactive oxygen species and apoptosis in the HT22 hippocampal cell line, which were demonstrated using 2′,7′-dichlorofluorescein diacetate and a terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) assay, respectively. Administration of PDIA3 significantly ameliorated ischemia-induced hyperactivity after transient forebrain ischemia of Mongolian gerbils. In addition, the treatment of PDIA3 significantly ameliorated the reduction of NeuN-immunoreactive neurons and reduced glial activation in the hippocampal CA1 region four days after ischemia/reperfusion. In addition, the administration of Tat-PDIA3 significantly reduced oxidative stress in the hippocampal homogenates after ischemia/reperfusion.
Conclusion: Our data demonstrated that Tat-PDIA3 has neuroprotective effects against ischemic damage by modulating the oxidative stress.

AS12-018

EXPERIMENTAL/TRANSLATIONAL MEDICINE

EFFECT OF RADIOFREQUENCY THERMAL BALLOON ANGIOPLASTY ON NEOINTIMAL HYPERPLASIA REDUCTION ACCOMPANIED BY PROTOPORPHYRIN IX ADMINISTRATION : MONITORED BY B-MODE ULTRASOUND AND HISTOLOGY

H. Mehrad[1], B. Mahvi[2] and M.R. Hemmati[3]
[1]Islamic Azad University-Tabriz Branch, Department of Physics, Tabriz, Iran
[2]Islamic Azad University-Tabriz Branch, Department of Bioengineering, Tabriz, Iran
[3]Social Security Organization-Medical Section, Department of Pathology, Tabriz, Iran

Background and Aims: Balloon angioplasty is a clinical procedure for mechanically widening a narrowed artery and is frequently coupled with the use of stents to maintain blood flow. In- Stent restenosis or neointimal hyperplasia, is an adverse outcome of stenting. Sever restenosis can cause to ischemic stroke and its related deaths. We developed an experimental radiofrequency thermal balloon angioplasty that allows controlling both pressure of inflation and local heating, and investigated its effectiveness on neointimal hyperplasia reduction in the rabbit carotid artery.
Method: In this study, New Zeland white rabbits underwent perivascular flexible silicon collar injury at the right common carotid artery. The neointimal formation in the rabbit collared artery mediated by the obstruction of the adventitial vasa vasorum with the creation of a localized ischemic region and the occurrence of an inflammatory response. After four weeks, the histopathology results showed progressive smooth muscle cells proliferation in intimal layer, resulting in vessel wall thickening. Then treatment group underwent radiofrequency thermal balloon angioplasty accompanied by protoporphyrin-IX (50 mg/kg) administration. Wall mean thickness and percentage of luminal cross-sectional area of stenosis were measured by B-mode ultrasound and histology at the stenotic region.
Results: Results showed a significant reduction in the mean value for wall mean thickness and the percentage of luminal cross-sectional area of stenosis in the treatment group compared with the other groups ($P < 0.05$).
Conclusion: Local thermal angioplasty accompanied by protoporphyrin-IX (50 mg/kg) administration can cause to reduce the smooth muscle cells and inflammation in the intima layer and significantly dilate the luminal cross-sectional area of stenosis.

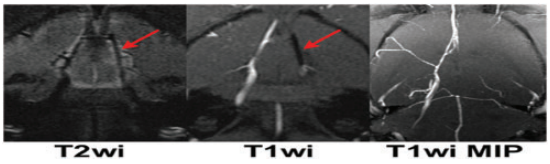
AS12-019

EXPERIMENTAL/TRANSLATIONAL MEDICINE

INTRAOPERATIVE MRI CONTROL IN TRANSIENT MIDDLE CEREBRAL ARTERY OCCLUSION MODEL IN RODENTS

I. Gubskiy[1], D. Namestnikova[2], K. Yarygin[3] and L. Gubsky[2]
[1]Pirogov Russian National Research Medical University, Research Institute of Cerebrovascular Pathology and Stroke, Moscow, Russia
[2]Pirogov Russian National Research Medical University, Department of Fundamental and Clinical Neurology and Neurosurgery, Moscow, Russia
[3]Orekhovich Institute of Biomedical Chemistry, Laboratory of Cell Biology, Moscow, Russia

Background and Aims: Intraluminal Middle Cerebral Artery Occlusion (MCAO) model was first proposed in 1986 by Koizumi J. and modified in 1989 by Longa E., and now is the most widely used model of ischemic stroke in rodents. MCAO model has many advantages, including low invasiveness, the ability of reperfusion and etc. However, it has several disadvantages, such as hemorrhagic complications, variation in infarct volume due to insufficient occlusion of vessels and\or collateral blood flow. Our work is dedicated to the use of intraoperative MRI for early detection and reduction of these complications.
Method: Intraoperative control of transient MCAO was performed in 51 Wistar rats. Immediately after insertion of filament in ICA, rats were placed in 7T MRI scanner. High-resolution T2 and T1 weighted images (voxel size 0,1x0,1x0,3 mm and 0,125x0,129x0,2 mm) in coronal plane was acquired for visualization of filament and blood flow.



Results: Three rats had hemorrhagic complications. In group without partial blood flow in MCA on MRI all rats had infarct. Rate of hemispheric stroke was 11% in rats with partial flow in MCA on MRI and 59% in group without it.
Conclusion: Using of intraoperative MRI control of MCAO model allows to control the position of the filament and to reveal various complications (like hemorrhage) in the start. In case the filament has been inserted incorrectly, it could be replaced immediately.

AS12-020

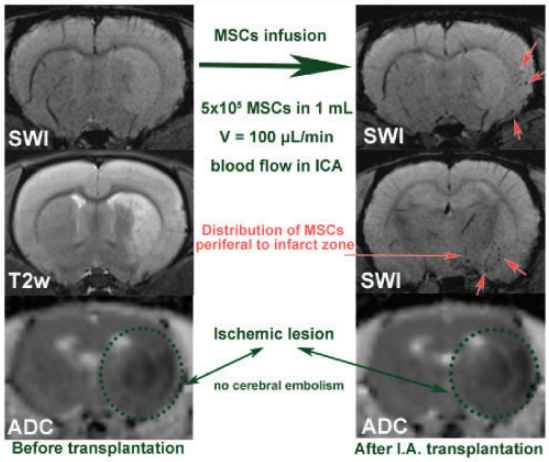
EXPERIMENTAL/TRANSLATIONAL MEDICINE

MESENCHYMAL STEM CELLS IN TREATMENT OF ISCHEMIC STROKE: THERAPEUTIC EFFECTS, CELL MIGRATION AND COMPLICATIONS AFTER INTRA-ARTERIAL INFUSION IN RATS

D. Namestnikova[1], I. Gubskiy[2], K. Sukhinich[3], P. Melnikov[4], A. Gabashvili[4], D. Visnievskiy[4], A. Solovyova[1], K. Voitkowskaya[1], I. Vakhrushev[5], L. Gubsky[1] and K. Yarygin[5]
[1]Pirogov Russian National Research Medical University, Fundamental and Clinical Neurology, Moscow, Russia
[2]Pirogov Russian National Research Medical University, Research Institute of Cerebrovascular Pathology and Stroke, Moscow, Russia
[3]Koltzov Institute of Developmental Biology, Department of Problems of Regeneration, Moscow, Russia
[4]Pirogov Russian National Research Medical University, Medical Nanobiotechnology, Moscow, Russia
[5]Institute of Biomedical Chemistry, Cell Biology, Moscow, Russia

Background and Aims: Intra-arterial transplantation of mesenchymal stem cells (MSCs) can improve recovery in animal stroke models and in humans according to the outcomes of clinical trials. Despite significant therapeutic results, the mechanisms of MSCs beneficial effects and cell migration have not been fully understood. Moreover, adverse events such as cerebral embolism have been reported. The aim of our study was to assess therapeutic effects after intra-arterial transplantation of MSCs, to determine cell distribution and optimal parameters of infusion in rats after MCAO.
Method: Intact male wistar rats ($n = 25$) and rats 24 h after 90 minutes MCAO ($n = 30$) were infused with saline ($n = 20$) or SPIO-labeled hMSCs ($n = 30$) at different doses ($2x10^3$ to $1x10^6$), infusion volumes, velocity, blood flow in rICA. For evaluation of therapeutic effects and cell

distribution 7T-MRI and behavioral test were performed at 1d, 7d, 14d after MCAO (before histology).
Results: Optimal parameters of MSCs infusion were considered to be $5x10^5$ (1 ml/10min) with maintenance of blood flow in ICA. In this group we observed significant decrease of the infarct size 7d after transplantation and positive functional outcome after 14d. MSCs distributed peripheral to infarct zone, located near blood vessels at the injection side.



Conclusion: Intra-arterial transplantation of MSCs decreased infarct volume and improved neurological outcomes after stroke. Optimization of infusion parameters can prevent cerebral embolism. MSCs migrated from blood vessels and distributed around infarct core.

AS12-021

EXPERIMENTAL/TRANSLATIONAL MEDICINE

THE RELATIONSHIPS BETWEEN THE DEGRADATION OF THE NEUROVASCULAR UNIT AND THE DELAYED CEREBRAL ISCHEMIA AFTER SUBARACHNOID HEMORRHAGE IN MICE MODEL

K. Mizutani[1], S. Takahashi[1], D. Kamamoto[1], T. Akiyama[1], T. Horiguchi[1] and K. Yoshida[1]
[1]Keio University, Department of Neurosurgery, Shinjuku, Japan

Background and Aims: Although delayed cerebral ischemia (DCI) after subarachnoid hemorrhage (SAH) can cause poor outcome, its pathophysiology has not been fully understood. In the current study, we evaluated the histomorphological changes of neurovascular unit (NVU) after SAH in mice model and examined the relevancy between the NVU and the DCI.
Method: The SAH mice model was made by the following methods. After intraperitoneal anesthesia, autologous peripheral blood was stereotactically injected into prechiasmatic cistern. After the injection, the mice were sacrificed and the components of NVU (neuronal cells (NeuN), basement membrane (type 4 collagen), astrocytes (glial fibrillary acidic protein) were evaluated histomorphologically. The neurological function of mice was evaluated by Rotarod test.
Results: The immunostaining of type IV collagen significantly diminished 24 hours after SAH whereas that of NeuN did not show any histomorphological change after SAH. The score of the Rotarod test was significantly lower in delayed manner 3 days after SAH as compared with control. The disruption of NVU was observed 24 hours after SAH, which was followed by the delayed neurological impairment 3 days after SAH. At 7 days after SAH, the number of the neuronal cells did not change.
Conclusion: The results of the current study suggested that the dysfunction of NVU can be involved in DCI without any neuronal cell losses and NVU can be therapeutic target for the DCI after SAH. A further research is necessary to elucidate the relationship between disruption of NVU and secondary cerebral ischemia after SAH.

AS12-023

EXPERIMENTAL/TRANSLATIONAL MEDICINE

ISCHEMIC STROKE AND RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR (R-TPA) INTERFERE WITH ANTI-INFECTIVE PHAGOCYTE FUNCTION

A. Vogelgesang[1], C. Lange[1], L. Blümke[1], G. Laage[1], S. Rümpel[1], S. Langner[2], B.M. Bröker[3], A. Dressel[4] and J. Ruhnau[1]
[1]University Medicine Greifswald, Department of Neurology, Greifswald, Germany
[2]University Medicine Greifswald, Department of Department of Diagnostic Radiology and Neuroradiology, Greifswald, Germany
[3]University Medicine Greifswald, Department of Immunology, Greifswald, Germany
[4]Carl-Thiem Klinikum, Department of Neurology, Cottbus, Germany

Background and Aims: Stroke impairs oxidative burst and neutrophil extracellular trap (NET) release. Two key enzymes of these mechanisms myeloperoxidase (MPO) and neutrophil elastase (NE) were analyzed following ischemic stroke. Stress hormones are known mediators of post stroke immune alterations while potential immunological effects of r-tPA are unknown. Here the *in vitro* effects of these substances on innate immune functions were investigated.
Method: Intracellular and serum MPO and NE were measured on days 0, 1, 3, 5 post stroke by FACS or ELISA. Healthy donors' blood was incubated with one of the hormones or acetylcholine and NET (immunohistochemistry), MPO and NE were quantified. Blood was incubated with r-tPA; oxidative burst, phagocytosis, NET formation, cytokine release, MPO and NE were quantified.
Results: MPO was reduced in granulocytes but increased in sera obtained from stroke patients compared to controls. NE was elevated in patient sera. The percentage of NET producing neutrophils was decreased by stress hormones and increased by acetylcholine. Epinephrine and acetylcholine induced NE release. *In vitro* exposure to r-tPA reduced phagocytosis and oxidative burst in granulocytes and monocytes and enhanced NE release.
Conclusion: Intracellular reduction of MPO might be the mechanism underlying reduced NET formation in stroke patients. The impact of enhanced MPO and NE serum levels merits further investigation. Since r-tPA impairs bactericidal functions *in vitro,* studies investigating immunological effects of stroke should control for r-tPA exposure. Whether rt-PA exposure may contribute to the susceptibility for infection in patients that did not benefit from thrombolysis remains to be determined.

AS12-024

EXPERIMENTAL/TRANSLATIONAL MEDICINE

LOW-LEVEL FOCUSED ELECTROHYDRAULIC SHOCK WAVE THERAPY REDUCES INFLAMMATION AND IMPROVES ENDOTHELIAL FUNCTION IN AN EXPERIMENTAL MODEL OF BALLOON INJURED CAROTID ARTERY

H. Mehrad[1], M. Farhoudi[2], A. Foletti[3] and B. Mahvi[4]
[1]Islamic Azad University- Tabriz Branch, Department of Physics, Tabriz, Iran
[2]Tabriz University of Medical Sciences - Neurosciences Research Center, Department of Neurosciences, Tabriz, Iran
[3]Italian National Research Council- Institute of Translational Pharmacology, IFT, Rome, Italy
[4]Tabriz Branch - Islamic Azad University, Department of Bioengineering, Tabriz, Iran

Background and Aims: Atherosclerosis is the leading cause of stroke and cardiovascular disease. As is well recognized, the majority of atherosclerosis start with an inflammatory process, resulting in endothelial dysfunction. We developed an experimental focused electrohydraulic shock wave generator and investigated its effectiveness on inflammation reduction and improvement of endothelial function in the rabbit carotid artery.
Method: Briefly, New Zealand white rabbits underwent balloon dilatation injury at the right common carotid artery. Then common carotid arteries of the treatment group at lesion region, treated using extracorporeally low-level focused electrohydraulic shock waves (10 Kv, 5 Hz, 0.35 mj/mm2, 300 impulses). In order to evaluate endothelial-dependent relaxation, acetylcholine-mediated dilation (AMD) was measured during the infusion of acetylcholine at a rate of 0.5 μg/kg/min and endothelial-independent relaxation was evaluated by measuring nitroglycerin-mediated dilation (NMD) during the infusion of nitroglycerin at a rate of 5 μg/kg/min.
Results: Results from B-mode ultrasonography showed significant differences in AMD between the treated and the non-treated rabbits ($p < 0.05$), whereas there were no significant differences in NMD between the treatment and normal groups ($p > 0.05$). Also, results from histopathology showed a significant reduction in the mean value for macrophages density within the lesion in the treatment group compared with the non-treatment group ($p < 0.05$). No microscopic intimal lesions were seen in the normal and treated rabbits, but intimal thickening was observed in the histological studies in the non-treated rabbits.
Conclusion: Low-level focused electrohydraulic shock wave therapy cause to macrophage egress from intimal layer and improves endothelial function via increasing endothelial nitric oxide (NO) synthase.

AS12-025

EXPERIMENTAL/TRANSLATIONAL MEDICINE

TREATMENT OF THE RABBIT CAROTID ARTERY ATHEROTHROMBOTIC OCCLUSION USING Q-SWITCHED ND:YAG LASER GENERATED FOCUSED ULTRASOUND ACCOMPANIED BY THROMBOLYTIC AGENT (R-TPA) ADMINISTRATION

H. Mehrad[1], M. Farhoudi[2], A. Paknezhad[1] and M.R. Hemmati[3]
[1]Islamic Azad University-Tabriz Branch, Department of Physics, Tabriz, Iran
[2]Tabriz University of Medical Sciences-Neurosciences Research Center, Department of Neurology, Tabriz, Iran
[3]Social Security Organization-Medical Section, Department of Pathology, Tabriz, Iran

Background and Aims: Thrombus formation on a disrupted atherosclerotic plaque is a key event that leads to atherothrombosis. Atherothrombosis mediated acute clinical events such as myocardial infarction and stroke. The aim of this study was to investigate the feasibility of Q-switched Nd:YAG laser-generated focused ultrasound thrombolytic therapy accompanied by thrombolytic agent (r-tPA) administration in the rabbit carotid artery atherothrombotic occlusion.
Method: Briefly, male New Zealand white rabbits were submitted to common carotid artery atherothrombotic occlusion by primary balloon injury followed 1.5% cholesterol- rich diet injury and finally perivascularly severe cold injury. Then treatment group underwent Q-switched Nd:YAG laser ($p = 30$ w, $pd = 5$ ns)-generated focused ultrasound (12 MHz) thrombolytic therapy accompanied by r-tPA (0.6 mg/kg) administration.
Results: Results from color doppler ultrasonography, B-mode ultrasonography and histopathology, showed a significant reduction in the mean value for blood mean velocity and the percentage of luminal cross-sectional area of stenosis and a significant increase in the mean value for blood volume flow at the stenotic region in the treatment group compared with the other groups ($p < 0.05$).
Conclusion: High peak pressures of tens of Mpa could be tightly focused onto spot diameter of <100 mm due to inherent high-frequency characteristics of optoacoustic generation. Focal thrombus disruption mechanism was partly clarified as originated from micro-jet formation upon bubble collapse. Enhanced anti-thrombotic effect of cavitation bubbles-induced by Q-switched Nd:YAG laser generated focused ultrasound accompanied by thrombolytic effect of r-tPA, can cause to reduce the thrombus and significantly dilate the luminal cross-sectional area of stenosis in the rabbit model of atherothrombosis.

AS12-026

EXPERIMENTAL/TRANSLATIONAL MEDICINE

MICROGLIA REMAIN ACTIVATED IN THE RAT SUBVENTRICULAR ZONE AFTER NEONATAL HYPOXIA-ISCHEMIA AND SUPPORT NEUROGENESIS IN VITRO

U. Fisch[1,2], C. Brégère[1], F. Geier[3], L. Chicha[1] and R. Guzman[1,4]
[1]Brain Ischemia and Regeneration, Departement of Biomedicine University Basel, Basel, Switzerland
[2]Departement of Neurology, University Hospital Basel, Basel, Switzerland
[3]Bioinformatics Core Facility, Departement of Biomedicine University Basel, Basel, Switzerland
[4]Departement of Neurosurgery, University Hospital Basel, Basel, Switzerland

Background and Aims: Recent findings indicate that microglia are temporarily activated and support neurogenesis in the early postnatal subventricular zone (SVZ) of healthy rats. We investigated the impact of neonatal hypoxia-ischemia (HI), known to induce SVZ neurogenesis, on SVZ microglia via *in vivo* and *in vitro* approaches.
Method: Postnatal-day (P)7 rats underwent sham or right-hemispheric (ipsilateral) HI surgery. Microglia were immunohistochemically analyzed in the anterior SVZ, M2 cortex (CX) and median corpus callosum (CC) at P10, P20 and P40. Transcriptome analysis of purified SVZ microglia isolated from P10 and P20 animals was performed. Periventricular tissue from P10 animals was cultured for neurosphere generation and microglia selectively depleted.
Results: In sham SVZ, activated and phagocytic microglia declined significantly after P10 while microglia density remained constant. However, after HI, ipsilateral SVZ microglia remained activated until P20 and

phagocytic until P40 with increased microglia density from P10 onward. These findings were SVZ-specific and did not occur in the CX or CC. Further, the transcriptome analysis of ipsilateral SVZ microglia from HI animals revealed significantly increased expression of genes linked to neurotrophic support. Finally, periventricular tissue-derived neurospheres from sham and HI animals were significantly reduced if microglia were depleted.

Conclusion: We report that SVZ microglia undergo specific developmental changes that are disrupted by neonatal HI, as manifested by prolonged activation and phagocytosis, persistent cell accumulation, and increased expression of genes related to neurotrophic support. Lastly, reduction of neurospheres after microglia depletion *in vitro* suggests a supportive role of microglia for neurogenesis in early postnatal development and after HI.

AS12-027

EXPERIMENTAL/TRANSLATIONAL MEDICINE

BIO-OPTIMIZED CERIA NANOPARTICLES CAN PROTECT AGAINST SUBARACHNOID HEMORRHAGE

H.G. Jeong[1], D.Y. Kim[1], B.G. Cha[2], D.W. Kang[1], W. Yang[1], S.K. Ki[1], S.I. Kim[1], J.H. Han[1], J. Kim[2] and S.H. Lee[1]

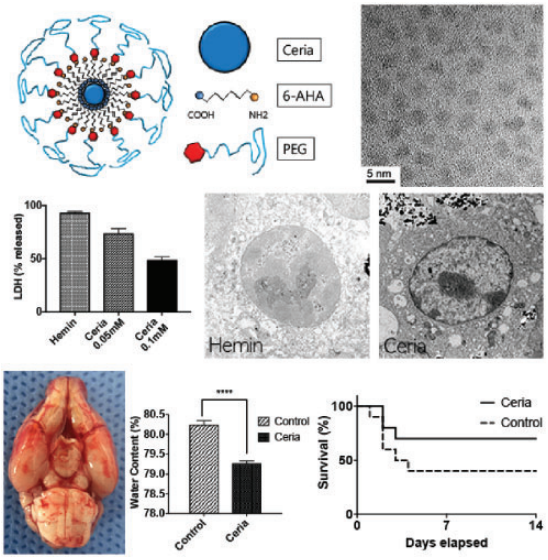
[1]Seoul national university hospital, Neurology, Seoul, Republic of Korea
[2]Sungkyunkwan University, Chemical engineering, Suwon, Republic of Korea

Background and Aims: Conventional ceria nanoparticle, showing promising results in various preclinical models, are not yet clinically available due to biocompatibility issues. Potential toxicity may arise with organic solvents used during synthesis such as chloroform, xylene and oleylamine. To overcome this, we developed a novel ceria nanoparticle (CeNPs) which is synthesized in aqueous phase with 6-aminohexanoic acid (6-AHA) to maximize biocompatibility.

Method: Our CeNPs were synthesized with mixing cerium (III) nitrate and 6-AHA solution, and capped with polyethylene glycol. Subarachnoid hemorrhage (SAH) was induced by endovascular perforation in rats and CeNPs (0.5 mg/kg) were injected intravenously at 6 and 30 hours post-SAH. Brain water content, Evans blue extravasation, macrophage infiltration and neuronal death were evaluated at 72 hours. Mortality and behavioral function were assessed until 14 days.

Results: Our CeNPs showed 3-nm size, high Ce3+/4+ ratio and excellent colloidal stability, resulting in a potent anti-oxidant and cytoprotective activity in vitro. CeNPs significantly reduced brain water content, blood brain barrier permeability, macrophage infiltration and neuronal cell death 72 hours post-SAH. CeNPs also reduced mortality (30%, CeNPs vs. 60%, control) and improved neurological deficits post-SAH.

Conclusion: Our novel CeNPs, synthesized in aqueous phase without toxic organic solvents, demonstrated a strong cytoprotective and therapeutic effects against SAH. Enhanced biocompatibility greatly increases the potential that our CeNPs will be an investigational new drug for initial use in humans.



AS12-030

EXPERIMENTAL/TRANSLATIONAL MEDICINE

APIXABAN DECREASES BRAIN THROMBIN ACTIVITY IN AN ACUTE ISCHEMIC STROKE MODEL

D. Bushi[1,2], J. Chapman[1,2,3,4], A. Wohl[5] and D. Tanne[1,4]

[1]Chaim Sheba Medical Center, Comprehensive Stroke Center-Department of Neurology and The J. Sagol Neuroscience Center, Tel Hashomer, Israel
[2]Tel Aviv University, Department of Physiology and Pharmacology-Sackler Faculty of Medicine, Tel Aviv, Israel
[3]Tel Aviv University, Robert and Martha Harden Chair in Mental and Neurological Diseases- Sackler Faculty of Medicine, Tel Aviv, Israel
[4]Tel Aviv University, Department of Neurology- Sackler Faculty of Medicine, Tel Aviv, Israel
[5]Chaim Sheba Medical Center, Departments of Neurosurgery, Tel Hashomer, Israel

Background and Aims: Factor Xa (FXa) plays a critical role in the coagulation cascade by generation of thrombin. In addition to its role in thrombogenesis, during focal ischemia thrombin levels increase in the brain tissue and cause neural damage through the activation of its own receptor. This study examined the hypothesis that administration of FXa inhibitor, apixaban following focal ischemic stroke may have therapeutic potential by decreasing brain thrombin activity and infarct volume.

Method: Ischemic stroke was induced in C57BL6 mice by permanently blocking the middle cerebral artery (MCA). Mice were divided into a "treated" groups that received different doses of apixaban (2, 20, 100 mg/kg administered I.P) immediately after blocking the MCA and a group that received saline. Thrombin activity was measured by a fluorescent assay on fresh coronal slices taken from the from the mice brains 24-hours following the MCA occlusion. Infarct volume was assessed using triphenyltetrazolium chloride staining.

Results: High dose of apixaban (100 mg/kg) significantly decreased thrombin activity levels that were measured in the ischemic hemisphere compared to thrombin activity levels that were measured in the control group ($p = 0.003$). Moreover, infarct volumes that were measured in areas outside the ischemic core were significantly lower in the treated groups compared to the control group ($30 \pm 5\%$, 32 ± 8 % and 76 ± 7 %

in the 20 mg/kg, 100 mg/kg and control groups respectively, $p < 0.001$). No brain hemorrhages were observed either in the treated or control groups.

Conclusion: Administration of apixaban immediately after inducing an ischemic stroke decreases brain thrombin activity and reduces infarct size.

AS12-032

EXPERIMENTAL/TRANSLATIONAL MEDICINE

HYPOTHERMIC NEUROPROTECTION OF ISCHEMIC HUMAN NEURONS

L. Ye[1], A. Antonic[2] and D. Howells[3]
[1]The Florey Institute of Neuroscience and Mental Health-Austin Campus, Stroke Division, Melbourne, Australia
[2]University of Melbourne, Centre for Neural Engineering, Melbourne, Australia
[3]University of Tasmania and Florey Institute of Neuroscience, Neuroscience and brain plasticity, Hobart, Australia

Background and Aims: Developing drugs for humans logically requires evaluation in human tissues. Clinical trial of every candidate drug is impractical and unethical because of the risks of exposing people to all these new chemicals. Our aim is to develop a human embryonic stem cell derived neuronal culture system that can be subject to injuries that mimic human stroke and used to screen new drugs for therapeutic potential. We report evaluation of this system using hypothermia as an exemplar therapy.

Method: Neural differentiation was induced by Noggin. After 49 days in vitro (DIV), the neurons were exposed to oxygen glucose deprivation injury for 1 or 4 hours in the presence or absence of hypothermia (33°C). Outcome was assessed by measuring cell death, neurite number and density and by measuring expression of mRNA's for critical neurotransmitter systems.

Results: Neurons showed complex arbour morphology expressing MAP2 and the synaptic markers GAP43, DLG4 and SYN1. Glutamatergic (NR1 - 39 fold, GRM5 - 41 fold, GRM2 - 74 fold) and GABAergic (GAD1 - 70 fold, GAD2 - 99 fold and GABAR1 - 111 fold) specific markers were highly expressed.

Hypothermia reduced 4-hour OGD-induced cell death from 70% to 48%, and reduced loss of neurite complexity measured counting interaction points from 501.2 ± 162.5 to 1462.2 ± 293.4 per field.

Conclusion: hESC derived neurons are structurally and neurochemically mature by 49DIV. Hypothermia protects these neurons against the damaging effects of OGD injury, reducing cell death and maintaining neuronal network complexity.

AS12-033

EXPERIMENTAL/TRANSLATIONAL MEDICINE

PHOSPHORYLATION OF ENOS ON SERINE1176 MEDIATES VASCULAR REACTIVITY AND STROKE OUTCOME IN AKT1 DEFICIENT MICE

D. Atochin[1], M. Litvak[2], S. Mohd[3] and P. Huang[4]
[1]Massachusetts General Hospital, CVRC, Charlestown, USA
[2]Tomsk Polytechnic University, RASA Center, Tomsk, Russia
[3]Massachusetts General Hospital, Wellman Center for Photomedicine, Boston, USA
[4]Massachusetts General Hospital, Cardiology, Boston, USA

Background and Aims: AKT phosphorylation of eNOS on serine 1176 (S1176) stimulating endothelial nitric oxide (NO) production, mediates vasodilation, blood flow and ischemic injury. We hypothesized that AKT1 is involved in protection against stroke due to S1176 eNOS phosphorylation. We generated AKT1 knockout (AKT1KO) mice carrying a phosphomimetic (S1176D) mutation in the eNOS gene to test whether constitutively active eNOS could improve stroke outcome in AKT1KO mice.

Method: Adult mice were anesthetized (1.5% isoflurane/30% oxygen/70% nitrous oxide) for the middle cerebral artery occlusion by filament for 60 minutes with subsequent reperfusion (30 minutes) under blood flow monitoring by laser Doppler flowmetry. 23 hours later mice were examined for neurological deficit by a 5 point scale and for brain infarct volume (indirect method). Separate groups of mice were used for study of vascular reactivity of pressurized and constricted isolated carotid arteries to acetylcholine (ACh) with a pressure myograph.

Statistical analysis was performed using the Student t-test, and differences of $p < 0.05$ were considered significant.

Results: The infarct volume was larger in Akt1KO (103 ± 21 mm^3) mice than in WT (71 ± 33) and S1176D/Akt1KO mice (60 ± 20, $n = 10$/group, Mean $\pm$ SD, $P < 0.05$). This was associated with a functional impairment in the neurologic deficit (2.7 point for Akt1KO; 2.0 for WT and 1.3 for S1176D/Akt1KO mice).

In carotid arteries isolated from Akt1KO mice, relaxation to ACh was attenuated (53 ± 24%, maximal relaxation) as compared with WT (85 ± 18) and S1176D/Akt1KO (86 ± 19, $n = 7$–8/group) mice.

Conclusion: Together, these results demonstrate that S1176 eNOS-derived NO improves vascular reactivity and stroke outcome in the deficiency of AKT1.

AS12-036

EXPERIMENTAL/TRANSLATIONAL MEDICINE

THE LIFE AND FATE OF ENGINEERED HUMAN BONE MARROW-DERIVED MESENCHYMAL STEM CELLS (HBM-MSCS) TRANSPLANTATED IN RATS WITH DEEP BRAIN LACUNAR INFARCT

A. Andrzejewska[1], S. Koniusz[1], A. Nowakowski[1], M. Janowski[1,2] and B. Łukomska[1]
[1]Mossakowski Medical Research Centre PAS, NeuroRepair Department, Warszawa, Poland
[2]The Johns Hopkins University School of Medicine, Russel H. Morgan Department of Radiology and Radiological Sciences,, USA

Background and Aims: Transplantation of mesenchymal stem cells (MSCs) is widely used for experimental therapies of CNS diseases. While, MSC homing capacity has been well described the regulation of cell migration is still lacking. We hypothesize that induction of integrin overexpression in MSCs will enhance their adhesion and transendothelial migration after intra-arterial transplantation. *The aim of our study* was to induce the expression of ITGA-4 (VLA-4 subunit) via mRNA-based method and to test whether this overexpression leads to modify MSC homing into rat brain after grafting.

Method: Naive (non-transfected) and modified (mRNA-ITGA4 transfected) hBM-MSCs were labelled with iron nanoparticles (Molday, BioPAL) and transplanted into right internal carotid artery in rats with ouabain-induced injury of right striatum performed 48 hours earlier. The infusion of hBM-MSCs was monitored with MRI directly after transplantation and 24, 48 and 72 h later.

Results: Intravital imaging showed that both naive and VLA-4 overexpressing MSCs flowed into the right hemisphere of rat brain after their infusion. Interestingly, directly after transplantation the strength of signal coming from VLA-4 overexpressing cells was higher in comparison to non-modified hBM-MSCs. Immunocytochemical analysis of rat brains revealed that both types of infused cells remained inside cerebral blood

vessels 24 hr and 48 hr after transplantation. At the third day some hBM-MSCs entered the sub-endothelial space and migrated over basement membrane.
Conclusion: Inducing expression of ITGA-4 in hBM-MSCs leads to increased homing of transplanted cells to the rat brain. However, the overexpression of adhesive molecules did not enlarge the number of transmigrated MSCs into the tissue.

AS12-038

EXPERIMENTAL/TRANSLATIONAL MEDICINE

DANTROLENE IMPROVES ENDOTHELIAL FUNCTION IN TYPE-1 DIABETIC RATS BY DECREASING OXIDATIVE STRESS

M.J. Crespo-Bellido[1], J. Quidgley[1], M. Roman[1], R. Zack[2], J. Matias[2], M. Morales[2], H. Torres[2] and S. Alemar[1]
[1]University of Puerto Rico Medical School, Physiology, San Juan, Puerto Rico
[2]University of Puerto Rico Medical School, Anesthesiology, San Juan, Puerto Rico

Background and Aims: Diabetic patients have a high risk of developing cerebral vasospasms (CVSP). Experimental evidence indicates that the addition of the ryanodine receptor (RyR) blocker dantrolene to standard therapies reduces vasoconstriction in non-diabetic patients with CVSP. Whether diabetics with CVSP also benefit from this drug, however, is unknown. We evaluated the effects of a 30-minute incubation with dantrolene (50 μM) on acetylcholine (ACh)–induced relaxation in phenylephrine (PHE)-precontracted aortic rings from streptozotocin (STZ)-induced Type-1 diabetic rats. Age-matched non-diabetic rats were used as controls (CT).
Method: Concentration response curves for the ACh-induced relaxation from 0.1 nM to 10 μM were performed in the presence and absence of dantrolene. The oxidative-stress markers malondialdehyde (MDA) and 4-hydroxyalkenal (4-HAE) were also measured in aortic homogenates after a 30- minute incubation period with dantrolene.
Results: The E_{MAX} value for the ACh-induced relaxation was reduced in diabetic rats ($40.97 \pm 1.92\%$) when compared to CT ($75.74 \pm 5.27\%$) ($N = 5$, $P < 0.05$) without changing the EC_{50} value. Acute incubation of aortic rings with 50 μM dantrolene increased the E_{MAX} value in diabetic rats to 70.39 ± 13.84 % ($N = 5$, $P < 0.05$), without affecting this parameter in CT. Endothelium-independent relaxation with 10 μM sodium nitroprusside (SNP) was not affected by dantrolene in either diabetic or CT. In addition, dantrolene decreased MDA +4-HAE (μM/g protein) in the vasculature of diabetic rats from 3.19 ± 1.15 to 1.16 ± 0.10 ($N = 5$, $P < 0.05$).
Conclusion: Together, our results suggest that by reducing oxidative stress and improving endothelial function, dantrolene may exert a beneficial effect in diabetic patients with CVSP.

AS12-039

EXPERIMENTAL/TRANSLATIONAL MEDICINE

HIPPOCAMPUS DEFORMITIES AND ENTORHINAL CORTEX ATROPHY ASSOCIATED TO LONG-TERM COGNITIVE DEFICIT: FROM MCAO RAT MODEL TO STROKE PATIENT

M. Bastide[1], C. Delattre[1], C. Bournonville[1], F. Auger[1], R. Lopes[1], M. Petrault[1], C. Delmaire[1], H. Henon[1], S. Bombois[1], A.M. Mendyk[1], D. Leys[1], C. Cordonnier[1] and R. Bordet[1]
[1]Univ Lille - Inserm, Pharmacology U1171, LILLE, France

Background and Aims: Stroke patients are at risk to develop long-term cognitive disorders which is often associated with mediotemporal lobe atrophy. However, whether hippocampal and entorhinal cortex atrophies are sufficient to predict post-stroke coghitive decline remains unclear. In a preclinical model, we hypothesized that hippocampus deformities rather than atrophy are predictive markers of long-term post-stroke cognitive decline and tested our hypothesis in a prospective cohort of stroke patients.
Method: Male rats subjected to transient middle cerebral artery occlusion and patients free of dementia who suffered a first ischemic stroke event are included in this study. After 6 months, MRI is used to study volume and shape brain regions. Cognitive troubles were completed by performing a battery of behavioural (rat) or neuropsychometric (patient) tests.
Results: On rats, a significant impairment of working memory and of spatial memory is observed. MRI revealed significant deformities of ipsilateral hippocampus but no atrophy. Neuronal cellular surface is significantly decreased, associated to a loss of tissue density. Entorhinal cortex thickness is thinned.
49/90 stroke patients had cognitive impairments. No significant hippocampus atrophy is observed while shape analysis revealed significant deformations and a significant reduction of entorhinal cortex surface compared to stroke patients without cognitive impairment.
Conclusion: Hippocampus deformities and entorhinal cortex atrophy associated to other preexisting biomarkers would constitute new tools for a more sensitive and earlier prediction of poststroke cognitive decline. This translational approach is essential to establish disease-modifier strategies for future clinical trials in the aim to stop or at least, to slow down the progression of the pathology.

AS12-041

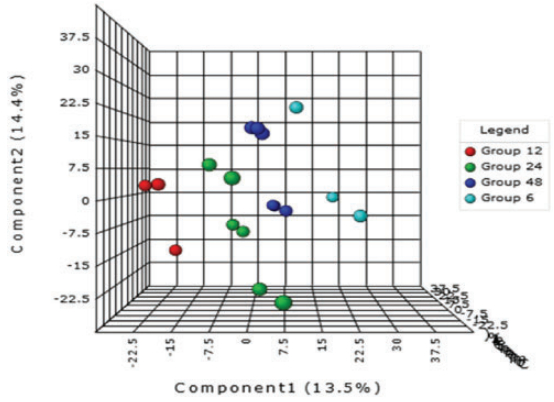
EXPERIMENTAL/TRANSLATIONAL MEDICINE

METABOLOMICS ESTIMATION OF THE DIAGNOSIS AND ONSET TIME OF PERMANENT AND TRANSIENT CEREBRAL ISCHEMIA

S. Cambray[1], M. Portero-Otín[2], M. Jové[3], N. Torreguitart[4], A. Sanz[1], L. Colàs-Campàs[1], I. Benabdelhak[5], M. Yemisci[6], T. Dalkara[6], B. Dönmez-Demir[6] and F. Purroy[5]
[1]IRB Lleida, Clinical Neurosciences, Lleida, Spain
[2]IRB Lleida/Universitat de Lleida, Department of Experimental Medicine, Lleida, Spain
[3]IRB Lleida, Metabolomics, Lleida, Spain
[4]Hospital Arnau de Vilanova, Department of Vascular surgery, Lleida, Spain
[5]IRB Lleida/Hospital Arnau de Vilanova, Clinical Neurosciences, Lleida, Spain
[6]Institute of Neurological Sciences and Psychiatry/Faculty of Medicine-Hacettepe University, Department of Neurology, Ankara, Turkey

Background and Aims: Near 25% of strokes are of unknown time onset and patients have denied access to thrombolytic and/or recanalization therapies. Aims were to obtain specific biomarkers for early stroke and Transient Ischemic Attack
Method: We adapted a protocol for manual occlusion of distal Middle Cerebral Artery that allows an immediate reduction of 70–80% of cerebral blood flow and also an immediate recovery. We set up TIA and stroke occlusion times and then obtained plasma samples at different time points. Using metabolomics we compared, on one hand, TIA plasmatic signature to Sham mice, and on the other hand we compared plasma profile 6 h after stroke against plasma profiles 12, 24 and 48 h after stroke.

Results: On TIA model we obtained specific plasmatic signature and specific metabolites for each time point analyzed. For early stroke (≤6 h), we obtained metabolomic profiles and specific BMs, including products of DNA oxidative damage (8-oxo-dGTP) and neuronal residues (nervonic acid) among others.



Conclusion: If any of proposed BMs could be extrapolated to clinical practice, patients benefiting from strokes therapies would increase and thus sequels reduced. Moreover we provide insight on a topic that, despite being very common on the day to day neurovascular practice, is under-represented on medical research bibliography.

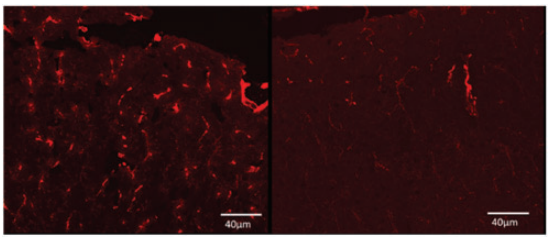
AS12-042

EXPERIMENTAL/TRANSLATIONAL MEDICINE

IDENTIFICATION OF TRANSCRIPTION FACTORS INVOLVED ON ISCHEMIC TOLERANCE

A. Sanz-Alcázar[1], L. Colàs-Campàs[2], I. Benabdelhak[3], S. Cambray[2] and F. Purroy[3]
[1]University of Lleida, Clinical Neurosciences, Lleida, Spain
[2]IRB Lleida, Clinical Neurosciences, Lleida, Spain
[3]IRB Lleida/Arnau de Vilanova, Clinical Neurosciences, Lleida, Spain

Background and Aims: mRNA array analyses of mice with ischemic conditioning showed that 8 transcription factors (TF) control up to 80% of the genes differentially expressed 24 h after induction of ischemic tolerance (IT).
Method: Current work uses confocal immunofluorescence and Western blot to validate expression of proposed transcription factors on IT and to check biological pathways involved in this neuroprotective phenotype.
Results: Results showed that 24 h after conditioning, IT has effects on both, cerebral vasculature and glucose metabolism. We observed increased staining of brain vessels which also had a larger diameter. We also detected increased levels of glucose receptor Glut-1 and the glucose metabolizing enzyme GAPDH. Two of the TF proposed from array analysis showed specific vasculature staining in conditioned mice, moreover, promoter analysis of Glut-1 and other vasculature and metabolism related mRNAs showed enrichment of binding sites for these TFs.



Conclusion: In conclusion, neuroprotection by conditioning could be, in part, regulated by two TF that induce vasodilation and increase glucose metabolism.

AS12-043

EXPERIMENTAL/TRANSLATIONAL MEDICINE

DANTROLENE AND NIMODIPINE REDUCE ARTERIAL TONE SYNERGISTICALLY IN AORTIC RINGS FROM TYPE-1 DIABETIC RATS

M.J. Crespo-Bellido[1], M. Roman[1], J. Matias[2], M. Torres-Grajales[2], R. Zack[2], M. Morales[2], H. Torres[2] and J. Quidgley[1]
[1]University of Puerto Rico Medical School, Physiology, San Juan, Puerto Rico
[2]University of Puerto Rico Medical School, Anesthesiology, San Juan, Puerto Rico

Background and Aims: Diabetic patients have a high risk of developing cerebral vasospasms (CVSP). The current treatment of this condition is similar for diabetics and non-diabetics, and includes the use of nimodipine and other calcium channel antagonists to reduce vasoconstriction. Concomitant administration of the ryanodine receptor (RyR) blocker dantrolene with these antagonists may be beneficial to diabetic patients, knowing that this combination reduces vasoconstriction in non-diabetic patients. In this study, we evaluated the effects of dantrolene (50 μM), nimodipine (50 nM), and both drugs in combination, on the phenylephrine (PHE)-induced contraction of aortic rings from streptozotocin (STZ)-induced Type-1 diabetic rats. Age-matched non-diabetic rats were used as controls (CT).
Method: PHE-induced concentration response curves from 0.1 nM to 10 μM were performed on aortic rings in the presence and absence of dantrolene, nimodipine, or their combination.
Results: After a 30-minute incubation period, the PHE-induced contraction was reduced to the same percentages in diabetic and non-diabetic rats by dantrolene (37 %; $N = 5$, $P < 0.05$) and nimodipine (about 50%; $N = 5$, $P < 0.050$). In contrast, the combination of these drugs reduced the PHE-induced contraction by 81% in CT, but only by 69% in diabetic rats. In addition, endothelium-independent relaxation with 10 μM sodium nitroprusside (SNP) was not affected by dantrolene or nimodipine in either diabetic or CT rats.
Conclusion: Our results suggest that the combination of dantrolene and nimodipine may have beneficial effects in both diabetics and non-diabetics with CVSP by decreasing arterial tone more than either drug alone. Supported by RCMI Grant G12-RR03051.

AS12-044

EXPERIMENTAL/TRANSLATIONAL MEDICINE

SAFETY OF HEAD DOWN TILT 15° IN EXPERIMENTAL INTRACEREBRAL HAEMORRHAGE: RELEVANCE FOR HYPERACUTE GRAVITATIONAL THERAPY IN ACUTE STROKE

S. Beretta[1], A. Versace[1], M. Vigano'[1], G. Paterno'[1], D. Carone[1], M. Riva[1], B. Martini[1], G. Padovano[1], L. Monza[1] and C. Ferrarese[1]
[1]University of Milano Bicocca, Laboratory of Experimental Stroke Research, Monza MB, Italy

Background and Aims: Intracranial collaterals are dynamically recruited after arterial occlusion and are emerging as a strong determinant of tissue outcome in both human and experimental ischemic stroke. Head down tilt 15° (HDT15°) has been shown to be a very effective and safe "collateral therapeutic" in an experimental ischemic stroke model, applied with a therapeutic time window of 30 min. The aim of the present study was to investigate the safety of HDT15° in experimental intracerebral haemorrhage (ICH), which is a prerequisite for the translational development of HDT15° as a hyperacute collateral therapeutic in prehospital suspected ischemic stroke.
Method: Intracerebral haemorrhage was produced by stereotaxic intrastriatal injection of collagenase (IA-S; 0.4 CDU) in adult male Wistar rats (n=64). A randomized non-inferiority trial design (non-inferiority limit 15%) was used to randomize rats to HDT15° for 60 minutes or usual flat body position. HDT15° was applied from 60 to 120 minutes after collagenase injection, which corresponds to a time window of hematoma expansion in this model. Primary outcome was hematoma expansion at 24 hours, secondary outcome was neurobehaviour assessed by Garcia sensorimotor neuroscore and corner turning test.
Results: HDT15° achieved the specified criteria for non-inferiority in both hematoma volume (HDT15° 97+/-17 mm3 versus flat position 116+/-23 mm3) and neurobehavioural tests.
Conclusion: Our findings indicate that HDT15° does not worsen hematoma expansion if applied in the hyperacute phase of experimental intracerebral haemorrhage. Further research is needed to effectively develop a HDT-based gravitational therapy for enhancing cerebral collateral flow in suspected hyperacute ischemic stroke.

AS12-045

EXPERIMENTAL/TRANSLATIONAL MEDICINE

SODIUM CHLORIDE INCREASES INFARCT VOLUMES AND EXACERBATES THE INFLAMMATORY RESPONSE IN A MOUSE MODEL OF ACUTE ISCHEMIC STROKE

A. Schmidt[1], J.K. Strecker[2], C. Massoth[3], K. Diederich[3] and J. Minnerup[3]
[1]University Hospital Münster, Department of Neurology, 48149, Germany
[2]University Hospital Münster, Department of Neurology, Münster, Germany
[3]University of Münster, Department of Neurology, Münster, Germany

Background and Aims: Sodium chloride-rich diet promotes a pro-infammatory immune cell polarization and aggravates CNS autoimmunity. However, in spite of an immense translational importance, the functional and pathophysiological relevance of sodium chloride in acute ischemic stroke is unclear. We therefore aimed to investigate the effects of sodium chloride-rich diet in a mouse model of middle cerebral artery occlusion (MCAO).
Method: Seventy-two adult C57BL/6 mice received either either sodium chloride-rich diet with 4% sodium chloride content (ssniff, Germany) and tap water containing 1% sodium chloride or standard diet and tap water for seven days. Thereafter, all animals underwent 60 minutes of MCAO. A neuroscore and the foot fault test were employed to assess functional outcomes. Infarct volumes were determined three days after MCAO and immunohistochemical analyses were performed to characterize the post-ischemic inflammatory response.
Results: Infarct volumes were significantly increased (63.19 $mm^3 \pm 3.16$ mm^3 vs. 54.65 $mm^3 \pm 2.74$ mm^3, $p < 0.05$, t test) and neuroscores were significantly worse ($p < 0.05$, 2way ANOVA) after sodium chloride rich diet. As demonstrated by immunohistochemistry, the immigration of neutrophilic granulocytes and pro-inflammatory $CD16/32^+$- macrophages was significantly increased following sodium chloride rich diet ($p < 0.05$, t-test). Additional immunohistochemical analyses and flow cytometry analyses to further characterize the postischemic inflammatory response are ongoing.
Conclusion: Sodium chloride increases infarct volumes and immune cell immigration in acute ischemic stroke. Further pathophysiological mechanisms shall be addressed in future experiments.

AS12-046

EXPERIMENTAL/TRANSLATIONAL MEDICINE

CCL17-DEFICIENCY RESULTS IN INCREASED INFARCT VOLUME AND INCREASED TH1 AND TH17 IMMUNE CELL POLARISATION AFTER EXPERIMENTAL STROKE

J.K. Strecker[1], A. Schmidt[2], I. Förster[3], K. Diederich[4], J. Alferink[5] and J. Minnerup[4]
[1]University Hospital Münster, Department of Neurology, 48149, Germany
[2]University Hospital Münster, Münster, Germany
[3]University of Bonn, Department of Immunology and Environment, Bonn, Germany
[4]Münster, Germany
[5]University of Münster, Department of Psychiatry and Psychotherapy, Münster, Germany

Background and Aims: Following cerebral ischemia, a plethora of immune cells like functional diverse T cell subsets contribute to both, beneficial and deleterious effects during the progressing damage development. The role of dendritic cells (DCs), which activate T cells, has not been determined within strokes pathology. DCs, which express the chemokine CCL17, are known to be key regulators of Th17 and Treg cell function. The role of CCL17 and the DC-dependent immunomodulation within the pathogenesis of the ischemic stroke are subject of this presentation.
Method: Transient middle cerebral ischemia was induced by occlusion of the middle cerebral artery (MCAO, 30 min) in CCL17-deficient, heterozygous and wildtype mice. Furthermore, CCL17ko/WT and WT/CCL17ko-bone marrow chimeras were generated. Following MCAO, mice were tested for functional outcome, infarct volume, CCL17-expression, expression of Th1/M1-, Th2/M2-, Th17 and Treg-gene, and presence as well as activation state of immune cells by immunofluorescence analysis and flow cytometry.
Results: Cerebral ischemia led to worsened functional outcome ($p < 0.001$) and increased infarct size ($p < 0.05$) in CCL17-deficient mice. Immunofluorescence analysis revealed CCL17 expression by neurons and immigrated hematogenous cells. CCL17-deficient brains showed increased neutrophil immigration and increased expression of Th1- and Th17-related genes. Restimulated splenocytes showed increased TNF-

alpha production. Analysis of bone-marrow chimeras further suggests a neuroprotective role of neuronal expressed CCL17.
Conclusion: These results suggest a neuroprotective role of CCL17 within the pathogenesis of ischemia/reperfusion damage.

AS12-049

EXPERIMENTAL/TRANSLATIONAL MEDICINE

THE MDM2-DEPENDENT P53 DEGRADATION SIGNALLING PATHWAY IS INVOLVED IN NEURONAL ISCHEMIC TOLERANCE

R. Vecino[1,2], M.C. Burguete[3], T. Jover-Mengual[3], J. Agulla[1,4], J.B. Salom[3], A. Almeida[1,2] and M. Delgado-Esteban[1,2]
[1]Institute of Biomedical Research IBSAL, Neurobiology, Salamanca, Spain
[2]Institute of Functional Biology and Genomics, University of Salamanca, Salamanca, Spain
[3]Unidad Mixta de Investigación Cerebrovascular- Instituto de Investigación Sanitaria Hospital La Fe-, Departamento de Fisiología-Universitat de València, Valencia, Spain
[4]Stroke Program. Department of Neurology, Hospital Clinico Universitario- Valladolid and IESCYL., Valladolid, Spain

Background and Aims: Brain ischemic preconditioning (IPC) refers to a state of transient tolerance to a lethal insult that can be evoked by a prior mild insult. IPC induces neuroprotection through the attenuation of apoptotic cell death. p53 is a stress sensor that accumulates during brain ischemia. The murine double minute 2 gene (MDM2) is the main E3 ubiquitin ligase of p53 mediating its degradation, although the role of MDM2 in neuroprotection is largely unknown. Here, we studied the role of MDM2-p53 signalling pathway in IPC-induced neuroprotection.
Method: Primary cortical neurons from *wild type* or p53-null mice (9 DIV) were exposed to N-methyl-D-aspartate (20 μM NMDA; IPC) for 2 h, followed by incubation for further 90 min in ischemia (oxygen and glucose deprivation) or normoxia. After 4 h, neuronal apoptosis and protein levels were analyzed. We used an *in vivo* validated method of IPC (brief transient middle cerebral artery occlusion, tMCAO, 10 min) against temporary focal cerebral ischemia induced by severe tMCAO (60 min) in rats. 24 h after IPC, tMCAO or sham surgery, the brains were removed for TTC-staining and protein expression analysis.
Results: We showed that IPC increased neuronal (*in vitro*) and cerebral (*in vivo*) MDM2 levels, which increased MDM2-p53 interaction leading to p53 destabilization after ischemia. IPC prevented ischemia-induced activation of the p53/PUMA/caspase-3 signalling pathway. Indeed, the pharmacological inhibition of MDM2-p53 interaction with nutlin-3a abrogated neuroprotective effects of IPC against an ischemic insult.
Conclusion: These findings demonstrate the key role of the MDM2-p53 signalling pathway in neuroprotection induced by IPC against a subsequent ischemic insult.
ISCIII:PI15/00473; RD12/0014/0004,RD12/0014/0007 CP0014/00010)JCyL:(BIO/SA35/15)

AS12-051

EXPERIMENTAL/TRANSLATIONAL MEDICINE

NEUROPROTECTIVE EFFECT OF MONOMETHYL FUMARATE IN BRAIN ISCHEMIC REPERFUSION INJURY IN RATS

D. Singh[1], R. KH[1] and Y. Gupta[1]
[1]All India Institute of Medical Sciences AIIMS, Department of Pharmacology, New Delhi, India

Background and Aims: Ischemic stroke still remains a major cause of mortality and morbidity, worldwide. Middle cerebral artery occlusion (MCAo) is a well-accepted model to study the pathophysiology and neuroprotection after ischemia/reperfusion injury. Monomethyl fumarate (MMF), an active metabolite of fumaric acid esters, has shown to be neuroprotective based on its antioxidant and anti-inflammatory properties. Hence, this study was planned to evaluate the neuroprotective effects of MMF in ischemia reperfusion injury in rats.
Method: In Male Sprague Dawley rats (260–290 g), middle cerebral artery was occluded for 90 min using 3.0 monofilament. MCAo was confirmed by laser Doppler flow meter. MMF was administered at 3 doses (5, 10 and 20 mg/kg) at two time points; 30 min post ischemia and 5 min post reperfusion. Neuroprotective effects of MMF were evaluated by neurological deficit score, motor in-coordination by time spent on rota rod and % infarct of ipsilateral area by TTC staining after 24 hr.
Results: Inter group cerebral blood flow was not significantly different during either ischemia or post reperfusion. MMF treatment at doses of 10 and 20 mg/kg significantly ($p < 0.05$) reduced infract area by 30.8 % and 36.1%, respectively as compared to MCAo group. The neurological deficits score ($p < 0.01$) and the time spent on rota rod were also significantly ($p < 0.05$) improved by MMF treatment.
Conclusion: The results show that MMF acute treatment reduces the progression of ischemic damage. This study thus suggests the potential of MMF in the treatment of acute ischemic stroke.

AS12-052

EXPERIMENTAL/TRANSLATIONAL MEDICINE

NUCLEAR ACCUMULATION OF WRAP53 PROMOTES NEURONAL SURVIVAL AFTER ISCHEMIA

C. Rodríguez[1], I. Sánchez Morán[1] and A. Almeida[1]
[1]Institute of Biomedical Research of Salamanca, University Hospital of Salamanca - University of Salamanca, Salamanca, Spain

Background and Aims: WRAP53 (WD40 encoding RNA Antisense to p53) is a scaffold protein implicated in Cajal Bodies maintenance, telomere elongation and DNA repair. Double-strands breaks may result from ischemic stroke, thereby contributing to neuronal death and subsequent brain dysfunction. An adequate DNA damage response is essential to survive after cerebral ischemia and preserve the integrity of the transcribed genome in neurons. Although DNA repair pathways are active after ischemia, the molecular mechanisms underlying neuronal survival remain unknown.
Method: To investigate the role of WRAP53 in neuronal survival after ischemia, primary mouse cortical neurons were subjected to an experimental protocol of ischemia *in vitro* (oxygen and glucose deprivation, OGD) for 3 hours and were further incubated in culture medium (reoxygenation). Wrap53 mRNA and protein levels were determined by RT-qPCR and Western blott, respectively. Protein location was analyzed by cellular fractionation and confirmed by immunofluorescence.
Results: We first observed that ischemia promoted DNA damage, as revealed by the accumulation of γH2AX and 53BP-1 in neurons. We also found a time-dependent increase in *Wrap53* gene expression and protein abundance from 4 hours after the ischemic insult. In parallel, ischemia induced the traffic of WRAP53 to the nucleus, which has been associated with cell survival in tumor cells. Furthermore, WRAP53 depletion by siRNA increased neuronal susceptibility to ischemia-induced apoptosis, which was prevented by expression of WRAP53 in ischemic neurons.
Conclusion: Our results demonstrate that ischemia-induced WRAP53 nuclear accumulation plays an essential role in neuronal survival.
Funded by ISCIII (PI15/00473; RD12/0014/0007), FEDER, and Junta de Castilla y León (ISM)

AS12-053

EXPERIMENTAL/TRANSLATIONAL MEDICINE

INTRACRANIAL PRESSURE RISES 24 HOURS AFTER MILD-MODERATE ISCHAEMIC STROKE – A POTENTIAL TRIGGER FOR EARLY NEUROLOGICAL DETERIORATION?

T. Kovacs[1], L. Murtha[1], D. Beard[1], D. McLeod[1], R. Hood[1], C. García-Esperón[2], J. Demeestere[2], C. Levi[2], B. Schmidt[3] and L. Spratt[2]

[1]University of Newcastle, School of Biomedical Sciences and Pharmacy, Newcastle, Australia
[2]John Hunter Hospital, Department of Neurology, Newcastle, Australia
[3]Medical Centre Chemnitz, Department of Neurology, Chemnitz, Germany

Background and Aims: Early neurological deterioration (END) following initially mild ischaemic stroke has been associated with collateral vessel "failure" despite stable arterial occlusion. Raised intracranial pressure (ICP) may play an important role. We have recently identified in rats that ICP increases dramatically 24 hours after minor experimental ischaemic stroke, and that artificial ICP elevation reduces collateral blood flow after permanent arterial occlusion. However, whether ICP increases in patients with mild-moderate ischaemic stroke is currently unknown. We aimed to determine whether ICP increases in patients with minor-moderate ischaemic stroke from 6 to 24 hours post-stroke, and whether this is associated with END.
Method: We compared the change in ICP over time between two groups: patients with first-ever minor-moderate ischaemic stroke (defined by clinical and perfusion computer tomography criteria), and healthy controls. ICP was calculated noninvasively (nICP) using a validated mathematical algorithm applied to arterial blood pressure (Finapres) and middle cerebral artery blood flow velocity (transcranial Doppler) recordings at 6 and 24 hours post-stroke or two time-points 18 hours apart (controls). We defined END as $\geq$4-point increase in NIHSS score.
Results: nICP increased significantly among stroke patients (10.18 ± 4.25 mmHg 6 hours, 13.31 ± 6.25 mmHg 24 hours, $n = 10$, $p = 0.02$) but not among controls (10.66 ± 3.24 mmHg baseline, 10.41 ± 2.81 mmHg 18 hours, $n = 75$, $p = 0.49$). In 7 stroke patients, nICP increased more than 1.2 mmHg (95th percentile among controls). No stroke patient suffered END.
Conclusion: nICP increased modestly in some patients with minor-moderate ischaemic stroke 24 hours post-stroke, but none suffered END. Patient recruitment is ongoing to further examine the relationship between nICP, collateral failure and END.

AS12-054

EXPERIMENTAL/TRANSLATIONAL MEDICINE

MAGNETIC RESONANCE SPECTROSCOPY APPLIED TO MONITOR NON-INVASIVELY THERAPEUTIC RESPONSE TO CITICOLINE IN A RAT STROKE MODEL

E. Jimenez-Xarrie[1], A.P. Candiota[2,3,4], R. Delgado-Mederos[1,5], C. Arús[2,3,4] and J. Martí-Fàbregas[1,5]

[1]Biomedical Research Institute Sant Pau IIB Sant Pau, Neurology Department, Barcelona, Spain
[2]Centro de Investigación Biomédica en Red en Bioingeniería-Biomateriales y Nanomedicina CIBER-BBN, Cerdanyola del Vallès, Spain
[3]Universitat Autònoma de Barcelona, Departament de Bioquímica i Biologia Molecular, Cerdanyola del Vallès, Spain
[4]Universitat Autònoma de Barcelona, Institut de Biotecnologia i de Biomedicina, Cerdanyola del Vallès, Spain
[5]Hospital de la Santa Creu i Sant Pau, Neurology Department, Barcelona, Spain

Background and Aims: Magnetic resonance spectroscopy (MRS) can be used to evaluate non-invasively metabolic pathways affected by therapeutic interventions in brain. Citicoline was tested as a neuroprotective treatment for ischemic stroke. Our aim was to evaluate by MRS changes in brain parenchyma due to stroke treatment.
Method: Sprague-Dawley rats were subjected to middle cerebral artery occlusion. Experimental groups were: treated-rats ($n = 6$) and control-rats ($n = 6$) at day-1 ($n = 3$) and day-7 post-stroke ($n = 3$) in each group. Citicoline was administered intraperitoneally in the treated-rats with a dose of 500 mg/kg at reperfusion and 2 hours post-reperfusion and 4 doses of 250 mg/kg every 3 hours for the following 6 days. MRS was acquired at 7-Tesla (TR/TE = 1800/12 ms). Apoptosis was measured by TUNEL immunohistochemistry. Statistical analysis was performed using Student's t-test.
Results: There were no significant differences between both groups in the infarct volume at day-1 and day-7 post-stroke assessed by magnetic resonance imaging, although we measured in vitro a 69% decrease in apoptosis in the infarct at day-7 post-stroke ($p = 0.04$) in treated-rats. MRS showed a significant 1.5 fold-increase in lactate + mobile lipids (1.30 ppm) at day-1 post-stroke ($p = 0.01$) in treated-rats. No changes were detected in other mobile lipids resonances (e.g. 0.9 ppm) in agreement with major contribution from lactate. Lactate increase can be related to an increased glycolytic metabolism which is necessary for brain parenchyma maintenance during ischemia.
Conclusion: MRS showed that at day-1 post-stroke there seems to be higher lactate accumulation in the treated-rats. MRS can be used for obtaining non-invasively metabolomic information about treatment effect from infarcted brain parenchyma.

AS12-056

EXPERIMENTAL/TRANSLATIONAL MEDICINE

DETECTION OF ACTIVATED MOTOR CIRCUITS INVOLVED IN GAIT RESTORATION DURING STIMULATION OF THE MESENCEPHALIC LOCOMOTOR REGION IN A RAT STROKE MODEL

F. Fluri[1], S. Krämer[2], I. Israel[3], M. Krstić[1], M. Schuhmann[1], F. Schadt[3], S. Samnick[3] and J. Volkmann[1]

[1]University Hospital Wuerzburg, Neurology, Würzburg, Germany
[2]ETH Zürich, Chemistry and Applied Biosciences, Zürich, Switzerland
[3]University Hospital Wuerzburg, Nuclear Medicine, Würzburg, Germany

Background and Aims: One-third of all stroke patients are unable to walk, even after intensive physiotherapy. Thus, other concepts to regain walking are needed. Since electrical stimulation of the mesencephalic locomotor region (MLR) is known to elicit gait movements, this area might be a promising target for restorative neurostimulation in stroke patients with gait impairment. Recently, we have demonstrated that high frequency stimulation (HFS) of the MLR in rats restored coordinated and balanced gait after photothrombotic stroke. However, it remains elusive which motor circuits are involved during MLR-stimulation.
Method: Rats underwent photothrombotic stroke of the right sensorimotor cortex and implantation of a microelectrode into the right MLR. Gait parameters were assessed using the ladder rung walking test on day 3 after stroke induction with and without MLR-HFS. Paw placement on the rung was rated using a foot fault score (FFS). 2-[^{18}F]Fluoro-2-deoxyglucose ([^{18}F]FDG)-PET was conducted without and 24 hours later with MLR-HFS and thereafter, differences in tracer uptake were calculated.

Results: MLR-HFS resulted in a significantly lower FFS compared to the non-stimulated state ($p < 0.0001$). Compared to the non-stimulated state, animals exhibited a significant higher uptake of [^{18}F]FDG in the right but not in the left motor cortex ($p < 0.0001$ vs $p = 0.72$) the substantia nigra ($p = 0.03$ vs $p = 0.12$), the striatum ($p = 0.02$ vs $p = 0.83$), the somatosensory cortex ($p = 0.007$ vs $p = 0.90$) as well as the medial (fastigial) cerebellar nucleus ($p = 0.02$ vs $p = 0.05$) when MLR-HFS was applied.
Conclusion: By modulating particular motor centers, MLR-HFS may reverse remote network effects of stroke which otherwise result in chronic motor symptoms.

AS12-058

EXPERIMENTAL/TRANSLATIONAL MEDICINE

TIME-DOMAIN NEAR-INFRARED SPECTROSCOPY OXYGENATION PARAMETERS IN HEALTHY VOLUNTEERS AND IN ACUTE ISCHEMIC STROKE PATIENTS ACCORDING TO BRAIN TISSUE AND VASCULAR STATUS

G. Giacalone[1], M. Zanoletti[2], D. Contini[2], R. Re[2], L. Spinelli[3], B. Germinario[4], A. Torricelli[2] and L. Roveri[1]
[1]San Raffaele Scientific Institute, Neurology Department, Milan, Italy
[2]Politecnico di Milano, Dipartimento di Fisica, Milan, Italy
[3]Consiglio Nazionale delle Ricerche, Istituto di Fotonica e Nanotecnologie, Milan, Italy
[4]"Vita-Salute" San Raffaele University, Faculty of Medicine, Milan, Italy

Background and Aims: Time-Domain Near-Infrared Spectroscopy (TD-NIRS) is an optical technology able to non-invasively measure the absolute concentrations of deoxy-haemoglobin (HHB), oxy-haemoglobin (OHB) and to calculate tissue oxygen saturation [$SO_2 = OHB/(OHB + HHB)$] in the outer layers of brain tissue. Our aim was to compare SO_2 values in control subjects with acute ischemic stroke patients according to brain tissue and middle-cerebral artery (MCA) recanalization status.
Method: We enrolled 33 controls (mean age: 71.6 ± 8.4 y), and 15 ischemic stroke patients (mean age: 76.4 ± 12.1 y) (<48 h from onset). TD-NIRS measurements of at least 3 brain regions per hemisphere were performed using 3 wavelengths (690, 785, 830 nm). Data were fitted with the diffusion model for semi-infinite homogenous media. TD-NIRS optodes were placed on corresponding ischemic brain tissue according to fiducial markers in CT-/MRI-scans. Stroke patients were divided in 3 groups: MCA occlusion and early recanalization after rTPA and thrombectomy ($n = 3$), spontaneous late recanalization ($n = 3$), no evidence of recanalization ($n = 6$), stroke in deep brain tissue without evidence of arterial occlusion ($n = 3$).
Results: Mean (CI 95%) concentrations (mM) in controls were: HHB = 23.5 (23.1–23.9), OHB = 44.6 (43.6–45.6), $SO_2 = 65.1\%$ (64.1–65.5). Early recanalization patients had significantly reduced mean SO_2 in optodes above subcortical core compared to normal tissue of affected and unaffected hemisphere (respectively 54.7, 58.6, 59.3%; $p < 0.001$) and compared to control subjects ($p < 0.001$) and to patients with deep stroke, late recanalization or no recanalization (respectively 64.9, 61.6, 62.7%; $p < 0.001$).
Conclusion: According to these data, SO_2 is reduced in cortical brain regions rescued by recanalization in comparison to normal tissue of both hemispheres and respect to control subjects.

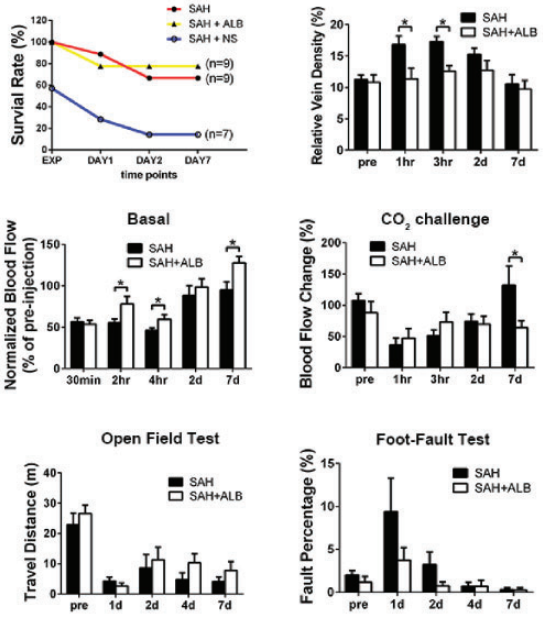
AS12-061

EXPERIMENTAL/TRANSLATIONAL MEDICINE

AN MRI STUDY ON THE NEUROPROTECTION OF HUMIN ALBUMIN IN EXPERIMENTAL SUBARACHNOID HEMORRHAGE

Y. Sun[1], L.T. Watts[2], G.Y. Yang[3], J.I. Suarez[4] and T.Q. Duong[5]
[1]Ruijin Hospital - Shanghai Jiao Tong University School of Medicine, Department of Neurosurgery, Shanghai, China
[2]The University of Texas Health Science Center at San Antonio, Research Imaging Institute, San Antonio, USA
[3]Med-X Research Institute- Shanghai Jiao Tong University, Neuroscience and Neuroengineering Research Center, Shanghai, China
[4]Baylor College of Medicine- Baylor St Luke's Medical Center, Division of Vascular Neurology and Neurocritical Care- Department of Neurology, Houston, USA
[5]Stony Brook School of Medicine, Department of Radiology, Stony Brook, USA

Background and Aims: The development of treatments in subarachnoid hemorrhage (SAH) might prevent hemodynamic-related neurological complications and subsequently reduce the mortality of patients. Human albumin has been demonstrated neuroprotection in various cerebrovascular diseases. However, less has been defined the effect of albumin therapy after SAH. Magnetic resonance imaging (MRI) will be utilized to longitudinal evaluate hemodynamic changes after albumin treatment underlying SAH within the acute phase.
Method: Blood was injected into the cisterna magna of the rats to mimic SAH. With the intravenous injection of 25% human albumin (1.25 g/kg) or same volume saline (5 ml/kg), hemodynamic changes measured by using multimodal MRI and neurological assessment were evaluated before and after SAH establishment.
Results:



1) Dramatic decreases of survival rates were observed after saline injection, indicative of severe adverse effects of volume expansion by saline. 2) Transient CBF increases in cortex after albumin injection reveals regional basal CBF improvement during the acute phase. In contrast, hypercapnic challenge CBF response in the albumin group showed no significant differences from the control ($p > 0.05$). 3) While no changes in the arteries

were observed after albumin treatment across the time points ($p > 0.05$), vein dilation could be alleviated at 1 and 3 hrs following SAH compared to control animals ($p < 0.05$). 4) It deserves mentioning that albumin group showed a better spontaneous recovery trend in the travel distance and foot-fault test compared to control animals throughout the first week but not perfectly normal.

Conclusion: These findings suggest that human albumin has protective effects on insulted hemodynamics that may contribute to acute complications after SAH.

AS12-062

EXPERIMENTAL/TRANSLATIONAL MEDICINE

THE ROLE OF BNIP3 IN ACUTE CARDIAC INJURY FOLLOWING ISCHEMIC STROKE

S. Mencl[1], T. Rassaf[2], C. Kleinschnitz[1] and U. Hendgen-Cotta[2]
[1]University Hospital Essen, Neurology, Essen, Germany
[2]University Hospital Essen, Cardiology, Essen, Germany

Background and Aims: Cardiac diseases are common post-stroke and are associated with increased morbidity and mortality. One possible mechanism of acute cardiac injury is the neurogenic myocardial damage, where the cerebral injury is disturbing the normal sympathetic and parasympathetic neuronal outflow to the heart leading to cardiac damage including myocardial infarctions. A consequence of an increased sympathetic activity is an exaggerated norepinephrine efflux from cardiac sympathetic nerve terminals into the myocardial interstitium with prolonged opening of the ß1-adrenergic receptor-controlled calcium channels. Abnormal intracellular Ca2+-handling, leads to mitochondrial dysfunction, presumably mediated by the pro cell death protein BNIP3, and generation of reactive oxygen species (ROS). The exact mechanism is not completely understood and the major objective of this project is to characterize the molecular phenotype of the neurogenic myocardial damage post-stroke.

Method: Our data demonstrate acute myocardial damage in wild-type mice after right-sided transient middle cerebral artery occlusion (tMCAO).

Results: Notably, the size of myocardial damage correlated with the brain infarct volume and triggered a ~4-fold elevation of troponin t levels that were detectable 20 h after stroke. Similar effects were found using the ß1-adrenergic receptor stimulator isoproterenol, an established model of heart failure. Following either cerebral stroke or isoproterenol treatment, higher levels of BNIP3, cardiac troponin t, ANP, BNP and norepinephrine were found in blood and heart samples at distinct time points.

Conclusion: We found expression of the pro cell death protein BNIP3 in the heart after cerebral ischemia and we will further investigate the role of BNIP3 in mediating neurogenic cardiac damage.

AS12-063

EXPERIMENTAL/TRANSLATIONAL MEDICINE

THE MDM2 309T>G POLYMORPHISM CONTROLS THE MDM2-P53 SIGNALING PATHWAY AND DICTATES FUNCTIONAL OUTCOME AFTER STROKE

M.E. Ramos-Araque[1], C. Rodríguez[1], S.M. Irene[1], T. Sobrino[2], J.C. Gómez-Sánchez[1], J. Castillo[2] and A. Almeida[1]
[1]Institute of Biomedical Research of Salamanca IBSAL, University Hospital of Salamanca-University of Salamanca, Salamanca, Spain
[2]Clinical Neurosciences Research Laboratory, Health Research Institute of Santiago de Compostela IDIS, Santiago de Compostela, Spain

Background and Aims: The highly variable prediction of functional outcome after stroke could be the effect of different genetic backgrounds to apoptosis. The MDM2 protein is the main negative regulator of p53, which plays an important role in neuronal apoptosis after cerebral ischemia. We found that the *Arg72Pro* single nucleotide polymorphism (SNP) of *p53* regulates the pro-apoptotic activity of the protein and conditions neuronal vulnerability to ischemia-induced apoptosis and prognosis of stroke patients. A functional SNP (309T > G) in the gene promoter of *Mdm2* modulates its expression. However, the role of *Mdm2 309T > G* in stroke prognosis remains unknown.

Method: Here we study the association of the *Mdm2 309T* > G and the functional outcome after stroke in blood samples from 408 patients with ischemic stroke and 206 with intracerebral hemorrhage. Functional outcome at 3 and 12 months was evaluated by the modified Rankin scale. Mononuclear cells from healthy individuals were collected to quantify Mdm2 mRNA and protein levels.

Results: We found that mononuclear cells harboring the *Mdm2 TT* genotype have lower levels of mRNA and MDM2 protein than those with the *Mdm2 TG* and *GG* genotypes. These differences may affect p53 stabilization and, accordingly, cell vulnerability to ischemia-induced apoptosis. Furthermore, patients harboring the *Mdm2 TT* genotype showed poor functional outcome at 3 and 12 months following ischemic ($p = 0{,}003$) and hemorrhagic ($p < 0{,}0001$) stroke, respectively.

Conclusion: Our results suggest that the *Mdm2 309T > G* polymorphism modulates the MDM2-p53 signaling pathway and then cell susceptibility to apoptosis, which conditions the functional outcome of patients after stroke.

Funded by FEDER and ISCIII: (CM14/00096;PI12/00685;PI15/00473;RD12/0014/0001;RD12/0014/0007)

AS12-066

EXPERIMENTAL/TRANSLATIONAL MEDICINE

CRYOPRESERVED HUMAN CORD BLOOD USAGE FOR IMMUNE SYSTEM CORRECTION IN EXPERIMENTAL ISCHEMIC STROKE

V. Lebedynets[1,2], L. Ostankova[3], T. Dubrava[3], D. Lebedynets[1,2], M. Ostankov[3] and A. Goltsev[3]
[1]Kharkiv Clinical Railway Hospital #1, Neurology Department #1, Kharkiv, Ukraine
[2]V.N. Karazin Kharkiv National University, Psychiatry- Narcology-Neurology and Medical Psychology Department, Kharkiv, Ukraine
[3]Institute for Problems of Cryobiology and Cryomedicine of the National Academy of Sciences of Ukraine, Department of Cryopatophysiology and Immunology, Kharkiv, Ukraine

Background and Aims: Immune mechanisms (autoimmune aggression, local inflammation) take part in ischemic stroke (IS) pathogenesis. T cells inhibition, reduction of natural killer cells activity observed. There is an

evidence of humoral immunity activation (increase of B cells, Ig and CIC levels). There is some data showing the relation between the level of immune system disorders and severity and outcome of IS.
We performed complex immune investigation in rats with induction of IS and after injection of cryopreserved human cord blood (cHCB).
Method: Experiments were performed at 6-month male rats (Wistar) with MCAo model of IS. Cryopreservation of HCB was performed using controlled rate freezer. Intraperitoneal (IP) injection of $5x10^6$ cHCB cells was performed in 6 hours after IS. Neurological and behavioral testing was performed on 3rd, 7th, 14th and 28th days after IS. Subpopulation analysis of spleen was performed with flow cytometry with mAb to CD3, CD4, CD8, CD25. Concentration of IFN-γ and IL-10 was measured with enzyme immunoassay (EIA).
Results: Treatment of experimental IS with IP injection of cHCB showed statistically significant improvement of neurologic and structural recovery after IS in rats in all time points (compared to non-treated rats). Immune system analysis showed that usage of this therapy increased CD3+, CD4+, CD8+ cells level, decreased CD4+CD25+ cells level, increased IL-10 level, decreased IFN-γ level, restored the phagocytic and adhesive activity of the mononuclear phagocyte system and the concentration of CIC.
Conclusion: cHCB treatment showed good positive effect in experimental study and can be possibly used in future for immune system correction in IS patients

AS14-005

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

THE METABOLIC PROFILE OF CEREBRAL WHITE AND GREY MATTER IN PATIENTS WITH WHITE MATTER HYPERINTENSITIES

S. Elyas[1], J. Fulford[2], D. Adingupu[3], K. Aizawa[4], F. Casanova[4], K. Gooding[4], A. Shore[4], P. Gates[5] and D. Strain[4]
[1]Royal Devon & Exeter Hospital, Stroke Medicine, Exeter, United Kingdom
[2]University of Exeter Medical School, Department of Biomedical science, Exeter, United Kingdom
[3]Astrazeneca, Astrazeneca, Gothenburg, Sweden
[4]University of Exeter Medical School, Diabetes and Vascular Research, Exeter, United Kingdom
[5]Utah University, Utah University, Utah, USA

Background and Aims: Cerebral WMH are recognised surrogate markers for cerebral small vessel disease (SVD). Many mechanisms have been proposed in the pathogenesis of cerebral SVD. The metabolic activity of the white matter and grey matter in cerebral SVD is not clearly studied. We set out to investigate this in patients with mod/severe cerebral SVD compared to controls.
Method: 21 patients with known moderate/severe WMH and 21 participants with no or mild WMH (controls) on MRI scan were recruited from a community cohort and from the local clinic. All patients had proton MRS and data about N-Acetyleaspartate (NAA), creatine (Cr), Choline (Ch) and myo-inositol (MI) activity were obtained. All MRS metabolite data were corrected to water concentration.
Results: Patients with mod/severe WMH were significantly older ($p < 0.001$) and had a higher BP($p = 0.03$). NAA(1.2 ± 0.18 vs 1.3 ± 0.11, $p = 0.02$) and MI(0.78 ± 0.2 vs. 1.0 ± 0.23, $p = 0.03$) were significantly lower in the white matter of participants with moderate/severe WMH compared to controls, there was no significant difference in Cr and Ch. In the grey matter NAA, Cr and Ch were significantly lower in patients with mod/severe WMH compared to controls (1.42 ± 0.26 vs. 1.63 ± 0.23, $p = 0.007$, 0.85 ± 0.16 vs. 0.96 ± 0.11, $p = 0.01$, 0.62 ± 0.14 vs. 0.80 ± 0.29, $p = 0.01$ respectively). There was no difference in MI.
Conclusion: We demonstrated a different metabolic profile in the white matter and grey matter of patients with mod/severe WMH compared to controls. Cerebral WMH may underlay a more generalised and systemic pathological process that involves the white and grey matter equally. Further studies are needed to explore this area as a potential therapeutic target to avoid disease progression.

AS14-007

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

HIGH SERUM C REACTIVE PROTEIN LEVEL MAY ENHANCE THE ACCURACY AND PRECISION OF PREDICTION OF OUTCOME AFTER SPONTANEOUS INTRACEREBRAL HAEMORRHAGE: A PROSPECTIVE COHORT STUDY

A. Kumar[1], S. Misra[2], R. Sagar[2], D. Vibha[2], A. Garg[2], D. Mohania[3] and K. Prasad[2]
[1]New Delhi, India
[2]All India Institute of Medical Sciences- New Delhi, Neurology, New Delhi, India
[3]All India Institute of Medical Sciences- New Delhi, Ophthalmology, New Delhi, India

Background and Aims: C-reactive protein (CRP) is an inflammatory biomarker and its high level may lead to progression of vascular disease and could be used as a prognostic biomarker for intracerebral hemorrhage. The aim of this study is to determine whether CRP is a predictor of neurological outcome in patients with primary intracerebral hemorrhage having onset within 72 hours.
Method: In a prospective cohort study, patients with ICH were recruited after obtaining written informed consent. Venous blood samples (3 ml) were collected for serum separation and stored at -80° C until analysis. Enzyme Linked Immunosorbent assay was used for the assessment of CRP. All the patients were telephonically followed using the modified Rankin Scale (mRS) at 3 months by an observer blinded to baseline CRP level.
Results: A total of 171 patients with ICH were screened for eligibility out of which 79 patients were recruited. 68 patents were excluded due to ischemic stroke, 21 due to window period over, 2 due to SAH and 1 due to co-morbid illness. High CRP level significantly predicted the mortality at 3 months after the acute intracerebral hemorrhage (OR, 2.90; 95% CI 1.14 to 7.43, $P = 0.026$,). Significantly high CRP within 72 hours of onset of symptoms was observed in patients who had poor outcome (mRS 4 to 6) (OR 2.2, 95% CI 0.86 to 5.4, $P = 0.09$)
Conclusion: High baseline CRP level is an important prognostic biomarker for death and unfavorable outcome after spontaneous intracerebral hemorrhage. It may help to stratify patients for early referral or intervention.

AS14-009

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

MOLECULAR ANALYSIS OF PENTRAXIN 3 AND ASYMMETRIC DIMETHYLARGININE. PREDICTING SYMPTOMATIC CAROTID STENOSIS

J. Serena[1], B. Alemany[1], M. Terceño[1], M. Reina[1], L. Pardo[1], G. Blasco[2], J. Puig[2], P. Rodriguez[3], O. Andrés[3], C. Gubern[1] and Y. Silva[1]
[1]Hospital Universitari Dr. Josep Trueta, Neurology, Girona, Spain
[2]Hospital Universitari Dr. Josep Trueta, Neuroradiology IDI, Girona, Spain
[3]Hospital Universitari Dr. Josep Trueta, Vascular surgery, Girona, Spain

Background and Aims: To determine the relationship of asymmetric dimethylarginine (ADMA) and Pentraxin-3 (PTX3) with carotid stenosis and restenosis, and to study associated clinical factors. ADMA is a marker of endothelial dysfunction, an endogenous inhibitor of iNOs. PTX3 is expressed in response to inflammatory stimuli. Both have been associated with subclinical atherosclerosis and the development of vulnerable plaques, without having been analysed in patients with symptomatic carotid stenosis.
Method: Prospective study of cases and controls with carotid stenosis operated on with endarterectomy/carotid stent. Descriptive analysis and retrospective univariate analysis of demographic characteristics, cardiovascular risk factors, characteristics of the carotid stenosis, lipidogram, glycaemia, LDH, PCR, and pharmacological treatment. ADMA and PTX3 concentrations were studied in patients and controls using ELISA.
Results: 45 patients submitted to endarterectomy ($n = 37$) or stent ($n = 8$) and 35 healthy controls were included. 20 (44.4%) had contralateral stenosis and 6 (13.3%) had received cervical radiotherapy. 35 (77.8%) were symptomatic. The indication in asymptomatic patients was progression of the stenosis or failure of collateral circulation. 6 (13.3%) patients suffered a restenosis.
Levels of ADMA and PTX3 in patients and controls were 0.71 ± 19 vs. 0.60 ± 0.13 ($p < 0.01$) and 8.157 ± 5.614 vs. 8.071 ± 5.381 ($p = NS$), respectively.
Although PTX3 was associated with inflammatory markers (PCR and DM; $p = 0.01$), only levels of ADMA were strongly associated with the risk of restenosis (0.56 ± 0.07 vs. 0.72 ± 0.18 ($p < 0.01$), without association with any other variable studied.
Conclusion: High circulating levels of ADMA were independently associated with critical carotid stenosis and the risk of restenosis. Neither PTX3 nor other biochemical or clinical markers were identified.

AS14-010

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

INCREASE OF TELOMERE LENGTH IN ISCHAEMIC STROKE

L. López-Mesonero[1], S. Marquez Batalla[2], J. Fernandez Mateos[3], J.C. Gómez Sánchez[4] and R. Gonzalez Sarmiento[3]
[1]Salamanca, Spain
[2]Clinical University Hospital, Internal Medicine, Salamanca, Spain
[3]Clinical University Hospital, Investigation Laboratory IBSAL, Salamanca, Spain
[4]Clinical University Hospital, Neurology, Salamanca, Spain

Background and Aims: Telomeres are the extreme ends of chromosomal DNA, composed of a variable number of tandem repeats of the sequence TTAGGG and have been proposed as markers of the biological ageing process because they shorten with each cell division. Telomere length has been linked to stroke, but has not been conclusively demonstrated. Our aim was to determine leukocyte telomere length as a predictor of clinical outcome and the influence of lifestyle as determinant of telomere length.
Method: The relative telomere length of leukocytes was determined by quantitative polymerase chain reaction in 135 stroke patients (105 ischaemic and 30 haemorrhagic stroke) and 150 age and sex control subjects followed prospectively 1 year. Data regarding demographics, stroke type, leukoaraiosis measured with Fazekas scale, atheroma plaques and carotid stenosis were collected. Clinical outcomes were assessed using the modified Rankin Scale (mRS). A second measure of telomere length was made 1 year later of stroke event in a subgroup of 22 patients with ischaemic stroke with good clinical outcome defined as 0–2 in mRS
Results: Mean telomere length was significantly shorter in stroke patients than in control subjects. There was no association between telomere length and clinical outcome with mRS. Alcohol consumption was related with longer telomeres. The second measure of telomere length was longer ($p < 0{,}001$).
Conclusion: Telomere length is shorter in patients with stroke. Among those with good clinical outcome there was an increase in telomere length that could be a marker of a stop in biological ageing.

AS14-011

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

BNP LEVELS IN THE FIRST 24 HOURS AFTER AN ACUTE ISCHEMIC STROKE AS A METHOD FOR PREDICTING ATRIAL FIBRILLATION DEVELOPMENT

P. Pérez Torre[1], A. Escobar Villalba[1], P. Martínez Ulloa[1], E. Monreal[1], M. Pascual Izco[2], A. De Felipe[1], C. Matute Lozano[1], R. Vera Lechuga[1], J. Masjuan[1] and A. Cruz Culebras[1]
[1]Hospital Universitario Ramón y Cajal, Neurology, Madrid, Spain
[2]Hospital Universitario Ramón y Cajal, Cardiology, Madrid, Spain

Background and Aims: To determine whether serum BNP (natriuretic peptide type B) levels available in the emergency department, within the first 24 hours of ischemic stroke can predict the occurrence of atrial fibrillation (AF) in patients suspected of embolism of undetermined source.
Method: Patients with acute ischemic stroke from suspected embolism without a documented history of AF were enrolled prospectively from January 2015 to July 2015. Clinical, demographic and cardiac imaging data were collected. Blood samples to measure BNP levels were taken within the first 24 hours of symptom onset and patients were followed for 12 months. We excluded patients with heart and renal failure or a well documented etiology for the stroke.
Results: A total of 54 patients were included in the study (mean age 71 years SD +/- 12, 50.9% males). 13 patients developed AF during follow-up (24%). 10% of the patients didn t have vascular risk factors. Baseline ECG on the ER was normal in 98%. BNP levels in patients who developed AF was higher tan in those who did not develop atrial fibrillation (median of 273,4 pg/ml vs 78,3 pg/ml, $p < 0.001$). In bivariate analysis and logistic regression, levels greater than 80 pg/ml ($p = 0.024$) and female gender ($p = 0.005$) were associated with an increased risk of developing AF.

Conclusion: Moderate elevations of BNP in the first 24 hours after ischemic stroke may help to predict the development of AF in patients with stroke from suspected cardiac embolism.

AS14-013

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

AN ASSOCIATION STUDY OF THE MATRIX METALLOPROTEINASE-8, -13 GENETIC POLYMORPHISMS ON THE RISK OF ISCHEMIC STROKE

L.M. Lien[1], F.I. Hsieh[2], Y.S. Zeng[2] and H.Y. Chiou[2]
[1]Shin Kong WHS Memorial Hospital, Department of Neurology, Taipei, Taiwan R.O.C.
[2]Taipei Medical University, School of Public Health, Taipei, Taiwan R.O.C.

Background and Aims: Previous studies indicated that matrix metalloproteinase-8 (MMP-8) and MMP-13 were associated with plaque stability. We aim to investigate the association between the genetic polymorphisms of MMP-8, -13 and the risk of ischemic stroke.
Method: We enrolled 500 ischemic stroke patients and 500 age-, sex-matched healthy controls. The genotypes of selected SNPs (rs3740938, rs1940475, rs11225395, rs597315, rs640198) from MMP-8 and MMP-13 were determined by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). Multivariate logistic regression models were used to analyze the relationship between genetic polymorphisms and risk of ischemic stroke.
Results: In this study, we found that obesity, smoking, alcohol drinking, hypertension (OR = 2.675), diabetes mellitus (DM), heart disease, high level of triglyceride, and low level of high-density lipoprotein (HDL) cholesterol were the risk factors of ischemic stroke. After adjusting for age, gender, obesity, smoking, alcohol, hypertension, DM, heart disease, and abnormal HDL cholesterol, only MMP-8 rs3740938 AA genotype carriers had an increased risk of developing ischemic stroke (OR = 1.924; 95% C.I. = 1.021–3.626). Moreover, MMP-8 rs3740938 AA genotype carriers had an increased risk of developing ischemic stroke in the smokers (OR = 3.148; 95% C.I. = 1.071–9.255), abnormal triglyceride (OR = 2.471; 95% C.I. = 1.149–5.316), or abnormal HDL cholesterol (OR = 2.083; 95% C.I. = 1.013–4.280). There was no significant interaction on the risk of developing ischemic stroke between MMP-8 rs3740938 and conventional stroke risk factors.
Conclusion: MMP-8 rs3740938 AA genotype may be used as a predictor for the risk of developing ischemic stroke.

AS14-014

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

SERUM NEUROFILAMENT LIGHT CHAIN PROTEIN: A PROMISING BIOMARKER FOR LACUNAR STROKE AND CEREBRAL SMALL VESSEL DISEASE

T. Gattringer[1], D. Pinter[1], C. Enzinger[1], M. Kneihsl[1], S. Fandler[1], A. Pichler[1], C. Barro[2], S. Gröbke[2], M. Voortman[1], T. Seifert-Held[1], L. Pirpamer[1], E. Hofer[1], S. Ropele[1], R. Schmidt[1], J. Kuhle[2], F. Fazekas[1] and M. Khalil[1]
[1]Medical University of Graz, Neurology, Graz, Austria
[2]University of Basel, Neurologic Clinic and Policlinic- Departments of Medicine- Biomedicine and Clinical Research, Basel, Switzerland

Background and Aims: Neurofilament light chain (NfL) is a neuro-structural protein that has been shown to correlate with axonal damage in multiple sclerosis, however scarce information is available for other disorders affecting the white matter such as cerebral small vessel disease (CSVD) and lacunar stroke. We hypothesized that serum NfL levels were increased in patients with a recent small subcortical infarct (RSSI) compared to age-matched healthy controls. Moreover, we aimed to assess longitudinal changes of NfL following RSSI and their association with progression of CSVD on MRI.
Method: We analysed serum NfL using a single molecular array (Simoa) assay and rated the MRI scans of prospectively collected RSSI patients (n = 79) at baseline and at three and 15 months post-stroke. Community-dwelling healthy age- and sex-matched individuals with balanced severities of MRI white matter hyperintensities (WMH) (n = 53) served as controls.
Results: RSSI patients (mean age: 61 ± 11 years, 67% male) had significantly higher NfL baseline levels compared to healthy controls (73.45 vs. 34.59 pg/ml, $p < 0.0001$). NfL levels remained increased at the 3-months follow-up and returned to normal 15 months post-stroke. In patients, NfL was associated with RSSI size, WMH severity and the development of new CSVD-related lesions during the follow-up period.
Conclusion: Serum NfL is increased in patients with RSSI and associated with the progression of CSVD-related MRI markers. NfL is therefore a promising biomarker for lacunar stroke and CSVD.

AS14-015

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

SERUM AMYLOID A – A NOVEL PREDICTOR OF STROKE ASSOCIATED INFECTIONS

J.M. Schneider[1], V.L.F. Lapierre- Fetaud[2], L. Azurmendi Gil[3], F. Fluri[4], A. Luft[5], M. Christ-Crain[6], J. Montaner[7], J.C. Sanchez[8] and M. Katan[9]

[1]University Hospital of Zürich, Neurology, Zürich, Switzerland
[2]TBG - Department of Human protein Science, Translational Biomarker Group 9052B, Geneva, Switzerland
[3]Centre Medical Universitaire CMU, Biomedical Proteomics Research Group, Geneva, Switzerland
[4]University Hospital Wuerzburg, Neurology, Wuerzburg, Switzerland
[5]University hospital Zürich, Neurology, Zürich, Switzerland
[6]University Hospital Basel, Department of Endocrinology- Diabetes & Metabolism, Basel, Switzerland
[7]Hospital Vall d'Hebron- Barcelona, Laboratorio de Investigación Neurovascular Institut de Recerca, Barcelona, Switzerland
[8]Centre Médical Universitaire Geneva, Human Protein Science Departmen, Geneva, Switzerland
[9]Universitiy hospital Zürich, Neurology, Zürich, Switzerland

Background and Aims: The use of novel blood biomarkers to identify patients, vulnerable for post-stroke infections, may help to implement treatment more rapidly thus eventually reducing mortality-rates. We addressed the value of Serum Amyloid A – Protein (SAA) in prediction of stroke-associated.

Method: In this prospective cohort-study we measured SAA of ischemic stroke patients within 72 h of symptoms onset. Patients with signs of infection on admission or before stroke onset were excluded. The primary outcome measure was any stroke-associated infections occurring within 5 days of hospital admission. Infections were diagnosed according to the criteria of the U.S. Centers for Disease Control and Prevention.

Results: Of 283 patients, 60 (21.2%) developed an infection after onset of stroke. In the univariate analysis SAA was associated with the development of any infection with an OR of 1.51 [95% CI, 1.26 – 1.82]. After adjusting for all other predictors which were significantly associated with any infection (*P*-value cut off $\leq$0.001), SAA remained and independent predictor (adj. OR 1.36 [95% CI, 1.02 – 1.82]). Adding SAA to the regression model, the discriminatory accuracy improved, from 0.75 [95% CI, 0.67 – 0.82] to 0.76 [95% CI, 0.68 – 0.83] $p < 0.04$ (likelihood ratio test). The addition of SAA to the multivariate model led to an NRI of 0.31 [95% CI, -0.06 – 0.58].

Conclusion: Among ischemic stroke patients, serum Amyloid A- Protein measured on admission is a novel independent predictor of infection after stroke. SAA improved the prediction model of patients who developed any infection.

AS14-016

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

COURSE OF CIRCULATING NEURONAL AND ENDOTHELIAL MICROVESICLES IN THE ACUTE PHASE AFTER ISCHEMIC STROKE – A PILOT STUDY

S. Huo[1], N. Kränkel[2,3], B. Siegerink[1], A.H. Nave[1,3,4], U. Landmesser[2,3], M. Endres[1,3,4,5,6] and T.G. Liman[1,4]

[1]Charité Universitätsmedizin, Center for Stroke Research Berlin CSB, Berlin, Germany
[2]Charité Universitätsmedizin, Campus Benjamin Franklin- Department of Cardiology, Berlin, Germany
[3]Charité Universitätsmedizin, German Center for Cardiovascular Research DZHK, Berlin, Germany
[4]Charité Universitätsmedizin, Department of Neurology, Berlin, Germany
[5]Charité Universitätsmedizin, Excellence Cluster Neurocure, Berlin, Germany
[6]Charité Universitätsmedizin, German Center for Neurodegenerative Disease DZNE, Berlin, Germany

Background and Aims: Microvesicles (MV) are formed during activation or apoptosis by membrane outward-blebbing, carrying surface markers and contents of their parent cell. While endothelial microvesicle levels (EMV) are a well-established biomarker in cardiovascular diseases, circulating MV from neurons (NMV) have never been measured in the human circulation before. The course of circulating EMV and NMV in the acute phase of ischemic stroke has not yet been investigated.

Method: Blood samples were taken at three time points after onset of ischemic stroke (t1 <48 h, t2 day 3–5, t3 day 6–7 or at discharge). Levels of EMV (AnnexinV+, CD31+/CD144+/CD146+ and CD41-) and NMV (AnnexinV+, CD56+/CD171+/CD271+, CD41- and CD45-) were measured using flow cytometry.

Results: We included 11 patients with ischemic stroke, median-NIHSS on admission was 5 (IQR 3,8). The median difference in EMV between t1 and t3 was -0.26/μl (IQR -1.43/μl,0.03/μl, p-value = 0.08) and in NMV -0.26/μl (IQR -1.13/μl,-0.01/μl, p-value = 0.04). Detailed course of EMV and NMV levels are shown in Fig 1.

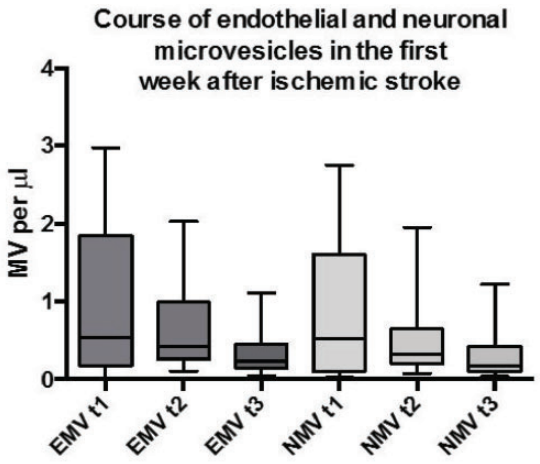


Fig. 1

Conclusion: This exploratory study is the first ever to measure NMV in humans. Levels of EMV and NMV are elevated early after stroke and decrease during the first week. This rapid change indicates the need to consider time after event in studies measuring MV during the acute phase after stroke. Further evidence from prospective studies with larger sample sizes is needed.

AS14-017

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

OXIDATIVE STRESS, LEUKOARAIOSIS AND DIZZINESS BEFORE AND AFTER SUPPLEMENTATION WITH A POLIPHENOL COMPOUND. A PRELIMINARY STUDY

M. Maccarrone[1], N. Giannini[1], L. Ulivi[1], V. Montano[1], E. Ferrari[1], C. Cravcenco[1], L. Chico[1], G. Siciliano[1], U. Bonuccelli[1] and M. Mancuso[1]
[1]Neurological Clinic, Department of Clinical and Experimental Medicine, Pisa, Italy

Background and Aims: Cerebral small vessel disease (cSVD) is commonly found in the elderly and is associated with a wide clinical spectrum, including cognitive decline, gait disturbances and dizziness. Although the etiopathogenic mechanisms are not completely understood, a potential role for oxidative stress and endothelial dysfunction has been suggested.
Method: We investigated a cohort of twenty elderly with cSVD and unexplained dizziness (age 69.1 ± 8.1 years; 9 males). Redox status was evaluated through plasma advanced oxidation protein products (AOPP), ferric reducing antioxidant power (FRAP) and tiols. Vascular burden and dizziness severity were evaluated through Fazekas Scale and Dizziness Handicap Inventory (DHI). Patients were evaluated at baseline and after two-months supplementation with an antioxidant polyphenol phytocomplex compound.
Results: Patients showed increased oxidative load. No correlation between leukoaraiosis severity, DHI and redox biomarkers was observed, although a trend in decreasing AOPP with increasing DHI and Fazekas severity was detected. After two months supplementation with polyphenol phytocomplex compound, we observed a significant decrease of both AOPP values ($p = 0.04$) and DHI score ($p = 0.01$).
Conclusion: Our data revealed impaired redox balance in elderly cSVD population with dizziness, that may be ameliorated antioxidant supplementation. We therefore confirm the occurrence of oxidative stress in cSVD, that may be even more prominent in the earliest phases, as supported by the trend in decreasing AOPP with increasing disease and symptoms severity. Quantifying brain and peripheral oxidative load may lead to better stratification of vascular risk and allow to reduce progression of vascular damage, preventing the disability due to reiterated microvascular damage.

AS14-018

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

CIRCULATING MIR-126-3P AND MIR-126-5P ARE INCREASED AFTER ACUTE ISCHEMIC STROKE BUT SHOW OPPOSING PATTERNS OVER TIME

S. Tiedt[1,2], N. Schieferdecker[1], V. Kautzky[1], M. Klein[3] and M. Dichgans[1,4]
[1]Institute for Stroke and Dementia Research, Klinikum der Universität München- Ludwig-Maximilians-Universität LMU, München, Germany
[2]Graduate School of Systemic Neurosciences, Ludwig-Maximilians-Universität LMU, Munich, Germany
[3]Department of Neurology, Klinikum der Universität München- Ludwig-Maximilians-Universität LMU, Munich, Germany
[4]Munich Cluster for Systems Neurology, SyNergy, Munich, Germany

Background and Aims: miR-126-3p and miR-126-5p have been proposed to be critical regulators of platelet aggregation and atherosclerosis – two processes closely related to ischemic stroke (IS). Here we investigated their association with acute IS, determined their temporal course up to 90 days post stroke, and explored their cellular source.
Method: Expression changes of miR-126-3p and -5p were studied in 60 IS patients (time from symptom onset to hospital arrival: 5.4 ± 4.3 hours) and 60 matched healthy controls. Sampling of patient plasma was done immediately upon hospital arrival before initiation of medical treatment and longitudinally during hospitalization and up to day 90. Small RNAs were isolated from platelet-poor plasma and analyzed by qRT-PCR. Magnetic-activated cell sorting and platelet spike-in experiments were used to identify cell types contributing to circulating miRNA levels.
Results: Expression levels of miR-126-3p and miR-126-5p were significantly higher in IS patients compared to controls (miR-126-3p: $p = 0.0025$, miR-126-5p: $p = 0.0005$), but did not correlate with infarct volume. Longitudinal analysis up to day 90 after stroke showed opposing expression patterns: while miR-126-3p remained elevated until day 90, miR-126-5p dropped to control levels already after the first day. We found platelets and circulating T-cells to be a major source of both circulating miR-126-3p and miR-126-5p.
Conclusion: Circulating miR-126-3p and -5p are significantly elevated after acute IS with platelets and T cells being the major cellular source in blood. Intriguingly, although being transcribed from the same locus, their longitudinal expression shows opposing patterns.

AS14-022

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

NEUTROPHIL EXTRACELLULAR TRAPS IN PATIENTS WITH ACUTE ISCHEMIC STROKE

J. Tembl[1], L. Aida[1], F. Gerardo[1], N. Candela[1], L. Ana Maria[2], V. Juana[2] and M. Antonio[2]
[1]HOSPITAL LA FE, Neurology, VALENCIA, Spain
[2]HOSPITAL LA FE. Health Research Institute La Fe, Hemostasis-Thrombosis- Atherosclerosis- and Vascular Biology Unit, VALENCIA, Spain

Background and Aims: Neutrophil extracellular traps (NETs) are formed by DNA, histones, and proteolytic enzymes and are produced by activated neutrophils through different mechanisms. NET formation is promoted by activated platelets and can activate platelets, thus favoring thrombotic processes. NETs have been detected in venous and arterial thrombosis, but data on stroke are scarce. Objective: To evaluate NETs in the plasma of patients with acute ischemic stroke and their potential association with baseline clinical characteristics, stroke severity and one-year clinical outcomes.
Method: Markers of NETs, including cell-free DNA, nucleosomes, and citrullinated histone 3 (citH3), were determined in a consecutive series of 243 patients with acute ischemic stroke. Then we analyzed their potential association with demographic data and stroke severity (NIHSS and mRs) at onset as well as with the outcomes after a 12 months follow-up period. Multivariate logistic regression analyses were used to assess the independent association of NETs with related variables.
Results: NETs were significantly elevated in the plasma of patients with acute ischemic stroke when compared to healthy subjects (CitH3 0.080 ± 0.002 ng/ml [0.040–0.284]; $p < 0.0001$). NETs levels are positively correlated with stroke severity. CitH3 is elevated mainly in older patients, patients with higher fasting glucose and patients with prior AF. The citH3 is independently associated with all-cause mortality at one year follow up (OR 7.055, CI 1.631–30.50; $p = 0.009$).
Conclusion: Our results suggest that NETs, and especially citH3, may constitute a useful prognostic marker in patients with acute ischemic stroke.

AS14-025

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

INTEGRATED IN SITU AND PLASMA PHOSPHOLIPIDOME STUDIES OF ISCHEMIC STROKE IN RATS

H.Y. Wang[1], E.H. Hsiang[1] and Z.F. Zheng[2]
[1]National Sun Yat-Sen University, Department of Biological Sciences, Kaohsiung, Taiwan R.O.C.
[2]Hyper Quantum Technologies- Ltd., Technical Division, Kaohsiung, Taiwan R.O.C.

Background and Aims: Stroke, a serious neurovascular condition, often leads to various extent of neuronal loss in the central nervous system (CNS). The inflammatory response that follows the initial ischemic attack perturbed the expression of various classes of biological molecules, lipid included, and further aggravates the damage to the CNS. Previous mass spectrometry imaging (MSI) studies of animal models of ischemic stroke indicated that several in situ phospholipid (PL) species could earmark the ischemic assault to the brain parenchyma. However, such a claim has yet to be thoroughly validated and investigated.
Method: Changes of phospholipidome in the ischemic core at the temporal cortex, in the ischemic penumbra at the parietal cortex, and in the subcortical penumbra at the striatum of rat brains, as well as those changes in rat plasma, were analyzed using LC-MS/MS-based lipidomic approaches following permanent middle cerebral artery occlusion (pMCAO).
Results: Multivariate data analyses and the subsequent validation showed the differential up- and down-regulation of PLs across these three ischemic brain regions and concluded only five PL species as the common markers of the ischemic cortex which were largely different from those in striatum and in the previous MSI studies. The plasma analyses, on the other hand, revealed a comprehensive up-regulation of sphingomyelins (SMs) by pMCAO.
Conclusion: The brain parenchymal and plasma results identified the potential in situ and plasma PL markers for ischemic stroke, and further implicated the potential involvement of other organ systems in the mediation of global PL expression following cerebral ischemia.

AS14-027

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

RELATIONSHIP BETWEEN SEVERITY OUTCOME AND S100B LEVEL AMONG INTRACEREBRAL HEMORRHAGE (ICH) STROKE PATIENTS: A HOSPITAL BASED STUDY

R. Sagar[1], A.K. Yadav[1], A. Kumar[1], S. Misra[1], A.K. Srivastava[1], S. Vivekanandhan[2], D. Dash[1], A.K. Pandit[1] and K. Prasad[1]
[1]All India institute of Medical sciences, Department of Neurology, New Delhi, India
[2]All India institute of Medical sciences, Neurosciences Centre, New Delhi, India

Background and Aims: Intracerebral hemorrhage having high morbidity and mortality rates worldwide, accounts for approximately 20–30% of acute strokes in India and mortality of up to 35–50%. ICH affected by both genetic and environmental factors. Biomarkers may be associated with different outcomes in patient with ICH and may helpful in predicting the outcome.
Our objective is to find out there is any difference in the level of S100B among patient with different recovery outcome as measured by mRS at three months. We measured S100 calcium-binding protein B (S100B) after ICH and its relationship to modified Rankin Scale (mRS) at three months.
Method: In this study, 152 patients recruited within 72 hours of onset from Inpatient Department of Neurology at All India Institute of Medical Sciences, New Delhi. After obtaining written informed consent from patients/proxy, blood sample collected and analysed for S100B level and telephonically followed by using mRS scales at three months after the recruitment.
Results: The data has been analysed for 75 patients. Mean S100B was 9.4 pg/ml (SD $\pm$ 10.9). The mean age of the patient was 54.2 years (SD $\pm$ 12.4). 27.7% participant was female. A total of 34 (45.3%) deaths were observed. The mean values of S100B at 0,1,2,3,4,5,6 category of mRS were 6.6(3.4), 13.63 (13.7), 14.11 (13.7), 6.72 (4.2), 4.2 (1.6), 10.67 (13.3) respectively. One way ANOVA shows no statistical significant difference in level of S100B among the mRS category at three months.
Conclusion: The findings of present study suggested that there is no statistical significant difference in the S100B level amongst ICH stroke patient.

AS14-035

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

GLUTAMINE SYNTHETASE EXPRESSION IN CAROTID ATHEROSCLEROTIC PLAQUES

P. Isoviita[1], J. Saksi[1], M. Mäyränpää[2], K. Nuotio[3], P. Ijäs[3], J. Tuimala[4], L. Soinne[3], P. Kovanen[5] and P. Lindsberg[3]
[1]Helsinki University, Research Program of Molecular Neurology, Helsinki, Finland
[2]University of Helsinki and HUSLAB- Helsinki University Hospital, Department of Pathology, Helsinki, Finland
[3]Helsinki University Hospital and Clinical Neurosciences, Department of Neurology, Helsinki, Finland
[4]Finnish Tax Administration, Individual Taxation Unit, Helsinki, Finland
[5]Wihuri Research Institute, -, Helsinki, Finland

Background and Aims: Macrophages can utilize glutamine on multiple biochemical processes. The only enzyme capable of generating glutamine glutamine synthetase (GS). We recently found GS mRNA 2.2 fold overexpressed in symptom-causing carotid atherosclerotic plaques. GS mRNA and protein are differentially regulated. This immunohistochemical study elucidates GS expression in different areas of an advanced carotid plaque.
Method: 43 patients (19 asymptomatic, 24 strokes) underwent clinical examination and carotid endarterectomy. Adjacent longitudinal sections of the endarterectomized carotid plaques were immunostained for GS, macrophages, smooth muscle cells and tissue iron, and a subgroup of samples for heme oxygenase -1 (HO-1) and CD163. Stainings were analysed microscopically in adjacent 1 mm^2 areas throughout the plaque section and scored semiquantitatively with respect to signs of cholesterol, erythrocyte accumulations (hemorrhages) and calcification.
Results: We found clusters of GS-expressing CD68 positive macrophages to localize in plaque domains siding especially thin fibrous caps, and around cholesterol clefts in stroke-associated plaques. GS was increased in areas with erythrocytes, tissue iron, CD163 and HO-1. Numerous GS expressing erythrophagocytes were seen. GS expression in stroke-associated plaques located deeper than in the asymptomatic plaques ($p = 0.036$).
Conclusion: GS protein associated with morphological features previously associated with unstable atherosclerosis leading to rupture or intraplaque hemorrhages. Our results support a role for GS and

glutamine in endogenous cellular mechanisms to trap heme, neutralize free iron and reduce the consequences of disrupted tissue redox state.

AS14-037

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

TWO CASES OF LOEYS DIETZ SYNDROME (LDS) WITH NOVEL MUTATIONS DIAGNOSED AFTER A CEREBROVASCULAR DISORDER

L. Picchetto[1], D. Laterza[1], M. Ritelli[2], M. Colombi[2], G. Bigliardi[1], L. Vandelli[1], L. Poli[3], L. Ciolli[1], F. Assenza[4], F. Rosafio[1], M. Dell'Acqua[1] and A. Zini[1]

[1]Nuovo Ospedale Civile Sant'Agostino Estense-Modena and Reggio Emilia University, Neurosciences-Stroke Unit, Modena, Italy
[2]Brescia University, Division of Biology and Genetics- Dept Molecular and Translational Medicine-, Brescia, Italy
[3]Spedali Civili- Brescia University, Clinical and Experimental Sciances-Neurology Unit, Brescia, Italy
[4]Campus Biomedico University of Rome, Neurosciences-Neurology Unit, Rome, Italy

Background and Aims: Introduction: LDSs are connective tissue disorders characterized by multiple arterial aneurysms and dissections, and other neurological, osteoarticular, musculoskeletal, gynecological, cutaneous and craniofacial manifestations, and due to TGF-B signaling autosomal dominant genetic mutations of TGFBR1, TGFBR2, SMAD3, TGFB2 and TGFB3 (type 1–5) proteins.
Method: Case 1: A 47years-old man presented a left hemiparesis due to right MCA, ACA occlusion and ICA dissection. Despite sudden i.v. thrombolysis e thrombectomy he developed malignant cerebral infarction treated successfully by decompressive hemicraniectomy. Angiograms showed bilateral carotid and vertebral kinkings, aneurismatic dilatation on common iliac arteries and ectasy of descending aorta. His father died after ischaemic stroke and his uncle because of a cerebral aneurism rupture.
Case 2: A 68year-old man was admitted at our Stroke-Unit because of aphasic TIA. Previously he suffered for inguinal hernias and multiple dissecting-aneurysms of aorta, left subclavian artery and iliac arteries. Brain CT-scan was negative for acute lesions; CT-angiography did not show intracranial aneurysms but incidentally demonstrated chronic right vertebral artery dissection. P-ANCA antibodies and ANA test were positive. His mother died of stroke complications.
Results: In both cases we suspected a connective tissue genetic disease and performed LDS molecular analysis. In Case 1 the novel c.1225T > G (p. Trp409Gly) TGFBR1 mutation was found (LDS type1). In Case 2 the novel c.840T > G (p. Asn280Lys) SMAD3 mutation was found (LDS type3).
Conclusion: LDSs are characterized by genetic and clinical variability. Our report suggests that genetically-determined-connective-tissue-disorders are probably underestimated even in patients with dissection and stroke.

AS14-038

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

UNEXPECTED CONFORMATIONAL CHANGE OF PLATELET GLYCOPROTEIN IB (GPIB) RECEPTOR AFTER RT-PA TREATMENT OF LARGE VESSEL ISCHEMIC STROKE

Q. Da[1], P. Mandava[2], N. Shah[3], M. Cruz[1], P. Thiagarajan[1] and T. Kent[1]

[1]Baylor College of Medicine, Center for Translational Research on Inflammatory Diseases, Houston, USA
[2]Michael E. DeBakey VA Medical Center, Neurology, Houston, USA
[3]Baylor College of Medicine, Neurology, Houston, USA

Background and Aims: Many stroke patients do not fully respond to intravenous rt-PA, possibly due to factors that increase clot resistance or impede reperfusion. GPIb receptors on the platelet surface initiate vessel occlusion through an interaction with subendothelium-bound von Willebrand resulting in further platelet activation. Here, we tested rt-PA effects on GP1b; an increase may enhance downstream thrombosis.
Method: Blood from healthy donors was incubated with rt-PA and tested with conformation sensitive monoclonal antibodies AN51, 6D1. Intensity was determined by flow cytometry pre and post-treatment. To compare results in-vivo, after consent blood from 5 subjects with large artery stroke treated with rt-PA was tested before and 90 minutes post rt-PA bolus.
Results: Healthy donor blood showed a fluorescence increase of 21.4% with AN51 and 41.3% with 6D1 after rt-PA. In patients, 4 of 5 showed a median percentage increase post-treatment of 40.6% with AN51 and 60.3% with 6D1. The 1 subject with no change had the only hemorrhagic transformation.
Conclusion: These results indicate for the first time rt-PA induced conformation changes on platelet GPIb in acute ischemic stroke in vitro despite that GPIb is not the direct target. These changes were also seen after rt-PA in patients. It is possible that up-regulation of GPIb receptors plays a protective role in preventing post-rt-PA hemorrhages but also may mediate increased propensity for clot resistance or downstream thrombosis. If confirmed in a larger ongoing sample, measuring GP1b binding may provide a rational approach to post-rt-PA antiplatelet therapy and identify a new risk for hemorrhagic transformation.

AS14-039

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

PROENKEPHALIN A (PENK-A) ADDS NO INCREMENTAL PROGNOSTIC VALUE AFTER ACUTE ISCHEMIC STROKE

P. Gruber[1], F. Fluri[2], B. Müller[3], A. Luft[4], M. Christ-Crain[5] and M. Katan[4]

[1]Cantonal Hospital of Aarau, Department of Neuro-Radiology/ Department of Neurology, Aarau, Switzerland
[2]University Hospital of Würzburg, Department of Neurology, Würzburg, Germany
[3]Cantonal Hospital of Aarau, Department of Inner Medicine,, Switzerland
[4]University Hospital of Zürich, Department of Neurology, Zürich, Switzerland
[5]University Hospital of Basel, Department of Endocrinology, Basel, Switzerland

Background and Aims: Proenekephalin (PENK –A) is a stable precursor fragment of the enkephalin neuropeptide family involved in blood

brain barrier disruption and apoptosis. Plasma levels of PENK-A were previously associated with poor outcome after ischemic stroke in a pilot study (Doehner W et al. 2012). The aim of this study was to validate PENK-A as potential novel prognostic biomarker in an independent prospective larger cohort.

Method: PENK-A levels were measured within 72 hours of symptom onset in 320 consecutively enrolled ischemic stroke patients at a tertiary stroke centre in Switzerland. The primary outcome measures were functional outcome (assessed by the modified Rankin Scale) and mortality within 90 days. For the association between PENK-A and the primary outcomes, logistic and cox proportional regression analyses were fitted to estimate odds ratios (OR), hazard ratios (HR) and 95% confidence intervals (CI), respectively.

Results: Among the 320 patients 41% had an unfavourable outcome and 12% died within 90 days. In the univariate analysis PENK-A levels were significantly associated with both outcome measures, however after adjusting for demographic and vascular risk factors, PENK-A was no longer independently associated with functional outcome and mortality OR 1.5 (95%CI: 0.15–15.52; $p = 0.72$) and HR 1.29 (95%CI: 0.16–10.35; $p = 0.81$). The strongest confounding factors for the association of PNEK A with both outcome measures were age, cardiac-comorbidities and renal-insufficiency.

Conclusion: Among patients with acute stroke PENK-A does not serve as an independent prognostic marker. Therefore, previous observations could not be confirmed. This study underlines the importance of independent validation studies in the assessment of blood biomarkers.

AS14-041

GENETICS, PROTEOMICS, METABOLOMICS, AND BIOMARKERS

USING RNA SEQUENCING TO DEFINE SYSTEM BIOLOGY OF EARLY NEUROLOGIC DECLINE IN PATIENTS TREATED FOR ACUTE ISCHEMIC STROKE

A. Simpkins[1], K. Johnson[2], R. Benson[1], M. Luby[1], A. Hsia[1], D. Kelley[1], J. Lynch[1], R. Leigh[1], Z. Nadareishvili[1], L. Latour[1] and J. Hallenbeck[1]

[1]NIH/NINDS, Stroke Branch, Bethesda, USA

[2]NIH/NINDS, Bioinformatics Section, Bethesda, USA

Background and Aims: In order to understand how imaging and blood biomarkers of ischemic stroke may identify variance in system biology between patients with early neurologic decline (END, increase of 4 or more in NIHSS from baseline to 24 hours) despite acute intervention, we have implemented a combined biomarker protocol that acquires both MRI and RNA sequencing of mRNA and miRNA during the very early phases of treatment. We report preliminary data from this pilot study.

Method: Patients were treated with thrombolysis ($n = 18$) and enrolled 2014–2015. Variables were collected at baseline and 24 hours (NIHSS, MRI scans, and whole blood sample in PAXgene tubes). Blinded reviewers measured MRI diffusion and perfusion lesion volumes. RNA Seq was performed using HiSeq 2500 Illumina platform (paired-end libraries; 125 bp; 40 million reads) with the Illumina RNA Strand RiboGOLD Globinclear protocol. CLCbio Genomics Workbench and R (cran.r-project.org) performed post processing. Age, time to treatment, lesion volumes, admission NIHSS were similar per Mann Whitney analysis between patients with END ($n = 3$) and without ($n = 15$). ANOVA with correction for age, gender, race using AIC-based step algorithm was used to select transcripts of significance (false discovery rate corrected $P < 0.05$, with 1.5-fold change).

Results: There were 480 mRNA and 8miRNA transcripts differentially expressed between those with and without END. IPA pathway analysis and miRNA integration showed upregulation of inflammatory mediators and altered regulation of sumoylation pathway in patients with END.

Conclusion: Thus, miRNA and mRNA analysis may be useful for discovering new ischemic stroke.

AS07-023

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

SHOULD WE DISCONTINUE ANTICOAGULANTS IN PATIENTS WITH ACUTE ISCHEMIC STROKE?

A. Groot[1], J.D. Vermeij[1], W.F. Westendorp[1], P.J. Nederkoorn[1], D. van de Beek[1] and J.M. Coutinho[1]

[1]Academic Medical Center, Neurology, Amsterdam, The Netherlands

Background and Aims: There is no consensus on whether anticoagulation should be continued in patients who suffer acute ischemic stroke (AIS) while being treated with anticoagulation. We assessed treatment variations and outcomes in these patients.

Method: Post-hoc analysis of the Preventive Antibiotics in Stroke Study (PASS), a large nation-wide randomized controlled trial. Anticoagulation use at admission was defined as: vitamine K antagonist (VKA) and $INR > 1.7$; intravenous heparin and $APTT > 45$; therapeutic dose low-molecular weight heparin; direct oral anticoagulants. We compared clinical outcomes, recurrent thrombotic events and bleeding events at 3 months between patients who did vs. did not use anticoagulation, and between patients in whom anticoagulation was continued vs. discontinued.

Results: 141 of 2125 patients with AIS (6.6%) were on anticoagulant therapy (VKA in 134/141 [95%]). There were no differences in recurrent thrombotic (4/141 [2.8%] vs. 59/1958 [3.0%]) or bleeding events (2/141 [1.4%] vs. 23/1958 [1.2%]) between patients who did vs. who did not use anticoagulation. Anticoagulation was continued in 115 of 141 patients (82%). Admission NIHSS scores were lower in patients in whom anticoagulation was continued vs. discontinued (median 4 vs. 14, $p < 0.001$). Recurrent thrombotic (2/115 [1.7%] vs. 2/26 [7.7%], $p = 0.16$) and bleeding events (1/115 [0.9%] vs. 1/26 [3.8%], $p = 0.34$) occurred less often in patients in whom anticoagulation was continued, but the difference was not statistically significant.

Conclusion: Physicians generally continue anticoagulants in patients with AIS, in particular in those with low NIHSS scores. Recurrent thrombotic and bleeding events were infrequent and did not differ significantly between groups.

AS07-030

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

PRE-IMAGING IDENTIFICATION OF THE IDEAL ENDOVASCULAR STROKE CANDIDATE

D. Strambo[1], G. Sirimarco[1], M. Amiguet[2], A. Eskandari[1], S. Puccinelli[3] and P. MIchel[1]

[1]CHUV, Centre Cérébrovasculaire- Service de Neurologie, Lausanne, Switzerland

[2]CHUV, Unité de statistique US, Lausanne, Switzerland

[3]CHUV, Service de Radiodiagnostic et Radiologie Interventionelle, Lausanne, Switzerland

Background and Aims: Clinical scores to triage acute ischemic stroke (AIS) patients to centers providing endovascular treatment (EVT) usually aim at predicting intracranial large vessels occlusion (LVO). Now we rather aim at identifying the "Ideal endovascular patient"(IEP), with LVO, limited core and good collaterals, independently from time window.

Method: From the Acute Stroke Registry and Analysis of Lausanne (ASTRAL), we selected patients with pre-stroke Rankin scale ≤2, baseline NIHSS >1 and CT angiography performed within 24 hours from symptoms onset. Patients were considered IEP in the presence of LVO (M1, dominant M2, siphon, basilar artery occlusion), (pc-)ASPECTS ≥6 and good collaterals (Tan-score ≥2 and PCCS ≥6 for basilar occlusions). Using multivariable analysis results a score to identify IEP was built.
Results: 387 of 2'494 (15.5%) consecutive AIS patients were IEP. Best predictors of IEP used to build the score were female sex (OR = 1.42; 1 point), absence of previous coronary disease (OR = 1.55; 1 point), normal vigilance (OR = 1.56; 1 point), gaze deviation (OR = 1.61; 1 point), limb paresis (OR = 2.09; 2 point), speech alteration (OR = 2.61; 2 point), systolic blood pressure < 155 mmHg (OR = 1.77; 1 point), and onset-to-imaging less than 6 hours (OR = 2.61; 2 point). AUC was 0.73. A total score ≥ 7 points had 91% sensitivity and 41% specificity for IEP.
Conclusion: This novel score, using simple parameters available in the pre-hospital setting, permitted to identify up to 90% of ideal endovascular candidates in the 24 hours time-window. Using such data, pre-imaging selection of patients with the highest potential benefit from EVT may allow best triage and utilisation of health care facilities.

AS07-031

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

PREHOSPITAL STROKE RECOGNITION, SEVERITY GRADING, AND PREDICTION OF LARGE VESSEL OCCLUSION USING A SINGLE CLINICAL SCALE ONLY

J. Purrucker[1], H. Richter[2], F. Härtig[2], A. Engelbrecht[1], J. Hartmann[3], J. Auer[4], C. Hametner[1], E. Popp[5], P.A. Ringleb[1], S. Nagel[1] and S. Poli[2]
[1]Heidelberg University Hospital, Department of Neurology, Heidelberg, Germany
[2]Tuebingen University Hospital, Department of Neurology & Stroke- and Hertie Institute for Clinical Brain Research, Tuebingen, Germany
[3]University of Tuebingen, Department of Medical Informatics, Tuebingen, Germany
[4]University of Stuttgart, Department of Computer Science & Software Engineering, Stuttgart, Germany
[5]Heidelberg University Hospital, Department of Anesthesiology, Heideberg, Germany

Background and Aims: To develop the first fully NIH Stroke Scale (NIHSS)-compatible, simple, all-in-one scale for rapid and comprehensive prehospital stroke assessment including recognition of stroke, severity grading, and prediction of large vessel occlusion (LVO).
Method: International emergency medical services (EMS) personnel and stroke physicians (N = 326) rated each item of the NIHSS regarding suitability for prehospital use; best-rated items were included. Stroke recognition was evaluated retrospectively in 689 consecutive patients with acute stroke or stroke mimics, prediction of LVO in 741 consecutive ischemic stroke patients with acute vessel imaging independent of admission-NIHSS score.
Results: Nine of the NIHSS-items were rated as "suitable for prehospital use". After excluding two items to streamline the final scale (termed shortened NIHSS for EMS, sNIHSS-EMS), it consists of 'level of consciousness', 'facial palsy', 'motor arm/leg', 'sensory', 'language', and 'dysarthria'. Sensitivity for stroke recognition of the sNIHSS-EMS is 91% (95% confidence interval [CI] 86–94], specificity 52% (95% CI 47–56). Receiver operating curve analysis revealed an optimal cut-off point for LVO prediction of ≥6 (sensitivity 70% [95% CI 65–76], specificity 81% [95% CI 76–84], positive predictive value 70 [95% CI 65–75], area under the curve 0.81 [95% CI 0.78–0.84]). Test characteristics were non-inferior to non-comprehensive scales.
Conclusion: The sNIHSS-EMS overcomes the sequential use of multiple emergency stroke scales by enabling parallel stroke recognition, severity grading, and LVO prediction. Full NIHSS-item-compatibility permits evaluation of stroke progression including the prehospital phase. Integration into a prehospital triage algorithm will be discussed.

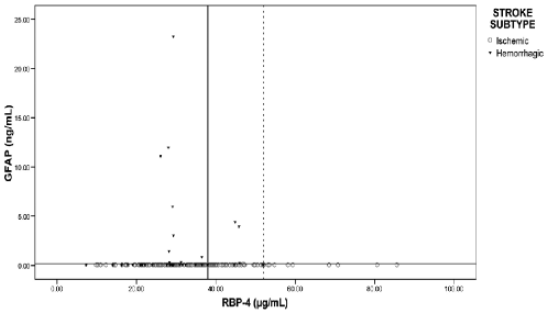
AS07-039

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

RETINOL BINDING PROTEIN-4 AND GLIAL FIBRILLARY ACID PROTEIN DIFFERENTIATE BETWEEN ISCHEMIC AND HEMORRHAGIC STROKE WITHIN THE THERAPEUTIC WINDOW FOR INTRAVENOUS THROMBOLYSIS

A. Bustamante[1], A. Penalba[1], V. Llombart[1], J. Pagola[2], A. Simats[1], A. Negro[1], M. Ribó[2], T. García-Berrocoso[1] and J. Montaner[1]
[1]Institut de Recerca- Hospital Universitari Vall d'Hebron- Universitat Auntónoma, Neurovascular Research Laboratory, Barcelona, Spain
[2]Hospital Universitari Vall d'Hebron, Stroke Unit, Barcelona, Spain

Background and Aims: Pre-hospital differentiation between ischemic stroke (IS) and intracerebral hemorrhage (ICH) allow early initiation of intravenous thrombolysis. The combination of glial fibrillary acid protein (GFAP) and retinol binding protein-4 (RBP-4) has been proposed to differentiate both subtypes. In this study, we aimed to validate these results in patients with suspected stroke.
Method: From December-2013 to July-2014, patients with suspected stroke admitted within 4.5 hours after onset were enrolled. Blood samples were collected at admission. GFAP and RBP-4 were measured by ELISA. Stroke subtype was confirmed by neuroimaging. Cut-off points to compare sensitivity and specificity were obtained with ROC curves.
Results: After exclusion of stroke-mimics, 190 patients (155 IS and 35 ICH) were enrolled. IS patients had higher RBP-4 and lower GFAP levels than ICH. A cut-off point of RBP-4 > 52 μg/mL had 100% sensitivity, 6.5% specificity for IS diagnosis, and a cut-off of GFAP > 0.18 ng/mL had 100% sensitivity, 34.3% specificity for ICH. The combination of these cut-offs resulted in an accurate diagnosis of 6.5% of IS and 34.3% of ICH. With a cut off of RBP-4 > 38 μg/mL, specificity increased to 32.5% but sensitivity was lowered (85.7%). Application of this cut-off together with GFAP > 0.18 ng/mL correctly identified 32.3% of IS, but 5.7% of ICH were identified as IS.



Conclusion: The present study confirms RBP-4 and GFAP as useful biomarkers for IS and ICH differentiation. Incorporation of new

biomarkers to this panel might allow a safe pre-hospital treatment in selected cases.

AS07-043

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

WHICH TELESTROKE PRACTICE IN FRANCE?

B. Bouamra[1], M. Erbault[2], K. Chakroun[1], L. Bonnet[1], E. Medeiros De Bustos[1], F. Vuillier[1] and T. Moulin[1]
[1]Besancon University Hospital, Neurology, Besancon, France
[2]French National Authority for Health, clinical practice indicators, Paris, France

Background and Aims: The third clinical practice indicators campaign led by the French National Authority for Health took place in 2015. It involved 542 medical institutions with Stroke Units (SU) or Telestroke (TS).
Method: Out of 26887 stroke medical files, a random selection of 80 files per institution were analysed along 10 medical practice indicators. A national map presenting the institution typology was created (136 with Stroke Units, 112 with Telestroke, 340 without SU or TS). The 662 files showing a Telestroke activity were compared to the remaining 26225 files and analyzed per institution.
Results: Overall, the Indicators' results are better in Institution with Stroke Units. Compared to the 340 institutions without SU or TS, in institutions practicing Telestroke the 5 main indicators show significantly better results (41% vs. 30% neurovascular expertise, 1 :35 vs. 1 :54 delay for imaging, 80% vs. 73% investigation of symptom onset time, 77% vs. 74% medical file completion). This result might be explained by the networking of training resources, expertise, and care protocols.
Conclusion: Telestroke is not meant to replace Stroke Units, but pragmatically its deployment is beneficial to the patients. It leads to an improvement of professional practices that is evidenced by the indicators' results.

AS07-050

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

FUNCTIONAL STROKE AND HYPNOTHERAPY

R. Sanyal[1], G. Muddegowda[1], I. Natarajan[1] and C. Roffe[1]
[1]University Hospital of North Midland NHS Trust, Stroke Medicine, Stoke on Trent, United Kingdom

Background and Aims: Functional Neurological Disorder is an umbrella term; around 5% of all strokes are functional. There are anecdotal case reports of use of hypnotherapy in functional neurological disorder. This is an audit of patients treated with hypnotherapy for functional stroke symptoms.
Method: Successive patients with a clinical diagnosis of functional stroke supported by normal negative imaging were offered hypnotherapy within 1 week. This was provided by a single stroke physician trained in the technique. Each treatment lasted about 60 minutes and consisted of arm raising induction, deepening, imagery, and suggestion.
Results: 44 patients were included in the study. The female: male ratio was 32:12 and the mean (range) NIHSS score was 6 (2–9). The primary presentation in 42 out of 44 was weakness of the limbs. 32 had a right and 20 a left hemiparesis. The primary presentation in other two patients was severe dysarthria and homonymous hemianopia. 1 out of 44 patients could not be hypnotized. 38 out of 43 patients responded with complete resolution of their symptoms (NIHSS 0). 5 out of 43 responded partially.35 out of 38 patients who responded to hypnotherapy received one session, 3 out of 38 patients needed two or more sessions for resolution of symptoms. All 38 responding patients were contacted by phone after 6 weeks, 35 remained well without recurrence. 3 patients developed new symptoms, which responded to a repeat hypnotherapy treatment.
Conclusion: In this patient group with functional strokes hypnotherapy was associated with rapid and sustained recovery of symptoms.

AS07-001

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EFFECTIVENESS AND SAFETY OF SODIUM-GLUCOSE COTRANSPORTER2 INHIBITORS TO MANAGE HYPERGLYCEMIA IN ACUTE STROKE PATIENTS

T. Mori[1], Y. Tanno[1], S. Kasakura[1], K. Yosioka[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital, Stroke Treatment, Kamakura, Japan

Background and Aims: To investigate effectiveness and safety of sodium-glucose cotransporter-2 (SGLT2) inhibitors in an acute stroke stage.
Method: We included acute stroke patients 1) who were admitted between Sep 2015 and Oct 2016, 2) who could take food orally after admission, and 3) who received SGLT2 inhibitors of dapagliflozin (dg) 5 mg or luseogliflozin (lg) 2.5 mg for treating hyperglycemia after admission, and excluded patients of enteral tube feeding or insulin therapy. We didn't use sulfonylureas nor glinides. We provided appropriate calorie and limited carbohydrates (carbo) to 40% of the target calorie. We evaluated blood glucose (BG), urine glucose (UG) and urine ketones (UK) on arrival and at discharge.
Results: Forty-nine patients matched our criteria. Among them, 38 patients took dg and others lg. Their average age was 71 years. Average body mass index (BMI) was 26.3 and creatinine clearance (CCr) 79.7 ml/min. On admission, their average HbA1c was 7.9% and fasting BG (FBG) 214 mg/dl. Twenty-six patients presented positive UG and 5 patients positive UK on admission. Patients take food of average 1400 kcal and 140 g of carbo per day. They started to take SGLT2 inhibitors on the third day. About five days after starting SGLT2 treatment, their average FBG improved to 121 mg/dl, all patients except 3 presented positive UG and 28 patients (57%) positive UK. No hypoglycemia occurred.
Conclusion: The SGLT2 inhibitors coupled with calorie and carbo-limited food was effective and safe in the management of hyperglycemia in acute stroke patients.

AS07-002

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EARLY HOSPITAL ARRIVAL TIME AND IN-HOSPITAL DELAYS IN STROKE THROMBOLYSIS

H. Kawano[1,2], A. Bivard[2], M. Parsons[2], C. Paul[3], M. Krause[4], C. D'Este[5], C. Bladin[6], R. Lindley[7], J. Attia[8], F. Henskens[3], M. Longworth[9], S. Middleton[10], A. Ryan[3], E. Kerr[2], R. Sanson-Fisher[3], T. Hirano[1] and C. Levi[2]
[1]Kyorin University, Department of Stroke and Cerebrovascular Medicine, Mitaka- Tokyo, Japan
[2]John Hunter Hospital- Hunter Medical Research Institute- and the University of Newcastle, Department of Neurology, New Lambton Heights- Newcastle, Australia

[3]The University of Newcastle- and Hunter Medical Research Institute,., New Lambton Heights- Newcastle, Australia
[4]Royal North Shore Hospital- Northern Clinical School- University of Sydney, Department of Neurology, Sydney, Australia
[5]National Centre for Epidemiology and Population Health- The Australian National University College of Medicine- Biology and Environment,., Canberra, Australia
[6]Florey Institute of Neuroscience and Mental Health- University of Melbourne- and Monash University-, Department of Neurology, Melbourne, Australia
[7]The George Institute for Global Health- and Westmead Clinical School- Sydney Medical School- University of Sydney, Department of Geriatric Medicine, Sydney, Australia
[8]Hunter Medical Research Institute- and Centre for Clinical Epidemiology and Biostatistics- University of Newcastle,., Newcastle, Australia
[9]Mount Druitt Hospital- Western Sydney Local Health District,., Sydney, Australia
[10]Nursing Research Institute- St. Vincent's Health Australia Sydney and Australian Catholic University,., Sydney, Australia

Background and Aims: Rapid stroke thrombolysis has been shown to increase the likelihood of disability-free life. Streamlining processes around imaging assessments are important. We aimed to examine the relationships between early or late hospital arrival and in-hospital processes in stroke thrombolysis.
Method: Data of patients who underwent intravenous alteplase therapy at 20 hospitals in Australia were entered into the Thrombolysis ImPlementation in Stroke (TIPS) audit tool. During the pre-intervention phase, 601 patients who received alteplase ≤270 minutes of stroke onset were analysed (71 ± 13 year-old, male 55%, median NIHSS score 11). Onset-to-door (OTD), door-to-imaging (DTI), imaging-to-needle (ITN), and overall door-to-needle (DTN) times were assessed using uni- and multivariate linear regression analyses.
Results: The mean OTD, DTN, DTI, ITN times were 82.3, 90.7, 38.1, and 52.6 minutes, respectively. Every minute earlier of OTD resulted in 0.23 minutes slower DTN ($p < 0.001$), 0.06 minutes slower DTI ($p = 0.021$), and 0.18 minutes slower ITN times ($p < 0.001$). Every point decrease of baseline NIHSS score resulted in 0.57 minutes slower DTN ($p = 0.010$) and 0.46 minutes slower DTI ($p = 0.002$), however there was no significant association between ITN and baseline NIHSS score.
Conclusion: Early hospital arrival time was a greater contributor to delayed treatment, in particular post-imaging processes, in patients with thrombolytic therapy for ischemic stroke. Improved processes to reduce post-imaging delays are needed for rapid thrombolytic treatment.

AS07-003

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

POSSIBLE UTILITY OF EPA/DHA, BCAA AND MCT CONTAINED IN ENTERAL FORMULA TO PREVENT ENERGY MALNUTRITION IN ACUTE STROKE PATIENTS TREATED WITH ENTERAL NUTRITION

T. Mori[1], Y. Tanno[1], S. Kasakura[1], K. Yosioka[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital, Stroke Treatment, Kamakura, Japan

Background and Aims: Some components of enteral formula (EF) are expected to prevent energy malnutrition (EM) in severe acute stroke patients treated with enteral nutrition (EN). The aim of our study was to investigate whether total protein (tPr), branched chain amino acids (BCAA), middle chain triglyceride (MCT), EPA/DHA contained in EF prevented EM.
Method: We included in our retrospective study acute stroke patients 1) who were admitted between Sep 2015 and July 2016, 2) who continued to use EFs over 7 days, i.e., PEPTAMEN AF, IMPACT or MEIN, 3) who underwent blood examination on the 7th day. We evaluated patients' features, their daily intake of tPr, BCAA, EPA/DHA and MCT, serum albumin (Alb) (g/dl), prealbumin (PreAlb) (mg/dl) and total cholesterol (T-CHO) (mg/dl) on the 7th day.
Results: Forty-five patients matched our inclusive criteria and were analyzed. The median age was 75.2 years. We used PEPTAMEN AF in 12 patients, IMPACT in 10 patients and MEIN in 23 patients. Their average calorie intake was 1,249 kcal/day, tPr 68.1 g/day, BCAA 13.5 g/day, EPA/DHA 0.81 g/day and MCT 8.3 g/day. On the 7th day, their average Alb (7-Alb) was 2.9 g/dl, PreAlb (7-PreAlb) 17.1 g/dl and T-CHO (7-TCHO) 150.0 mg/dl. Univariate analysis showed 7-PreAlb was correlated with EPA/DHA ($p < 0.05$) and 7-TCHO with EPA/DHA ($p < 0.05$), whereas 7-Alb had possible relation to Pr ($p < 0.1$).
Conclusion: Higher intake of EPA/DHA contained in EF lead to higher prealbmin and T-CHO levels on the 7th day and had possibly beneficial effects on preventing early energy malnutrition in severe stroke patients.

AS07-008

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

PREHOSPITAL DELAY IN STROKE AND TIA PATIENTS. FACTORS INFLUENCING ARRIVAL IN THE FIRST THREE HOURS

R. García Ruiz[1], J. Silva Fernández[2], R.M. García Ruiz[3], A. Arias[4], I. Rueda Medina[1], M. Recio Bermejo[1], A. Santos Pinto[1], A.M. González Manero[1], E. Botia Paniagua[1], J. Abellán Alemán[5] and C. González Pereira[6]
[1]Hospital General La Mancha Centro, Neurology, Alcázar de San Juan, Spain
[2]Hospital General La Mancha Centro, Endocrinology, Alcázar de San Juan, Spain
[3]Hospital de Denia, Internal Medicine - Nursery, Denia, Spain
[4]Hospital General La Mancha Centro, Research, Alcázar de San Juan, Spain
[5]Universidad Católica de Murcia UCAM, Cátedra de Riesgo Vascular, Guadalupe - Murcia, Spain
[6]Hospital Central de Asturias, Intensive Care Unit - Nursery, Oviedo, Spain

Background and Aims: Stroke is the second leading cause of death and the first of disability. Prehospital delay (PD) is the main limitation for reperfusion therapies. We investigated PD in our population and factors influencing early arrival (PD < 180').
Method: 382 Patients with acute stroke or TIA were prospectively included. Sociodemographic and clinical parameters, data on decision delay (DD), PD, and first medical contact were recorded. Multivariate logistic regression analyses were conducted to identify factors related to PD < 180'.
Results: Median times were 72' for DD and 201' for PD. 186 patients (48,7%) arrived the hospital within 180'. Severity (p = 0,024), onset witnessed by an own child (OR 3,84; IC 95% 1,90–7,76; p < 0,001) or during a non-working day (OR 1,91; IC 95% 1,08–3,37; p = 0,026), a familial (OR, 2,13; IC 95% 1,24–3,63; p = 0,006) o personal history (OR 2,14; IC 95% 1,12–4,10; p = 0,022) of stroke or TIA, cardiopathy (OR 1,89; IC 95% 1,04 – 3,44; p = 0,036), experiencing aphasia (OR 2,30; IC 95% 1,18–4,47; p = 0,014), suffering a TIA (OR OR 2,76; IC 95% 1,38–5,54; p = 0,004), the use of a prenotification system (Stroke Code) (OR 8,18; IC 95% 2,95–22,70) and dialing 112 (OR 3,86; IC 95% 1,47–10,11; p = 0,006) were independently related to a sooner arrival (PD ≤ 180').

Conclusion: Using a prenotification system and dialing 112 were the main predictors of early arrival. Future campaigns should focus on immediately dialing 112. Clinical factors -a familial or personal history of stroke or TIA- also played an important role, maybe related to the knowledge, not only of stroke symptoms, but also its consequences.

AS07-010

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

ARE YOU SUFFERING FROM A LARGE ARTERIAL OCCLUSION? - PLEASE RAISE YOUR ARM!

C. Cooray[1], M. Mazya[1], M. Bottai[2], J. Scheitz[3], A. Abdul-Rahim[4], T. Moreira[1], R. Mikulik[5], A. Krajina[6], D. Toni[7], M. Nevsimalova[8], N. Wahlgren[1] and N. Ahmed[1]
[1]Karolinska University Hospital, Department of Neurology, Stockholm, Sweden
[2]Unit of Biostatistics, Institute of Environmental Medicine- Karolinska Institutet, Stockholm, Sweden
[3]Center for Stroke Research Berlin, Department of Neurology- Charité Universitätsmedizin, Berlin, Germany
[4]Stroke Research- Institute of Cardiovascular and Medical Sciences, University of Glasgow, Glasgow, United Kingdom
[5]International Clinical Research Center, Department of Neurology- St. Annés University Hospital in Brno and Masaryk University, Brno, Czech Republic
[6]Department of Radiology, University Hospital, Hradec Kralove, Czech Republic
[7]Emergency Department Stroke Unit- Hospital Policlinico Umberto I, Department of Neurology and Psychiatry- Sapienza University, Rome, Italy
[8]Comprehensive Cerebrovascular Centre, Hospital Ceske Budejovice, Ceske Budejovice, Czech Republic

Background and Aims: Triage tools to identify candidates for thrombectomy are of the utmost importance in acute stroke. No prognostic tool has yet gained any widespread use. We compared the predictive value of various models based on National Institutes of Health Stroke Scale (NIHSS) sub-items, ranging from simple to more complex models, for predicting large-artery-occlusion (LAO) in anterior circulation stroke.
Method: Patients registered in the SITS international Stroke Register with clinically defined anterior circulation stroke, and available NIHSS and radiological arterial occlusion data were analysed. We compared 1975 patients harbouring an LAO with 2036 patients having either no or more distal occlusions. Using binary logistic regression, we developed models ranging from simple 1 NIHSS-sub-item to full NIHSS-sub-items models. Sensitivities and specificities of the models for predicting LAO were examined.
Results: The model with highest predictive value included all NIHSS sub-items as well as other relevant parameters for predicting LAO (AUC 0.78), yielding a sensitivity and specificity of 74% and 72% respectively. The second most predictive model (AUC 0.76) included 4-NIHSS-sub-items (gaze, visual fields, facial and arm motor function) yielding a sensitivity and specificity of 65% and 77% respectively. The simplest model included only deficits in arm motor-function (AUC 0.72) for predicting LAO, yielding a sensitivity and specificity of 69% and 70% respectively.
Conclusion: Although increasingly more complex models yield higher discriminative performance for predicting LAO, differences between models are not large. Simply assessing the grade of arm-dysfunction along with established stroke diagnosis model may serve a surrogate measure of arterial occlusion-status, thereby assisting in triage decisions.

AS07-012

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

FAST-TRACK VERSUS OPEN-END HOSPITALIZATIONS FOR PATIENTS WITH NON-DISABLING, ACUTE ISCHEMIC STROKE REQUIRING HOSPITALIZATION

L. Hoffmann[1], J. Fladt[1], A. Polymeris[1], D. Seiffge[1], A. Imhof[2], C. Traenka[1], L. Hert[1], P. Simon[3], N. Peters[1], L. Bonati[1], S. Engelter[1], P. Lyrer[1] and G.M. De Marchis[1]
[1]University Hospital Basel, Stroke Center/Neurology, Basel, Switzerland
[2]University Hospital Basel, Controlling, Basel, Switzerland
[3]University Hospital Basel, Clinical Trials Unit, Basel, Switzerland

Background and Aims: Fast-track hospitalizations for patients with non-disabling, acute ischemic stroke (AIS) bear the potential to expedite return to daily life while optimizing the use of healthcare resources. This study aims at assessing the feasibility and safety of fast-track hospitalizations among patients with non-disabling AIS.
Method: Retrospective cohort study on patients hospitalized in the Stroke Center of the University of Basel, Switzerland, between January 1st, 2014 and December 31st, 2015. Fast-track hospitalizations were defined as $\leq$72 hours. Patients with non-disabling AIS were those discharged directly home, i.e. not to a rehabilitation facility. The primary endpoint was the rate of unplanned rehospitalizations for any reason within 3 months from the index hospital discharge.
Results: During the study period, 2'220 patients were hospitalized for AIS. Of these, 558 patients (25%) had a non-disabling AIS, and their median length of hospitalization was 6 days (IQR: 4–9). Fast-track hospitalizations have been realized among 15% of the analyzed patients with non-disabling AIS (83/558). Patients discharged per fast-track had less severe AIS, were treated less frequently with thrombolysis, and had a lower comorbidity index. The rates of unplanned rehospitalization within 3 months from hospital discharge did not differ between fast-track (10%) and open-end hospitalizations (9%, $P = 0.83$). After adjusting for stroke severity, thrombolysis rate, and comorbidity, the difference in the rehospitalization odds remained non-significant ($OR_{fast\text{-}track}$ 1.5 [95%-CI: 0.6–4.1], $P = 0.39$).
Conclusion: Among patients with non-disabling AIS, fast-track hospitalizations are feasible and do not seem to be associated with a higher risk of unplanned rehospitalizations. Randomized clinical trials are needed.

AS07-013

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

DIAGNOSTIC AND PROGNOSTIC VALUE OF PLASMA LIGHT-CHAIN NEUROFILAMENTS IN ACUTE CEREBROVASCULAR EVENTS – A PROSPECTIVE COHORT STUDY

G.M. De Marchis[1], M. Katan[2], C. Barro[1], D. Buhl[3], C. Traenka[1], D. Seiffge[1], L. Hert[1], H. Gensicke[1], G. Disanto[4], R. Sutter[1], N. Peters[1], H. Sarikaya[5], B. Goeggel-Simonetti[5], M. El-Koussy[5], S. Engelter[1], P. Lyrer[1], M. Christ-Crain[6], M. Arnold[5], J. Kuhle[1] and L. Bonati[1]
[1]University Hospital Basel, Stroke Center/Neurology, Basel, Switzerland
[2]University Hospital Zurich, Stroke Center/Neurology, Zurich, Switzerland
[3]Kantonsspital Luzern, Laboratory Medicine, Lucerne, Switzerland
[4]Neurocenter Southern Switzerland, Neurology, Lugano, Switzerland
[5]Inselspital, Stroke Center/Neurology, Bern, Switzerland
[6]University Hospital Basel, Endocrinology, Basel, Switzerland

Background and Aims: Plasma Neurofilaments are markers of axonal injury. We addressed their diagnostic and prognostic role in acute ischemic stroke and TIA.
Method: Nested within a prospective cohort study, we compared plasma neurofilament light chain levels (pNfL) drawn within 24 hours from symptom onset in patients with acute ischemic stroke or TIA and healthy controls. Associations with the presence and volume of acute infarcts on MR-diffusion weighted imaging were analyzed. The prognostic value of pNfL for unfavorable functional outcome three months after stroke was assessed.
Results: We analyzed 692 patients with acute ischemic stroke and 187 patients with TIA, along with 165 healthy controls. Higher levels of pNfL were found in patients with stroke, followed by TIA and controls ($P < 0.01$). Among patients with stroke, the trend of increase in pNfL across patients with infarct volumes 1–10 cm^3, 10–100 cm^3, >100cm^3 was not significant ($P = 0.10$). A significant increase in pNfL over the first 24 hours of hospitalization was seen only among patients with a large infarct. Functional outcome three months after stroke was not associated with pNfL. Among patients with TIA, the presence of an acute ischemic injury was associated with pNfL, but the discriminatory accuracy for the presence of an acute infarct was moderate (Area Under the Curve 0.71, 95%-CI: 0.61–0.82).
Conclusion: Interpretation: pNfL-levels measured within 24 h from onset of stroke or TIA cover no clinically relevant diagnostic or prognostic role beyond clinical severity and imaging. pNfL did not prove to be the "brain troponin" we were hoping for.

AS07-014

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

NATIONWIDE SURVEY OF ISCHEMIC STROKE CAUSED BY STANFORD TYPE A AORTIC DISSECTION IN JAPAN

M. Koga[1], Y. Iguchi[2], T. Ohara[3], Y. Tahara[4], Y. Inoue[5], T. Fukuda[6], K. Kajimoto[7], Y. Sakamoto[8], N. Makita[9], S. Matsubara[9] and K. Toyoda[9]
[1]National Cerebral and Cardiovascular Center, Suita- Osaka, Japan
[2]Jikei University School of Medicine, Department of Neurology, Tokyo, Japan
[3]Kyoto Prefectural University of Medicine, Department of Neurology, Kyoto, Japan
[4]National Cerebral and Cardiovascular Center, Department of Cardiovascular Medicine, Suita- Osaka, Japan
[5]National Cerebral and Cardiovascular Center, Department of Cardiovascular Surgery, Suita- Osaka, Japan
[6]National Cerebral and Cardiovascular Center, Department of Radiology, Suita- Osaka, Japan
[7]National Cerebral and Cardiovascular Center, Department of Neurology, Suita- Osaka, Japan
[8]Nippon Medical School Hospital, Department of Neurological Science, Tokyo, Japan
[9]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita- Osaka, Japan

Background and Aims: Stanford type A aortic dissection (AAD) occasionally causes ischemic stroke or transient ischemic attack (IS/TIA). The AAD diagnosis could be delayed due to the consciousness disturbance or cortical dysfunction such as aphasia. AAD patients with IS/TIA may have a risk to receive intravenous rt-PA therapy inappropriately. We aimed to reveal the status of this condition in Japan with a nationwide survey.
Method: We sent WEB-based questionnaires to 1517 hospitals with certified neurologists, stroke physicians, cardiovascular physicians, emergency physicians or cardiovascular surgeons in October, 2015.
Results: Of all, 527 physicians (35%) who are responsible for AAD management and 545 (36%) responsible for stroke management responded. Initial urgent care doctors were mainly from neurology, neurosurgery or stroke medicine (43%), followed by cardiology or cardiovascular surgery (27%) and emergency medicine (25%). Twenty-eight hospitals (5.2%) had a written protocol with emergency service to check chest/back pain and blood pressure laterality in the prehospital stroke management. Of all, 430 hospitals (82%) managed ≥1 AAD patients (median 6, IQR 3–12) in the last year. Of these, the median number of AAD patients with IS/TIA was 1 (0–2). Fourteen patients from 13 hospitals (2.4%) were treated with rt-PA and 5 of them (36%) died in the acute stage. Contrast-enhanced CT (94%), chest X-ray (61%), transthoracic echocardiography (59%) and D-dimer (47%) but not carotid ultrasound (8%) were commonly used as AAD screening tests.
Conclusion: Stroke physicians were most likely to initially manage AAD patients with IS/TIA. The occurrence of rt-PA treatment in these patients were still not negligible in Japan.

AS07-016

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

RENAL FUNCTION AND MECHANICAL THROMBECTOMY IN ANTERIOR-CIRCULATION STROKE

M. Laible[1], M.A. Möhlenbruch[2], J. Pfaff[2], E. Jenetzky[3], P. Ringleb[1], M. Bendszus[2] and T. Rizos[4]
[1]Heidelberg University, Neurology, Heidelberg, Germany
[2]Heidelberg University, Neuroradiology, Heidelberg, Germany
[3]German Cancer Research Center, Division of Clinical Epidemiology and Aging Research, Heidelberg, Germany
[4]Department of Neurology, Heidelberg, Germany

Background and Aims: Renal dysfunction (RD) may be associated with unfavorable outcome in ischemic stroke patients treated with mechanical thrombectomy (MT) but data concerning this important and emerging comorbidity are not existent by now. We investigated the influence of RD on postprocedural intracerebral hemorrhage (ICH), clinical outcome, and mortality in a large prospectiveley collected cohort of acute ischemic stroke patients treated with MT.
Method: Consecutive patients with anterior-circulation stroke treated with MT between October 2010 and January 2016 were included. RD was defined as glomerular filtration rate (GFR) <60 ml/min/1.73 m^2. In a prospective database, clinical characteristics were recorded and brain-imaging was analysed for the presence of ICH after treatment. Clinical outcome was assessed by the modified Rankin Scale after 3 months. Uni- and multivariate regression analyses were applied to evaluate associations between clinical factors and outcomes.
Results: 505 patients fulfilled all inclusion criteria (female: 49.7%, mean age: 71.0 years). RD at admission was present in 20.2%. RD patients were older and had more often cardiovascular risk factors. However, multivariate regression analysis revealed that RD was not independently associated with poor outcome (OR 1.38, 95%-CI 0.57–3.33; $p = 0.472$), mortality (OR 1.75, 95%CI 0.64–4.77, $p = 0.278$), or ICH. Compared to admission, GFR values were higher at discharge (mean: 77.9 vs. 80.8 ml/min/1.73 m^2; $p = 0.046$).
Conclusion: Renal dysfunction does not increase the risk of an unfavorable outcome and ICH after endovascular stroke treatment. Our findings encourage performing MT also in this relevant subgroup of acute ischemic stroke patients.

AS07-017

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EFFECT OF TRANSDERMAL GLYCERYL TRINITRATE ON BLOOD PRESSURE: RELATIONSHIP WITH HYDRATION STATUS

J.P. Appleton[1], C.K. Billington[2], L.J. Woodhouse[1], Z.K. Law[1], M. Glover[2], N. Sprigg[1] and P.M. Bath[1]
[1]University of Nottingham, Stroke- Division of Neuroscience, Nottingham, United Kingdom
[2]University of Nottingham, Division of Respiratory Medicine, Nottingham, United Kingdom

Background and Aims: High blood pressure (BP) is common in acute stroke and associated with poor outcome. Antihypertensive agents have accentuated vasodepressant effects in dehydrated patients. We assessed the effect of transdermal glyceryl trinitrate (GTN) on BP in the context of hydration status using data from the Efficacy of Nitric Oxide in Stroke (ENOS) trial.
Method: ENOS randomised 4011 patients with acute stroke and raised systolic BP (SBP) to transdermal GTN patch or no GTN within 48 hours of onset. The primary outcome was functional outcome (modified Rankin Scale, mRS) at day 90. Blood markers of dehydration at baseline were collected at two sites ($n = 310$). Urea and urea:creatinine ratio were split into equal tertiles for comparison with outcome.
Results: In those randomised to GTN, increased baseline urea and urea:creatinine ratio were associated with an increase in diastolic BP from day 0 to 1; a relationship not seen with systolic BP or heart rate. No associations were noted between dehydration markers and hypotension, hypertension or headache by day 7, or change in BP from baseline to day 1. The highest tertile of urea (>6.9 mmol/L) was associated with less neurological improvement at day 7 ($p = 0.017$) and an unfavourable shift in mRS at day 90 (odds ratio 1.81, 95% confidence interval 1.07–3.08, $p = 0.028$) as compared with lower tertiles.
Conclusion: Transdermal GTN was safe in dehydrated acute stroke patients with no precipitous changes in BP noted. Increased baseline urea was associated independently with poor early and late outcome after acute stroke.

AS07-018

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

MONITORING TELEMEDICINE PROGRAMS ACROSS THE GLOBE: THE DEVELOPMENT OF AN INTERNATIONAL TELESTROKE MINIMUM DATA SET

K. Bagot[1], C. Bladin[1], B. Demaerschalk[2], D. Hess[3], G. Hubert[4], T. Ingall[2], L. Schwamm[5], C. Watkins[6] and D. Cadilhac[1]
[1]The Florey Institute of Neuroscience and Mental Health, Public Health, Melbourne, Australia
[2]Mayo Clinic, Neurology, Phoenix, USA
[3]Augusta University, Neurology, Augusta, USA
[4]Klinium Munchen-Harlaching, Neurology and Neurological Intensive Care, Munich, Germany
[5]Massachusetts General Hospital, Neurology, Boston, USA
[6]University of Central Lancashire, College of Health and Wellbeing, Preston, United Kingdom

Background and Aims: Globally, implementation and evaluation of acute care telestroke programs are expanding. Currently, a standardised set of variables for cross-country comparisons of telestroke processes of care and patient outcomes does not exist.
The aim of this research is to establish an agreed international minimum data set (ST-MDS) to evaluate and compare clinical processes and patient outcomes of telestroke programs between countries/regions.
Method: An initial scoping review of variables was conducted and telestroke program leads were contacted to provide details of their datasets. An international expert panel (clinicians, researchers, administrators; $n = 20$) from Australia, United States of America, United Kingdom and the European Union was convened. A modified-Delphi technique was used to identify a standard set of items. The panel indicated item relevance on a 5 point scale (1 = totally irrelevant to 5 = totally relevant) through on-line surveys and consensus was reached via teleconferences. Items were added and adapted during the multi-stage, iterative process.
Results: There were 527 items identified in the scoping review. Same and similar items were harmonised, with the panel reviewing 160 items covering 11 categories: 1) Socioeconomic and Demographics characteristics, 2) Presentation to hospital, 3) Processes of Care Within First 24 hours, 4) Processes of Care Beyond the First 24 hours, 5) Thrombolysis Treatment, 6) Endovascular Treatment, 7) Stroke Telemedicine Consultation, 8) Discharge Information, 9) Post-Discharge/Follow-up 10) Hospital and 11) Telestroke Service characteristics. The final ST-MDS items will be presented.
Conclusion: The ST-MDS provides a recommended set of variables to evaluate and compare clinical processes and patient outcomes of acute telestroke consultations, internationally.

AS07-022

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

THE EFFECT OF TYPE OF ANESTHESIA IN ENDOVASCULAR TREATED PATIENTS: A SINGLE CENTER EXPERIENCE

C. Motta[1], A. Davoli[1], G. Koch[1], B. Rizzato[1], M. Diomedi[1], E. Pampana[2], D. Konda[2], R. Gandini[2], G. Tenze[3], F. Leonardis[3] and F. Sallustio[1]
[1]Policlinico Tor Vergata, Neuroscience-Stroke Center, Rome, Italy
[2]Policlinico Tor Vergata, Diagnostic Imaging - Interventional Radiology and Neuroradiology, Rome, Italy
[3]Policlinico Tor Vergata, Anesthesiology and Intensive Care, Rome, Italy

Background and Aims: Randomized prospective clinical trials and retrospective studies produced conflicting results about the role of anesthesia in affecting outcome of acute ischemic stroke (AIS) patients undergoing endovascular treatment (ET). Our aim is to evaluate how different kind of anesthesia can influence efficacy and safety of ET.
Method: Methods: Patients from a prospective single-centre database with anterior circulation AIS who underwent ET were divided into two groups based on type of anesthesia used: conscious sedation (CS) or general anesthesia (GA). Baseline and treatment characteristics, safety outcomes such as intracranical haemorrhage (ICH) and mortality and efficacy outcomes such as successful reperfusion and 3 months good clinical outcome were compared between the two groups. Logistic regression analysis was performed to identify predictors of clinical outcome.
Results:71 patients were included in the CS group and 130 in the GA group. The onset-to-reperfusion time was shorter in the CS group (276.1 ± 65.4 vs 333.5 ± 108.7, $p = < 0.001$) and the rate of ICH was higher in the GA group (15% vs 45%, $p = 0.006$), whereas no differences were found between groups in successful reperfusion (62% vs 71%, $p = 0.26$) and good clinical outcome (36% vs 36%, $p = 1$). Logistic regression analysis revealed lower mortality at 3 months in the CS group ($_{Adj}$OR 1.5; 95% CI, 0.58 to 3.86; $p < 0.05$).

Conclusion: The type of anesthetic management influenced procedure duration, with no difference in recanalization rate. ET under CS can be performed with reasonable efficacy and lower mortality respect to GA.

AS07-024

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

A REVIEW OF PRE-HOSPITAL STROKE ASSESSMENT TOOLS: MORE THAN FAST

S.P. Jones[1], J.M. Gibson[1], C. Price[2] and C.L. Watkins[1]
[1]University of Central Lancashire, School of Nursing, Preston, United Kingdom
[2]Newcastle University, Institute of Neuroscience, Newcastle, United Kingdom

Background and Aims: It is recommended that in people with suspected stroke a validated tool such as FAST (Face Arm Speech Test) should be used to screen for a diagnosis of stroke/TIA. Although FAST has very good sensitivity, there are approximately 10–15% of stroke patients that do not present with FAST symptoms.
Method: We searched Medline and EMBASE for published studies of pre-hospital stroke assessment tools that included items in addition to FAST. A search of the grey literature, and contact with experts for any unpublished assessment tools was also undertaken. Two authors independently screened titles and abstracts. Data including setting, population, assessment tool items, associated training, sensitivity, and specificity were extracted.
Results: We identified 1203 studies of which 6 papers, 1 conference abstract, 1 protocol and 1 public awareness campaign were included in the review. 6 pre-hospital stroke assessment tools were identified from the literature and 3 from contact with experts in the field. In addition to items included in the FAST, pre-hospital assessment tools included: visual disturbance (n = 6; AVVV, BE-FAST, MedPACS, MEND, RACE, ROSIER), leg weakness (n = 5; MedPACS, OPSS, RACE, ROSIER), ataxia (n = 2; AVVV, BE-FAST), grip strength (n = 2; LAPSS, MASS), sensory deficit (n = 2; AVVV, MEND), co-ordination (n = 2; AVVV, MEND), agnosia (n = 1; RACE), aphasia (n = 1; RACE), vertigo (n = 1; AVVV) and vomiting (n = 1; AVVV). Six of the tools were validated. Sensitivity ranged from 44% to 97% and specificity from 33% to 97%.
Conclusion: Although a number of tools contain items beyond FAST, there is no consensus on which offers the optimal balance of sensitivity versus specificity.

AS07-025

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EFFICACY OF ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE DEPENDS ON AGE AND CLINICAL SEVERITY

R. Le Bouc[1], F. Clarencon[1], E. Meseguer[2], B. Lapergue[3], G. Turc[4], O. Naggara[4], J. Servan[5], D.L. Duong[5], P. Reiner[6], M. Obadia[7], W. Farhat[8], M. Zuber[8], H. Chabriat[6], F. Pico[5], J.L. Mas[4], P. Amarenco[2]and Y. Samson[1] ; for the Paris Stroke Consortium
[1]Hôpital de la Pitié-Salpêtrière, Paris, France
[2]Hôpital Bichat, Paris, France
[3]Hôpital Foch, Paris, France
[4]Hôpital Saint-Anne, Paris, France
[5]Hôpital de Versailles, Paris, France
[6]Hôpital Lariboisière, Paris, France
[7]Hôpital Fondation Rothschild, Paris, France
[8]Hôpital Saint-Joseph, Paris, France

Intra-arterial thrombectomy (IAT) is recommended in acute ischemic stroke of the anterior circulation. However, whether the benefit of IAT is generalizable to all clinical subgroups remains elusive.
We performed a retrospective, observational, multicenter study, among 4079 patients with an acute ischemic stroke, either treated with intravenous alteplase, IAT, both, or none.
The primary outcome was the adjusted common odds ratio for an improvement in functional outcome at 90 days. Functional outcome was measured by the modified Rankin scale (mRS). We developed a prognostic score –the checkerboard score (C-score), based on age and clinical severity– and assessed whether it predicted IAT efficacy.
Patients were categorized as Low (12) C-scores. Low C-scores were highly predictive of favorable outcomes (82% mRS 0–2), whereas high C-scores were highly predictive of poor outcomes (77% mRS 4–6). In our global population, IAT was beneficial in patients with high (OR 1.70; 95%CI 1.13–2.56) and intermediate C-scores (OR 1.37; 95%CI 1.11–1.69), but had deleterious effects in patients with low C-scores (OR 0.72; 95%CI 0.56–0.93). In patients with a proximal occlusion in the anterior circulation, IAT was effective in patients with high (OR 1.79; 95%CI 1.13–2.83), and intermediate C-scores (OR 1.58; 95%CI 1.24–2.00), but had neutral effects in patients with low C-scores (OR 0.91; 95%CI 0.64–1.32). However in this subgroup, poor outcomes were increased after IAT (OR 1.97; 95%CI 1.02–3.81). In patients with an acute ischemic stroke, IAT improved functional outcome in older and severe patients but not in younger and less severe patients.

AS07-026

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EMERGENCY DEPARTMENT PHYSICIAN AND NURSE ATTITUDES TO ACUTE STROKE TREATMENT

S. Coote[1], A. Gilligan[2], J. Bray[3] and A. Maclean[1]
[1]Eastern Health, Department of Neurosciences, Box Hill, Australia
[2]Epworth Eastern, Neurosciences, Melbourne, Australia
[3]Monash University, Epidemiology and Preventative Medicine, Melbourne, Australia

Background and Aims: There has long been controversy surrounding the use of intravenous (IV) t-PA for acute stroke, especially amongst some emergency department (ED) physicians. With the recent introduction of endovascular clot retrieval (ECR), we sought to better understand the attitudes and opinions of ED medical and nursing staff regarding acute stroke treatments, in order to address their concerns and guide future education.
Method: Box Hill Hospital sees more than 900 stroke/TIA presentations per year, most arriving via ED. Between February and April 2016, electronic and paper surveys were distributed among our ED medical and nursing staff. Paper surveys were entered electronically.
Results: Of 202 surveys, 91 (45%) were returned. Respondents were senior medical (30%), junior medical (5%), senior nursing (45%) and junior nursing staff (20%). The majority (68%) of respondents reported first-hand experience with t-PA, and of these 75% had witnessed serious complications. The majority (70%) believed t-PA to be harmful with complication rates much higher than published literature, yet 89% still supported its use, but with a number of caveats. Less than half (43%) of respondents were familiar with ECR studies. Of these 88% supported its use and only 58% thought it carried significant risk of harm.
Conclusion: ED staff, from this clinical experience, perceive the risks associated with t-PA use to be much higher than published data, yet

support its use in eligible patients. Staff were far less aware of ECR data, but it was still seen as a safer treatment than t-PA.

AS07-027

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

HIGH QUALITY OF ACUTE STROKE CARE IN THE TELESTROKE NETWORK TEMPIS COMPARED TO STATEWIDE (BAVARIA) RESULTS AND NATIONAL (GERMANY) REFERENCE VALUES

E. Frank[1], N. Hubert[1], G. Hubert[1], R. Backhaus[2] and R. Haberl[1]
[1]Städtisches Klinikum München GmbH, Neurology, München, Germany
[2]Universität Regensburg, Neurology, München, Germany

Background and Aims: The Telemedical Project for Integrative Stroke Care (TEMPiS) is a TeleStroke Unit network in the mostly rural, neurologically underserved area of south-east Bavaria for the treatment of acute stroke.
We aimed to monitor quality of acute stroke care in TEMPiS TeleStroke Units in comparison to all hospitalized Stroke patients in Bavaria and national reference values.
Method: The Committee of German Stroke Registry predefined 19 quality indicators for processes (16) and outcomes (3) of acute in hospital stroke care, such as imaging, time delays, thrombolysis, early prevention, diagnostics, mobilization and dysphagia screening, mortality and pneumonia, 9 of them with predefined target values. Quality data of all patients diagnosed with stroke in Bavaria are registered and analysed in the compulsatory Bavarian Stroke Registry. We compared results of each quality indicator of TEMPiS TeleStroke Units with statewide results and analysed, wether predefined target values were met for the year 2015.
Results: In 2015, 18 TEMPiS TeleStroke Units treated 7903 patients with Stroke or TIA (hospital range 58 to 817). Average documentation rate in TEMPiS was 93,4% and in Bavaria 92,6%. In comparison to all participating hospitals in Bavaria, TeleStroke Units performed better in 16 and worse in 3 indicators. In TEMPiS, as in statewide analysis, 8 of 9 national target values were met. In all of the 3 outcome parameters, TEMPiS performed better than statewide results.
Conclusion: Bavarian Stroke Registry data for the TEMPiS network indicates a convincingly high quality in acute stroke care at TeleStroke Units.

AS07-028

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

CHARACTERIZATION OF FACE ARM SPEECH – TEST NEGATIVE THROMBOLYSIS CANDIDATES HIGHLIGHTS NEED TO IMPROVE PREHOSPITAL DETECTION OF POSTERIOR CIRCULATION STROKES

J. Ritvonen[1], O.S. Mattila[1,2], S. Pihlasviita[1], H. Harve[3], G. Sibolt[2], S. Curtze[2], M. Pystynen[3], D. Strbian[2], T. Tatlisumak[2,4,5], M. Kuisma[3] and P.J. Lindsberg[1,2]
[1]University of Helsinki, Molecular Neurology Research Program, Helsinki, Finland
[2]University of Helsinki and Helsinki University Hospital, Neurology-Clinical Neurosciences, Helsinki, Finland
[3]University of Helsinki and Helsinki University Hospital, Emergency Medical Services- Department of Emergency Care, Helsinki, Finland
[4]Sahlgrenska University Hospital, Department of Neurology, Gothenburg, Sweden
[5]Sahlgrenska Academy at University of Gothenburg, The Institute of Neuroscience and Physiology, Gothenburg, Sweden

Background and Aims: Stroke recognition instruments like the Face Arm Speech -test (FAST) are far from perfect, missing a significant portion of acute stroke cases, especially posterior circulation strokes. Currently no guidelines exist on training Emergency Medical Services (EMS) to identify FAST-negative stroke patients. We set out to characterize FAST-negative thrombolysis candidates transported to our stroke center, comparing features of stroke and stroke mimic (SM) patients.
Method: A prospective observational cohort of 1015 thrombolysis candidates recruited into a prehospital biomarker study was reviewed for FAST-negative patients. Data were extracted from EMS and in-hospital patient records.
Results: Out of 1015 thrombolysis candidates, we identified 53 cases in which no FAST-symptoms were noted in prehospital records. Based on discharge diagnoses 15 (28.3%) patients had ischemic stroke (IS), 9 (17.0%) TIA, 4 (7.5%) ICH, and 25 (47.2%) SM. The majority of these FAST-negative patients had stroke or TIA (28/53; 52.8%), most of them affecting the posterior circulation (n = 20/28; 71.4%). Typical symptoms were unilateral sensory disturbance (43.4%), visual disturbance (45.3%) and vertigo (47.2%). 92.5% of patients had one or two of these symptoms, but they did not differentiate between stroke/TIA and SM groups. Previous stroke/TIA was also equally common in both groups (8/28 vs. 7/25). Seven IS patients (13.2%) and one SM patient (1.9%) received thrombolysis.
Conclusion: Transportation of selected FAST-negative stroke patients enabled thrombolysis for a small but significant group of posterior stroke patients. Improved identification tools and referral rules are still needed for optimal selection of patients for hospital transport.

AS07-029

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

STROKE MIMICS PRESENTING TO THE HYPERACUTE STROKE UNIT

M. Hagan[1], J. Orrock[1] and S. Raghunathan[1]
[1]Nottingham City Hospital, Stroke Department, Nottingham, United Kingdom

Background and Aims: To identify the number of admissions to the Nottingham hyperacute stroke unit with a final diagnosis of stroke mimic.
Method: The notes of all admissions between 1st August 2015 – 31st July 2016 were reviewed. The electronic patient record was used to gather information on: patient demographics, medical history, referral source, imaging performed, length of stay, diagnosis, and stroke within 3 months of discharge. Exclusion criteria: transient ischaemic attack (TIA).
Results: There were 2134 admissions during the study period with 594 (28%) patients diagnosed with a stroke mimic.
Gender: 334 female and 260 male patients.
Referral source: 39% from emergency department, 36% - paramedics, 24% - general practice, 1% - TIA clinic, 10% - other.
Top five diagnoses: migraine (15%), functional (10.2%), sepsis (10.1%), seizure (8.9%), labyrinthine disorder (8.4%). 134 patients had a prior diagnosis of stroke and 1 patient was diagnosed with acute stroke within 3 months of discharge.
Imaging: 70% had a CT head, 3% MRI head, 16% both CT and MRI head and 10% had no imaging.
Length of stay: 78% of patients were discharged within 48 hours of admission.
Conclusion: At least one in four suspected stroke patients admitted to our hospital had a non-stroke diagnosis and this highlights the difficulties

in diagnosing acute stroke in the absence of proficient history taking and the use of imaging. This also reiterates the need for a stroke mimic pathway in delivering and improving hyperacute stroke services.

AS07-034

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

THE EFFECT OF ARTERIAL STIFFNESS ON THE BLOOD PRESSURE CHANGE IN ACUTE ISCHEMIC PATIENTS TREATED WITH INDUCED HYPERTENSION

M.H. Choi[1], S.E. Lee[2], S.J. Lee[2], J.S. Lee[2] and J.M. Hong[2]
[1]Ajou University School of Medicine, Department of Neurology, Suwon-si, Republic of Korea
[2]Ajou University School of Medicine, Department of Neurology, Suwon, Republic of Korea

Background and Aims: Blood pressure (BP) augmentation can be used as one of the therapeutic options in acute ischemic stroke with early neurological deterioration, while the degree of BP augmentation is influenced by several factors. We aimed to investigate the effect of surrogate markers regarding arterial stiffness on the BP change in patients treated with induced hypertension.
Method: Between Jan 2015 and Sep 2016, 113 patients were treated with induced-hypertension in a prospectively collected stroke registry. The analysis of central BP, augmentation index (AIx), and pulse wave velocity (PWV) was available in 60 patients. Target BP was defined as a 20% increase of initial mean arterial pressure (MAP) and the response to induced-hypertension was determined positive when $\geq$2-point decrease of NIH stroke scale during treatment. Good outcome was designated as a modified Rankin scale 0–2 after 3 months. The Pearson Correlation coefficient was computed between MAP change and arterial stiffness parameters.
Results: The positive-response group (n = 36) and the negative-response group (n = 24) were not significantly different from baseline clinical, BP parameters and markers of arterial stiffness. The good outcome group (n = 45) showed significantly higher MAP change compared to the poor outcome group (30.5 vs. 21.4 mmHg, p = 0.030). The MAP change had a moderately positive correlation with central pulse pressure (*r*-value from 0.44 to 0.54) and AIx (0.36 to 0.45).
Conclusion: The present study suggests that arterial stiffness can influence BP augmentation during induced hypertension, which can lead to the different treatment response.

AS07-035

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

REASONS FOR NON RECANALIZATION WITH MECHANICAL THROMBECTOMY IN ACUTE ISCHEMIC STROKE

E. Cuadrado-Godia[1], A. Gomez[1], E. Vivas[2], A. Ois[1], A. Rodriguez[1], A. Zabalza[1], P. De Ceballos[1], T. Sola[2], L. Guimaraens[2] and J. Roquer[1]
[1]IMIM-Hospital del Mar Research Institute., Neurology, Barcelona 08003, Spain
[2]J.J. Merland- Hospital del Mar. Hospital General de Cataluña, Interventional Radiology, Barcelona, Spain

Background and Aims: In a variable proportion of patients with acute stroke due to intracranial vessel occlusion, arterial recanalization is not achieved despite the use of retriever devices. Our aim was to describe the reasons why recanalization is not attained and to identify factors associated with non-recanalization (NR).
Method: Prospective registry of all endovascular procedures (primary or rescue after intravenous thrombolysis) performed in a tertiary hospital from November 2009 to December 2016. NR is defined as TICI grade <2b-3 after thrombectomy with retriever devices (Solitaire, Trevo and/or Penumbra). We analyzed the association of vascular risk factors, previous medications, treatment timings and etiology with NR.
Results: A total of 141 endovascular procedures were indicated. In 22 cases thrombectomy was not performed due to: exclusive extracranial occlusion (n = 2), occlusion of distal branches (n = 8), spontaneous recanalization (n = 4), impossibility to reach the arterial occlusion (n = 5), carotid dissection (n = 2) and medica.
1 complication (n = 1). Of the remaining 119 cases, 25 (17.7%) had NR due to: no thrombus removal (n = 8), re-occlusion (n = 7), residual atherosclerotic stenosis (n = 6), arterial rupture (n = 3) and inability to cross the thrombus (n = 1). In 14 of these patients intracranial angioplasty and stenting was performed. The only factor that was associated with NR was stroke etiology, with higher NR rates in large artery atherosclerosis and unclassified strokes (more than one causal mechanism), P = 0.034) (Table 1).

Cross TAB

			Large artery atherosclerosis	Cardioaortic Embolism	Unfrequent	Cryptogenic	Unclassified	Total
Non recanalization (NR)	NO	N	12	51	6	22	3	94
		% within group	60,0%	85,0%	100,0%	81,5%	50,0%	79,0%
	YES	N	8	9	0	5	3	25
		% within group	40,0%	15,0%	0,0%	18,5%	50,0%	21,0%
Total		N	20	60	6	27	6	119
		% within group	100,0%	100,0%	100,0%	100,0%	100,0%	100,0%

Conclusion: The percentage of patients with stroke due to intracranial vessel occlusion who have NR despite thrombectomy is non-negligible. We described different reasons. Stroke etiology might be affecting the chance of recanalization.

AS07-040

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

THROMBECTOMY IN TIA AND MINOR ACUTE ISCHEMIC STROKE WITH CLINICAL RECOVERY

M. Bisciglia[1], C. Ciobanu[1], D. Brisbois[2], O. Cornet[2], P. Reginster[2] and P. Desfontaines[1]
[1]Centre Hospitalier Chrétien, Neurology Departement- Stroke Unit, LIEGE, Belgium
[2]Centre Hospitalier Chrétien, Departement of Radiology and Interventional Neuroradiology, LIEGE, Belgium

Background and Aims: The efficiency of thrombectomy has been demonstrated in acute stroke with proximal occlusion of anterior cerebral artery and a NIHSS score $\geq$2. Patients with TIA or ischemic stroke with early clinical recovery were excluded from trials in thrombectomy despite the risk of recurrence or clinical worsening. We discuss the usefulness of thrombectomy in 3 cases of TIA and 1 case of minor stroke.

Method: A 79 years-old woman, a 74, a 64 and a 67 years-old men were admitted for stroke (NIHSS of 2, 8, 10 and 6 respectively at stroke onset) with complete clinical recovery within 30 min after admission. The angioCT scan showed a M1 occlusion of the MCA with a good collateral supply in the 4 cases.
Results: Thrombectomy has been performed in 2 cases despite they remained asymptomatic and in one case because of recurrence of worsening (NIHSS = 3), with good outcome (modified Rankin score = 0 at 3 months). Thrombectomy was performed two days after admission for the woman, because of clinical worsening (NIHSS = 9), with a less favorable outcome (modified Rankin Score = 2 at 3 months).
Conclusion: In TIA or minor stroke with spontaneous resolution and a proximal occlusion, thrombectomy may be useful to avoid a delayed worsening. Indeed, delayed thrombectomy may lead to a clinical worsening despite the presence of a good collateral supply. Further trials are needed to demonstrate the safety and efficacy of thrombectomy in such patients.

AS07-041

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

"IN SEARCH OF LOST TIME, DRIP-AND-SHIP OR SHIP-AND-DRIP?" TELESTROKE EXPERIENCE IN FRANCHE-COMTE - SEASON 2

L. Bonnet[1], G. Charbonnier[1], B. Bouamra[1], C. Iosif[2], F. Vuillier[1], A. Biondi[2] and T. Moulin[1]
[1]Besancon University Hospital, Neurology, BESANCON, France
[2]Besancon University Hospital, Neuroradiology and Vascular Radiology, BESANCON, France

Background and Aims: In 2016, thrombectomy has become routinely used in the management of cerebral infarctions (CIs), increasing dramatically its practice. In territories with a drip-and-ship organization, it often implies a secondary transfer of patients who received intravenous thrombolysis (IVT) via telemedicine in spoke hospitals.
Method: Patients were prospectively selected from the Stroke Registry of Franche-Comte which includes a telestroke service (8 spoke hospitals and 1 hub with interventional neuroradiology). All acute infarctions treated with thrombectomy in 2016 were included.
Results: Seventy-eight patients were included (44 women; mean age: 70; age range: 28–95). Forty-seven patients (median NIHSS: 19) received a secondary transfer from a spoke (42 IVTs, median onset-to-needle time: 2 h 47) and 31 patients (median NIHSS: 20) were initially treated at the hub (21 IVTs, mean onset-to-needle time: 3 h 25). Hub patients underwent thrombectomy in average 3 h 55 after symptoms onset, compared to 4 h 51 for spoke patients. Hub performed 48% successful reperfusion (TICI 2b/3), 51% at spokes ($p > 0.5$). The ratio of poor outcome (Rankin 5–6) at 3 months was 52% at hub and 57% at spokes ($p > 0.5$). The ratio of symptomatic haemorrhagic transformations were similar in both groups.
Conclusion: Telemedicine for acute CIs shortens time delays for IVT and lengthens time delays for thrombectomy due to secondary transfer, with no difference in benefits and risks. Telestroke seems to improve patient selection and suitability.

AS07-047

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

LOW LEVELS OF CAVEOLIN-1 PREDICT SYMPTOMATIC BLEEDING IN PATIENTS WITH ACUTE ISCHEMIC STROKE TREATED WITH RT-PA

M. Castellanos[1], C. van Eendenburg[2], C. Gubern[2], E. Kádár[3], G. Hughet[3], J. Puig[4], T. Sobrino[5], G. Blasco[4], J. Serena[2] and J.M. Sanchez[6]
[1]INIBIC/CHUAC, Department of Neurology, A Coruña, Spain
[2]Biomedical Research Institute of Girona/Hospital Dr. Josep Trueta, Department of Neurology, Girona, Spain
[3]University of Girona, Department of Biology, Girona, Spain
[4]Biomedical Research Institute of Girona/Hospital Dr. Josep Trueta, Department of Radiology, Girona, Spain
[5]Laboratory of Neurovascular Resarch/Univeristy Hospital Santiago de Compostela, Department of Neurology, Santiago de Compostela, Spain
[6]University of Girona, Department of Analytical Chemistry, Girona, Spain

Background and Aims: Experimental models of cerebral ischemia demonstrate that the decrease of the membrane protein caveolin-1 results in an increase of endothelial permeability. Since this phenomenon is responsible of hemorrhagic transformation (HT) after cerebral ischemia, we aimed to determine whether caveolin-1 levels may predict bleeding after rt-PA administration in patients with acute stroke.
Method: We included 132 patients with a first hemispheric stroke treated with rt-PA following SIST-MOST criteria. HT was evaluated and classified on cranial CT at 24 h. HT was considered as symptomatic (sHT) if associated with neurological deterioration. Caveolin-1 levels were analyzed before and at 2, 24 and 72 h post-rtPA administration in patients, and in 40 healthy controls.
Results: Baseline caveolin-1 levels were higher in patients than controls (0.26 [0.12,0.40] vs. 0.07 [0.00,0.19] ng/mL) ($p < 0.000$). Twenty five (18.9%) patients had HT, which was symptomatic in 7 (5.3%). Patients with PH2 and sHT had lower baseline caveolin-1 levels compared to the rest of patients (0.08 [0.05–0.22] vs 0.26 [0.14,0.40], $p = 0.043$ and 0.08 [0.02,0.17] vs 0.26 [0.12,0.40], $p = 0.020$, respectively). The levels remained stable in the first 72 h in patients with PH2 and/or sHT, whereas in the rest of patients levels decrease in this time, always remaining higher than in patients with PH2 and/or sHT. After adjusting for confounders, caveolin-1 levels ≤ 0.14 ng/mL remained as an independent predictor of sHT.
Conclusion: Low levels of caveolin-1 are an independent predictor of sHT after rt-PA administration. These results identify this protein as a new therapeutic target for endothelial protection after cerebral ischemia.

AS07-049

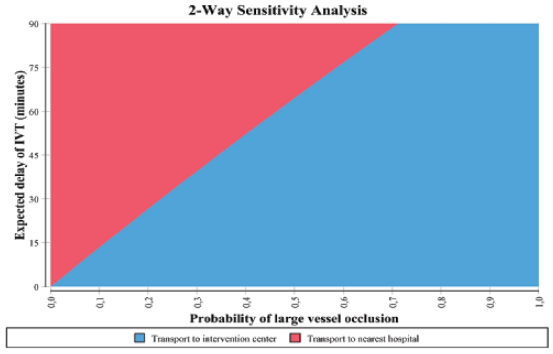
HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

DEVELOPMENT OF A PERSONALIZED MODEL FOR PREHOSPITAL DECISION-MAKING IN ACUTE ISCHEMIC STROKE

E. Venema[1], B. Roozenbeek[2], H. Lingsma[1], V. Chalos[2], M. Mulder[2], M. Hunink[3] and D. Dippel[2]
[1]Erasmus University Medical Center, Public Health, Rotterdam, The Netherlands
[2]Erasmus University Medical Center, Neurology, Rotterdam, The Netherlands

[3]Erasmus University Medical Center, Epidemiology, Rotterdam, The Netherlands

Background and Aims: Rapid pre-hospital decision making for suspected stroke patients requires a trade-off between avoiding delay of intravenous treatment (IVT) by transport to the nearest hospital, and avoiding transfer-related delay of intra-arterial treatment (IAT) by direct transport to an intervention center. By quantifying factors of decisional uncertainty we identified priorities for future research.
Method: We constructed a decision tree model comparing expected outcome (90-day modified Rankin Scale) after transport to the nearest hospital versus direct transport to an intervention center. Individual input consisted of age, probability of large vessel occlusion (pLVO) and travel times. Model parameters, such as recanalization rates, were derived from literature and clinical databases. We used deterministic and probabilistic sensitivity analysis to assess parameter uncertainty.
Results: Most important individual factors for decision-making were pLVO and expected delay of IVT. Direct transportation to an intervention center resulted in better outcome for expected IVT delays of <75 minutes if pLVO > 60%, and for delays of <40 minutes if pLVO > 30% (reference-case, Figure 1). Probabilistic sensitivity analysis revealed residual uncertainty, with direct transport to an intervention center preferred in 75% of simulations. Eligibility for IVT and for IAT caused most decisional uncertainty.



Conclusion: The individual probability of large vessel occlusion and expected delay of IVT are important factors for prehospital decision-making. Further research should focus on reliable predictions of the individual eligibility for IVT and for IAT.

AS07-052

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

CLINICAL INFORMATION SYSTEMS INTEGRATION IN NEW YORK CITY'S FIRST MOBILE STROKE UNIT

B. Kummer[1,2,3], M. Lerario[2,4,5], A. Ganzman[5], B. Navi[2,5], D. Ribaudo[6], S. Mir[2,5], S. Pishanidar[2,5], R. Mehendale[3], O. Williams[3], H. Kamel[2,5], R. Marshall[3], M. Elkind[3,7] and M. Fink[5]
[1]Columbia University, Biomedical Informatics, New York, USA
[2]Clinical and Translational Neuroscience Unit- Feil Family Brain and Mind Research Institute, Weill Cornell Medicine, New York, USA
[3]Columbia University Medical Center, Neurology, New York, USA
[4]New York-Presbyterian Queens, Neurology, Flushing, USA
[5]Weill Cornell Medicine, Neurology, New York, USA
[6]NewYork-Presbyterian Hospital, Emergency Medical Services, New York, USA
[7]Columbia University Medical Center, Neurology Clinical Outcomes Research and Population Sciences Division- Department of Neurology, New York, USA

Background and Aims: The first mobile stroke unit (MSU) in New York City and the East Coast of the U.S. was established in October 2016, in conjunction with NewYork-Presbyterian Hospital (NYP) and the Fire Department of New York. We describe the integration of NYP's MSU into our hospital's clinical information systems to support patient care and research efforts.
Method: Our MSU is staffed by two paramedics, one radiology technologist, and a vascular neurologist. Three laptop computers and a secure Wi-Fi access point were installed on the MSU, enabling all staff to reliably access the hospital intranet during operating hours. We established a standard telephone-based registration procedure to seamlessly register patients into our institutional electronic health record (EHR). We developed and implemented a computerized physician order entry (CPOE) set with pre-selected fields to permit quick ordering of medications, imaging, and laboratory testing. We also built and implemented a structured clinician note to capture pre-hospital clinical encounter data and facilitate extraction of EHR data into our research database.
Results: The NYP MSU began operating on October 3rd, 2016. As of January 12th, 2017, the MSU responded to 109 calls and transported 25 patients. Seven patients were treated with IV thrombolysis without complications; two patients received endovascular therapy. The most commonly reported problem was incomplete clinician documentation. No issues relating to registration, CPOE, or access to Wi-Fi or intranet were reported.
Conclusion: We have successfully integrated the NYP MSU into our hospital's clinical information systems. Future studies are necessary to determine whether such integration impacts care quality.

AS07-053

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

INTER-RATER VARIABILITY FOR SEVERE HEMIPARESIS EVALUATION BETWEEN STROKE SPECIALISTS AND PARAMEDICS IN ACUTE STROKE PATIENTS

J. Kral[1], D. Holes[2], D. Vaclavik[3], L. Klecka[4], R. Mikulik[5] and M. Bar[1]
[1]Comprehensive Stroke Center- University Hospital Ostrava, Department of Neurology and Psychiatry- Faculty of Medicine- University Ostrava, Ostrava, Czech Republic
[2]Emergency Medical Service Moravian-Silesian Region- Jesenius Faculty of Medicine in Martin- Comenius university in Bratislava, Emergency Medical Service Moravian-Silesian Region, Ostrava, Czech Republic
[3]Agel Research and Training institute, Ostrava Vitkovice Hospital, Ostrava, Czech Republic
[4]City Hospital Ostrava, Neurology, Ostrava, Czech Republic
[5]St. Anne's University Hospital and Faculty of Medicine- International Clinical Research Center- Stroke Research Program- St. Anne's University Hospital, Department of Neurology, Brno, Czech Republic

Background and Aims: The severe stroke is associated with the presence of large cerebral vessel occlusion and therefore the correct resolution of minor and severe stroke pre-hospital is very important for selection and patients rapid transportation to Comprehensive or Primary Stroke Centre. The objective of this study is to assess inter-rater variability between stroke specialists and emergency technicians, concerning the presence of severe motor arm or leg deficit only.
Method: Prospective multicentre study. Firstly, the paramedics had been learned and tested for severity of hemiparesis assessment via web-

seminars. Secondly, the all suspected stroke patients according FAST test were examined by paramedics pre-hospital to distinguish between mild (NIHSS 1 or 2 points, item 5 and/or 6) or severe (3 or 4 points) hemiparesis. The patients were also examined by stroke specialists immediately after the entry to stroke centres. Inter-rater agreement was assessed using the Kappa index ("poor" with $\kappa < 0.4$, "moderate" if 0.41–0.60, " strong" if 0.61–0.80 and " very strong" if > 0.81).
Results: During 10 months 2016, 377 patients were enrolled to study, male 191 (51%), average age 72,9 y, NIHSS average 8.3. The average time between paramedic and stroke specialist examinations was 32 min. The total agreement between the paramedics and stroke specialists was 69%, Kappa index 0,43 (moderate), $p < 0.001$.
Conclusion: In our study, inter-rater agreement in evaluation of the severity of hemiparesis in acute stroke between paramedics and stroke specialists was moderate. More training of paramedics to recognize severity of hemiparesis is needed.

AS07-054

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

A PROTOCOL DESIGNED TO REDUCE IN-HOSPITAL DELAYS IN TREATMENT WITH INTRAVENOUS THROMBOLYSIS ALSO ALLOWS TO REDUCE TIME TO GROIN PUNCTURE FOR ENDOVASCULAR TREATMENT

A.M. Iglesias Mohedano[1], A. García Pastor[1], F. Díaz Otero[1], P. Vázquez Alen[1], Y. Fernández Bullido[1], M. del Valle Diéguez[2], J. Saura Lorente[2], E. Castro Reyes[2], F. Villoria Medina[2], F. Fortea Gil[2] and A. Gil Núñez[1]
[1]Hospital General Universitario Gregorio Marañón, Neurology Department-Vascular Neurology Section, Madrid, Spain
[2]Hospital General Universitario Gregorio Marañón, Radiology Department-Neuroradiology Section, Madrid, Spain

Background and Aims: To determine if a protocol originally designed to reduce in-hospital time to intravenous thrombolysis (IVT) in acute ischemic stroke is also effective reducing time to endovascular treatment.
Method: A series of interventions aimed to reduce IVT treatment delays were implemented in a tertiary care hospital in February 2014. Consecutive ischemic stroke patients treated with endovascular treatment were prospectively registered. In-hospital delays of endovascular treatment were analyzed before (pre-intervention period: January 2011-January 2014) and after the new protocol (post-intervention period: February 2014-December 2016). Endovascular treatment is only available in our institution during office hours. Intra-hospital strokes and patients transferred from other hospitals with part of their work-up complete were excluded.
Results: 50 patients. Mean age (SD) 64.8 (13.9). 46% were males. 16 patients were included before and 34 after the new protocol. Among these patients, 32% were treated previously with IVT. Median time in minutes before/after the new interventions were respectively: Door-to-imaging 20/15 ($p = 0.06$); Door-to-IVT 48/32 ($p = 0.02$); imaging-to-groin puncture 106/54 ($p = 0.002$); door-to-groin puncture 122/76 ($p = 0.001$); door-to-reperfusion 162/154 ($p = 0.71$); endovascular procedure time 73/90 ($p = 0.51$). Time from imaging-to-groin puncture in patients with/without IVT performed was 116/54 minutes respectively ($p < 0.001$). When IVT was initiated on CT table this interval was reduced to 51 minutes.
Conclusion: Interventions aimed to reduce in-hospital delays to IVT appear to be also effective reducing time to groin puncture. IVT was identified as delaying factor for endovascular treatment when not started on CT table. Other more specific measures should be implemented in order to reduce endovascular procedure time and conclusively time to reperfusion.

AS07-055

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

STROKE AND TIA MIMICS IN AN URBAN NEUROLOGICAL EMERGENCY DEPARTMENT

M. Karlinski[1], D. Kozera[1], M. Wojdacz[1], G. Rak[1], H. Sienkiewicz-Jarosz[2], I. Kurkowska-Jastrzębska[1] and A. Członkowska[1,3]
[1]Institute of Psychiatry and Neurology, 2nd Department of Neurology, Warsaw, Poland
[2]Institute of Psychiatry and Neurology, 1st Department of Neurology, Warsaw, Poland
[3]Medical University of Warsaw, Department of Experimental and Clinical Pharmacology, Warsaw, Poland

Background and Aims: Our aim was to investigate the occurrence, structure and management of conditions mimicking acute cerebrovascular events (ACE, defined as stroke or transient ischaemic attack) in patients referred by a healthcare professional directly to neurological emergency department (ED).
Method: We analyzed consecutive patients referred to a Polish urban neurological ED with suspicion of ACE between 1st January 2014 and 31st December 2014.
Results: During the study period there were 693 patients with a final diagnosis of ACE and 256 ACE mimics. In 171 cases ACE mimic was another neurological condition (vertigo 20.5%, headache 14.6%, epileptic seizure 9.3%, brain tumor 8.2%, Bell's palsy 7.0%). The remaining 85 cases were non-neurological (high blood pressure 20.0%, metabolic and electrolyte disturbances 16.5%, syncope 14.1, infections 14.1%, alcohol abuse 5.9%). Patients with neurological and non-neurological ACE mimics did not differ significantly in terms of gender (62.6% vs 63.5% females), type of the referring professionals (paramedics 22.8% vs 32.9%, ambulance physicians 22.8% vs 25.9%, non-emergency physicians 54.4% vs 41.2%), history of seizures (5.9% vs 2.4%) or previous ACE (22.2% vs 31.4%), necessity for neuroimaging (59.6% vs 49.4%) and indications to hospital admission or urgent referral to a non-neurological ED (49.1% vs 49.4%). However, they were significantly younger (median age 66 vs 77 years, $p < 0.001$) and more often required brain MR (17.5% vs 7.1%, $p = 0.023$).
Conclusion: Approximately 1 in 3 patients incorrectly suspected in the prehospital setting of having ACE actually suffers from non-neurological condition that in almost 50% may require urgent transfer to a general ED.

AS07-056

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

THROMBOEMBOLIC RISK STRATIFICATION AND OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE AND HEART FAILURE

S. Lorenzano[1], F. Orlando[1], S. Strano[2], L. Durastanti[1], M.T. Di Mascio[1], A. Falcou[1] and D. Toni[1]
[1]Sapienza University of Rome, Department of Neurology and Psychiatry-Unità di Trattamento Neurovascolare- Policlinico Umberto I Hospital, Rome, Italy
[2]Sapienza University of Rome, Department of "Heart and Great Vessels", Rome, Italy

Background and Aims: Stroke occurs in 2% of patients within the first year of diagnosis of heart failure (HF) and 20% of patients with acute

ischemic stroke (AIS) has left ventricle systolic dysfunction (LVSD). HF and atrial fibrillation (AF) usually coexist and the onset of AF during an acute stroke is associated with higher mortality and disability. Aim of the study was to evaluate the role of HF as outcome predictor in AIS patients and whether CHA2DS2VASc score calculated by excluding the index cerebrovascular event is related with HF and onset of AF during the admission.

Method: A retrospective analysis on patients with AIS admitted at our stroke unit and undergoing transtoracic echocardiography was performed.

Results: Out of 287 patients, 92(32%) had LVSD(FE of 49% or less). Compared to the other patients, patients with LVSD had a worse thromboembolic risk profile (i.e. median CHA2DS2VASc, 4 vs.2), higher prevalence of AF(53.2% vs. 22.1%) and higher median NIHSS at baseline (9 vs.6) and discharge (3 vs.2). HF related with worse short-term (clinical deterioration at discharge[15.2% vs. 6.7%, $p = 0.021$] and/or intra-hospital mortality[9.8% vs.0, $p < 0.001$]) and long-term outcome (all-cause mortality[22.8% vs.7.7%, $p < 0.001$]). No significant association between HF and recurrence of cerebrovascular events was observed. CHA2DS2VASc was found to be associated with HF($p < 0.01$) and the onset of AF during the admission ($p = 0.004$).

Conclusion: Management of patients with AIS and HF should take into account the instability of cardiac profile and association with AF leading to an increasing risk of the overall mortality. The use of CHA2DS2VASc for predicting AF onset can be helpful in patient selection for a more appropriate management.

AS07-057

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

D-DIMER AS A PREDICTOR OF LARGE VESSEL OCCLUSION IN ACUTE ISCHEMIC STROKE

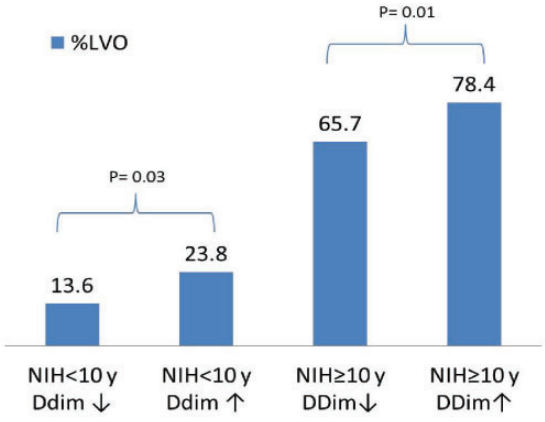
E. López-Cancio[1], A. Bustamante[2], T. García-Berrocoso[2], M. Millán[1], P. Cardona[3], M. Rubiera[4], J. Serena[5], M. Garcès[6], X. Ustrell[7], E. Baldrich[2], L. Cano[3], M. Hernández-Pérez[1], M. Terceño[5], A. Dávalos[1] and J. Montaner[2]

[1]Hospital Universitari Germans Trias i Pujol, Neurology, Badalona, Spain
[2]Vall D'Hebron Research Institute, Neurology, Barcelona, Spain
[3]Hospital Universitari Bellvitge, Neurology, L'Hospitalet del LLobregat, Spain
[4]Hospital Universitari Vall D'Hebron, Neurology, Barcelona, Spain
[5]Hospital Universitari Josep Trueta, Neurology, Girona, Spain
[6]Hospital Verge de la Cinta, Neurology, Tortosa, Spain
[7]Hospital Universitari Joan XXIII, Neurology, Tarragona, Spain

Background and Aims: Study of early predictors of large vessel occlusion (LVO) in acute stroke is important to identify candidates for endovascular treatment. We aimed to evaluate circulating biomarkers as predictors of LVO.

Method: The StrokeChip is a prospective observational study conducted at 6 Primary Stroke Centers in Catalonia. Consecutive patients with suspected stroke were enrolled at Emergency Departments in the first 6 hours after symptom onset. Blood samples were obtained immediately after admission. Stroke severity was evaluated with NIHSS and LVO was assessed with CTA, MRA and/or TCCD.

Results: From August-2012 to December-2013, 941 acute ischemic strokes were enrolled (mean age 72, 54% men, median NIHSS 7). LVO was evaluated in 811 and detected in 319 patients (33.9%). Best clinical predictor of LVO was NIHSS. Levels of D-dimer were significantly higher in those patients harboring a LVO and in those with higher NIHSS($p < 0.001$). D-dimer > 6.8 ng/ml was independently associated with presence of a LVO(crude OR 2.92[2.17–3.91]and OR adjusted by NIHSS 1.94[1.37–2.75]). Accuracy of the model (AUC) increased from 0.782[0.748–0.816] if only NIHSS ≥ 10 was included to 0.809[0.776–0.841]after D-Dimer was added. Percentage of LVO increased from 13.6% in those with a NIHSS < 10 and D-dim<6.8 to 74.8% in those with NIHSS ≥ 10 and D-Dim>6.8 (figure).



Conclusion: D-dimer is an independent predictor of LVO and may be useful at prehospital level and at Community Hospitals without intracranial vessel imaging techniques.

AS07-060

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

ENDOVASCULAR TREATMENT OF TANDEM OCCLUSION ACUTE STROKE PATIENTS: A COHORT FROM HOSPITAL GENERAL DE ALICANTE

C. Diaz Urrea[1], J.C. Rayon-Aledo[2], N. López Hernández[1], J.I. Gallego León[2], I. Beltrán[1], L. Llorente Ayuso[1], G. Barbieri[2], M. Pryszlak[2], L. Gonzalez Fernandez[1], D. Corona Garcia[1], P. Barredo Benitez[1], J. Gualda Heras[1], R. Garcia Tercero[1] and C. Dominguez Rodriguez[2]

[1]Hospital General Universitario de Alicante, Neurology, Alicante, Spain
[2]Hospital General Universitario de Alicante, Neurorradiology, Alicante, Spain

Background and Aims: Acute tandem occlusion (TO) of the internal carotid artery (ICA) and a large intracranial vessel are associated with a poor prognosis. The best approximation in endovascular management is unclear.

We will describe our experience along since February 2014.

Method: We performed a retrospective analysis of prospectively collected data for TO patients who underwent acute endovascular treatment.

We favour a distal to proximal approach, avoiding stenting if there is good collateralization. If stenting is necessary, we administer intravenous acetylsalicylic acid acutely and Clopidogrel after 24 hours CT scan.

We collected demographical, radiological and clinical outcome related variables.

Results: Our cohort accounts 30 patients, with a mean age 63 years old, 24 men (80%), mean ASPECTS: 7.9, mean NIHSS on arrival: 16.17, 60% received previous i.v. thrombolysis. Time to groin puncture (mean): 233 minutes. 23 patiens (76,6%) underwent a distal to proximal approach. Carotid treatment was indicated in 16 cases: 13 acute stenting, 2 delayed stenting and one delayed surgical treatment.

TICI 2B-3 was achieved in 63.3%. Bleeding (PH1/PH2) occurred in 26.6%, in 2 cases the carotid stent thrombosed shortly after the procedure, and 0% restroke.
Favorable ranking (mRs 0–2) was achieved in 27.5%.
Conclusion: Despite the randomized control trial demonstrating the effectiveness of thrombectomy there is still a research gap about tandem occlusions. Further research and guidelines for the endovascular management of tandem occlusions are needed.

AS07-062

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

RESULTS OF A TURKISH COMPREHENSIVE STROKE TREATMENT REFERRAL PROGRAM QUALITY DATABASE

B. Koyuncu[1], R. Pourmohammed[2], H. Harabati[1], T. Ozer[1], U. Kelleci[1], R. Tolun[1], Y. Krespi[2] and S. Tavukcu Ozkan[3]
[1]Memorial Hizmet Hospital Stroke Acute Treatment Center, Neurology, Istanbul, Turkey
[2]Memorial Sisli Hospital Stroke Research And Rehabilitation Center, Neurology, Istanbul, Turkey
[3]Memorial Hİzmet Hospital, Intensive Care Unit, Istanbul, Turkey

Background and Aims: In Istanbul acute stroke patients are generally first transported to nearby "not stroke ready" hospitals. Memorial Comprehensive Ischemic Stroke Treatment Program is the first referral program in Istanbul. The objective of this study was to examine the change in performance of quality indicators over time after a pilot running phase.
Method: Institutional prospective quality database include JCI comprehensive stroke center quality indicators. Quality data of patients who were consecutively admitted in the first 24 hours after onset between September 2012 and May 2016 were reviewed.
Results: During this period 817 patients were admitted, the mean age was 67(16–100) and 56% was male. Median onset-to-door time was 257 minutes. Revascularization therapy (147 IVrTPA(67%),52 bridging (24%),19 endovascular treatment (EVT)(9%))was performed in 218 patients (26.7%). The frequency of both IV rTPA and EVT had increased over the years (8,9% to 25,4% and 6.3% to 15.6% respectively)(p:0.000). From the eligible patients 91.5 % received IVrTPA in the first 4.5 hours. In the 4.5 hours patient group (51%) door-to-needle time (DNT) was 33 minutes. The rate of DNT below 40 and 30 minutes was 67,7% and 46,1% and improved significantly over time; p.0.000 and p:0.012 respectively. Median door-to-femoral puncture and femoral puncture-to-recanalization time was 76 and 75 minutes, respectively. Good prognosis (mRS 0–2) and mortality were observed in 61,1% and 8,3%, respectively.
Conclusion: Patient referal got more selective over time. Intravenous rTPA treatment delivery times got significantly shorter and to some extent compensated late arrival. Endovascular time metrics are in line with the literature but should be improved.

AS07-063

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

EMERGENT CAROTID ENDARTERECTOMY JUST AFTER INTRAVENOUS THROMBOLYSIS IS SAFE AND EFFICIENT?

M. Nevšímalová[1], J. Fiedler[2], M. Reiser[1], L. Šterba[3] and S. Ostrý[1]
[1]Hospital České Budějovice, Neurology, České Budějovice, Czech Republic
[2]Hospital České Budějovice, Neurosurgery, České Budějovice, Czech Republic
[3]Hospital České Budějovice, Radiology, České Budějovice, Czech Republic

Background and Aims: Ischaemic stroke caused by occlusion of extracranial carotid artery is a very serious stroke.
We analysed our experience with emergent carotid endarterectomy, speciale just after IVT.
To evaluate safety and efficiency of emergent carotid endarterectomy without 6 hous after ischaemic stroke, just after intravenous thrombolysis.
Method: Retrospective analysis of neuroemergency,surgical and radiology reports.
Outcome was evaluated according Modified Rankin score (mRS) 3 months after treatment.
Results: 16 patients (13 males, 3 females, age from 61–87 years, mean: 72.6 years) underwent emergent CEA in the period from 1/2014 to 12/2016.
11 patients were operated just after IVT (68.7%).
5 patients has wake-up stroke or unknown-onset stroke (31%).
Admission NIHSS was from 1 to 21, mean: 10 points, SD: 6.29.
Onset to surgery time (11 pts): from 150 to 340mins, mean 254.8 mins, SD 60.32.
Door to surgery time (16pts): from 68 to 248mins, mean 156.2 mins, SD 58.9.
Clinical outcome 3 months after treatment (all 16pts): mRS 0–2: 11 (68.7%), mRS 2: 0, mRS 3:, mRS 4–0, mRS 5: 2 (12.5%), mRS 6: 3 (18.7%).
Clinical outcome 3 month after IVT+ CEA (11 pts): mRS 0–2: 6 (54.5%).
Conclusion: Emergent carotid endarterectomy sems to be the safe and efficient treatment of acute ischaemic stroke caused by extracranial carotid artery occlusion.

AS07-065

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

THROMBECTOMY WITH OR WITHOUT STENTING OF CONCURRENT EXTRACRANIAL CAROTID DISEASE

A. Weill[1], A.Y. Poppe[2], L. Nico[1], C. Odier[2], M. Kotowski[1], Y. Deschaintre[2], D. Roy[1], L. Gioia[2], J. Raymond[1], G. Jacquin[2], N. Khoury[1], N. Daneault[2] and C. Stapf[2]
[1]CHUM, Neuroradiology, Montreal, Canada
[2]CHUM, Vascular Neurology, Montreal, Canada

Background and Aims: In patients undergoing thrombectomy for acute ischemic stroke, the benefit of immediate endovascular treatment of concurrent cervical carotid disease (stenosis or occlusion) has not been demonstrated. Our aim was to compare clinical outcome at 3-month (mRS) in patients with or without ACI stenting during the acute treatment session.

Method: A series of 54 consecutive patients (mean age 63 years; n = 15 (30%) women, median NIHSS: 19) underwent endovascular therapy for acute ischemic stroke at a single institution in a setting of concurrent anomalies (stenosis or occlusion) of the ipsilateral ICA. N = 34 (63%) received iv thrombolysis treatment prior to endovascular procédures.
Results: Angiography demonstrated n = 35 (65%) patients with extracranial ACI occlusions and n = 19 (25%)with ACI stenosis. Underlying mechanisms included 10 dissections (19%) or atherothrombotic disease. Stenting with or without angioplasty was performed in 20 (37%) patients during the acute endovascular treatment session, while the remaining 34 (63%) did not undergo additional procedures at the cervical ACI level. Baseline characteristics (age, sex, NIHSS) and technical success of intracranial clot removal were similar between treatment groups. Clinical outcome at 3 month was similarly favourable in patients treated with (mRS 0–2: n = 8/20 patients, 40%) or without (mRS 0–2: n = 11/33, 32%) acute therapy for concurrent cervical ICA disease.
Conclusion: In patients undergoing acute thrombectomy, no difference in clinical outcomes was found after additional acute endovascular intervention for cervical ACI disease. Based on these restrospective observational data, clinical trial comparing acute versus deferred ACI therapy appears justified.

AS07-067

HYPERACUTE MANAGEMENT – EXCLUDING CLINICAL TRIAL RESULTS

PATIENTS WITH STROKE MISSED IN PRE-HOSPITAL IDENTIFICATION—MISSED OPPORTUNITY FOR MOBILES STROKE UNIT

K. Uchino[1], J. Mathew[1], A.B. Buletko[1], A. Taqui[1], A.P. Reimer[2], T. Thacker[1], A. Russman[1], P.A. Rasmussen[1] and M.S. Hussain[1]
[1]Cleveland Clinic, Cerebrovascular Center, Cleveland, USA
[2]Cleveland Clinic, Critical Care Transport, Cleveland, USA

Background and Aims: Efficient pre-hospital stroke identification is essential in early notification and in reducing time to treatment. We aimed to compare characteristics of ischemic strokes evaluated on mobile stroke unit (MSU) and those brought to ED by municipal ambulance ("missed cases").
Method: We performed a retrospective study of patients with final diagnosis of ischemic stroke within our hospital system from July 2014 to June 2015. Emergency medical service (EMS) dispatcher uses during the initial phone call the Face-Arm-Speech Test symptoms then the EMS on-scene identified stroke using Cincinnati Prehospital Stroke Scale (CPSS). Study subjects were restricted to presentation by ambulance or MSU within the geographic and time coverage of MSU. We compared patient characteristics and acute stroke treatment rates.
Results: Thirty-two presented to ED by EMS crew and 65 were evaluated on MSU. Patients arriving by EMS compared to MSU were more likely to present with dizziness (9/32 v 5/65, $p < 0.01$) or unsteady gait (8/32 v 6/65 $p = 0.04$). Stroke severity was similar (median NIH Stroke Scale 6 in ED v 7 on MSU, $p = 0.10$). Only 4 patients brought by EMS received acute stroke treatment, compared to 26 among MSU evaluation ($p < 0.01$). Among those with initial dispatch information, only 9/28 (32%) patients were dispatched as strokes and remainder were dispatched for "sick person" (11), and other (8). When evaluated by EMS, the majority of patients (16/28) had a negative CPSS.
Conclusion: Ischemic strokes missed as stroke by EMS system had less frequent classical stroke symptoms, but only a few were eligible to receive acute treatment.

AS21-001

IMAGING – HYPERACUTE

ASSOCIATION BETWEEN INTRAINFARCT RELATIVE SIGNAL INTENSITY ON FLAIR MRI AND INTRACEREBRAL HEMORRHAGE AFTER ACUTE STROKE REPERFUSION THERAPY

T. Yoshimoto[1], M. Hayakawa[2], H. Yamagami[3], N. Funatsu[1], K. Sonoda[2], T. Satow[4], J.C. Takahashi[4], M. Ihara[1] and K. Toyoda[2]
[1]National Cerebral and cardiovascular Center, Neurology, Osaka, Japan
[2]National Cerebral and cardiovascular Center, Cerebrovascular Medicine, Osaka, Japan
[3]National Cerebral and cardiovascular Center, Stroke Care Unit, Osaka, Japan
[4]National Cerebral and cardiovascular Center, Neurosurgery, Osaka, Japan

Background and Aims: In acute ischemic stroke (AIS) patients, the ratio of intrainfarct to contralateral FLAIR signal intensity (FLAIR-relative signal intensity [rSI]) was reported to be associated with hemorrhagic transformation. We analysed whether FLAIR-rSI predicted intracerebral haemorrhage (ICH) after acute stroke endovascular therapy (EVT).
Method: Among consecutive 195 AIS patients undergoing EVT in our hospital between October 2012 and August 2016, we retrospectively examined patients with anterior-circulation large vessel occlusion of whom pretreatment diffusion-weighted and FLAIR MRI were available. Patients with bilateral ischemic lesions were excluded. We measured rSI of the brightest area on FLAIR within the diffusion-restricted area. The endpoints were ICH and symptomatic ICH (sICH, defined as an ICH with $\geq$1-point increase of NIHSS score from baseline) detected by T2*-weighted MRI within 7 days after onset.
Results: A total of 156 patients (87 men, 73 ± 12 years old, median baseline NIHSS score of 18) was included. ICH was occurred in 83 patients and sICH in 26 patients. FLAIR-rSI was larger in ICH group than in no-ICH group (median, 1.29 vs 1.13, $p < 0.01$) and in sICH group than in no-sICH group (1.34 vs 1.18, $p < 0.001$). The cut-off values of FLAIR-rSI to predict ICH and sICH were 1.21(AUC 0.74) and 1.23(AUC 0.74), respectively. After multivariate adjustment, FLAIR-rSI > 1.21 and > 1.23 were associated with ICH (OR, 10.9; 95% CI 4.07–33.1) and sICH (7.88; 2.44–32.0), respectively.
Conclusion: Intrainfarct FLAIR-rSI was significantly associated with ICH and sICH after acute stroke EVT.

AS21-002

IMAGING – HYPERACUTE

PERIHEMATOMAL DIFFUSION RESTRICTION AS A COMMON FINDING IN LARGE HYPERACUTE INTRAPARENCHYMAL CEREBRAL HEMORRHAGES

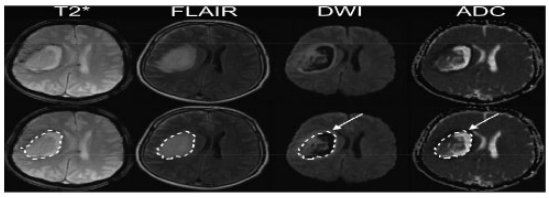
T. Schneider[1], D. Frieling[1], J. Regelsberger[2], J. Schroeder[3], J. Fiehler[1] and S. Siemonsen[1]
[1]University Medical Center Hamburg-Eppendorf, Neuroradiology, Hamburg, Germany
[2]University Medical Center Hamburg-Eppendorf, Neurosurgery, Hamburg, Germany
[3]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany

Background and Aims: In acute and subacute (>six hours to seven days from symptom onset, SO) intraparenchymal cerebral hemorrhages (IPH), the development of surrounding perihematomal edema (PHE) is a well known phenomenon. Here, we aim to study the morphology and the

clinical impact of the PHE region in hyperacute IPH patients (≤six hours from SO).

Method: This monocentric, retrospective study includes 83 patients with first-ever primary IPH. Three-dimensional volumetric segmentation was performed for IPH and PHE on fluid-attenuated inversion recovery (FLAIR)/T2-weighted (T2w) and ADC images.

Results: In 56/83 patients (67.5%) we found a rim-like ADC-hypointensity around supratentorial PHE (perihematomal rim, PHR) that never appeared demarcated on FLAIR/T2w. Multivariate logistic regression analysis revealed every 10-year increase of age (hazard ratio (HR) 1.929, 95% confidence interval (CI) 1.047–3.552, $P=.035$) and male gender (HR 5.672, 95% CI 1.038–30.992, $P=.045$) as significant predictors of the presence of a PHR, but not IPH size, IPH location, time from SO to MRI, nor National Institutes of Health Stroke Scale Score (NIHSS) at admission. We found no difference in NIHSS at discharge, hematoma removal rate, or mortality rate in PHR-positive patients. ADC values of the PHR show a step-wise normalization with increasing time from SO.



Conclusion: Occurrence of PHR is a common finding in supratentorial hyperacute IPH. Whether this phenomenon is caused by transient oligemic and metabolic changes has to be further studied. Nevertheless, sole presence of a PHR does not influence the patient's short-term outcome.

AS21-003

IMAGING – HYPERACUTE

SAFETY OF MULTIPLE TREATMENTS WITH INTRAVENOUS TISSUE PLASMINOGEN ACTIVATOR IN PATIENTS WITH RECURRENT ACUTE ISCHEMIC STROKE

M. Luby[1], I. Naqvi[1], K. Cullison[1], T. Burton[1], R. Benson[1], R. Leigh[1], J. Lynch[1], Z. Nadareishvili[1] and L. Latour[1]
[1]NIH, NINDS, Bethesda, USA

Background and Aims: The purpose of this study was to investigate the frequency of hyperintense acute reperfusion marker (HARM) in patients with recurrent stroke treated repeatedly with intravenous tissue plasminogen activator (IV tPA). We hypothesized that patients were more likely to have HARM at their second stroke.

Method: Two independent readers evaluated pre-contrast FLAIR at 24 hours for severe HARM and pre-contrast FLAIR as baseline for deep white matter (DWM) disease. Lesion volumes were measured on baseline DWI and follow-up FLAIR. Favorable clinical outcome was defined as follow-up modified Ranking Score (mRS) $<=2$ or return to pre-stroke mRS.

Results: Nine patients were in the study, including 44% female, median [IQR] time between strokes of 686 [307–1001] days, baseline NIHSS 6 [3–10] and 6 [3–14], follow up mRS 1 [0–2] and 2 [0–3], baseline DWI volume 1.3 [0.9–4.0] and 2.0 [0.8–4.2] mL, and final infarct volume on FLAIR of 1.1 [0.5–5.5] and 2.8 [0–20.7] mL, for the first and second strokes. Overall, 78% and 67% of patients had favorable outcome at the first and second strokes. There were no instances of severe HARM for the first strokes but two instances for the second strokes. There were no instances of hemorrhagic transformation. The median DWM scales were 1 and 1 for the first and second strokes.

Conclusion: In this small study, patients treated with recurrent strokes had small ischemic lesion volumes and mild underlying white matter disease, contributing to minimal hemorrhagic complications and blood brain barrier disruption.

AS21-004

IMAGING – HYPERACUTE

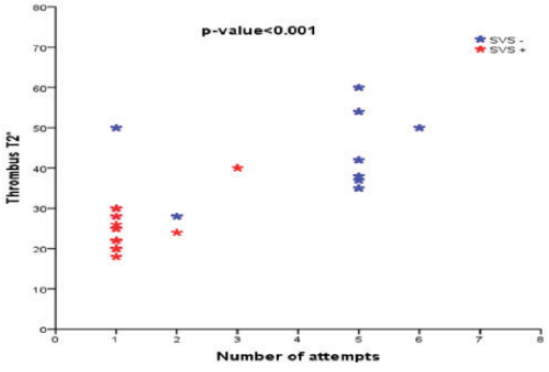
MRI QUANTITATIVE T2* MAPPING ON THROMBUS TO PREDICT RECANALIZATION AFTER ENDOVASCULAR TREATMENT FOR ACUTE ANTERIOR ISCHEMIC STROKE

R. bourcier[1], N. brecheteau[1], V. costalat[2], B. daumas-duport[1], B. delasalle[3], H. desal[1], O. naggara[4] and J.M. serfaty[5]
[1]University Hospital of Nantes, Neuroradiology, nantes, France
[2]University Hospital of Montpellier, neuroradiology, Montpellier, France
[3]University Hospital of Nantes, Institut du thorax, nantes, France
[4]Saint Anne Hospital, neuroradiology, Paris, France
[5]University Hospital of Nantes, Hemodynamic and Cardiac imaging, nantes, France

Background and Aims: In acute stroke treated with endovascular treatment (EVT), the susceptibility vessel sign (SVS+ or SVS-) is related to TICI 2b/3 and clinical outcome. However a binary assessment of thrombus does not reflect its complex composition. This may alters the predictive performance of SVS. Our aim was to assess whether a quantitative MRI marker, Thrombus-T2*, may help predict a low number of attempts to obtain the recanalization and compare its performance to SVS.

Method: Thrombus-T2* was prospectively obtained for consecutive patients treated by EVT for acute anterior stroke. Patients were treated according the same strategy i.e. use of intermediate aspiration catheter and a stent retriever. The occlusion locations, time from onset to groin puncture, use of IV tPa, final TICI scores, number of attempts, SVS were assessed and compared to the Thrombus-T2*.

Results:



Thirty Thrombus-T2* measurements were performed. Twenty-two patients (73%) required ≤2 attempts. In this group, 6 patients (27%) were SVS – and 16 patients (73%) were SVS+, mean Thrombus-T2* was 25 ms (18–50, SD 7). Among the patients who required >2 attempts, 7 patients (87%) were SVS – and 1 patient (13%) was SVS+, mean Thrombus-T2* was 45 ms (35–60, SD 9). SVS+ ($p=0.01$) and a shorter Thombus-T2* ($p<0,001$) were associated with a lower number of attempts.

Conclusion: Similar to the binary SVS, a quantitative biomarker is related to the number of attempts to reach successful recanalization after EVT. Thrombus T2* may be useful to adapt the EVT strategy to the clot characteristics.

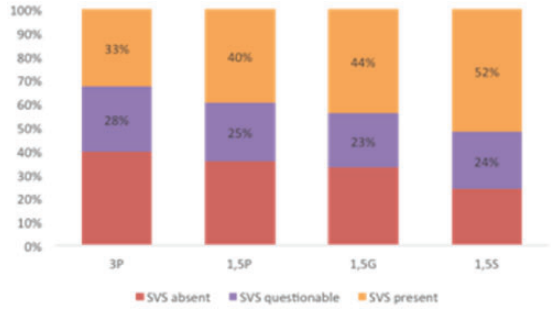
AS21-005

IMAGING – HYPERACUTE

DIAGNOSTIC ACCURACY OF THE SUSCEPTIBILITY VESSEL SIGN TO PREDICT OCCLUSIVE THROMBUS COMPOSITION IN ACUTE ANTERIOR ISCHEMIC STROKE VARIES AMONG MRI UNITS: IN-VITRO MULTI-MACHINES DEMONSTRATION

R. bourcier[1], L. detraz[1], O. naggara[2], B. delasalle[3], C. toquet[4] and H. desal[1]
[1]University Hospital of Nantes, Neuroradiology, nantes, France
[2]Saint Anne Hospital, Neuroradiology, Nantes, France
[3]University Hospital of Nantes, institut du thorax, nantes, France
[4]University Hospital of Nantes, Anatomopathology, nantes, France

Background and Aims: The susceptibility vessel sign (SVS) on MRI is related to thrombus location, composition and size, in acute stroke. No study has questioned its inter MRI machines agreement. We aimed to compare *in vitro* the diagnostic accuracy of 4 different MRI machines for thrombus histological characterization.
Method: 35 thrombi analogs of different composition that was histologically categorized as fibrin-dominant, mixed, or red blood cell (RBC)-dominant. We scanned these thrombi on four different MRI machines with T2* sequence according the constructor parameters. Nine radiologists, blinded to thrombus composition and MRI machine model, classified twice, in a two-week interval, the SVS of each thrombus as absent, questionable, or present. Weighted kappa was calculated along with 95% confident interval (CI). We calculated the sensitivity, specificity and accuracy of the SVS on each MRI machines to detect RBC dominant thrombi and compared it between MRI machines.
Results: The SVS was present in 42%, absent in 33%, and questionable in 25%. The inter-machine agreements were moderate to good, ranging from 0,45 (CI: 0,37–0,52) to 0, 67 (CI: 0,61 – 0, 74). The correlation between the SVS and the thrombus composition was moderate κ: 0,50 (CI: 0, 44 – 0,55) to good κ: 0, 76 (CI: 0,72–0,80). Sensitivities, specificities and accuracy to identify RBC-dominant clots were significantly different between MRI machine ($p < 0.001$).



Conclusion: The diagnostic accuracy of the SVS to determine thrombus composition varies significantly among MRI machines. Normalization of T2*-sequences between vendors is probably needed to better predict thrombus composition in future multicenter studies.

AS21-006

IMAGING – HYPERACUTE

PERFUSION-CT IMAGING IN ACUTE EPILEPTIC SEIZURES

D. Strambo[1], V. Rey[1], A. Rossetti[2], P. Maeder[3] and P. Michel[1]
[1]CHUV, Centre Cérébrovasculaire- Service de Neurologie, Lausanne, Switzerland
[2]CHUV, Service de Neurologie, Lausanne, Switzerland
[3]CHUV, Service de Neuroradiologie, Lausanne, Switzerland

Background and Aims: Perfusion CT (PCT) is used in the diagnosis of acute neurological syndromes. We aimed to evaluate CTP abnormalities in patients with acute epileptic seizures or status epileptics (SE).
Method: We prospectively collected patients presenting with focal epileptic seizures or generalized seizures with a postictal deficit who underwent acute PCT. PCT were analysed for the presence of hyper- and hypoperfusion, and results correlated with delay from seizure onset, aetiology, type of seizures and electrical SE.
Results: Half of the 43 consecutive patients had regional PCT abnormalities: hyperperfusion in 13 (30%) and hypoperfusion in 8 (19%). Among the 13 with hyperperfusion, 6 had a focal deficit during PCT, 9 were in SE and none had a stroke. All 8 patients with hypoperfusion had focal neurological deficits, 1 had an electrical SE, and 3 had a simultaneous ischemic stroke. In the 22 with normal perfusion, 9 had a focal deficit, 3 had a SE, and 1 had a stroke. Patients with SE featured a higher prevalence of hyperperfusion (9/13 [69%] of SE patients vs. 4/30 [13%] of non SE patients, p. 0.002). There were no significant correlation between PCT abnormalities and the delay from seizure onset to PCT acquisition, the seizure type and the seizure etiology.
Conclusion: In patients with acute epileptic seizures, regional hyperperfusion on PCT may suggest an ongoing or recently resolved SE, whereas hypoperfusion may be due to post-ictal state or simultanous acute ischemic stroke. These observations might help attributing focal deficits to epileptic seizures rather than to stroke, allowing for targeted therapy.

AS21-008

IMAGING – HYPERACUTE

FLUID-ATTENUATED INVERSION RECOVERY HYPERINTENSE VESSELS AND FUNCTIONAL OUTCOME IN PATIENTS WITH MIDDLE CEREBRAL ARTERY OCCLUSION RECEIVING ENDOVASCULAR TREATMENT

A.H. Nave[1,2], P. Bücke[3], A. Kufner[1], E. Siebert[4], S. Kliesch[4], U. Grittner[5], H. Bäzner[3], T. Liebig[4], M. Endres[1,2], J.B. Fiebach[1], M. Ebinger[1,2], C. Nolte[2] and H. Henkes[6]
[1]Center for Stroke Research Berlin CSB, Neurology, Berlin, Germany
[2]Charite-Universitätsmedizin Berlin, Neurology, Berlin, Germany
[3]Klinikum Stuttgart, Neurology, Stuttgart, Germany
[4]Charite-Universitätsmedizin Berlin, Neuroradiology, Berlin, Germany
[5]Center for Stroke Research Berlin CSB, Biostatistics, Berlin, Germany
[6]Klinikum Stuttgart, Neuroradiology, Stuttgart, Germany

Background and Aims: Fluid-attenuated inversion recovery (FLAIR) hyperintense vessels (FHV) are frequently observed in acute stroke patients with proximal vessel occlusion. Whether FHV can act as a surrogate for collateral status or an indicator for functional outcome is still a matter of debate.
Method: All acute ischemic stroke patients with M1-middle cerebral artery occlusion who received magnetic resonance imaging and endovascular treatment (mechanical thrombectomy, intra-arterial thrombolysis) in two hospitals in Germany between 2007 and 2016 were eligible for

analysis. Quantification of FHV was performed using the FHV-Alberta Stroke Program Early CT Score (ASPECTS) rating system. Collateral status of patients was graded on available baseline angiography using the ASITN/SIR collateral score. Functional outcome was evaluated with the modified Rankin Scale (mRS) three months after stroke. Odds of a favorable outcome (mRS 0–2) was determined using binary logistic regression analysis.

Results: 117 patients were analyzed (median age: 74 [IQR: 65–79]; median NIHSS: 14 [IQR: 10–19]). The median FHV-ASPECTS was 2 [1–3]. Patients with FHV-ASPECTS $\leq$2 were more likely to have good collateral status (ASITN/SIR score: 3–4) on angiography (82.5% vs. 56.6%, $p = 0.025$). Patients with an FHV-ASPECTS ≤ 2 had a better functional outcome at three months (median mRS: 2.0, IQR: 0.75–5.0), compared to patients with a FHV-ASPECTS > 2 (median mRS 4.0, IQR: 2.25–6.0; $p = 0.014$). In multivariate analyses, FHV-ASPECTS ≤ 2 was independently associated with favorable outcome after three months (adjusted OR 10.58, 95% CI 1.96–57.27, $p = 0.006$).

Conclusion: FHV-ASPECTS are associated with collateral status and functional outcome after three months in acute stroke patients with M1 vessel occlusion.

AS21-009

IMAGING – HYPERACUTE

ACUTE REPERFUSION WITHOUT RECANALIZATION: SERIAL ASSESSMENT OF COLLATERALS WITHIN 6 HOURS USING PERFUSION-WEIGHTED MRI

T.H. Cho[1], N. Makris[1], L. Chamard[2], I. Klærke Mikkelsen[3], M. Hermier[2], L. Derex[1], S. Pedraza[4], G. Thomalla[5], L. Østergaard[3], J.C. Baron[6], N. Nighoghossian[1] and Y. Berthezène[2]

[1]Université Lyon 1- Hospices Civils de Lyon- CREATIS- CNRS UMR 5220-INSERM U1044- INSA-Lyon., Stroke Medicine, Lyon, France
[2]Université Lyon 1- Hospices Civils de Lyon- CREATIS- CNRS UMR 5220-INSERM U1044- INSA-Lyon., Neuroradiology, Lyon, France
[3]Center of Functionally Integrative Neuroscience- Aarhus University- Aarhus- Denmark., Neuroradiology, Aarhus, Denmark
[4]Department of Radiology IDI- Girona Biomedical Research Institute IDIBGI- Hospital Universitari de Girona Dr Josep Trueta- Girona- Spain., Neuroradiology, Girona, Spain
[5]Department of Neurology- Center for Clinical Neurosciences- University Medical Center Hamburg-Eppendorf- Hamburg- Germany., Neurology, Hamburg, Germany
[6]University of Cambridge- Department of Clinical Neurosciences- Cambridge- UK. INSERM U894- Hôpital Sainte-Anne- Université Paris Descartes- Sorbonne Paris Cité- France., Neurology, Cambridge, United Kingdom

Background and Aims: Acute reperfusion (<6 hrs after symptom onset) despite persistent vessel occlusion may occur in up to 30% of acute stroke patients. Retrograde reperfusion through leptomeningeal collaterals may explain this phenonemon. We assessed the evolution of collateral circulation during the first 6 hrs in relation to recanalization and reperfusion status.

Method: From a multicenter prospective database (I-KNOW), 46 patients with magnetic resonance angiography visible occlusion and in whom both reperfusion and recanalization were assessed within 6 hrs of symptom onset were identified. Maps of collateral flow at arterial, capillary and late venous phases were automatically generated from dynamic susceptibility-contrast perfusion images through inter-frame registration, baseline signal subtraction and temporal summation, and graded blind to all other relevant clinical and radiological data using the Higashida scale. Flow direction (anterograde vs retrograde) was visually assessed from the dynamic series. The acute evolution of collateral grades was evaluated against reperfusion and recanalization.

Results: Acute reperfusion was associated with better collateral grades at baseline (OR: 36.02; 95% CI: 8.5–207.7; $p < 0.001$). Among patients without recanalization, flow direction remained retrograde; however, collateral grades significantly improved between admission and acute follow-up in patients who reperfused (OR: 4.57; 95% CI: 1.1–22.7; $p = 0.048$), but not in those who did not reperfuse (OR: 1.34; 95% CI: 0.4–4.5; $p = 0.623$). Regardless of flow direction, acute reperfusion was associated with favorable clinical outcome.

Conclusion: Acute reperfusion without recanalization is associated with significant improvement of retrograde collateral flow. MRI-based collateral maps can be used to monitor acute changes in collateral flow.

AS21-010

IMAGING – HYPERACUTE

LEPTOMENINGEAL COLLATERAL STATUS PREDICTS SHORT-TERM AND LONG-TERM OUTCOME FOLLOWING MIDDLE CEREBRAL ARTERY OCCLUSION

C.F. Madelung[1], C. Ovesen[1], C. Trampedach[2], A. Christensen[2], I. Havsteen[2], C.K. Hansen[1] and H. Christensen[1]

[1]Bispebjerg Hospital, Department of Neurology, Copenhagen NV, Denmark
[2]Bispebjerg Hospital, Department of Radiology, Copenhagen NV, Denmark

Background and Aims: Perfusion through leptomeningeal collateral vessels is a likely pivotal factor in the outcome of stroke patients. We investigated the effect of collateral status in a cohort of unselected, consecutive stroke patients with middle cerebral artery occlusion undergoing reperfusion therapy.

Method: We included 187 consecutive patients with middle cerebral artery occlusion undergoing intravenous thrombolysis, mechanical thrombectomy or both from May 2009 to April 2014. Collateral status was assessed on computed tomography angiography on admission. Hemorrhagic transformation was evaluated on non-contrast computed tomography after 24 hours. Modified Rankin Scale score was assessed after 90 days and mortality after one year.

Results: At 90 days median (interquartile range) modified Rankin Scale score in patients with poor collateral status was 4 (3–6) compared to 2 (1–4) in patients with good collateral status ($p < 0.0001$). Patients with poor collateral status were less likely to achieve a good 90-day outcome (modified Rankin Scale score 0–2) (Adjusted odds ratio 0.24, 95% CI: 0.07- 0.76). During the first year 41.9% of patients with poor collateral status died vs. 18.3% of the remaining population ($p = 0.001$). Poor collateral status was associated with increased mortality during the first year (Adjusted hazard ratio 4.3, 95% CI: 1.52–12.4). Collateral status correlated well with the rate of hemorrhagic transformation (7.4%, 14.8% and 34.1% in patients with good, moderate and poor leptomeningeal collateral status respectively).

Conclusion: Leptomeningeal collateral status predicts functional outcome, mortality and hemorrhagic transformation following middle cerebral artery occlusion.

AS21-011

IMAGING – HYPERACUTE

STROKE SUBTYPE CLASSIFICATION BY GEOMETRICAL DESCRIPTORS OF LESION SHAPE

B. Cheng[1], C. Knaack[2], N. Forkert[3], C. Gerloff[2] and G. Thomalla[2]
[1]Hamburg, Germany
[2]Neurology, University Medical Clinic Hamburg Eppendorf, Hamburg, Germany
[3]Hotchkiss Brains Institute, Radiology, Calgary, Canada

Background and Aims: Stroke etiology has a substantial impact on treatment, prognosis and risk of recurrence. Inference of stroke etiology from lesion pattern in acute magnetic resonance imaging is therefore of high value. Specifically, inference of a cardioembolic etiology has been attempted previously with albeit moderate accuracy. Recently, a novel analysis has been proposed that quantifies three-dimensional geometrical properties of stroke lesions. We assess the value of lesion shape descriptors for stroke subtype classification, specifically regarding stroke of a cardioembolic origin.
Method: Patients with acute stroke and magnetic resonance imaging <24 h were included, stroke etiology was classified according to ASCOD phenotyping. Stoke lesions were segmented on diffusion weighed images and quantified regarding the number of lesion components, lesion volume, surface, sphericity, bounding box volume and ratio between bounding box and lesion volume. Morphological measures were compared between stroke subtypes classified by ASCOD. After exclusion of patients with stroke caused by small-vessel disease, a further comparison was performed between patients with cardioembolic and non-cardioemolic strokes.
Results: Group comparison of lesion shape measures demonstrated significant differences between patients with small-vessel disease and other subtypes. No differences of morphological measures were detected between patients with cardioembolic and non-cardioembolic stroke.
Conclusion: Our findings support the clinical observation that stroke subtype classification based on ischemic lesion pattern is associated with a substantial degree of uncertainty. Etiology of stroke lesions considered to be embolic (i.e. non-lacunar) could not be inferred from the morphology measures studied in our analysis.

AS21-012

IMAGING – HYPERACUTE

DEMOGRAPHICS AND INDICATORS OF STROKE SEVERITY DO NOT DIFFER BETWEEN PATIENTS WITH WAKE UP STROKE AND PATIENTS WITH ACUTE ISCHEMIC STROKE WITH KNOWN ONSET TIME

H.P. Bienfait[1], C. van den Berg[2], J.W. Dankbaar[2], J. Kappelle[3], B. Velthuis[2] and I. DUST[4]
[1]Gelre Hospitals, Neurology, Apeldoorn, The Netherlands
[2]UMCU, Radiology, Utrecht, The Netherlands
[3]UMCU, Neurology, Utrecht, The Netherlands
[4]Collaborating DUST centers, Radiology & Neurology, Netherlands, The Netherlands

Background and Aims: Time of symptom onset is important to treat acute ischemic stroke. This is unclear in patients with wake-up stroke (WUS). We hypothesized that most patients wake-up from their stroke symptoms and therefore do not differ from non-WUS patients with a similar onset to door time.
Method: In a prospective cohort study patient demographics (age, gender, history of atrial fibrillation) and indicators of stroke severity (NIHSS, non-contrast CT ASPECTS score, proximal occlusions and collaterals on CT angiography) were compared between WUS and non-WUS patients with acute ischemic stroke and an occlusion of the internal carotid artery or middle cerebral artery (MCA)).
Results: One-hundred-and-forty-nine of 1393 patients (10.7%) had a proven WUS. Most WUS patients (86%) had favorable ASPECTS > 7 and good collaterals (>50% MCA territory). More WUS-patients had ASPECTS ≤ 7 than non-WUS-patients with <4,5 hour onset time (14.1% versus 8.5%, p 0.031), but there were no other differences, including ASPECTS <5 (p = 0.174). WUS-patients with a proximal occlusion (n = 63, 42.3%) had similar demographics and indicators of stroke severity as non-WUS-patients with proximal occlusions and <6 hours onset time (n = 460). Only 3.4% of WUS-patients with proximal occlusions had severe ischemia (ASPECTS < 5), and 70.5% had ASPECTS > 7 and good collaterals.
Conclusion: Demographics and indicators of stroke severity of WUS-patients are comparable to non-WUS-patients with acute ischemic strokes. Our findings suggest that the majority of WUS-patients can be treated safely with intravenous or intra-arterial treatment if they fulfill the prerequisites for these therapies other than a known time of symptom onset.

AS21-014

IMAGING – HYPERACUTE

ASSOCIATION BETWEEN REDUCED CEREBRAL BLOOD VOLUME AND EARLY FLAIR HYPER INTENSITY IN ACUTE ISCHEMIC STROKE

N. Nagaraja[1], H. Adams[2], E. Leira[2], D.W. Kang[3], D. Liebeskind[4], G. Thomalla[5], V. Thijs[6], S. Warach[7], L. Latour[8] and M. Luby[8]
[1]University of Florida College of Medicine, Neurology, Gainesville, USA
[2]University of Iowa College of Medicine, Neurology, Iowa City, USA
[3]Asan Medical Center- University of Ulsan College of Medicine, Neurology, Seoul, Republic of Korea
[4]University of California Los Angeles, Neurology, Los Angeles, USA
[5]Center for Clinical Neurosciences- University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany
[6]Austin Health and Florey Institute of Neuroscience and Mental Health, Neurology, Heidelberg, Australia
[7]Dell Medical School- University of Texas at Austin, Neurology, Austin, USA
[8]National Institute of Neurological Disorders and Stroke, Stroke Branch, Bethesda, USA

Background and Aims: The appearance of FLAIR hyperintensity is variable ranging from 1–6 hours from symptom onset. We sought to determine if reduced CBV is associated with FLAIR hyperintensity in early hours of acute ischemic stroke (AIS).
Method: Subjects from Stroke Imaging Repository (STIR)\VISTA Imaging were included in the study if they had AIS in the anterior circulation, scanned within 180 minutes from onset, perfusion deficit and evaluable DWI, FLAIR and PWI images. Posterior circulation strokes, lacunar strokes and stroke <1 cm were excluded. A 1 cm diameter circular ROI was placed on the ischemic lesion and second ROI placed on the contralateral corresponding location. The CBV ROI and FLAIR ROI ratios, defined by dividing the lesion ROI/contralateral ROI, were calculated. The ROI measurements were performed by two independent raters.

Results: Among 226 subjects screened, 33 met the study criteria. The mean age was 67.8 ± 15.9 years with 45% women, median admit NIHSS 15 (IQR 8–21) and median last known normal to MRI time of 108 minutes (IQR 82–140). CBV ROI ratio <1 was seen in at least 75% of subjects across the two raters. However, low CBV defined as ratio ≤ 0.25 or 0.5 was not associated with early FLAIR hyper intensity defined as ratio ≥1.05 (p = 1, 95% CI 0.38 – 3.41; p = 0.8, 95%CI 0.48–3.33), 1.1 (p = 0.75, 95% CI 0.4–5.15; p = 0.58, 95%CI 0.49–4.39) or 1.15 (p = 1, 95%CI 0.31–5.45; p = 1, 95%CI 0.26–3.0).
Conclusion: Reduced CBV is common in AIS. However, reduced CBV is not associated with early FLAIR hyperintensity in the first 3 hours of AIS.

AS21-015

IMAGING – HYPERACUTE

FEASIBILITY OF USING BRAIN ATTENUATION CHANGES ON CT TO ACCURATELY PREDICT TIME OF ISCHAEMIC STROKE ONSET

G. Mair[1], P. Sandercock[1] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Following ischaemic stroke, CT attenuation of affected brain reduces with time. We piloted whether attenuation of infarct can be used to predict time of stroke onset.
Method: We identified patients from the Third International Stroke Trial with large cerebral infarct on thin-slice (<2.5 mm) non-contrast CT. We selected a range of stroke onset to scan times (time). A neuroradiologist manually applied regions of interest within the infarct and an equivalent contralateral location and derived an attenuation ratio. We allocated cases into development and testing datasets (75/25%) blind to attenuation ratio. Attenuation ratios in the development dataset were plotted against time, a best-fit logarithmic function determined, and used to estimate time in the test dataset. Estimates for time were correlated with true time in the test dataset and differences assessed.
Results: We included 120 scans (75 patients), of time range 22 minutes to 8 days, median 11.75 hours. Development (n = 90) and test (n = 30) datasets had equal distributions of time and attenuation ratio, p > 0.18. The logarithmic model estimated an attenuation ratio of 0.8 at 6 hours. Estimated and true time values in the test dataset were highly correlated (0.93, p < 0.0001). Time estimation errors were greatest at extended times: 90% (9/10) scanned <5 hours had error <100 minutes; versus 46% (11/24) scanned <48 hours.
Conclusion: This pilot analysis suggests that it is feasible to estimate time after ischaemic stroke onset using only CT brain attenuation, particularly during the early, most clinically relevant period. Analyses are ongoing to further develop this technique.

AS21-018

IMAGING – HYPERACUTE

TENECTEPLASE IN ISCHEMIC STROKE OFFERS IMPROVED RECANALISATION: ANALYSIS OF TWO RANDOMIZED TRIALS

A. Bivard[1], X. huang[2], C. Levi[3], N. Spratt[3], B. Campbell[4], B. Cheripelli[2], D. Kalladka[2], F. Moreton[2], I. Ford[2], C. Bladin[4], S. Davis[4], G. Donnan[4], K. Muir[2] and M. Parsons[3]
[1]University of Newcastle, Newcastle, Australia
[2]University of Glasgow, Institute of Neuroscience and Psychology, Glasgow, United Kingdom
[3]University of Newcastle, Medicine, Newcastle, Australia
[4]University of Melbourne, Medicine, Melbourne, Australia

Background and Aims: Tenecteplase is a promising thrombolytic for acute ischemic stroke with a favourable pharmacokinetic and pharmacodynamic profile. We aimed to test whether patients with complete vessel occlusion show greater recanalisation at 24 hours and have improved clinical outcomes at 24 hours and 90 days when treated with tenecteplase compared to alteplase.
Method: Pooled clinical and imaging data from two phase 2 randomized trials comparing tenecteplase with alteplase allowed CTA scans to be assessed centrally for occlusion status at baseline and at 24 hours post thrombolysis using the modified TICI scale. 24 h post stroke National Institutes of Health Stroke Scale (NIHSS) and 90 day modified Rankin scale (mRS) scores were also compared between treatment groups using linear regression to generate odds ratios (OR).
Results: From 146 pooled patients, 69 had a complete (TICI 0/1) occlusion at baseline. Tenecteplase treated patients with a complete vessel occlusion had greater complete recanalisation rates at 24 hours (71% for tenecteplase vs 43% for alteplase, p < 0.001). Patients with a complete occlusion who were treated with tenecteplase also showed greater early clinical improvement (median NIHSS change with tenecteplase was 9, IQR 6, alteplase 1, IQR 1, p = 0.001), and higher rates of favorable 90 day outcomes (mR 0–1 of tenecteplase compared with alteplase, OR 4.82, 95% CI 1.02–7.84, p = 0.05).
Conclusion: Tenecteplase may offer greater recanalisation efficacy compared to alteplase in patients with complete vessel occlusions on baseline CT angiography.

AS21-019

IMAGING – HYPERACUTE

DIFFERENT THRESHOLDS FOR GREY MATTER AND WHITE MATTER IN ACUTE ISCHAEMIC STROKE: CT PERFUSION STUDY

C. Chen[1], A. Bivard[1], L. Lin[1], C.R. Levi[1], N.J. Spratt[1] and M.W. Parsons[1]
[1]The University of Newcastle, Priority Research Centre of Stroke and Brain Injury- and Departments of Neurology John Hunter Hospital, Newcastle, Australia

Background and Aims: To investigate optimal thresholds for defining infarct core and ischemic penumbra for hemispheric cortical Grey Matter (GM) and subcortical White Matter (WM) respectively.
Method: Patients underwent Computed Tomography Perfusion (CTP) within 6-hours of ischemic stroke onset, acute Magnetic Resonance Imaging (MRI) within one hour of the initial CTP, and MRI at 24-hours was retrospectively assessed. CTP maps were generated by standard Singular Value Deconvolution (sSVD) and SVD with delay and dispersion correction (ddSVD) methods. Pixel-based analysis was undertaken to calculate sensitivity and specificity of each threshold for core and penumbra in GM and WM, respectively. A Receiver Operating Characteristic (ROC) curve was plotted and Area under the Curve (AUC) was calculated, for each threshold.
Results: with sSVD, the core was defined by Cerebral Blood Flow (CBF) <30 %(AUC: 0.73) in GM and CBF < 20 % (AUC: 0.67) in WM. With ddSVD, the core in GM was defined by delay-corrected-CBF < 35 %(AUC: 0.75) and delay-corrected-CBF < 25 % (AUC: 0.68) in WM. Perfusion lesion was defined by the time to peak of the residual function (Tmax) > 5S (AUC: 0.80) in GM and Tmax > 7S (AUC: 0.75) in WM with sSVD. Delay time (DT) > 3S from ddSVD was the optimal threshold for both GM (AUC: 0.78) and WM (AUC: 0.75) to identify perfusion lesion.
Conclusion: GM has a higher CBF threshold for the core than WM in hemispheric acute ischemic stroke measured by CTP. However, a single delay corrected threshold (DT) was able to accurately quantify the acute perfusion lesion.

AS21-020

IMAGING – HYPERACUTE

DIFFERENT PERFUSION PATTERNS OF RECENT SMALL SUBCORTICAL INFARCTS ON COMPUTED TOMOGRAPHY PERFUSION

S. Rudilosso[1], C. Laredo[2], M. Mancosu[3], N. Moya-Planas[2], Y. Zhao[4], X. Urra[1] and Á. Chamorro[1]
[1]Hospital Clinic, Functional Unit of Cerebrovascular Diseases, Barcelona, Spain
[2]Institut d'Investigacions Biomèdiques August Pi Sunyer IDIBAPS, Functional Unit of Cerebrovascular Diseases- Hospital Clinic, Barcelona, Spain
[3]AOU Policlinico Universitario, Neurology, Monserrato Cagliari, Italy
[4]Àrea de Neurociències- Institut d'Investigacions Biomèdiques August Pi i Sunyer IDIBAPS, Functional Unit of Cerebrovascular Diseases- Hospital Clínic, Barcelona, Spain

Background and Aims: Small studies using perfusion imaging have shown that many recent small subcortical infarcts (RSSI) show decreased cerebral blood flow (CBF) on computed tomography perfusion (CTP). It is unknown why some RSSI apparently have normal perfusion. We sought to describe the perfusion patterns of RSSI and their clinical and radiological correlates in a cohort of patients with RSSI.
Method: We included 67 consecutive patients studied with CTP that had RSSI confirmed on a follow-up magnetic resonance imaging (MRI). The perfusion patterns on CTP were evaluated in the area of the ischemic lesions defined in a co-registered MRI. According to CBF thresholds we defined patterns of hypo-perfusion and normo- or hyper-perfusion. We also quantified infarct core, tissue at risk and mismatch volume. All patients were followed up to 3 months.
Results: The mean infarct volume on MRI was 1.2 cm^3. CTP were performed at a median delay of 231 min after stroke onset and the perfusion maps showed hypo-perfusion in 59 (88%) patients, 42% of these had significant mismatch. The rest of the patients showed normal or clearly increased CBF (in three patients). There were no significant clinical differences between patients with hypo-perfusion and those with normo- or hyper-perfusion. However, patients with normo- or hyper-perfusion were more likely to show established hypodensities on baseline non-contast CT (63% vs 15%, $p = 0.008$).
Conclusion: Although hypo-perfusion is the most frequent pattern, normalized or increased CBF may occur in RSSI. As in large vessel strokes, hyperperfusion may indicate reperfusion of already infarcted brain tissue.

AS21-021

IMAGING – HYPERACUTE

IMAGING-BASED SCORES TO PREDICT DECOMPRESSIVE HEMICRANIECTOMY AFTER ENDOVASCULAR THERAPY IN ACUTE ISCHEMIC STROKE

I. Maier[1], D. Behme[2], M. Schnieder[1], I. Tsogkas[2], K. Schregel[2], B. Mathias[1], M. Knauth[2], J. Liman[1] and M. Psychogios[2]
[1]University Medicine Goettingen, Neurology, Goettingen, Germany
[2]University Medicine Goettingen, Neuroradiology, Goettingen, Germany

Background and Aims: Identification of patients requiring decompressive hemicraniectomy (DH) after endovascular therapy is crucial as clinical signs are not reliable and DH should be performed early. Aim of our study was to identify imaging-based scores to predict the risk for space demanding ischemic stroke and DH.
Method: Prospectively derived data from patients with acute large artery occlusion within the anterior circulation and endovascular therapy was analyzed in this monocentric study. Predictive value of non-contrast cranial computed tomography (ncCT)- and cerebral blood volume (CBV)-based Alberta Stroke Program Early CT score (ASPECTS) were investigated for DH using logistic regression models and Receiver Operating Characteristic Curve analysis.
Results: From 218 patients with endovascular therapy, DH was performed in 20 patients (9.2 %). Baseline- (7 vs 9; $p = 0.009$) and follow-up ncCT-based ASPECTS (1 vs 7, $p < 0.001$) as well as CBV-based ASPECTS (5 vs 7, $p < 0.001$) were significantly lower in patients with DH. ncCT-based- (baseline: OR 0.71, $p = 0.018$; follow-up: OR 0.32, $p = < 0.001$) and CBV-based ASPECTS (OR 0.63, $p = 0.008$) predicted DH. Cut-off-scores were 7, 4 and 5 points respectively.
Conclusion: ASPECTS could be useful to identify patients requiring DH after endovascular therapy for acute large vessel occlusion. Other studies with larger sample size and multiple study centers are needed to confirm our findings.

AS21-023

IMAGING – HYPERACUTE

THE HARM OF STRICT IMAGE BASED INCLUSION CRITERIA FOR MECHANICAL THROMBECTOMY: A SINGLE CENTER ANALYSIS OF UNTREATED VS. TREATED PATIENTS WITH UNFAVORABLE BASELINE IMAGING

D. Behme[1], I.L. Maier[2], M. Schnieder[2], K. Schregel[1], I. Tsogkas[1], A. Kleinknecht[2], M. Knauth[1], M. Baehr[2], M. Psychogios[1] and J. Liman[2]
[1]Georg-August-Universitß Göttingen, Neuroradiology, Göttingen, Germany
[2]Georg-August-Universitß Göttingen, Neurology, Göttingen, Germany

Background and Aims: Since 2015, endovascular treatment (EVT) for acute ischemic stroke (AIS) with large artery occlusion has become the standard of care. However; the question if patients should be excluded from EVT based on pre-interventional imaging remains open. We therefore investigated untreated (before 2015) and treated patients (from 2015–2016) to elucidate the effects of strict image based inclusion criteria for EVT.
Method: We retrospectively analyzed our prospectively kept stroke database searching for all patients who presented within 6 h of onset with unfavorable imaging findings. Unfavorable imaging was defined as CBV ASPECTS < 7, which was the exclusion criteria at our institution before 2015. CT Perfusion imaging has still been acquired after the publication of MRClean until today, but is no longer used as an in-or exclusion criteria within 6 h of stroke onset.
Results: A total of 60 patients met the inclusion criteria, 40/60 were not treated mechanically in 2013/14, 20/60 were treated despite unfavorable pre interventional imaging findings in 2015/16. Baseline characteristics and percentage of patients treated with iv tPA were not significantly different in both groups. At discharge 40% of the interventionally treated patients had a good outcome at discharge (15% in the untreated cohort). Additionally the median NIHSS and mRS at discharge were significantly lower in the treated cohort ($p = 0{,}005$ and 0.002 respectively).
Conclusion: Strict image based inclusion criteria exclude patients from EVT who are likely to benefit from therapy and should therefore no longer be applied in clinical practice within 6 h of symptom onset.

AS21-024

IMAGING – HYPERACUTE

OXYGENATION-SENSITIVE MRI IN ACUTE ISCHEMIC STROKE USING T2'/R2' MAPPING: INFLUENCE OF RELATIVE CEREBRAL BLOOD VOLUME

A. Seiler[1], R. Deichmann[2], R. Noeth[2], W. Pfeilschifter[1], J. Berkefeld[3], O.C. Singer[1], J.C. Klein[4] and M. Wagner[3]
[1]Goethe University, Neurology, Frankfurt a.M., Germany
[2]Goethe University, Brain Imaging Center, Frankfurt a.M., Germany
[3]Goethe University, Neuroradiology, Frankfurt a.M., Germany
[4]Oxford University, Neurology, Oxford, United Kingdom

Background and Aims: Quantitative T2' and R2' (1/T2') mapping are sensitive to locally increased concentrations of deoxygenated hemoglobin (Hb). Decreased T2', respectively increased R2' values, had been observed within hypoperfused tissue in acute ischemic stroke, and were interpreted as a surrogate of an increased oxygen extraction fraction (OEF). However, R2' (1/T2') is assumed to be proportional to the product of OEF and relative cerebral blood volume (rCBV). Therefore, since increases of rCBV might substantially influence T2' and R2' through an accumulation of deoxygenated Hb, we aimed to investigate the possible influence of rCBV on T2'/R2' in patients with acute ischemic stroke.
Method: Data from patients with internal carotid artery (ICA) and/or middle cerebral artery (MCA) occlusion were analyzed. T2', R2' and rCBV were measured within the infarct core, slightly and severely perfusion-delayed areas on time-to-peak (TTP) maps and the relationship between these parameters was examined.
Results: No significant elevations of rCBV were detected within areas with significantly changed T2' and R2'. A strong negative correlation with rCBV was found for R2' ($r = -0.544$, $p = 0.002$) and T2' correlated positively with rCBV ($r = 0.546$, $p = 0.001$) in TTP-delayed areas. T2'/R2' within hypoperfused tissue remained unchanged at normal or elevated rCBV levels.
Conclusion: Changes of T2' and R2' within hypoperfused areas in acute stroke are not caused by local elevations of rCBV but are best explained by increases of cerebral OEF. T2'/R2' mapping are suitable to detect altered oxygen consumption in acute stroke. However, impact and reliablitiy of these methods can be improved by considering rCBV.

AS21-026

IMAGING – HYPERACUTE

THE RELATIONSHIP BETWEEN BLOOD FLOW IMPAIRMENT AND OXYGEN DEPLETION IN ACUTE ISCHEMIC STROKE IMAGED WITH MRI

A. Seiler[1], N.P. Blockley[2], R. Deichmann[3], U. Noeth[3], M.A. Chappell[4], J.C. Klein[5] and M. Wagner[6]
[1]Goethe University, Neurology, Frankfurt a.M., Germany
[2]Oxford University, Oxford Center for Functional Magnetic Resonance Imaging of the Brain FMRIB, Oxford, United Kingdom
[3]Goethe University, Brain Imaging Center, Frankfurt a.M., Germany
[4]Oxford University, Institute of Biomedical Engineering- Department of Engineering Science- University of Oxford- UK, Oxford, United Kingdom
[5]Oxford University, Neurology, Oxford, United Kingdom
[6]Goethe University, Neuroradiology, Frankfurt a.M., Germany

Background and Aims: Oxygen-sensitive magnetic resonance imaging (MRI) techniques may be useful to delineate the ischemic penumbra in acute ischemic stroke since perfusion-weighted imaging (PWI) alone cannot reliably discriminate between oligemic tissue and tissue at risk. Significant decreases of T2' ($1/T2' = 1/T2^* - 1/T2$), respectively increases of R2' (1/T2'), indicating locally increased concentrations of deoxygenated hemoglobin, had been observed in perfusion-restricted areas in acute stroke and interpreted as the result of elevated oxygen extraction fraction (OEF). However, the influence of cerebral blood flow (CBF) reduction, which is closely linked to OEF alterations, on T2'/R2' was not elucidated. We aimed to systematically investigate the relationship of T2'/R2' and relative (r)CBF within hypoperfused tissue in acute ischemic stroke.
Method: Data from patients (mean age 69 ± 11.6 years) with internal carotid artery (ICA) and/or middle cerebral artery (MCA) occlusion were analyzed. T2', R2' and rCBF values were extracted from perfusion-restricted tissue with time-to-peak (TTP) delay. To avoid systematic underestimation of rCBF with conventional deconvolution algorithms, a physiological model of the cerebral vasculature was used to process PWI raw data.
Results: A strong positive correlation with rCBF was found for T2' ($r = 0.444$, $p = 0.006$) and R2' correlated negatively with rCBF ($r = -0.494$, $p = 0.0025$). Regression analysis revealed a significant linear relationship of T2'/R2' and rCBF ($p < 0.01$).
Conclusion: Changes of T2'/R2' are caused by elevated OEF as a consequence of impaired blood flow showing pathophysiologically plausible results. Quantitative T2'/R2' mapping depicts increasing OEF in areas with critically reduced rCBF and may be used to complement PWI with metabolic information to characterize the ischemic penumbra in acute stroke.

AS21-028

IMAGING – HYPERACUTE

ASPECTS SCORE IN ENDOVASCULAR TREATMENT OF STROKE: WILL IT HAVE GREATER PREDICTIVE VALUE IN BASELINE CT, PERFUSION CT OR CT ANGIOGRAPHY SOURCE IMAGES?

C. Aguirre[1], S. Trillo[1], L. Martinez[1], C. Ramos[1], G. Zapata Wainberg[1], A. Ximenez-Carrillo[1], G. Reig[1], A. Barbosa del Olmo[2], R. Manzanares[2], J.L. Caniego[2], E. Barcena[2] and J. Vivancos[1]
[1]Hospital La Princesa, Neurology, Madrid, Spain
[2]Hospital La Princesa, Neuroradiology, Madrid, Spain

Background and Aims: We evaluate the correlation among ASPECTS score applied to non-contrast CT(ASPECTS-CT), cerebral blood volume maps of CT perfusion (ASPECTS-CBV) and CT angiography source images (ASPECTS-CTASI) with the outcome of patients with acute ischemic stroke (AIS) treated with thrombectomy. Scores were also correlated with symptomatic hemorrhage and infarct volume within 24 hours.
Method: Retrospective study of consecutive patients with AIS in middle cerebral artery territory treated with thrombectomy in our hospital. ASPECTS scores and infarct volume were assigned by radiologists and neurologists. Clinical outcome measured using modified Rankin scale at 3 months (mRs3m).
Results: N = 137. 79 women (57,66%). Average age: 63,32(range: 16–87), 124 (90,51%) successful procedures (TICI ≥ 2 b). Average ASPECTS-CT:8,04 (SD: 1,5), ASPECTS-CBV:7,71 (SD:1,61), ASPECTS-CTASI:7,96 (SD:1,44). Average infarct volume within 24 h: 25,11cc. 15 (11,03%)symptomatic hemorrhages. Average mRs3m: 2 (SD: 1,86). 88 (65,67%) were independent within 3 months. A strong direct correlation was found among the three scores. ASPECTS scores were significantly higher ($p < 0,05$) in independent patients, especially for ASPECTS-CTASI. Among ASPECTS scores and outcome an inverse correlation was obtained: ASPECTS-CT: rho -0,41 ($p = 0,000$), ASPECTS-CBV and ASPECTS-CTASI: rho -0,43 ($p = 0,000$). Among ASPECTS scores and infarct volume within 24 hours, an inverse correlation was also found,

stronger for ASPECTS-CTASI (rho - 0.58, p = 0.000). Patients with lower ASPECTS-CBV (p = 0,04) and ASPECTS-CTASI (p = 0,02) were significantly more likely to have symptomatic hemorrhage.
Conclusion: In our sample, ASPECTS-CBV and ASPECTS-CTASI have a better correlation than ASPECTS-CT with infarct volume within 24 h, symptomatic hemorrhage and outcome in patients treated with thrombectomy. Therefore, we consider them very useful tools for predicting the outcome of patients with AIS.

AS21-029

IMAGING – HYPERACUTE

CAN WE PREDICT THE COLLATERAL CIRCULATION IN ACUTE STROKE BY THE FEATURES OF OUR PATIENTS?

C. Ramos[1], S. Trillo[1], L. Martínez[1], S. Bashir[1], C. Aguirre[1], A. Miranda[1], J. Villacieros[1], E. Bárcena[2], J.L. Caniego[2], L. Vega[3], A. Fernández[4], G. Reig[1], Á. Ximénez-Carrillo[1] and J.A. Vivancos[1]
[1]La Princesa University Hospital, Neurology, Madrid, Spain
[2]La Princesa University Hospital, Radiology, Madrid, Spain
[3]La Princesa University Hospital, Research Institute, Madrid, Spain
[4]Autonomous University, School of Medicine, Madrid, Spain

Background and Aims: Collateral circulation (CC) status among patients presenting with acute ischemic stroke has been related to different genetic and environmental factors with disparate results. We try to evaluate the relationship between CC and epidemiological, clinical, analytical and radiological stroke variables.
Method: Retrospective study of consecutive patients with M1 segment middle cerebral artery occlusion treated with endovascular therapy (ET) in our center from Jan 2010 to May 2015. CC was assessed on baseline computed tomographic angiography (CTA) using a score derived from a previously validated regional leptomeningeal score (rLMC). It was correlated with a total of 58 variables.
Results: Baseline characteristics (N = 141) were: mean age = 66.3 ± 14.8 years. On univariate analyses we found statistically significant association between poor CC and male gender, smoking, previous lesion load on the FAZEKAS scale and higher levels of creatinine. Only male gender (odds ratio [OR] = 0.15, 95% confidence interval [CI] = 0.03–0.8, $p < 0.05$) and previous leukoaraiosis on the FAZEKAS scale (OR = 0.10 95% CI = 0.007–0.96, $p < 0.05$) were identified as independent predictors of poor collateral status on multivariate regression. A better CC was associated with previous treatment with angiotensin-converting-enzyme (ACE) inhibitors, presence of atrial fibrillation (AF), and higher levels of uric acid. After a multivariate analysis only previous treatment with ACE inhibitors (OR = 8.26 95% CI = 1.79–86.03, $p < 0.05$) remained statistically significant.
Conclusion: In our study, treatment with ACE Inhibitors was associated with good leptomeningeal collateral status in patients with acute ischemic stroke, whereas most of the rest of variables were previous conditions and therefore unmodifiable.

AS21-030

IMAGING – HYPERACUTE

VOLUMETRIC AND HEMORRHAGIC ASSESSMENT OF REPERFUSION THERAPY ELIGIBLE PATIENTS IN ACUTE ISCHEMIC STROKE BY MRI

M. Inoue[1], K. Sonoda[1], S. Wada[1], H. Yamagami[2], M. Koga[1], M. Ihara[2] and K. Toyoda[1]
[1]National Cerebral and Cardiovascular Center, Vascular Medicine, Osaka-Suita, Japan
[2]National Cerebral and Cardiovascular Center, Neurology, Osaka-Suita, Japan

Background and Aims: Efficacy of reperfusion therapy including mechanical thrombectomy (MT) in acute stroke has been established but the imaging criteria for hemorrhage complication have not yet well been assessed. Volumetric and hemorrhage incident in patients treated with reperfusion therapy were assessed in this study.
Method: Ischemic stroke patients with baseline diffusion weighted image (DWI) with baseline modified Rankin scale (mRS) <3 were included. Outcome was assessed by hemorrhage grading [hemorrhagic infarcts (HIs), parenchymal hematomas (PHs)]. Receiver operating characteristic (ROC) curve was analysed to identify optimal DWI volumes leads to hemorrhage assessed within 48 hours after lysis. Symptomatic hemorrhage was determined as >3 points of worsening in NIHSS.
Results: Out of 96 patients, median (IQR) NIHSS was 9 (5–12) and onset to MRI time was 108.5 (70–217) minutes. Overall Median DWI volume was 4.4 (1.3–17.0) mL. Of these, 32% (31/96) had hemorrhage (10 PH1, 7 PH2, 6 HI1, and 8 HI2) mostly scanned/detected by MRI (84%) gradient echo sequences (GRE). All of the hemorrhage events were asymptomatic. Median DWI lesion was 13.9 (4.2–69.4) mL in PH1/2 patients, 14.3 (3.7–22.7) mL in HI1/2 patients, and 3.0 (0.7–8.3) mL in those without hemorrhage (65/96). ROC analysis determined DWI volume as 9.5 mL (77% specificity and 67.8% sensitivity, AUC = 0.75) for any hemorrhagic events.
Conclusion: Optimal volume of any hemorrhage event after reperfusion therapy on DWI was approximately 10 mL. All of the HIs and PHs were asymptomatic in our study. Performing GRE after reperfusion therapy for hemorrhage detection may be too sensitive.

AS21-031

IMAGING – HYPERACUTE

THE E-ASPECTS CORRELATES WITH AND IS PREDICTIVE OF OUTCOME AFTER MECHANICAL THROMBECTOMY

J. Pfaff[1], C. Herweh[1], S. Schieber[2], S. Schönenberger[2], J. Bösel[2], P. Ringleb[2], M. Möhlenbruch[1], M. Bendszus[1] and S. Nagel[2]
[1]University Hospital Heidelberg, Department of Neuroradiology, Heidelberg, Germany
[2]University Hospital Heidelberg, Department of Neurology, Heidelberg, Germany

Background and Aims: The e-ASPECTS software is a tool for the automated use of ASPECTS. We analyzed if baseline e-ASPECT scores correlate with outcome after mechanical thrombectomy (MT).
Method: Patients with ischemic strokes in the anterior circulation who were admitted between 2010 and 2015 and diagnosed by computed tomography (CT) and received MT were included. The ASPECTS on baseline CT was scored by e-ASPECTS and three expert raters and interclass correlation coefficients (ICCC) were calculated. e-ASPECTS was correlated with functional outcome (modified Rankin scale, mRS)

at 3 months using Spearman ranked correlation coefficient (SRCC). Unfavorable outcome was defined as mRS 4–6 and a poor scan was defined as e-ASPECTS 0–5.

Results: 220 patients were included and 147 (67%) were treated with bridging protocols. Median e-ASPECTS was 9 (2–10, IQR = 2). ICCC between e-ASPECTS and raters were 0.72, 0.74 and 0.76 (all $p < 0.001$). e-ASPECTS (SRCC = −0.15, $p = 0.027$) correlated with mRS at three months. Patients with poor outcome had lower e-ASPECTS (median 8; 2–10 vs. 9; 5–10; $p = 0.014$). Sixteen patients (7.4%) had a poor scan which was associated with unfavorable outcome (OR 13.6, 95% CI 1.8–104). Independent predictors of unfavorable outcome were e-ASPECTS (OR: 0.79, 0.63–0.99), blood sugar (OR: 1.01, 1.004–1.02), atrial fibrillation (OR: 2.64, 1.22–5.69), premorbid mRS (OR: 1.77, 1.21–2.58), NIHSS (OR: 1.11, 1.04–1.19), general anesthesia (OR: 0.24, 0.07–0.84), failed recanalization (OR: 8.47, 3.5–20.2) and sICH (OR 25.8, 2.5–268).

Conclusion: The e-ASPECT score correlated with functional outcome and was predictive of unfavorable outcome after MT but further studies in patients with poor scans are needed.

AS21-032

IMAGING – HYPERACUTE

THE REVISED ARTERIAL OCCLUSIVE LESION RECANALIZATION SCORE NOVEL AND RELIABLE PREDICTOR OF CLINICAL OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE

F.S. Al-Ajlan[1], B.K. Menon[2], P. Pordeli[3], Z. Assis[4], M. Najm[2], J.P. Alcantara[5], D. Dowlatshahi[1], A. Calleja[6], S.I. Sohn[7], S.H. Ahn[8], A.Y. Poppe[9], R. Mikulik[10], N. Asdaghi[11], T.S. Field[12], J.M. Boulanger[13], J. Evans[2], S. Dey[2], M. Goyal[4], M.D. Hill[2] and A.M. Demchuk[2]

[1]University Of Ottawa, Neurology, Ottawa, Canada
[2]University of Calgary, Clinical Neurosciences, Calgary, Canada
[3]University of Calgary, Community Health Sciences, Calgary, Canada
[4]University of Calgary, Radiology, Calgary, Canada
[5]Institute of Diagnostic Imaging, Research Unit, Girona, Spain
[6]University of Valladolid, Neurology, Valladolid, Spain
[7]Keimyung University, Neurology, Daegu, Republic of Korea
[8]Chosun University, Neurology, Gwang Ju, Republic of Korea
[9]University of Montréal, Neurology, Montreal, Canada
[10]St. Anne's University Hospital in Brno, Neurology, Brno, Czech Republic
[11]University of Miami, Neuology, Miami, USA
[12]University of British Columbia, Neurology, Vancouver, Canada
[13]Sherbrooke University, Neuology, Sherbrooke, Canada

Background and Aims: The modified arterial occlusive lesion (mAOL) represents the standard scale for non-invasive evaluation of recanalization. The mAOL does not distinguish between major and minor persistent branch occlusions which could have significant differences in clinical outcome. In this study, we assess reliability and content validity of the revised arterial occlusive lesion (rAOL) score. The advantage of the rAOL compared to mAOL score is greater biological discrimination between patients with persistent major and minor occlusions.

Method: We included participants in INTERRSeCT trial who received baseline and follow-up vascular images treated with medical therapy including intravenous recombinant tissue-type plasminogen activator. Inter-observer agreement for mAOL vs. rAOL scores was assessed with Cohen's Kappa. Two logistic regression models were constructed; one each for mAOL vs. rAOL with favourable outcome (90-day mRS ≤ 2) as outcome measure. Area Under the Curve (AUC) of Receiver Operating Characteristics curves of the two models were compared.

rAOL score	Definition
0	Primary occlusive lesion remains same
1	Debulking of clot without recanalization
2a	Partial or complete recanalization of the primary lesion with clot/occlusion in major vascular branch* * **Major vascular branch:** ICA, M1 segment of MCA, Functional M1 "clot in both proximal M2s of MCA", A1 segment of ACA, Basilar artery, P1 segment of PCA.
2b	Partial or complete recanalization of the primary lesion with clot/occlusion in minor vascular branch**, or partial recanalization of the primary lesion with no clot in the vascular tree at or beyond the primary occlusive lesion **Minor vascular branch: other distal vessels
3	Complete recanalization of the primary occlusion with no clot in the vascular tree at or beyond the primary occlusive lesion

Results: In this cohort, 371 participants analysed for both scales. Excellent inter-observer agreement was found with rAOL score (ICC, 0.95) and (kappa = .91) as well as for mAOL score (ICC, 0.93) and (kappa = .95). The relationship to 90-day favourable outcome revealed a cOR (95% CI) = 2.27 (1.49, 3.46) for rAOL and cOR (95% CI) = 1.98 (1.31, 2.98) for mAOL. (both $p < 0.001$). Predictive values of the mAOL and rAOL were similar (AUC 0.84 and 0.84 respectively).

Conclusion: rAOL score is a reliable and valid tool for assessment of recanalization on CTA in patients with acute ischemic stroke and provides more granularity.

AS21-033

IMAGING – HYPERACUTE

MULTI-PHASE CT-ANGIOGRAPHY MAPS OF PARENCHYMAL FILLING DELAY FOR PREDICTING TISSUE FATE IN ACUTE ISCHEMIC STROKE

A. Boers[1,2,3], B. Menon[4,5], M. Najm[6], C. Majoie[1], H. Marquering[1,2], C. Slump[3], W. Qiu[6], E. Fainardi[7], M. Rubiera[8], A. Khaw[9], J.J. Shankar[10], M. Hill[4,5], P. Barber[4], A. Demchuk[4] and M. Goyal[4,5]

[1]Academic Medical Center - University of Amsterdam, Radiology, Amsterdam, The Netherlands
[2]Academic Medical Center - University of Amsterdam, Biomedical Engineering & Physics, Amsterdam, The Netherlands
[3]University of Twente, Robotics and Mechatronics, Enschede, The Netherlands
[4]Hotchkiss Brain Institute - University of Calgary, Clinical Neurosciences and Radiology, Calgary, Canada
[5]Hotchkiss Brain Institute - University of Calgary, Community Health Sciences, Calgary, Canada
[6]Hotchkiss Brain Institute - University of Calgary, Clinical Neurosciences, Calgary, Canada
[7]Azienda Ospedaliera Universitaria, Neuroscience and Rehabilitation, Ferrara, Italy
[8]Hospital Vall d'Hebron, Neurology, Barcelona, Spain
[9]University of Western Ontario, Clinical Neurosciences, London, Canada
[10]Dalhousie University, Diagnostic Radiology, Halifax, Canada

Background and Aims: Multiphase CT-Angiography (mCTA) provides hemodynamic information of the brain's pial vasculature and has shown utility in patient selection for endovascular therapy. However, the technique currently does not allow assessment of the microcirculation. We introduce quantitative mCTA maps that visualize blood flow dynamics and aim to investigate if these maps help predict tissue fate.

Method: Thirty-eight consecutive patients from the PRove-IT study were included. The 3-phases mCTA source images were aligned and large vessels were extracted. The time-point of maximum contrast enhancement was calculated per voxel and spatial Gaussian filtering was applied. In order to create a quantitative map of parenchymal filling "delay" (Fig1), the mean time-point of the contralateral MCA region was used as reference value for zero delay. Follow-up infarctions were segmented on MR-DWI and co-registered into the pertinent patient's coordinate space. Patients were stratified by reperfusion status (TICI:0/1 vs. TICI:2b/3). Segmented infarctions per group were analyzed using ROC curves to determine optimal threshold to predict infarction.
Results: Median follow-up infarct volumes were 24.5[IQR:10.0–57.1] mL for TICI:0/1 (N = 9) and 11.4[IQR:2.3–42.8] mL for TICI:2b/3 (N = 29). The optimal delay thresholds to predict infarction were 3.2 s and 4.1 s with AUCs of 0.84[CI:0.83–0.84] and 0.73[CI:0.73–0.73] for respectively the TICI:0/1 and TICI:2b/3 group.
Conclusion: mCTA delay maps can be used to visualize impaired parenchymal filling and are able to predict follow-up infarction in acute ischemic stroke patients.

AS21-035

IMAGING – HYPERACUTE

BLOOD-BRAIN BARRIER DISRUPTION IN ACUTE STROKE: PREDICTORS AND CLINICAL RELEVANCE

C. Laredo[1], A. Renú[1], R. Tudela[2], A. López-Rueda[1], L. Oleaga[1], X. Urra[1], L. San Román[1], L. Lull[1], S. Rudilosso[1], J. Blasco[1], V. Obach[1], Á. Chamorro[1] and S. Amaro[1]
[1]Hospital Clinic, Institut Clinic de Neurociències, Barcelona, Spain
[2]CIBER de Bioingeniería- Biomateriales y Nanomedicina, Grup Imatge Biomèdica UB, Barcelona, Spain

Background and Aims: Early blood-brain barrier permeability (BBBp) increase occurs early after acute ischemic stroke. We aimed to assess the predictors and relevance of early BBBp changes assessed through Dynamic Contrast-Enhanced Magnetic Resonance Imaging (DCE-MRI) in acute stroke patients.
Method: A prospective cohort of 116 patients (median NIHSS = 15) evaluated with a DCE-MRI within 24 h after stroke onset was analyzed. Patlak-derived K-trans maps were used to obtain the volume of regions with increased BBBp within the DWI lesion. Increased BBBp was defined as values higher than the mean plus 3 standard deviations of the contralateral non-ischemic tissue. Hemorrhagic transformation (HT) was evaluated according to usual definitions and poor clinical outcome was defined as a modified Rankin Scale >2 at 90 days.
Results: The volume of regions with increased BBBp volume was associated with markers of baseline stroke severity (NIHSS, hypoperfused and non-viable tissue) as well as with higher glucose and leukocyte levels, but not with the use of alteplase (n = 79) or thrombectomy (n = 67). In multivariate analysis, increased BBBp volumes were associated with higher hypoperfused tissue volume (b = 0.290, p = 0.001), glucose (b = 0.169, p = 0.042) and leukocyte levels (b = 0.181, p = 0.031) at admission, and with persistent vessel occlusion (b = 0.263, p = 0.003). Higher volumes of tissue with increased BBBp were associated with HT (p < 0.001) and poor outcome (p < 0.001). However, after adjustment for final infarct volume only the association with HT (p = 0.003) remained significant.
Conclusion: Overall, these results highlight the relevance of early BBB disruption as a marker of stroke severity and as a potential therapeutic target for cerebroprotective therapies.

AS21-036

IMAGING – HYPERACUTE

DETERMINING STROKE ONSET TIME USING QUANTIATIVE MRI: PRELIMINARY EVIDENCE OF AN ADC/QT2 MISMATCH IN ACUTE ISCHAEMIC STROKE PATIENTS

B. McGarry[1], M. Knight[1], T. Norton[1], P. Clatworthy[2,3], R. Bosnell[2,3] and R. Kauppinen[1]
[1]University of Bristol, School of Experimental Psychology and Bristol Clinical Research and Imaging Centre CRIC, Bristol, United Kingdom
[2]University of Bristol, School of Clinical Sciences, Bristol, United Kingdom
[3]North Bristol NHS Trust, Southmead Hospital, Bristol, United Kingdom

Background and Aims: Many ischaemic stroke patients are automatically ineligible for rtPA due to unknown onset time. DWI/T_2-FLAIR mismatch is as a potential MRI proxy for onset time but suffers low sensitivity [1], likely due to shading effects caused by B_0 and B_1 inhomogeneities [2]. This is avoidable by computing quantitative T_2 relaxation times (qT_2) [2]. We previously showed ADC/qT_2 mismatch in rat ischaemia where the volume of elevated qT_2 within low ADC volumes, termed 'f_2', increased with time [3]. Here we studied whether ADC/qT_2 mismatch occurs in patients.
Method: In this on-going study funded by Dunhill Medical Trust, ischaemic stroke patients are scanned at 3T within 9 hours of onset and some 1–6 days later. Protocol includes DWI and multi-echo T_2 for computation of ADC and qT_2. ADC voxels 1MAD > median whole-brain ADC distribution indicate low ADC volume. qT_2 voxels > modal non-ischaemic qT_2 by HWHM indicate elevated qT_2 volume. Extent of ADC/qT_2 mismatch, 'f_2', = 100*(high qT_2 voxels/low ADC voxels).
Results: Figure 1 shows ADC/qT_2 mismatch is evident in acute stroke cases and f_2 indicates its extent decreases in later hours.

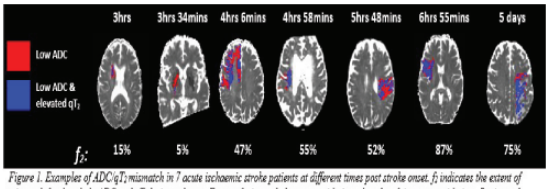


Figure 1. Examples of ADC/qT2 mismatch in 7 acute ischaemic stroke patients at different times post stroke onset. f2 indicates the extent of mismatch for the whole ADC and qT2 lesion volumes. Extent of mismatch decreases with time, therefore f2 increases with time. Regions of interest overlaid onto T2 maps.

Conclusion: There is preliminary evidence for ADC/qT_2 mismatch in the first few hours of stroke which could be informative of stroke onset time.

1. Thomalla et al. *Lancet Neurol*.2011 10(11):978–86.
2. Rogers et al. *Neuroreport*.2014 22;25(15):1180–5.
3. McGarry et al. *Int J Stroke*.2016 11(6):677–82.

AS21-037

IMAGING – HYPERACUTE

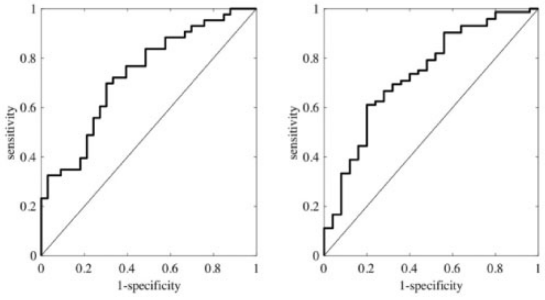
MULTIMODAL IMAGING MODEL TO PREDICT STROKE ONSET WITHIN 6H IN PATIENTS WITH LARGE VESSEL OCCLUSIONS

A. Wouters[1], P. Dupont[2], S. Kemp[3], R. Laage[4], B. Norrving[5], M. Lansberg[3], V. Thijs[6], G. Albers[3] and R. Lemmens[1]
[1]University of Leuven, Department of Neurosciences, Leuven, Belgium
[2]KU Leuven, Laboratorium for Cognitive Neurology, Leuven, Belgium
[3]Stanford University, Stroke Center, Palo Alto, USA
[4]Guided Development, Guided Development, Heidelberg, Germany

[5]Lund University, Neurology, Lund, Sweden
[6]Florey Department of Neuroscience and Mental Health, Neurology, Heidelberg, Australia

Background and Aims: Mechanical thrombectomy within 6 h after stroke onset improves the outcome in patients with large vessel occlusions. However patients with unknown stroke onset time are ineligible for this intervention. The aim of our study was to establish a model based on relative diffusion weighted imaging (rDWI) and perfusion weighted imaging (PWI) to provide an accurate prediction for the 6-hour time-window.
Method: We designed the model based on data from the AXIS 2 trial and validated our results in the DEFUSE2 data. Patients with a large vessel occlusion were included. rDWI maps were created in a voxel-based manner in the DWI lesion. Mean Tmax was calculated in the total region with Tmax > 6 s. Explanatory variables were standard deviation (SD) of rDWI, DWI volume and mean Tmax based on RAPID software.
Results: From AXIS 2, 76 patients were eligible for this substudy. rDWI SD and mean Tmax were predictors of stroke onset before vs after 6 h. Sensitivity and specificity were both 0.70. In the validation cohort of 97 patients from DEFUSE 2 sensitivity and specificity were respectively 0.61 and 0.80. ROC's with corresponding AUC are presented in Figure 1.

Figure 1 ROC curves for prediction of the 6h time-window;
Left: AXIS 2 (N=76, AUC=0.73 (95%CI 0.62-0.85))
Right: validation cohort of DEFUSE2 (N=97, AUC=0.73 (95%CI 0.62-0.85))



Conclusion: In patients with large vessel occlusion and unknown time of onset an automated multivariate imaging model is able to select patients who are likely within the 6 h time-window.

AS21-039

IMAGING – HYPERACUTE

A METHOD FOR OBTAINING ESTIMATES OF MRI T2 INCREASE CAUSED BY HYPERACUTE ISCHAEMIC STROKE: APPLICATIONS IN STROKE TIMING

M. Knight[1], B. McGarry[1], T. Norton[1], P. Clatworthy[1] and R. kauppinen[1]
[1]University of Bristol, School of experimental psychology, Bristol, United Kingdom

Background and Aims: Thrombolysis is contra-indicated by long or unknown onset time. MRI T2 increases with onset time in stroke but has proved hard to measure. We present a means of estimating this increase which may aid patient stratification.
Method: MRI T2 maps and ADC maps were obtained. The new algorithm determines the change in T2 for every ADC-demarcated voxel of the lesion by the steps in Figure 1. The result is a distribution in T2 changes across the ADC-demarcated lesion.
Results: Figure 2 shows the relation between estimated T2 changes and onset time. T2 was also elevated beyond the periphery of the lesion (T2/DWI mismatch). To test for false positives, the algorithm was applied to healthy brains with random regions-of-interest. No false positives were found. This was compared to the method of computing the difference in mean T2 between the lesion and some equally sized "reference" region, which performed poorly – having no time dependence for stroke patients and generating false positives for healthy brains.
Conclusion: The MRI method of estimating the distribution of time-dependent T2 change caused by ischaemia may aid patient stratification. Funded by Dunhill Medical Trust.

AS21-041

IMAGING – HYPERACUTE

REPERFUSION AFTER THROMBECTOMY AS IMAGING SURROGATE OF CLINICAL OUTCOME: PREDICTIVE VALUE OF MR PERFUSION AND ANGIOGRAPHIC REVASCULARIZATION GRADES

M. Hernandez-Perez[1], A. Sorrentino[2], L. Dorado[2], S. Remollo[2], J. Serena[3], N. Pérez de la Ossa[2], E. López-Cancio[2], M. Monica[2], G. Meritxell[2], P. Ernest[4], M. Lucia[1], J. Puig[5], C. Castaño[2], M. Terceño[3], J. Munuera[6] and A. Davalos[2]
[1]Health Sciences Research Institute of the "Germans Trias i Pujol" Foundation IG, Neurosciencies, Badalona, Spain
[2]University Hospital Germans Trias i Pujol, Neurosciences, Badalona, Spain
[3]University Hospital Josep Trueta, Neurology, Girona, Spain
[4]Mataró Hospital, Medicine, Mataró, Spain
[5]Diagnostic Imaging Institute, Radiology, Girona, Spain
[6]Diagnostic Imaging Institute, MR, Badalona, Spain

Background and Aims: We studied the predictive capacity of reperfusion assessed by angiography Thrombolysis in Cerebral Infarction (TICI) grades or by using MR perfusion TMax > 6 s maps as imaging surrogates of clinical outcome in an acute ischemic stroke cohort undergoing mechanical thrombectomy (MT).
Method: Acute ischemic stroke patients undergoing MT for anterior large vessel occlusion were prospectively studied by DWI and PWI at baseline and after MT (time end of the procedure-MR 76 min). Reperfusion index was calculated as (TMax6s pre-MT xTMax6s post-MT)/TMax6s pre-MT. Angiographic reperfusion was evaluated both as a TICI grade 3 and as a TICI grade 2b-3. Good functional outcome was defined as a modified Rankin Score ≤2 one month after stroke. COR curves were performed and optimal cutpoints for the lineal variables were selected. Accuracy tests and area under the curve (AUC) adjusted by baseline DWI volume were calculated.
Results: Forty-nine patients were studied between April 2015 and November 2016 (age 72, NIHSS 16). At the end of the procedure (18/49, 36.7%) patients had TICI2b and (21/49, 42.9%) TICI3. Optimal cut-point for TMax6s post-MT lesion volume was 5 mL and for reperfusion index was 90%. Table 1 summarizes the predictive values for functional outcome.

	TICI3	TICI 2b-3	TMax6s post-MT≤5mL	Reperfusion index≥90%
Sensitivity	53.6%	92.9%	80%	93.3%
Specificity	71.4%	28.1%	72%	66.7%
PPV	71.4%	66.7%	76.2%	73.7%
NPV	53.6%	80%	76.5%	90.9%
Adjusted AUC	0.670	0.707	0.858	0.924

Conclusion: Our findings suggest that reperfusion assessed by PWI is a better imaging surrogate of good functional outcome than reperfusion assessed by conventional angiography.

AS21-042

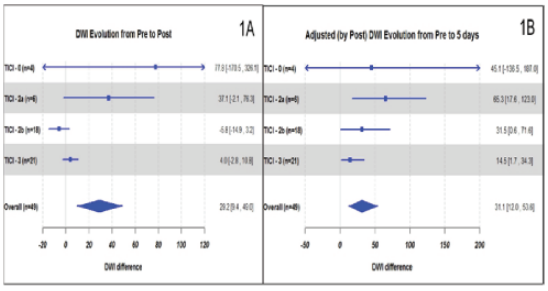
IMAGING – HYPERACUTE

DYNAMIC EVOLUTION OF DIFFUSION-WEIGHTED IMAGING LESION VOLUME ACCORDING TO REVASCULARIZATION GRADE AFTER MECHANICAL THROMBECTOMY IN ACUTE ISCHEMIC STROKE PATIENTS

M. Hernandez-Perez[1], S. Remollo[2], L. Dorado[2], A. Sorrentino[2], J. Serena[3], J. Munuera[4], M. Millan[2], J. Puig[5], N. Perez de la Ossa[2], E. Lopez-Cancio[2], M. Gomis[2], C. Castaño[2], E. Palomeras[6], L. Muñoz[1], M. Terceño[3] and A. Davalos[2]

[1]Health Sciences Research Institute of the "Germans Trias i Pujol" Foundation IG, Neurosciencies, Badalona, Spain
[2]University Hospital Germans Trias i Pujol, Neurosciences, Badalona, Spain
[3]University Hospital Josep Trueta, Neurology, Girona, Spain
[4]Diagnostic Imaging Institute IDI, MR, Badalona, Spain
[5]Diagnostic Imaging Institute IDI, Radiology, Girona, Spain
[6]Mataró Hospital, Medicine, Mataró, Spain

Background and Aims: To assess the dynamic evolution of DWI lesion volume after revascularization in acute ischemic stroke patients (AIS) treated with mechanical thrombectomy (MT).
Method: We prospectively recruited patients with AIS and anterior circulation large artery occlusion undergoing MT within 8 h of onset. DWI sequences were obtained at baseline (DWI0) and immediately after MT (DWIpost; median time from the end of the procedure to MR 76 min). A follow-up MR was performed on day 5. DWI volume at each time point was obtained by manual segmentation. Arterial revascularization was assessed according to the Thrombolysis in Cerebral Infarction (TICI) grades.
Results: Forty-nine patients were studied between April 2015 and November 2016 (age 72, NIHSS 16). At the end of the procedure 4 (8.2%) patients showed TICI0, 6 (12.2%) TICI2a, 18 (36.7%) TICI2b and 21 (42.9%) TICI3. DWI reversal volume greater than 10 mL between DWI0 and DWIpost occurred in 4 patients; three with final TICI2b and one with TICI3. Infarct growth between DWI0 and DWIpost was substantial for TICI0 and TICI2a but minimal for TICI2b and TICI3 (Figure 1A). At day 5, all groups showed increased DWI lesion volume after controlling for DWIpost lesion volume. Nevertheless, volume growth was driven by TICI grade (Figure 1B).



Conclusion: Immediate infarct growth after MT is only observed in poor grades of revascularization. However, complete revascularization is also associated with deferred infarct growth suggesting delayed mechanisms of damage.

AS21-044

IMAGING – HYPERACUTE

DYNAMIC EVALUATION OF COLLATERAL STATUS WITH CT PERFUSION IN ACUTE STROKE, AN ALTERNATIVE TO MULTIPHASE CT ANGIOGRAPHY?

S. Trillo[1], C. Aguirre[1], S. Bashir[1], E. Bárcena[2], C. Ramos[1], L. Martínez-Vicente[1], P. Alcántara[1], L. Pérez-Carbonell[1], A. Barbosa[2], G. Zapata[1], F. Nombela[1], Á. Ximénez-Carrillo[1], J.L. Caniego[2] and J. Vivancos[1]

[1]Hospital Universitario La Princesa, Stroke Unit, Madrid, Spain
[2]Hospital Universitario La Princesa, Radiology, Madrid, Spain

Background and Aims: Collateral circulation (CC) has great importance in prognosis after stroke and it has been evaluated using different methods. Single phase CTA(SPCTA) provides static information, whereas multiphase CTA and DSA can provide time-resolved angiograms. We attempt to evaluate CC in CT perfusion source images (CTPSI) with a dynamic score in patients treated with thrombectomy, and its prognostic value compared with SPCTA.
Method: Retrospective study of consecutive patients with acute ischemic stroke secondary to M1 occlusion from Dec-2010 to Mar-2016 treated with thrombectomy in our center. To grade CC in CTPSI we used a comparative system derived from ASITN score for DSA. The extent of maximal opacification compared to normal hemisphere and the contrast arrival time (in relation to the filling of the superior sagital sinus) were punctuated:4-greater or same opacification without delay, 3-same but delayed opacification, 2-less opacification without delay, 1-less and delayed and 0-scarce. In SPCTA, Miteff and regional score were measured. These variables were correlated with mRS3m using the Spearman method.
Results: N = 135. Mean age: 66.3 years. Women 57.7%. Median ASPECTS 8(7;10), mean NIHSS 17,4(SD: 6.6). There was a direct and statistically significant correlation between punctuations in ASITN score with mRS3m (Rho = 0.33, $p < 0.001$), which was stronger than Miteff score (Rho = 0.18, $p < 0,05$) and regional score (Rho = 0,28, $p < 0,01$). We also found correlation between better ASITN score with smaller infarction core in CBV perfusion ($p < 0,01$) and final infarction volume in follow up CT($p < 0,05$).
Conclusion: The ASITN score applied to CTPSI could provide a time-resolved estimation of collateral status with prognostic value after thrombectomy, and could be an alternative method to multiphase CTA.

AS21-045

IMAGING – HYPERACUTE

BLOOMING ARTIFACT ON GRE-MRI AS PREDICTOR OF UNFAVORABLE FUNCTIONAL OUTCOME AND DEATH AFTER ISCHEMIC STROKE

S. Kolieskova[1] and V. Milan[2]

[1]St. Annés University Hospital, 1st Department of Neurology, Brno, Czech Republic
[2]Kepler University Clinic, Department of Neurology2, Linz, Austria

Background and Aims: Prior studies have analyzed the early vessel signs in acute ischemic stroke with underlying clot composition and revealed an association between hyperdense MCA sign (HMCAS) on CT and blooming artifact (BA) on MRI. We sought to determine whether

BA can predict unfavorable functional outcome and death in acute ischemic stroke.
Method: We retrospectively reviewed consecutive patients with acute ischemic stroke who received intravenous thrombolysis (IV-tPA) and/or mechanical thrombectomy for the presence of MCA occlusion (MCAO) on baseline MRI/MRA. Gradient-recalled echo (GRE) sequences were independently reviewed by a neuroradiologist for the evidence of blooming artifact, defined as an area of hypointensity within the MCA that has increased diameter compared to the contralateral MCA. Patients without BA were taken as control. The functional outcome was measured by modified Rankin Scale (mRS). Logistic regression was used to assess the relationship between BA and unfavorable functional outcome (mRS 3–5), adjusting for age and baseline NIHSS.
Results: Of 138 consecutive patients treated with IV-tPA and with MCAO, 72 (57% female, mean age 76 ± 12, baseline median NIHSS 12, IQR 10) had BA on GRE. Demographic features, vascular risk factors and stroke severity were similar in both groups. BA did not predict unfavorable functional outcome (OR = 1.56, 95%CI 0.58–4.18, p = 0.38). Exposure to BA was an independent significant predictor of death (OR = 6.01, 95%CI 1.95–18.53, p = 0.002), after adjusting for age and baseline NIHSS.
Conclusion: Our study found that blooming artifact as an early vessel sign on GRE in patients with MCAO is a poor prognostic factor of death.

AS21-046

IMAGING – HYPERACUTE

TRANSIENT GLOBAL AMNESIA IS FREQUENTLY ASSOCIATED WITH ACUTE ISCHEMIC LESIONS IN ADDITIONAL REGIONS THAN HIPPOCAMPAL CA1-AREA

R. Ganeshan[1], J. Fiebach[1] and K. Villringer[1]
[1]Center for Stroke Research Berlin CSB, Department of Neurology, Berlin, Germany

Background and Aims: Transient Global Amnesia (TGA) is a frequent and often recurrent disorder. Pathophysiological mechanisms leading to TGA are not entirely understood so far. One hypothesis assumes TGA to be an ischemic event. Hence we assessed diffusion weighted images (DWI) for possible additional lesions to support this hypothesis.
Method: Patients clinically presenting with TGA between January 2015 and December 2016 admitted to our emergency department were prospectively evaluated. Cerebral magnetic resonance imaging (3T) was performed in all patients within 48 h from symptom onset. Besides the expected lesions in hippocampal CA-1 area on DWI, possible additional lesions were registered.
Results: In total, 68 patients were included into the final analysis. 51% (n = 35/68) presented with an acute lesion in hippocampal CA1-area, divided into unilateral (n = 24/68, 35,3%) and bilateral (n = 11/68, 16,2%) hippocampal lesions. In 7 patients (n = 7/68, 10,3%) there were more lesions to be found in other regions uni- as well as bilaterally to the original hippocampal one (posterior circulation n = 1, anterior circulation n = 6).
Conclusion: In 10% of the patients clinically presenting with TGA acute lesions on DWI have been detected uni- as well as bilaterally in addition to the expected lesion in hippocampal CA1-area, indicative of ischemic origin. Therefore, cardiovascular workup should be considered in patients with TGA to detect potential cardio embolic or arterio-arterial embolic risk factors.

AS21-047

IMAGING – HYPERACUTE

USING CT PERFUSION AND CT ANGIOGRAPHY TO ASSESS ANTEROGRADE FLOW AND PREDICT EARLY RECANALISATION WITH INTRAVENOUS RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR IN ACUTE ISCHAEMIC STROKE

S. Khan[1], S. El Tawil[2], S. Ramachandran[2], B.K. Cheripelli[2], F. McVerry[3], F.C. Moreton[2], X. Huang[2], D. Kalladka[2], N. MacDougall[4] and K.W. Muir[2]
[1]University of Glasgow, School of Medicine, Glasgow, United Kingdom
[2]University of Glasgow, Institute of Neuroscience and Psychology-Queen Elizabeth University Hospital, Glasgow, United Kingdom
[3]Western Health and Social Care Trust, Stroke, Londonderry County Borough, United Kingdom
[4]NHS Greater Glasgow & Clyde, Neurology, Glasgow, United Kingdom

Background and Aims: Early recanalisation is associated with better clinical outcomes than later recanalisation in acute ischaemic stroke. Intravenous thrombolysis may be more likely if there is residual anterograde flow in an occluded vessel. We investigated whether early major clinical recovery was associated with residual anterograde flow.
Method: Data from a stroke imaging research database was analysed. We selected patients treated with IV rtPA who underwent pre-treatment CT angiography (CTA) and CT perfusion (CTP). Thrombus location was identified on CTA. Flow was assessed on 3D-CTP and delay-time maps by placing ROIs along the vessel profile on corresponding CTP mean-maps. Early major improvement was defined as a decrease of ≥8 points or score of 0–1 on 24 hour NIHSS assessments. Clinical outcomes were assessed via penumbral salvage and modified Rankin Scale assessments performed at 30 and 90 days.
Results: 41 patients had vessel occlusion visible on CTP; 13 of these had anterograde flow on CTP delay-time maps, while 15 patients had residual flow on CTA. Major early improvement was seen in 10/40 (25%) patients. Major early improvement was associated with anterograde flow on CTP delay-time maps (Odds Ratio 8.63, 95% CI 1.64–45.3, P = 0.011) and residual flow on CTA (OR 6.65, 95% CI 1.21–36.4, P = 0.029). Penumbral salvage (P = 0.022) was greater among those with major early improvement and they achieved better mRS day 30 and day 90 scores (P = 0.003).
Conclusion: Anterograde flow detected on CTP delay-time maps and residual flow on CTA are strongly associated with early major clinical improvement and tissue salvage in patients treated with intravenous rtPA.

AS21-048

IMAGING – HYPERACUTE

EXTENDING THE TIME FOR THOMBOLYSIS IN EMERGENCY NEUROLOGICAL DEFICITS (EXTEND) – PREVALENCE OF INTRACRANIAL VESSEL OCCLUSION AND RECANALISATION IN WAKE-UP-STROKE AND EXTENDED TIME WINDOW PATIENTS

H. Ma[1,2], B. Campbell[3], M. Parsons[4], C. Levi[4], L. Churilov[2], R. Chandra[1], A. Meretoja[3], C. Hsu[5], S. Davis[3] and G. Donnan[2]
[1]Monash University, Neurology, Clayton, Australia
[2]Florey Neuroscience and Mental Health Research Institutes, Neurology, Melbourne, Australia
[3]Royal Melbourne Hospital, Neurology, Melbourne, Australia
[4]University of Newcastle, Medicine, Newcastle, Australia

[5]China Medical University Hospital, Neurology, Taichung, Taiwan R.O.C.

Background and Aims: Background: EXTEND is an ongoing investigator initiated, randomised, double-blind, placebo controlled phase 3 trial of intravenous alteplase vs placebo in patients with ischemic stroke 4.5–9 hours from stroke onset and wake-up-stroke (WUS). The prevalence of intra-cranial vessel occlusion in this cohort is unknown.
Objective: To study the prevalence of intra-cranial vessel occlusion in the EXTEND cohort.
Method: Ischemic stroke patients within 4.5–9 hours from stroke onset and WUS patients, (WUS defined as the midpoint between time to sleep and awakening with the stroke symptoms <9 hours), are eligible for recruitment.. Criteria for entry into the trial include perfusion-diffusion mismatch using a perfusion threshold of Tmax > 6 sec and a perfusion:-core volume ratio of >1.2. Core volume <70 mL based on RAPID software assessment. Intra-cranial vessel occlusion was assessed on MR or CT angiogram performed at randomisation and 24 hours re-image. Two expert readers assessed these images independently.
Results: 111 patients had images with adequate quality. 105 patients (94.5%) had vessel occlusion with 20.9% involving internal carotid artery (ICA), 63.8% M1 of the middle cerebral artery, 31.4% M2, 15.5% ICA + M1, and 7.6% posterior cerebral artery. 68 patients (64.7%) demonstrated recanalisation (77.9% TICI 3 and 22.1% TICI 2) on re-imaging. Recanalisation rate for ICA, M1 and M2 were 36.4%, 73.1% and 75.1% respectively.
Conclusion: Within the EXTEND cohort there is high rate of intracranial vessel occlusion and recanalization. Intravenous thrombolytic therapy together with thrombectomy in selected cases may be an appropriate therapeutic option. However, this will need to be assessed in randomized controlled trials.

AS21-049

IMAGING – HYPERACUTE

COMPARISON OF DIFFERENT METHODS OF THROMBUS PERVIOUSNESS MEASUREMENT AND IMPACT ON RECANALIZATION IN THE INTERRSECT MULTINATIONAL MULTICENTER PROSPECTIVE COHORT STUDY

H. Gensicke[1], P. Pordelli[2], J. Evans[2], D. Song[2], P.V. Eswaradass[2], S. Dey[2], F. Al Ajlan[3], J. Puig[4], D. Dowlatshahi[5], M. Najm[6], A. Poppe[7], R. Mikulik[8], N. Asdaghi[9], T. Asil[10], J.M. Boulanger[11], A. Jin[12], M. Hill[2], M. Goyal[6], A. Demchuk[2] and B. Menon[2]
[1]University Hospital Basel, Neurology, Basel, Switzerland
[2]Hotchkiss Brain Institute- Cumming School of Medicine University of Calgary, Department of Clinical Neurosciences, Calgary, Canada
[3]The Ottawa Hospital- University of Ottawa, Neurology, Ottawa, Canada
[4]Hospital Universitari Dr Josep Trueta, Department of Radiology, Girona, Spain
[5]Ottawa Hospital Research Institute, Neurology, Ottawa, Canada
[6]Hotchkiss Brain Institute- Cumming School of Medicine University of Calgary, Department of Clinical Neurosciences and Radiology, Calgary, Canada
[7]Université de Montréal-Centre Hospitalier de l'Université de Montréal, Department of Neurosciences, Montréal, Canada
[8]St. Anne's University Hospital and Faculty of Medicine- Masaryk University, Neurology, Brno, Czech Republic
[9]University of Miami Miller School of Medicine, Clinical Neuroscience, Miami, USA
[10]BezmiAlem Vakıf University, Neurology, Istanbul, Turkey
[11]Charles LeMoyne Hospital- University of Sherbrooke, Neurology, Montreal, Canada
[12]Queen's University, Neurology, Kingston, Canada

Background and Aims: To compare different methods of intracranial thrombus perviousness measurements on NCCT and CTA with respect to their ability to predict early recanalization.
Method: Patients with anterior circulation occlusion from the INTERRSeCT study were included. Thrombus perviousness was measured using the following methods: Method 1 = Mean attenuation increase on co-registered thin (< 2.5 mm) CTA/NCCT, Method 2 = Maximum attenuation increase on non-registered CTA/NCCT (ΔHU_{max}), Method 3 = Maximum attenuation on CTA (HU_{max}), Method 4 = Residual flow grading scale. Analyses were performed with co-registered CTA/NCCT (comparing methods 1–4;Group-1) and in all patients (comparing methods 2–4;Group-2). Primary outcome was early recanalization (after 2–8 hrs) on the revised AOL scale (2b/3). Regression models were compared using C-statistics, Akaike (AIC) and Bayesian information criterion (BIC).
Results: Majority of patients (91.5%) had intravenous tPA and/or endovascular treatment. In co-registered CTA/NCCT (Group-1;n = 88), methods 1–4 predicted recanalization similarly (C-statistic: 0.641,0.688,0.640,0.648). Method 2 potentially provided the best model fit using AIC (104.8) and BIC (109.8). In Group-2 (n = 480) methods 2–4 were similar in their ability to predict recanalization (C-statistic: 0.667,0.683,0.634); Method 3 potentially provided the best model fit (AIC = 483.8;BIC = 492.2). A thrombus was classified as pervious $HU_{max} \geq 89$. The probability of recanalization was significantly higher in pervious thrombi ($OR_{unadjusted}$[95%CI]: method 2 (5.50[3.46–8.77]); method 3 (6.28[3.94–9.99]); method 4 (4.22[2.64–6.74]). For Method 3 when $Hu_{max} \geq 89$ the rate of recanalization was 55.4% (95%CI:46.2–64.6) versus 16.8% (95%CI:13.0–20.6) when $Hu_{max} < 89$.
Conclusion: Automated, manual and visual methods of thrombus perviousness measurements did not differ significantly in predicting recanalization. A simple method measuring thrombi HU_{max} on CTA ≥ 89 is likely to best identify perviousness.

AS21-051

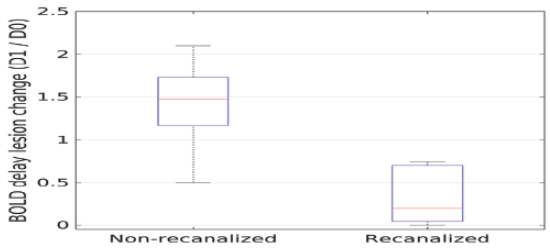
IMAGING – HYPERACUTE

NON-INVASIVE MONITORING OF REPERFUSION IN ISCHEMIC STROKE USING BOLD SIGNAL DELAY

A. Khalil[1], K. Villringer[1], V. Filleböck[2], A. Rocco[1], J. Fiebach[1] and A. Villringer[3]
[1]Charité Universitätsmedizin Berlin, Center for Stroke Research Berlin, Berlin, Germany
[2]Charité Universitätsmedizin Berlin, Campus Mitte, Berlin, Germany
[3]Max Planck Institute for Human Cognitive and Brain Sciences, Department of Neurology, Leipzig, Germany

Background and Aims: Relative delays in low-frequency oscillations of the blood-oxygen-level-dependent (BOLD) signal can be identified using time shift analysis of resting-state functional MRI (rsfMRI) data. This technique visualizes changes in brain perfusion without the need for intravenous contrast agents. In this study, we investigate the relationship between the longitudinal changes in cerebral vessel pathology and BOLD delay in acute stroke.
Method: Fifteen stroke patients with a vessel occlusion received a stroke imaging protocol (including rsfMRI) within 24 hours of symptom onset (D0) and one day later (D1). BOLD delay maps were created by calculating the time shift to maximum cross-correlation between each voxel's time series and the time series in the major venous sinuses. BOLD delay lesions were manually delineated by a blinded expert and their volumes were calculated.
Results: Six patients recanalized on D1 and nine showed persistent vessel occlusion. BOLD delay lesions volumes shrank (median D1/D0 volume ratio = 0.2) and grew (median D1/D0 volume ratio = 1.47) in

patients with and without vessel recanalization respectively (Wilcoxon rank-sum test, $p = 0.0016$, see Figure 1).



Conclusion: Our results show that BOLD delay is reversible following vessel recanalization and persists when recanalization is absent. This supports the use of rsfMRI for non-invasive monitoring of reperfusion in acute ischemic stroke.

AS21-052

IMAGING – HYPERACUTE

POCKET ECHO STROKE: SCREENING SOURCES OF EMBOLISM IN THE HYPERACUTE PHASE OF STROKE

J. Juega Mariño[1], J. Pagola[1], T. Garcia Alujas[2], N. Rodriguez-Villatoro[1], D. Rodriguez-Luna[1], S. Boned[1], M. Muchada[1], M. Rubiera[1], M. Ribó[1], E. Arturo[2], C. Pilar[3], A. Tomasello[3] and C. Molina[1]
[1]Hospital Vall ÓHebron, Stroke Unit, Barcelona, Spain
[2]Hospital Vall ÓHebron, Cardiology, Barcelona, Spain
[3]Hospital Vall ÓHebron, Neuroradiology, Barcelona, Spain

Background and Aims: Testing pocket size echocardiography (PSE)(VSCAN®) by trained neurologist within 0–24 h from stroke onset for fast screening sources of stroke embolism (SSE).
Method: Our protocol was defined as a bed-side non-contrast transthoracic handheld echocardiography focused on supra-esternal paraesternal and apical window. We analyzed SSE detection by PSE, time duration, and correlation with <72 hours TEE. As long as the impact on stroke secundary prevention.
SSE screened: Cardiac masses; Valvulopaties (mitral stenosis, mechanical protesis, endocarditis); Complex Atheromatosis of Aortic Arch (CAA); Severe ejection fraction disfunction (EFD) (myocardial infarction or dilated cardiomyopathy) and Atrial septal aneurysm paradoxical embolism (ASA). Transiet embolic sources (TES) were noted.
Results:. Out of 111 eligible patients, we detected 35% of SSE (39/111). Mean time 9.7 minutes ,it was shorter in case of thrombecthomy ($n = 42$) 7,6 minutes.
SSE prevalence 35% (39/111) PSE showed: sensitivity (SE) 82%,specificity (SP) 85 % and kappa correlation coefficient (K) = 0,68 (0,54–0,82). Different causes are shown in table.
We detected 3 types of TES: takotsubo syndrome, mobile thrombus from AAC and severe diskinesia. One in five detection (27/111) required anticoagulation for secondary stroke prevention K 0,8 (0,7–0,95) SE 85% SP 96% , Likelihood ratio positive of 23.85
Conclusion: Pocket size echocardiography in acute phase had good correlation with standard techniques and impact on stroke prevention.

AS21-053

IMAGING – HYPERACUTE

RELIABILITY OF CBV INFARCT CORE ACCORDING TO COLLATERAL CIRCULATION IN ACUTE STROKE

S. Boned[1], S.H.P. van Wijk[1], Á. García-Tornel[1], A. Tomasello[2], P. Coscojuela[2], D. Rodriguez-Luna[1], M. Muchada[1], N. Rodriguez-Villatoro[1], J.M. Juega[1], J. Pagola[1], C. Molina[1], M. Ribó[1] and M. Rubiera[1]
[1]Vall d'Hebron Hospital, Stroke Unit, Barcelona, Spain
[2]Vall d'Hebron Hospital, Neuroradiology, Barcelona, Spain

Background and Aims: CT perfusion (CTP) can be useful to identify the mismatch between infarct core and hypoperfused brain, however it may not always be righteous as a direct tissue damage indicator. The infarct growth can be influenced by collateral circulation (CC), therefore CTP may give indirect information about this downstream collateral sustenance of ischemic tissue. We aim to analyse the relationship between those cases in which admission core lesion on CTP does not reflect an infarct on follow-up imaging and collateral status.
Method: We studied ICA/MCA occlusion patients treated with thrombectomy who underwent on admission CTP and multiphase CTA(mCTA). Baseline infarct core was measured on initial CBV-CTP and final infarct on follow-up 24–36 h CT. We defined ghost infarct core (GIC): initial core-final infarct > 10 cc. CC degree on mCTA(Calgary CC Scale) was classified a poor (0–3) or good (4–5). Complete recanalization was defined as TICI ≥ 2b.
Results: 72 patients were studied, median NIHSS 18(11–20), median time-to-CT was 163(84–274) minutes. 28 patients (38.9%) presented poor CC. Rate of complete recanalization was 81% with median time-to-recanalization 260(185–356) minutes. 43% presented GIC > 10cc. Patients with poor CC presented more frequently with GIC > 10cc ($p = 0.003$). An adjusted logistic regression model pointed time-to-CT < 160 min (OR:0.18, 95%CI:0.051–0.67) and CC as the only predictors of GIC > 10cc (OR:7.16, 95%CI:1.94–26.4). Furthermore in patients presenting with a time-to-CT < 160 min, poor CC was associated with GIC > 10cc in 85% of cases. In contrast, after 160 min 50% patients with poor CC presented GIC > 10cc.
Conclusion: CBV-CT perfusion may overestimate final infarct core especially in patients with poor collateral circulation and in the early window from symptom onset.

AS21-057

IMAGING – HYPERACUTE

CTA ANGIO IN HYPERACUTE STROKE: A CHANCE TO DIAGNOSE INESTABLE AORTIC PLAQUES SOURCE OF EMBOLISM

J. Juega Mariño[1], J. pagola[2], C. PArra-Fariñas[2], N. Rodigez_Villatoro[2], D. Rodriguez-Luna[2], S. Boned[2], M. Muchada[2], M. Ribo[2], M. Rubiera[2], P. Coscojuela[2], A. tomasello[2] and C. Molina[2]
[1]Barcelona, Spain
[2]Hospital Vall dHebron, Stroke Unit, Barcelona, Spain

Background and Aims: Complex Atheromatosis of the Aortic Arch (CAA) is a main source of ESUS (Embolic strokes of undetermined source). Ulcerated plaques and mobile thrombus are related with high risk recurrence of stroke. We aimed to investigate role of CT angiography (CTA) and compare with Transesophageal echocardiography studies.
Method: From January 2012 to July 2016, acute stroke patients were studied by CTA in acute phase of strokemade a description with causes

related in ESUS patients (excluded main cardioembolic sources and intracranial or extracranial symptomatic stenosis >50%). Baseline characteristics were recorded.
CTA study included form proximal to distal aortic arch from pulmonary artery window, supra-aortic vessels and intracerebral circulation. CAA a plaque >4 mm thickness or with irregular ulcerations >2 mm depth and width. composition classified as: calcic, fibro-lipid or mixed. Transesophageal echocardiography (TEE) asssed the presence of ulcerated plaques or thrombus in inestable plaques.
Results: From 228 patients with CTA, TEE assessed morphology in 38% of cases, proximal fibrolipidic plaques detected by CTA were associated with Mobile components (44% vs 16 % p 0,046] mixed plaques with ulcerated plaques both proximal (64 % vs 21% p 0,001) and distal plaques (64% vs 33% p 0,034).
In ESUS patients , ACC detection 32% (41/127), associated with Hypertension [AAC 85% vs no AAC 8% p 0,03] and smoking (39% vs 19% p 0,020).
Conclusion: CTA in the acute phase of the stroke was a useful tool to detect high risk aortic plaques at high risk of embolization.

AS22-001

IMAGING – OTHER THAN HYPERACUTE

CORTICAL MICROINFARCTS IN PATIENTS WITH MIDDLE CEREBRAL ARTERY STENOSIS

X. Leng[1], H. Fang[1,2], Y. Pu[3], X. Zou[3], Y. Pan[3], Y. Soo[1], Y. Xu[2], C. Wang[3], X. Zhao[3], Y. Wang[3], Y. Wang[3], D.S. Liebeskind[4], L. Wong[1], T. Leung[1] and L. Liu[3]
[1]The Chinese University of Hong Kong, Medicine & Therapeutics, Hong Kong, China
[2]The First Affiliated Hospital of Zhengzhou University, Department of Neurology, Zhengzhou, China
[3]Beijing Tiantan Hospital- Capital Medical University, Department of Neurology, Beijing, China
[4]University of California- Los Angeles, Neurovascular Imaging Research Core- Department of Neurology, Los Angeles, USA

Background and Aims: Cortical microinfarcts (CMIs) have been correlated to cognitive decline and dementia. It was previously considered only visible upon microscope, but was recently reported visible on 3.0 Tesla MRI and linked to presence of intracranial stenosis. We aimed to investigate CMIs on 3.0 Tesla MRI in patients with M1 middle cerebral artery (MCA-M1) stenosis.
Method: Patients with a recent non-cardioembolic ischemic stroke or transient ischemic attack and an atherosclerotic MCA-M1 stenosis were recruited. The severity of MCA stenosis was defined as moderate (50–69%) or severe (70–99% or focal flow void) on time-of-flight MR angiography (MRA). The distal to proximal signal intensity ratio (SIR) of MCA stenosis was measured on time-of-flight MRA to represent its hemodynamic significance. The presence of CMI(s) in the ipsilateral hemisphere was assessed on axial T1/T2-weighted images and T2-weighted fluid-attenuated inversion-recovery (FLAIR) images.
Results: Overall, 86 patients (mean age 62.8 years; 77.9% males) were analyzed, with 66 (76.7%) and 20 (23.3%) respectively having moderate and severe MCA-M1 stenoses. The median SIR was 0.91. Forth-five (52.3%) patients had ipsilateral CMI(s). Multivariate logistic regression showed that a history of dyslipidemia (OR = 6.83, p = 0.008) and a SIR lower than median (OR = 4.73, p = 0.014) were independently associated with presence of CMI(s) in ipsilateral hemisphere to a MCA-M1 stenosis.
Conclusion: Patients with stroke and intracranial stenosis had a high burden of CMI. Except for a history of dyslipidemia, the hemodynamic significance of the arterial stenosis may contribute to the presence of ipsilateral CMI(s) in these patients, which warrants further investigation in prospective, longitudinal studies.

AS22-003

IMAGING – OTHER THAN HYPERACUTE

USEFULNESS OF ARTERIAL SPIN LABELED IMAGING FOR EVALUATION OF DURAL ARTERIOVENOUS FISTULA

N. Yamamoto[1]
[1]Tokushima, Japan

Background and Aims: Conventional digital subtraction angiography (DSA) has been a useful tool for the diagnosis of cranial dural arteriovenous fistula (cDAVF). We reported that magnetic resonance arterial spin-labeled imaging (ASL) was helpful to detect stagnant blood flow at occluded sites of major cerebral vessels. In most patients with cDAVF, blood flow through the arteriovenous shunt was pooled at diseased veins and/or sinuses. Therefore, we speculated that pooled blood at diseased veins in patients with cDAVF could be detected on ASL. The purpose of the present study was to investigate the usefulness of ASL to detect cDAVF.
Method: Thirty patients with cDAVF who were admitted to our hospital between April 2013 and March 2016 were included in our study. We performed magnetic resonance imaging (MRI), including ASL, before DSA and within 7 days after treatment for all of our patients. The accuracy for diagnosis of cDAVF was compared between conventional MRI findings and ASL findings. We also investigated the difference in ASL findings before and after treatment.
Results: We could detect hyperintense signals (HIS) on ASL in 12 patients, and this was more sensitive for diagnosis of cDAVF versus conventional MRI findings. (sensitivity; HIS on ASL vs. conventional MRI, 92.3% vs. 61.5%, $p = .030$) ASL found the same location of cDAVF as conventional angiography. After successful treatment, HIS on ASL disappeared.
Conclusion: ASL might be useful to detect cDAVF and predict the location of diseased sinuses.

AS22-004

IMAGING – OTHER THAN HYPERACUTE

ASSESSMENT OF CEREBRAL PERFUSION IN ASYMPTOMATIC CAROTID ARTERY STENOSIS BY ARTERIAL SPIN LABELING WITH MULTIPLE INVERSION TIMES

J. Schroeder[1], M. Heinze[1], N. Andreas[1], F. Fischer[1], S. Kessner[1], T. Schneider[2], B. Cheng[1], L. Rimmele[1], J. Fiehler[2] and G. Thomalla[1]
[1]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany
[2]University Medical Center Hamburg-Eppendorf, Neuroradiology, Hamburg, Germany

Background and Aims: Sufficient cerebral perfusion is essential for maintaining structural and functional integrity in cerebrovascular steno-occlusive disease. We aimed to assess cerebral perfusion changes in patients with asymptomatic carotid artery stenosis by arterial spin labeling (ASL), an innovative technique for perfusion MRI without the use of exogenous contrast agents.
Method: We evaluated cerebral perfusion in 15 patients with unilateral, asymptomatic, 70–90% carotid artery stenosis using pseudo continuous ASL with 10 inversion times on a 3T MRI Scanner before and 6–8 weeks after endarterectomy or stenting. Cerebral blood flow (CBF) and bolus arrival time (BAT) maps were generated. Relative perfusion values ($rCBF = CBF_{ipsilateral}/CBF_{contralateral}$; $rBAT = BAT_{ipsilateral}/BAT_{contralateral}$)

were calculated for core and border zone MCA territory regions of interest.
Results: At baseline mean rCBF values were significantly reduced (<1) in the MCA border zone ($p = 0.005$), mean rBAT was significantly increased (>1) in MCA border zone ($p < 0.001$) and core ($p = 0.001$). rCBF increased significantly after invasive therapy in the MCA border zone (0.904 vs 0.995, $p = 0.027$), increase of rCBF in MCA core was not significant (0.963 vs 1.01, $p = 0.331$). rBAT decreased significantly both in MCA core and border zone (Core: 1.054 vs 1.001, $p = 0.004$; border zone 1.051 vs 1.004, $p = 0.003$).
Conclusion: ASL demonstrates perfusion deficits in patients with asymptomatic carotid artery stenosis and normalization of CBF and BAT after revascularization therapy in line with pathophysiological assumptions. BAT appears to be more sensitive for hypoperfusion associated with asymptomatic carotid artery stenosis.

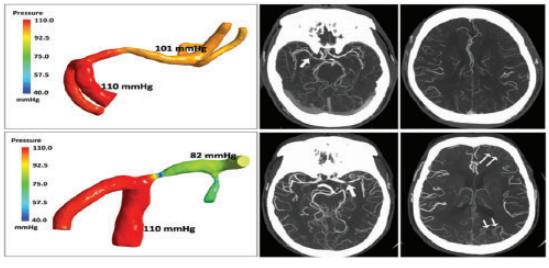
AS22-005

IMAGING – OTHER THAN HYPERACUTE

TRANSLESIONAL PRESSURE GRADIENT AND LEPTOMENINGEAL COLLATERAL STATUS IN SYMPTOMATIC MIDDLE CEREBRAL ARTERY STENOSIS

X. Leng[1], L. Lan[1], H.L. Ip[1], F. Fan[1], S.H. Ma[1], K. Ma[1], H. Liu[1,2], J. Abrigo[2], D.S. Liebeskind[3], K.S. Wong[1] and T.W. Leung[1]
[1]The Chinese University of Hong Kong, Medicine & Therapeutics, Hong Kong, China
[2]The Chinese University of Hong Kong, Imaging and Interventional Radiology, Hong Kong, China
[3]University of California- Los Angeles, Neurovascular Imaging Research Core- Department of Neurology, Los Angeles, USA

Background and Aims: Leptomeningeal collaterals (LMC) govern prognosis of large artery occlusive stroke. However, factors determining the LMC status in stroke patients were not fully elucidated.
Method: In this cross-sectional study, we recruited patients with a recent ischemic stroke or transient ischemic attack attributed to atherosclerotic M1 middle cerebral artery (MCA-M1) stenosis (50–99%). We graded LMC of ipsilesional anterior and posterior cerebral arteries as good or poor on CT angiography (CTA). Based on CTA source images, we constructed a computational fluid dynamics (CFD) model comprised of distal internal carotid artery, MCA-M1 and A1 anterior cerebral artery and calculated the pressure gradient across the culprit MCA stenoses.
Results: Among 85 patients (mean age 61.5 ± 10.9 years; 69.4% males), 38 (44.7%) and 47 (55.3%) respectively had good and poor LMC. Advanced age ($p = 0.030$) and larger translesional pressure gradient ($p = 0.029$) independently predicted good LMC. A lower fasting blood glucose level showed a trend for good LMC ($p = 0.058$). The figure shows two cases with symptomatic MCA-M1 stenosis (70%), who had different translesional pressure gradients and LMC status.



Conclusion: Our study suggested a strong correlation between translesional pressure gradient and maturation of leptomeningeal collaterals in intracranial atherosclerotic disease. Further studies that allow serial monitoring of cerebral hemodynamics and LMC evolution are warranted to verify if translesional pressure gradient drives LMC development.

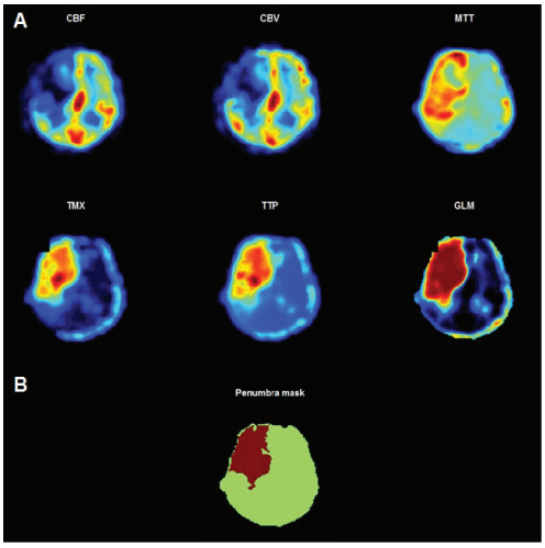
AS22-008

IMAGING – OTHER THAN HYPERACUTE

IDENTIFICATION OF THE PENUMBRAL FLOW USING A MULTI-PARAMETRIC DSC-MRI MODEL

M. Livne[1], T. Kossen[1], V. Madai[1], O. Zaro-Weber[2], W. Moeller-Hartmamm[3], W.D. Heiss[2], K. Mouridsen[4] and J. Sobesky[1]
[1]Charité Universitätsmedizin Berlin, Center for Stroke Research Berlin CSB, Berlin, Germany
[2]Max-Planck Institute for Neurological Research, Max-Planck Institute for Neurological Research, Cologne, Germany
[3]Ludmillenstift Meppen, Department of Radiology, Meppen, Germany
[4]Aarhus University, Center of Functionally Integrative Neuroscience, Aarhus, Denmark

Background and Aims: Identification of the penumbral flow by dynamic-susceptibility-contrast-MRI (DSC-MRI) is used for acute stroke treatment decisions. Although highly promising, a combination of different perfusion maps into one predictive model was yet not presented. We established a multi-parametric DSC-MRI model for detection of penumbral flow validated by positron-emission-tomography (PET).
Method: In a retrospective analysis of 17 sub-acute stroke patients with consecutive DSC-MRI and O15-water-PET, maps of cerebral-blood-flow (CBF), cerebral-blood-volume (CBV), mean-transit-time (MTT), time-to-maximum (Tmax) and time-to-peak (TTP) were calculated and integrated using a generalized-linear-model (GLM) to predict penumbral flow on a voxel-wise level and cross-validated with PET. Performance was tested by receiver-operating-characteristics (ROC) curve analysis, i.e. the area-under-the-curve (AUC), and compared to single perfusion parameters with Wilcoxon signed-rank test.
Results: The GLM method demonstrated significantly improved performance with comparison to each of the single perfusion maps ($p < 0.002$) reaching an AUC of 0.89 with fair improvement comparing to the best performing parameter Tmax (difference = 0.04).



Perfusion maps of CBF, CBV, MTT, Tmax and TTP are shown in comparison to a GLM-based probability map (A) to predict PET-based penumbral-flow (B) for a representative patient.
Conclusion: Our findings support a DSC-MRI based GLM as an improved model for penumbral flow prediction in stroke patients. This model is simple, observer independent and suited to the clinical routine for therapy stratification.

AS22-009

IMAGING – OTHER THAN HYPERACUTE

THE ANALYSIS OF THE RELATIVE BLOOD VOLUME IN THE TRIBUTARIES OF CAVERNOUS SINUS USING 320 ROW MULTI-DETECTOR CT

K. Mizutani[1], M. Toda[1], Y. Yajima[1], T. Akiyama[1], H. Fujiwara[2], Y. Kazunari[1] and M. Jinzaki[2]
[1]Keio University, Department of Neurosurgery, Shinjuku, Japan
[2]Keio University, Department of Radiology, Shinjuku, Japan

Background and Aims: The maintaining the cerebral venous drainage is critical for the normal brain function and the failure of it can result in the venous congestion, edema, and venous infarction. But there has been no literature to directly evaluate the blood flow volume in each small cerebral vein. In this study, using multi-detector computed tomography, we evaluated the relative blood volume in each tributary of cavernous sinus, which is the center of the cerebral venous channels and play a critical role to sustain cerebral venous circulation.
Method: Ten patients who had small brain tumor and otherwise had normal venous anatomy were included into the present study. All of them underwent preoperative CT scanning using 320 row multi-detector CT. After injecting the contrast bolus, we obtained the average Hounsfield unit (HU) value of each vein 11 times during the following 60 sec. The gamma distribution fitting to each HU value enabled us to obtain time-density curve and relative venous blood velocity and volume in each venous channel.
Results: The largest inflow or outflow channel to/from the cavernous sinus were the superficial middle cerebral vein and the inferior petrosal sinus. All the superior petrosal sinuses emptied into the cavernous sinus. The eight percent of the blood volume in the bilateral cavernous sinus seemed to contribute to the drainage of hypophysis.
Conclusion: The present method can be applied to the other intracranial venous channels and enable us to know the actual cerebral venous distribution and improve the knowledge of pathophysiology of the various cerebral venous diseases.

AS22-010

IMAGING – OTHER THAN HYPERACUTE

PREDICTION OF ISCHEMIC STROKE IN PATIENTS PRESENTING WITH VERTIGO: A SUBSTUDY OF THE PROSPECTIVE OBSERVATIONAL 1000PLUS STUDY

K. Villringer[1], A. Schneider[2], U. Grittner[2], H. Tepe[3], R. Ganeshan[1], K.G. Haeusler[4] and J.B. Fiebach[1]
[1]Charité-Universitätsmedizin, Center for Stroke Research Neuroradiology, Berlin, Germany
[2]Charité-Universitätsmedizin, Department of Biostatistics and Clinical Epidemiology- Center for Stroke Research, Berlin, Germany
[3]Charité-Universitätsmedizin, Department of Radiology, Berlin, Germany
[4]Charité-Universitätsmedizin, Department of Neurology, Berlin, Germany

Background and Aims: The frequency of stroke in patients presenting with vertigo in the emergency department ranges between 0,7%[1] and 55.3%[2] according to respective study design. In this study we not only wanted to assess the frequency but also build a prediction model of stroke detection in patients presenting with vertigo.
Method: Retrospective analysis as part of the prospective observational 1000Plus Study (clinicaltrials.org NCT00715522). Inclusion criteria were vertigo and MRI examination on a 3 T MRI scanner. Recursive partitioning tree analysis with 10-fold cross validation was used (https://cran.r-project.org/package = rpart) for prediction of MRI pathology. This model is based on demographic characteristics, neurological symptoms, risk factors and time of symptom onset to imaging (TSI).
Results: While MRI showed acute central lesions in 201 (26.6%) out of 756 patients, 161 (21.3%) had an ischemic stroke. Vertigo characteristics did not relate to positive or negative MRI findings ($p = 0.107$). The number of cardiovascular risk factors was significantly higher in patients with MRI pathology ($p < 0.001$). The prediction model reached an accuracy of 84% (sensitivity 49%, specifity 96%, PPV 83%, NPV 84%). TSI, risk factors and neurological symptoms were the main parameters associated with MR pathology.
Conclusion: Acute central lesions were found in 26.6% of patients presenting with vertigo, 80.1% of those lesions being ischemic infarctions. Using a combination of TSI, risk factors and neurological symptoms, 84% of the patients could be correctly classified for negative/positive MRI evidence.
Literature.
1. Kerber et al., Stroke 2006;37:2484–2487.
2. Newman-Toker et al., Acad Emerg Med 2013;20:987–996.

AS22-011

IMAGING – OTHER THAN HYPERACUTE

PESDA MICROBUBBLES BIND UP TO THE ATHEROSCLEROTIC PLAQUE IN THE CAROTID ARTERY AND IMPROVES COMPUTERIZED QUANTITATIVE ANALYSIS OF THE B-MODE ULTRASOUND IMAGES

H. Mehrad[1], M. Mokhtari-Dizaji[2] and H. Ghanaati[3]
[1]Islamic Azad University-Tabriz Branch, Department of Physics, Tabriz, Iran
[2]Tarbiat Modares University-Faculty of Medical Sciences, Department of Medical Physics, Tehran, Iran
[3]Tehran University of Medical Sciences-Imam Khomeini Hospital-Advanced Diagnostic and Interventional Radiology Research Center, Department of Radiology, Tehran, Iran

Background and Aims: We have shown previously that perfluorocarbon-exposed sonicated dextrose albumin (PESDA) microbubbles bind up to atherosclerotic plaque and can be detected with ultrasound imaging techniques. In this study we aimed to investigate its application in the new computerized analysis method for measurement of instantaneous changes in far and near atherosclerotic arterial walls in sequential ultrasound images. In this method, two algorithms, i.e., maximum gradient and dynamic programming, were composed and implemented. Reference points and cost function were based on dynamic programming and maximum gradient, respectively.
Method: Atherosclerotic plaque was induced at the right common carotid artery of New Zealand white rabbits. Then treatment group underwent PESDA microbubbles (100 ml/kg, 2- 5×10^5 bubbles/ml) administration. Approximately 70 sequential ultrasound images spanning three cardiac cycles were analyzed from each examination to detect instantaneous changes in the far and near walls and lumen maximum, minimum, and mean diameters. The mean wall thickness and the percentage of luminal cross-sectional area of stenosis were evaluated by

automatic and manual measurement of longitudinal B-mode ultrasound images.
Results: Quantitative and morphometric analysis of the mean wall thickness and the percentage of luminal cross sectional area of stenosis in the treatment (PESDA administration) group showed a significant correlation between the computer-assisted B-mode ultrasound image analysis and the histological measurements at each time point compared with the other groups ($P < 0.05$).
Conclusion: It is concluded that the administration of PESDA microbubbles can cause to enhance the far and near arterial walls contrast and increase the new automatic method ability to accurate and repeated evaluation of atherosclerosis.

AS22-012

IMAGING – OTHER THAN HYPERACUTE

THE MISMATCH BETWEEN CEREBRAL BLOOD FLOW AND TMAX PREDICTS THE QUALITY OF COLLATERALS IN ACUTE ISCHEMIC STROKE

I. Galinovic[1], E. Kochova[2], A. Khalil[1], K. Villringer[1], S. Piper[1] and J. Fiebach[1]
[1]Charité - Universitätsmedizin Berlin, Center for Stroke Research Berlin, Berlin, Germany
[2]Charité - Universitätsmedizin Berlin, International Graduate Program Medical Neurosciences, Berlin, Germany

Background and Aims: In acute ischemic stroke the status of collateral circulation is a critical factor in determining outcome. We propose a less invasive alternative to digital subtraction angiography for evaluating collaterals based on dynamic-susceptibility contrast magnetic resonance imaging.
Method: Perfusion maps of Tmax and cerebral blood flow (CBF) were created for 35 patients with baseline occlusion of a major cerebral artery. Volumes of hypoperfusion were defined as a Tmax delay of >4 seconds and a CBF drop <80% of contralateral healthy tissue. For each patient a ratio between the CBF and the Tmax based perfusion deficit was calculated and correlated to collateral status and radiological outcome.
Results: The CBF/Tmax ratio was significantly correlated with collateral status, infarct growth and final infarct size (Spearman's rho = 0.64, 0.68 and 0.71 respectively, all $p < 0.001$). The ratio also had a high area under the curve of 0.87 (CI 0.74 – 1.00) for predicting poor collaterals.
Conclusion: In the setting of acute ischemic stroke the CBF/Tmax ratio can be used to differentiate between good and insufficient collateral circulation without the need for invasive procedures like conventional angiography.

AS22-017

IMAGING – OTHER THAN HYPERACUTE

INTER-OBSERVER AND INTER-MR.I. SEQUENCE DIFFERENCES IN THE ASSESSMENT OF CORTICAL STROKES. DO THEY MATTER IN RESEARCH?

M. Valdés Hernández[1], E. Christopher[2], S. Makin[1] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]University of Edinburgh, College of Medicine and Veterinary Medicine, Edinburgh, United Kingdom

Background and Aims: We analyse variability of inter-observer and inter-sequence differences in the assessment of cortical strokes (CS) from magnetic resonance images (MRI) and its possible influence in their association with clinical parameters.
Method: Data were from 57 patients with CS. CS were delineated semi-automatically by two observers, blind to each-other, in MRI-FLAIR and MRI-T1-weighted(T1W), aided-by vs. blind-to DWI. We used Bland-Altman to analyse inter-observer and inter-sequence differences, and univariate linear regression for associations with clinical variables.
Results: The use of DWI identified on average 2.6 ml(95%CI[-5.4 + 10.5]ml) of additional volume in index CS and 1.1 ml(95%CI[-6.4 + 8.6]ml) in old CS compared to when only FLAIR was used. FLAIR identified on average 3.8 ml(95%CI[-6.7 + 14.4]ml) of additional volume on recent CS and 8.8 ml(95%CI[-5.1 + 6.9]ml) on old CS compared to T1W. FLAIR vs.T1W discrepancies were mainly in the middle cerebral artery territory, comparable in both hemispheres. Inter-observer differences were mainly in the right posterior cerebral artery territory. Inter-sequence, but not inter-observer differences increased with the increase of the CS volume. None of the measurements was associated with the clinical parameters evaluated: age, basal ganglia perivascular spaces burden, blood pressure, pulse frequency, small vessel disease load, Fazekas or atrophy scores, and all associations yielded similar B and p values.
Conclusion: T1W is the least sensitive sequence for establishing the boundaries and extent of, mainly, old CS. In absence of DWI, inter-observer differences for recent CS are higher. On average, inter-observer and inter-sequence differences in the quantification of CS volume do not seem to determine their relationship with clinical parameters.

AS22-018

IMAGING – OTHER THAN HYPERACUTE

AN AUTOMATIC MACHINE-LEARNING SCHEME FOR ASSESSING BRAIN ENLARGED PERIVASCULAR SPACES BURDEN PERFORMS EQUALLY WELL AS A TRAINED HUMAN OBSERVER

V. Gonzalez-Castro[1], M. Valdés Hernández[1], F. Chappell[1], P. Armitage[2], S. Makin[1] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]University of Sheffield, Cardiovascular Sciences, Sheffield, United Kingdom

Background and Aims: Moderate-to-severe burden of enlarged perivascular spaces (PVS) in the basal ganglia (BG) is a marker of cerebral small vessel disease (SVD), associated to poor cognition, inflammation and hypertension. We developed and validated an automatic machine-learning scheme to assess BGPVS burden.
Method: We used T2-weighted brain MRI from 264 (110 F) mild stroke patients. BGPVS were visually scored into none-or-mild vs. moderate-to-severe by two observers blind to each-other: a neuroradiologist (Obs1) and a trained analyst (Obs2). The automatic scheme (AS) uses scale-invariant feature-transform descriptors extracted from a dense grid of patches from the MRI slice with more BGPVS on a support-vector-machine. In addition to a 5-fold cross-validation for accuracy, sensitivity and specificity, we calculated agreement, and evaluated fitness of three correlated regression models that used different clinical variables as predictors.
Results: 50.4% of the sample scored none-or-mild BGPVS as per Obs1. The agreement between observers was $\kappa = 0.68$ (95%CI[0.61 0.75]). The AS had accuracy = 81.2%, sensitivity = 79.3% and specificity = 83.0%, with marginal proportions non-significantly different from Obs1 ($p = 0.11$). The AS agreement with Obs1 was $\kappa = 0.62$ (95%CI[0.53 0.72]) and with Obs2, $\kappa = 0.67$ (95%CI[0.59 0.76]). The AS had the highest consistency in model accuracy (AUC = 0.93, 0.90 and 0.92 for each model, maximum

variation = 3%), followed by Obs2(AUC = 0.91, 0.86 and 0.89, maximum variation = 5%). The AUC for Obs1 was almost perfect when the model included the SVD score (0.98), but not so otherwise (0.83).
Conclusion: Our AS for scoring BGPVS burden performs as well as a trained human observer, but fails to capture the degree of SVD severity, which was better reflected in the scores given by the neuroradiologist.

AS22-019

IMAGING – OTHER THAN HYPERACUTE

BURR-HOLE SURGERY IN ADULTS WITH MOYAMOYA ANGIOPATHY IS FOLLOWED BY DECREASE OF FRONTAL WHITE MATTER ADC AND IMPROVEMENT OF EXECUTIVE FUNCTION

L. calviere[1], P. Loubiere[1], V. Cazzola[2], M. Planton[3], I. Catalaa[2], H. Mirabel[3], C. Cognard[2], J.C. Sol[4], F. Bonneville[2] and V. Larrue[1]
[1]University Hospital Toulouse, Neurology, Toulouse, France
[2]University Hospital Toulouse, Neuroradiology, Toulouse, France
[3]University Hospital Toulouse, Neuropsychology, Toulouse, France
[4]University Hospital Toulouse, Neurosurgery, Toulouse, France

Background and Aims: In Moyamoya angiopathy (MMA), increased apparent diffusion coefficient (ADC) in frontal normal-appearing white matter (WM) has been associated with hypoperfusion and executive dysfunction. We assessed the effect of burr-hole surgery on ADC values and executive functions in adults with MMA.
Method: ADC was measured in 26 hemispheres from 14 consecutive adults with MMA (9 women, mean age ± SD: 38.1 ± 10.7 years), before and 6 months after burr hole surgery. ADC was obtained from regions of interest located in frontal and posterior (parieto-occipital) normal-appearing WM. Ten patients had available neuropsychological data focused on executive functions before and after surgery.
Results: Frontal and posterior ADC values were not different before surgery (815.8 ± 60.1 vs 812.1 ± 35.3 mm^2/sec, p = 0.88). After surgery, 80 % of hemispheres developed collaterals. Frontal ADC was lower than before surgery (789.9 ± 64.5 vs 815.8 ± 60.1 mm^2/sec; $p < 0.001$) whereas no change occurred in posterior ADC (812.1 ± 35.3 vs 802.04 ± 34.96 mm^2/sec; p = 0.31). Median Z score of Trail Making Test-part B increased from −1.47 to −0.21 (p = 0.018). No change was observed in other tests.
Conclusion: In adults with MMA, burr-hole surgery improved ADC in normal appearing frontal WM. ADC measurement may be a promising tool to explore potentially reversible microstructural WM damages related to hypoperfusion and cognitive changes in MMA.

AS22-020

IMAGING – OTHER THAN HYPERACUTE

POSTOPERATIVE DILATATION OF SUPERFICIAL TEMPORAL ARTERY CORRELATE WITH TRANSIENT NEUROLOGICAL SYMPTOMS AFTER DIRECT BYPASS SURGERY FOR MOYAMOYA ANGIOPATHY

D. Ishii[1], T. Okazaki[1], K. Shinagawa[1], N. Ichinose[1], T. Matsushige[1], S. Sakamoto[1] and K. Kurisu[1]
[1]Hiroshima University Graduate School of Biomedical & Health Sciences, Neurosurgery, Hiroshima, Japan

Background and Aims: In moyamoya angiopathy (MMA) transient neurological symptoms (TNS) are sometimes observed after superficial temporal artery (STA)- middle cerebral artery (MCA) direct bypass surgery. The purpose of this study was to investigate the correlation between TNS and postoperative MR images as well as STA diameter in a hypothesis that the drastic change of STA after bypass might affect on TNS.
Method: A total of 52 hemispheres in 33 patients with MMA who underwent direct bypass surgery were reviewed. All patients were performed MR images before and within 5 days after the surgery. TNS were defined as reversible neurologic dysfunction without any apparent intracranial infarction or hemorrhage. Maximum diameter of STA was measured at the straight section of parietal branch in time-of-flight MR angiography and the dilatation ratio (rSTA) was calculated. The presence of signal change in FLAIR image was evaluated.
Results: In total TNS were observed 13 of 52 (25%) cases between 1 and 15 days after the surgery. The mean pre-/post-operative STA and rSTA were 1.33 ± 0.27 mm/1.67 ± 0.30 mm and 1.29 ± 0.28, respectively. Intraparenchymal cortical hyperintensity lesion (suggesting vasogenic edema) and high- intensity signal in the cortex sulci (ivy sign) were detected 26 (50%) and 30 (57.7%), respectively. Univariate analysis showed over 1.5 folds dilatation of STA significantly correlated with TNS ($P < 0.0001$).
Conclusion: The dilatation of STA would be a useful predictor of TNS after direct bypass surgery for MMA.

AS22-021

IMAGING – OTHER THAN HYPERACUTE

WHITE MATTER HYPERINTENSITIES PREDICT LONG-TERM POST-STROKE APATHY: THE CASPER STUDY

E. Douven[1], S. Köhler[1], S.H.J. Schievink[1], R.J. van Oostenbrugge[2], J. Staals[2], F.R.J. Verhey[1] and P. Aalten[1]
[1]Maastricht University, Psychiatry and Neuropsychology, Maastricht, The Netherlands
[2]Maastricht University Medical Center, Neurology, Maastricht, The Netherlands

Background and Aims: Previous studies examining MRI markers associated with post-stroke apathy (PSA) and post-stroke depression (PSD) have found inconclusive results. The aim of the present study was to identify MRI markers associated with PSA and PSD at 3, 9, and 15 months post-stroke in a relatively large study sample.
Method: This prospective cohort study included 250 consecutive stroke patients. Presence of PSD and PSA was defined 3 (baseline), 9, and 15 months post-stroke using a Mini International Neuropsychiatric Interview diagnosis of depression or a Montgomery Åsberg Depression Rating Scale score ≥ 7, and an Apathy Evaluation Scale score ≥ 37. A subset ($n = 189$) received 3T structural brain MRI at baseline to evaluate acute lesion location, number of old infarcts, and presence and volume of white matter hyperintensities (WMH). Multivariable logistic regression analyses were performed to determine the contribution of MRI markers to PSD and PSA.
Results: PSD was present in 38%, 39%, and 40% at baseline, 9, and 15-months post-stroke, whereas PSA was present in 17%, 26%, and 23%. At baseline and 9 months we found no association between PSA and MRI markers, but deep and periventricular WMH Fazekas score were independent predictors for PSA at 15 months post-stroke after adjusting for age, sex, and presence of PSD [odds ratio (OR), 3.55; 95% confidence interval (CI), 1.32 – 9.54 and OR, 4.45; 95% CI, 1.14 – 5.51, respectively]. We found no association between PSD and MRI markers.
Conclusion: This study demonstrated that degree of WMH may predict long-term PSA.

AS22-024

IMAGING – OTHER THAN HYPERACUTE

LESION MASK INTEGRATION FOR FRACTIONAL ANISOTROPY (FA) ESTIMATION USING DIFFUSIONIST IMPROVES FA VALUES ACCURACY IN STROKE WITH LARGE LESIONS (ON BEHALF OF RESSTORE EUROPEAN CCT)

A. Jaillard[1] and F. Renard[2]
[1]CHU Grenoble Alpes, Research Pole, Grenoble, France
[2]University Grenoble Alpes, AGEIS, Grenoble, France

Background and Aims: Diffusion-tensor imaging (DTI) is a popular neuroimaging technique for assessing white matter microstructure and structural connectivity. However, previous work showed that brain lesions may induce severe inaccuracies in the diffusion coefficient measures. Therefore, we developed a program, *Diffusionist*, designed for DTI analysis in patients with stroke lesions.
Objectives (1) Validation of *Diffusionist* and (2) To assess the effect of lesion mask integration on fractional anisotropy (FA) measures.
Method: We tested the uncertainty and reproducibility of Diffusionist compared to ROI-based manual tractography (MT) in the corticospinal tract (CST) of controls using mean FA, coefficient of variation (CV) and ICC. Reliability of Diffusionist was assessed using test-retest.
We compared FA values with and without using a mask in 20 stroke patients with lesions >40 ml.
We computed correlations between FA and motor Fugl-Meyer scores (FMS) concurrently measured at one-month post-stroke using the three procedures: MT, Diffusionist with and without mask integration.
Results: Higher mean FA values, and lower SD and CV were observed with *Diffusionist* than with MT. High ICCs and significant p values indicated high consistency. Test-retest analysis showed good-excellent reliability of *Diffusionist* in 16 controls.
FA values in both ipsilesional and contralesional CST were different with and without mask procedure ($p < 0.001$).
Regression coefficients between FMS and FA were $R^2 = 0.56$ using MT, $R^2 = 0.66$ using Diffusionist without mask, and $R^2 = 0.70$ with mask procedure.
Conclusion: We validated our toolkit *Diffusionist*.
As diffusion coefficients are used as a predictors of recovery, lesion masking procedure is recommended to obtain an accurate estimation of these values in patients with large lesions.

AS22-025

IMAGING – OTHER THAN HYPERACUTE

PREDICTORS OF PENUMBRA SALVAGE AND INFARCT GROWTH IN ACUTE ISCHEMIC STROKE: TO DIE OR TO LIVE

G. Sirimarco[1], D. Strambo[1], J. Labreuche[2], S. Nannoni[1], R. Meuli[3], A. Eskandari[1], M. Wintermark[4] and P. Michel[1]
[1]CHUV, Stroke Center- Neurology Service- Department of Clinical Neurosciences, Lausanne, Switzerland
[2]CHU Lille, Department of Biostatistics, Lille, France
[3]CHUV, Department of Diagnostic and Interventional Radiology, Lausanne, Switzerland
[4]Stanford University and Medical Center, Department of Radiology-Neuroradiology Division, Stanford, USA

Background and Aims: Effective treatment of ischemic stroke requires reperfusion of the penumbra region. Using data from a large cohort of stroke patients, we investigated the predictors of the penumbra salvage and infarct growth.
Method: In the Acute STroke Registry and Analysis of Lausanne (ASTRAL) from 2003 to 2016, we selected middle cerebral artery strokes <24 h with a good quality CT-angiography and thresholded CT-perfusion available. Penumbra salvage (PS) and infarct growth (IG) over ≤ 24 hours were correlated with clinical, radiological and biochemical variables, and clinical outcome.
Results: Among 2513 patients with MCA stroke, 551 met the inclusion criteria. Median age was 68.7 ± 21, 50.8% males, admission NIHSS 14 ± 12, and onset-to-imaging time 169.5 ± 283 minutes. More PS was associated with higher BMI, shorter onset-to-door time, higher NIHSS and cortical signs, lower temperature and lower blood pressure. Radiologically, lower ASPECTS, hyperdensity sign and large vessels pathology correlated with more, and chronic vascular lesions with less PS. Less IG was significantly associated with male sex, smoking, higher BMI, lower NIHSS, normal vigilance and lower glycemia. Radiologically, more IG was found with lower ASPECTS, chronic vascular lesions, lower clot burden score, and poor collaterals. Among subacute variables, cardioembolic etiology and recanalisation were associated with more PS and less IG. More PS and less IG were correlated with better 12 months outcome. Multivariate regression analysis will be presented.
Conclusion: Penumbra salvage and infarct growth depend on multiple clinical, parenchymal, and arterial variables. These data may explain variability of treatment response and outcome, and help select patients for late or more aggressive management.

AS22-026

IMAGING – OTHER THAN HYPERACUTE

TIAS: "TO MRI OR NOT TO MRI"

B. oyanguren[1], M. gonzalez-salaices[1], S. muñiz[1], E. de antonio[1], M. eimil[1], L.I. casanova[1], C. de silanes[1], M.J. gil[1], J. sabin[1] and R. terrero[1]
[1]Hospital de Torrejón, Neurology, Madrid, Spain

Background and Aims: Some patients with transient neurologic symptoms have ischemic lesions on DWI-MRI. Detection of these lesions can be useful in the identification of patients with increased short-term risk of stroke.
Method: We analyzed the clinical and radiological characteristics of patients diagnosed as TIAs by the neurologist on-call during the first year of our newly open Stroke Unit.
Results: Fifty-three patients with TIAs were admitted to our SU. 38 patients had a DWI-MRI performed during the first 48 h of admission. 45% of them showed an acute ischemic lesion.
Average age was 61 vs 65 years, 64% vs 47% were males, symptoms average duration was 70 vs 111 min in the MRI positive (*P*) and negative (*N*) groups respectively.
Hemiparesis (S 70%, E 71%) and TIA recurrence in the first week were more frequent in *P*; whereas dysphasia, sensitive and visual symptoms, and dizziness were more frequent in *N*.
24% of *P* patients showed lesions >1.5 cm on DWI-MRI; all of them had presented with hemiparesis. 75% of them suffered a stroke in the following five days; 2 atherothrombotic, 1 lacunar. No one in the *N* group had a stroke.
Conclusion: -Hemiparesis showed the highest diagnostic value for *P*, and was also a risk factor for short-term stroke recurrence.
-*P* patients bear a general risk of stroke recurrence in the first week of 18%. In lesions >1.5 cm the risk is 75%.
-DWI-MRI findings in TIAs have a prognostic value and it is advisable to complete a 1-week- in-hospital observation if lesions are >1.5 cm.

AS22-027

IMAGING – OTHER THAN HYPERACUTE

STANDARD VENDOR PROTOCOL 20-GRADIENT DIFFUSION TENSOR IMAGING DOES NOT PROVIDE A BETTER ISCHEMIA DETECTION COMPARED TO 3-GRADIENT DIFFUSION WEIGHTED IMAGING

C. Ovesen[1], I. Havsteen[2], L. Willer[1], J. Damm[2], K. Ægidius[1], J. Marstrand[1], P. Meden[1], S. Rosenbaum[1], M. Norsker Folke[1], A. Christensen[2] and H. Christensen[1]
[1]Bispebjerg Hospital, Department of Neurology, Copenhagen, Denmark
[2]Bispebjerg Hospital, Department of Radiology, Copenhagen, Denmark

Background and Aims: Diffusion tensor imaging (DTI/20-DWI) may aid brain ischemia assessment, but is more time-consuming than conventional 3-gradient DWI (3-DWI). We compared 3- and 20-gradient DWI standard vendor protocols in a prospective cohort of TIA-patients for lesion detection and lesion brightness.
Method: We performed 3 T-MRI including diffusion and T2-FLAIR within 72 hours and 8 weeks after ictus. Perceived lesion brightness was assessed by visual inspection. Persisting infarction was defined as T2-FLAIR hyper-intensity or atrophy after 8 weeks.
Results: 117 patients with a clinical TIA-diagnosis showed 78 3-DWI lesions and 76 20-DWI lesions ($P = 0.500$). Two lesions showed only on 3-DWI. No lesions were uniquely 20-DWI positive. 34 (44%) lesions were brightest on 3-DWI. 12 (15%) lesions were brightest on 20-DWI. 32 (41%) were equally bright. The median [IQR] 3-DWI lesion area was larger for lesions equally bright or brightest on 20-DWI compared to lesions brightest on 3-gradient DWI (39 [18–95] versus 18 [10–34] mm^2, $p = 0.007$). After adjustment for 3-DWI lesion area, the perceived lesion brightness did not emerge as a significant predictor for persistent infarction after 8 weeks. Only 3-DWI lesion area predicted persistent infarction (OR 1.04, CI: 1.01–1.07 per mm^2).
Conclusion: Employing standard vendor protocols for ischemia detection 20-gradient DWI does not provide a better ischemia detection compared to 3-gradient DWI. 3-gradient DWI lesion size was a stronger predictor of persisting infarction than perceived lesion brightness. DTI did not add clinically relevant information to sub-acute TIA work-up.

AS22-029

IMAGING – OTHER THAN HYPERACUTE

CORRELATION BETWEEN TOTAL SMALL VESSEL DISEASE BURDEN ON MRI AND IMPAIRMENTS IN STRUCTURAL BRAIN NETWORKS IN PATIENTS WITH CEREBRAL AMYLOID ANGIOPATHY

R. Valenti[1,2], Y.D. Reijmer[1], A. Charidimou[1], G. Boulouis[3], S.R. Martinez[1], L. Xiong[1], P. Fotiadis[1], M. Jessel[1], A. Ayres[1], G. Riley[1], L. Pantoni[2], M.E. Gurol[1], S.M. Greenberg[1] and A. Viswanathan[1]
[1]Harvard Medical School- Stroke Research Center, Department of Neurology- Massachusetts General Hospital- Boston- MA- USA, Boston, USA
[2]University of Florence, NEUROFARBA Department- Neuroscience Section- Florence- Italy, Florence, Italy
[3]Université Paris-Descartes- INSERM UMR 894, Department of Neuroradiology- Centre Hospitalier Sainte-Anne- Paris- France, Paris, France

Background and Aims: Cerebral amyloid angiopathy (CAA), a common cause of lobar intracerebral hemorrhage (ICH) and cognitive impairment in the elderly, is associated with hemorrhagic and nonhemorrhagic markers small vessel disease (SVD). A composite score to quantify the total burden of SVD on MRI specifically for CAA patients was recently developed [1]. Brain network alterations related to individual MRI markers of SVD in CAA were demonstrated [2].
Objectives: Considering diffusion based network measures sensitive to detect different relevant SVD-related brain injury, we investigated if increased overall SVD injury on MRI corresponds to worse global brain connectivity in CAA.
Method: Seventy-three patients with a diagnosis CAA [3] and diffusion weighted sequence on MRI from an ongoing single-center cohort study were considered. SVD markers in total MRI SVD score included: ICH, lobar cerebral microbleeds, cortical superficial siderosis (cSS), white matter hyperintensities (WMH) and centrum semiovale-enlarged perivascular spaces [1]. Diffusion imaging based network reconstruction was made. The associations between total MRI SVD score and global network efficiency (GNE) were analyzed.
Results: The *total MRI SVD score* was normally distributed (mean $\pm$ SD: 3.9 ± 1.40) range (1–6). Figure 1 shows the association between *total MRI SVD score* and GNE. This association was primarily driven by the presence of cSS and moderate-severe WMHs.
Conclusion: An increased burden of SVD neuroimaging markers corresponds to more reductions in global brain connectivity, implying a possible cumulative effect of overall SVD markers on disrupted physiology. Some SVD component of the total MRI SVD score seemed to significantly contribute to the reduction in GNE.

AS22-032

IMAGING – OTHER THAN HYPERACUTE

ASPECTS (ALBERTA STROKE PROGRAM EARLY CT SCORE) IN NEUROLOGISTS DAY-TO-DAY: INTEROBSERVER AGREEMENT ASSESSMENT IN A TERTIARY HOSPITAL

E. Luque Buzo[1], A.M. Iglesias Mohedano[1], A. García Pastor[1], J. Guzman de Villoria Lebiedziejewski[2], N. Redondo Ráfales[1], M. Vales Montero[1], B. Chavarría Cano[1], F. Díaz Otero[1], Y. Fernandez Bullido[1], P. Vazquez Alen[1] and A. Gil Nuñez[1]
[1]Hospital General Universitario Gregorio Marañón, Neurology, Madrid, Spain
[2]Hospital General Universitario Gregorio Marañón, Radiology, Madrid, Spain

Background and Aims: The aim of this study was to determine inter-observer agreement in the evaluation of the ASPECTS (Alberta Stroke Program Early CT Score) scale between neurologists working in a tertiary care hospital and a high-qualified observer (neuro-radiologist), and also to assess if this concordance improved after carrying out a specific training.
Method: We included 16 CT scans of patients with an acute middle cerebral artery stroke. Inter-observer agreement in the assessment of ASPECTS among 19 neurologists and between the neurologists and the neuro-radiologist was analyzed before and after the training. Agreement was measured using intraclass correlation coefficient (ICC). Kappa coefficient was used to assess ASPECTS concordance dichotomized into ≤ 6 or > 6.
Results: Agreement among neurologists was almost perfect before and after training ($ICC = 0.903$ and 0.975 respectively). Concordance between neurologist and neuro-radiologist was substantial (ICC 0.71–0.90) in 37.5%, and slight-fair ($ICC < 0.50$) in 43.7%. After training, 85.7% of neurologists improved their concordance with the neuro-radiologist: agreement became

substantial in 57.8% of neurologists and remained slight-fair in only 10.5% ($p < 0.05$).
Compared to neuro-radiologist, agreement for ASPECTS dichotomized into ≤ 6 or >6 was moderate (kappa 0.41–0.60) in 63.1% of neurologists and slight-fair (kappa < 0.40) in 36.8%.
Conclusion: The concordance in ASPECTS assessment between neurologists and neuro-radiologist is only modest although it improves after specific training. The ability of neurologists to discriminate between ASPECTS $\leq$ or >6 was also not satisfactory. Our results suggest that ASPECTS should be considered with caution in the selection of patients with acute stroke for endovascular treatment.

AS22-033

IMAGING – OTHER THAN HYPERACUTE

LONG-TERM PROGNOSTIC VALUE OF ACUTE DWI LESIONS IN TIA AND MINOR ISCHAEMIC STROKE: A POPULATION BASED STUDY

R. Hurford[1], L. Li[1], K.K. Lau[1], S. Lyons[1], M. Kubiak[1], W. Kuker[1] and P.M. Rothwell[1]
[1]Centre for Prevention of Stroke and Dementia, Nuffield Department of Clinical Neurosciences- University of Oxford, Oxford, United Kingdom

Background and Aims: There is strong evidence that patients with a TIA associated with an acute ischaemic lesion on diffusion-weighted magnetic resonance (MR) imaging (DWI) have a high 90-day risk of stroke, but it is uncertain whether stroke risk remains increased in the long-term. We studied long-term post-90-day risk of recurrent stroke after DWI-positive vs DWI-negative TIA and minor ischaemic stroke.
Method: Patients with TIA or minor ischaemic stroke [NIHSS < 5] were prospectively recruited as part of the population-based Oxford Vascular Study. Stroke risk was determined by face-to-face follow-up out to 10-years and analysis was stratified by TOAST classification on the initial event.
Results: Of 1003 patients (595 TIA; 408 minor ischaemic stroke) who were able to undergo MR-imaging, 248 (24.7%) had acute lesions on DWI (13.8% of TIAs; 41.2% of minor strokes). The post-90-day 10-year actuarial risk of recurrent ischaemic stroke was increased in DWI-positive patients overall (HR = 2.23, 95% CI = 1.33–3.73) and in analysis confined to those who presented with TIA only (HR = 2.66, 95% CI = 1.17–6.05). The relative risk associated with DWI-positivity was greatest in the 375 patients with initial TOAST classification of undetermined aetiology (HR = 4.58, 95% CI = 1.54–13.65).
Conclusion: A 'positive' initial DWI indicates an increased long-term risk of recurrent stroke after TIA or minor ischaemic stroke, particularly in patients with events of undetermined aetiology. These patients might therefore merit more detailed second-line investigations and more research into secondary prevention.

AS22-037

IMAGING – OTHER THAN HYPERACUTE

FORNIX MICROSTRUCTURE CORRELATES WITH POST-STROKE MEMORY IMPAIRMENT INDEPENDENTLY OF LESION VOLUME

P. Wright[1], S. Williams[2], N. Ray[1] and M. O'Sullivan[1]
[1]Institute of Psychiatry- Psychology & Neuroscience, Basic & Clinical Neuroscience, London, United Kingdom
[2]Institute of Psychiatry- Psychology & Neuroscience, Centre for Neuroimaging Sciences, London, United Kingdom

Background and Aims: Memory impairment is common and a cause of unmet need after stroke. STRATEGIC is a prospective, longitudinal study of memory prognosis after stroke. The purpose of this analysis was to investigate the contributions of initial infarct and white matter status to early memory deficits after stroke in patients recruited into an in-depth imaging and cognitive substudy.
Method: Patients with recent, ischaemic stroke (n = 31) and healthy participants (n = 33) performed a cognitive battery and underwent diffusion-weighted MRI. We traced patient's lesions on FLAIR images and reconstructed the fornix using HARDI-based deterministic tractography. Lesions interrupt tractography, so in three patients with lesions involving the hippocampus, only the intact hemisphere's fornix was reconstructed. Participants performed Free and Cued Selective Reminding and a face recognition task with trial-wise confidence ratings.
Results: Recall was markedly reduced in patients (51% vs 71% in healthy participants, $p < 0.001$) but did not correlate with age, lesion volume or fornix integrity. Recognition memory was unimpaired in patients. For confidently remembered items, performance correlated with fornix mean diffusivity in both groups ($r < -0.34$, $p < 0.05$) but partial correlation controlling for age was significant only for patients ($r = -0.51$, $p < 0.01$).
Conclusion: These findings demonstrate that preserved recognition memory after stroke depends on the status of the fornix and is independent of infarct volume. Compromise of fornix structure from pre-existing neurodegeneration may be a predictor of poor cognitive outcome after stroke. Verbal recall in patients was independent of fornix integrity. Investigation of other temporal lobe pathways may reveal reorganisation underpinning partially preserved recall in some patients.

AS22-039

IMAGING – OTHER THAN HYPERACUTE

SOCIOECONOMIC AND DEMOGRAPHIC INFLUENCES ON WHITE MATTER HYPERINTENSITY BURDEN IN THE UNITED KINGDOM: DATA FROM UK BIOBANK

D.A. Dickie[1], C. McHutchison[1], F. Chappell[1], E. Backhouse[1], D. Job[1] and J. Wardlaw[1]
[1]University of Edinburgh, Brain Research Imaging Centre, Edinburgh, United Kingdom

Background and Aims: Disadvantages in early life, e.g. lower socioeconomic status or educational attainment, increase the lifetime risk of stroke. However, as found in our meta-analysis of all available data (30 studies, N = 24,000), the impact on cerebrovascular disease detected on neuroimaging, e.g., white matter hyperintensities (WMH), which are themselves risk factors for stroke, is less clear. Here, we aimed to clarify the independent influence of socioeconomic and demographic factors on WMH burden using data from UK Biobank.
Method: Brain MRI, country of birth, current Townsend deprivation index, measured blood pressure, diabetes, hypertension and smoking history were obtained from UK Biobank. We calculated WMH volume per subject using a validated probability-based automated method with manual checking corrected for intracranial volume (ICV). We used SAS to linearly regress socioeconomics, demographics, and vascular risk factors (VRF), against WMH volume.
Results: In 4283 community-dwelling subjects aged 40–70 years, WMH burden was generally low (1.31 ± 2.05 ml, 0.09 ± 0.14 %ICV) and mostly periventricular. More WMH were associated with older age, female sex, current smoking, higher diastolic blood pressure and hypertension. Scottish birth ($\beta = 0.925$) and higher deprivation index ($\beta = 0.037$) were independent predictors for greater WMH burden (all $P < 0.001$).
Conclusion: Within the UK, those who were born in Scotland and/or currently living in a deprived area are more likely to have a higher WMH burden even after adjusting for increased VRF in these areas. This is consistent with higher UK rates of stroke in Scotland and in areas of

deprivation. More research is required to determine how deprivation increases WMH and stroke.

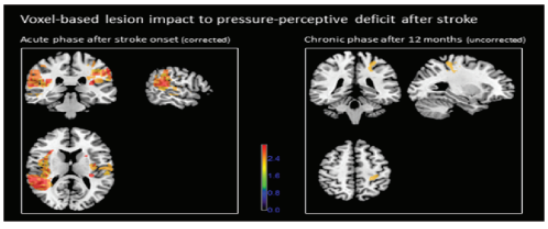
AS22-040

IMAGING – OTHER THAN HYPERACUTE

IMPACT OF STROKE LESIONS ON ACUTE AND CHRONIC SOMATOSENSORY OUTCOME

S.S. Keßner[1], B. Cheng[1], C. Gerloff[1] and G. Thomalla[1]
[1]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany

Background and Aims: About 50 to 80 percent of stroke survivors present with somatosensory impairment. Somatosensory impairment is critically determined by stroke location. However, detailed understanding of the long-term impact of stroke lesions on somatosensation is lacking. Here we present longitudinal data addressing this question.
Method: In a prospective observational study we enrolled 88 patients with acute first-ever stroke. Stroke lesions were segmented on sub-acute fluid-attenuated inversion recovery MRI and registered to standard MNI space. Multiple tactile and proprioceptive somatosensory modalities were assessed bilaterally in five body regions using established standardized tests. Somatosensory testing was performed within five days after stroke onset and repeated after twelve months. In a pilot analysis, impact of initial stroke lesion on acute and chronic pressure-perceptive deficit was analyzed using voxel-based lesion-symptom mapping.
Results: Relative recovery rate of the pressure-perceptive deficit was 53% across time. In the acute phase, significant associations of lesions to impaired pressure perception were found in primary and secondary somatosensory cortex, insula, thalamus, pons, and the dorsal internal capsule. In contrast, no significant association of stroke lesion with chronic pressure-perceptive impairment was observed at the chronic stage. Only in uncorrected analysis, correlation of lesions in the primary sensorimotor cortex with chronic pressure deficits was identified.
Conclusion: Lesions in all parts of the somatosensory system are associated with somatosensory deficits, but only lesions to primary cortex are associated with persisting sensory impairment in the chronic stage. Compensatory mechanisms including functional reorganization may lead to more efficient recovery of somatosensory symptoms due to associative cortical or subcortical lesions.



AS22-041

IMAGING – OTHER THAN HYPERACUTE

SPECTRUM OF MRI FINDINGS IN A PORTUGUESE CADASIL POPULATION

A. Aires[1], R. Soares dos Reis[1], S. Ferreira[2], P. Castro[1] and E. Azevedo[1]
[1]Hospital de S. João, Neurolgy, Porto - Portugal, Portugal
[2]Faculty of Medicine of Porto University, Genetics, Porto - Portugal, Portugal

Background and Aims: Cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy (CADASIL) is caused by *N0TCH3* gene mutations. Magnetic resonance imaging (MRI) shows on T2-weighted images diffuse white matter signal intensity abnormalities and circumscribed subcortical lesions located predominantly within the centrum semiovale, basal ganglia, and pons; external capsule and temporal pole lesions are typically present. In international series, the most frequently affected exons are 3 and 4 while in Portugal the majority of mutations were found in exons 4, 11 and 19. We investigated the spectrum of *N0TCH3* mutations and related to MRI features in Portuguese CADASIL patients.
Method: Mutational analysis of *N0TCH3* exons commonly affected in Portuguese population by direct DNA sequencing was performed in patients with clinically suspected CADASIL. MRI findings were retrospectively evaluated.
Results: Eight different point mutations and one deletion of *N0TCH3* were identified in 27 patients from 25 families. 51.9% of patients presented mutations in exon 11, 18.5% in exon 19, 14.8% in exon 4 and the remaining in exons 8 and 20. p. Arg558Cys was present in 85.7% of patients who had a mutated exon 11. The external capsule was involved in 70% and the temporal lobe in 40,7% of patients.
Conclusion: In our study, the most common affected exons were 11 and 19. Contrary to other series, exon 4 was affected in a minority of patients and anterior temporal lobe was infrequently involved. Our work enhances the variability of genotype-phenotype correlation in different populations, highlighting the need for correlating imaging markers and the genetic profile.

AS22-042

IMAGING – OTHER THAN HYPERACUTE

COMPARISON OF MICROVASCULATURE BETWEEN YOUNG AND ELDERLY INDIVIDUALS AS WELL AS SUBJECTS WITH PRONOUNCED LEUKOARAIOSIS USING MRI VESSEL SIZE IMAGING

I. van Sloten[1], I. Galinovic[1], P. Boehm-Sturm[2], E. Kellner[3], A.A. Khalil[1] and J. Fiebach[1]
[1]Charité Universitätsmedizin Berlin Campus Benjamin Franklin, Center for Stroke Research Berlin CSB, Berlin, Germany
[2]Charité - Universitätsmedizin Berlin Campus Mitte, Department of Experimental Neurology- Center for Stroke Research Berlin CSB- Charité Core Facility 7T Experimental MRIs- Cluster of Excellence NeuroCure, Berlin, Germany
[3]Universitätsklinikum Freiburg, Radiology - Medical physics, Freiburg, Germany

Background and Aims: Vessel size imaging (VSI) is a novel MRI technique for noninvasive, in vivo evaluation of the microvasculature using the parameters Q (related to microvessel density, s-1/3) and vsi (vessel size index, mean vessel diameter in μm). It is valuable in research concerning stroke, tumor angiogenesis and ageing. Currently, limited human data is available. We present data on 82 acute stroke patients aged $\geq$60 years and 9 healthy volunteers $<$40 years.
Method: VSI was coregistered to a T2 weighted image of higher resolution and segmented into grey matter (GM), white matter (WM) and cerebrospinal fluid. In patients, median Q- and vsi-values were only obtained for healthy non-stroked tissue. We manually placed small regions of interest in the center of white matter lesions in patients with advanced leukoaraiosis (Wahlund score $>$12) to calculate Q- and vsi-values.
Results: Q- and vsi-values were higher in GM than in WM ($p < 0.001$). Vsi-values within WM were highest in volunteers (29.130 μm) and lowest in areas of advanced leukaraiosis (22.687 μm) ($p = 0.03$). Q-values were

also lower in areas of leukoaraiosis than in WM of patients with a Wahlund score <5 and of healthy volunteers ($p = 0.01$). Microvessel density in GM was lower in elderly patients ($Q = 0.478$) than in young volunteers ($Q = 0.503$).
Conclusion: Our study showed a significant lowering of microvessel density and diameter in areas of white matter damage as well as in general lower Q- and vsi-values in WM as compared to GM, both results corresponding to histological data. Additionally we found age-related differences in microvessel density of the cortex.

AS22-044

IMAGING – OTHER THAN HYPERACUTE

MRI INFARCT PATTERN IS ASSOCIATED WITH STROKE RECURRENCE IN PATIENTS WITH MINOR ISCHEMIC STROKE AND TRANSIENT ISCHEMIC ATTACK

I. Donnini[1], J. Modi[2], S.B. Coutts[3], M.D. Hill[3] and E.E. Smith[3]
[1]University of Florence, NEUROFARBA Department- Neurosciences Section, Florence, Italy
[2]University of Calgary, Department of Radiology, Calagry, Canada
[3]University of Calgary, Department of Clinical Neurosciences, Calagry, Canada

Background and Aims: Introduction: MRI DWI lesions predict early recurrence in patients with minor ischemic stroke or TIA. We hypothesized that patients with multiple scattered infarcts would be most likely to have carotid artery or intracranial stenosis/occlusion and be at highest risk for recurrence.
Method: In the CT and MRI in the Triage of TIA and Minor Cerebrovascular Events to Identify High Risk Patients (CATCH) study, patients underwent CT-angiography and MRI within 24 hours and were followed for 90 days. DWI lesions were categorized by number and vascular territory (right and left anterior circulation or posterior circulation).
Results: There were 235 patients with one or more DWI lesions. Mean age was 67.3 ± 12.7 years, 34% were women, 34% had a symptomatic stenosis/occlusion, 11% had symptomatic carotid stenosis. Infarct patterns were: single lacunar infarct 13%, single non-lacunar infarct 26%, multiple infarcts in a single vascular territory 45%, and multiple infarcts in multiple vascular territories 16%. By 90 days 4.3% had a new stroke. Only patients with multiple infarcts experienced stroke recurrence (11% of patients with multiple infarcts in multiple territories and 5.7% multiple infarcts in 1 vascular territory vs. 0% of patients with single infarcts, $p = 0.04$). Multiple infarcts were associated with symptomatic stenosis/occlusion ($p = 0.01$) and symptomatic carotid stenosis ($p < 0.001$).
Conclusion: In minor ischemic or TIA, multiple scattered infarcts suggest underlying vascular stenosis/occlusion and predict a higher risk of recurrent stroke. This information could be used to improve existing prediction tools such as the $ABCD^3$-I score.

AS22-045

IMAGING – OTHER THAN HYPERACUTE

POSTERIOR REVERSIBLE ENCEPHALOPATHY SYNDROME: EVALUATION OF 70 CASES ADMITTED IN A BRAZILIAN TERTIARY HOSPITAL

P.C. Gasperin[1], V.M. Vedana[1], L.C.P. Marrone[1], G.H. Tomasi[1], W.A. Martins[1], A.C.H. Marrone[1], A.R. Massaro[1], J.C. da Costa[1] and R.D.A. Cristovam[1]
[1]BraIns- Pontificia Universidade Catolica do Rio Grande do Sul, Neurology, Porto Alegre, Brazil

Background and Aims: Posterior reversible encephalopathy syndrome (PRES) is a clinicoradiologic syndrome characterized by headaches, seizures, visual disturbance and altered mental status and is associated with white matter vasogenic edema predominantly affecting the posterior occipital and parietal lobes of the brain.
Method: From February 2009 to December 2017, there were 70 patients with PRES who were admitted to Hospital São Lucas-PUCRS All patients were submitted to a brain magnetic resonance imaging (MRI) and detailed neurological evaluation. PRES diagnosis was confirmed by typical radiological appearance of MRI, clinical syndrome, and recognized etiological factors.
Results: Evaluating 70 cases (55 female and 15 male) with mean age of 25.5 years old, we identified disorders related to pregnancy as the most common cause of PRES. The most commons triggers for PRES were disorders related to pregnancy (preeclampsia, eclampsia and HELLP syndrome), acute renal failure, lupus, chemotherapy, immunosuppression due to transplant and other rare etiologies. The involvement of occipital lobes was the most common topographic of brain edema (94.2%), following by parietal lobe in 50%, frontal lobe in 27.1% and temporal lobe in 25.7%. The most common symptoms were headache (84.2%), seizure (55.7%), visual disturbance (70%) and altered mental status (42.8%).
Conclusion: PRES is an increasingly recognized syndrome and since its firsts descriptions have been published. Neuroimaging remains with the major role in the diagnosis of this entity. The pathophysiology of PRES remains unclear.

AS22-046

IMAGING – OTHER THAN HYPERACUTE

ADAPTATIVE CHANGES IN THE INSULA NETWORK MATCH FUNCTIONAL RECOVERY FOLLOWING ACUTE STROKE

D. Carone[1], G.W. Harston[1], N. Filippini[2] and J. Kennedy[1]
[1]University of Oxford, AVIC- RDM Investigative Medicine, Oxford, United Kingdom
[2]University of Oxford, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom

Background and Aims: Clinical trials have been hampered by the absence of an imaging biomarker of recovery. The aim of this work was to use resting state functional MRI (rs-fMRI) to investigate the presence of common adaptive changes in areas that superintend interactions between other large-scale brain networks and that might potentially mediate functional recovery in a heterogeneous population of acute stroke patients.
Method: Twenty consecutive patients with a clinical definition of lacunar stroke (onset < 12 h) underwent rs-fMRI (TE 40 ms, TR 3000 ms, time of scan: 6 min) alongside clinical assessments (NIHSS, modified Rankin Scale (mRS)) at 4 time points: at presentation, 24 hours, 1 week, and 1 month.

Functional connectivity within RSNs was evaluated and correlated with clinical changes. Validated statistical methods were used for each analysis.
Results: Median NIHSS at onset was 4 and at 1 month was 0. Median mRS at 3 months was 1. The only area that demonstrated significant dynamic changes in functional connectivity was the insula network. Functional connectivity showed greatest variability at presentation, settling in a consistent pattern at a week/month. These changes significantly correlated with improvement in NIHSS ($p < 0.05$).
Conclusion: Consistent longitudinal changes in the insula network correlating with recovery were observed, despite differences in clinical presentation and lesion localization. These results match previous findings that suggest the insula to be an integral hub mediating interactions between other large-scale networks. Further work is required to guide the use of rs-fMRI in predicting functional outcome, and potential use as an imaging surrogate in clinical trials.

AS22-047

IMAGING – OTHER THAN HYPERACUTE

DIAGNOSTIC AND PROGNOSTIC BENEFIT OF ARTERIAL SPIN LABELING PERFUSION IMAGING IN SUBACUTE STROKE

S. Zweynert[1], T. Thamm[1], S.K. Piper[2], M.A. Mutke[1], V.I. Madai[2], E. Siebert[3] and T. Liebig[3]
[1]Charité - Universitätsmedizin Berlin, Department of Neurology, Berlin, Germany
[2]Charité Universitätsmedizin Berlin, Center for Stroke Research, Berlin, Germany
[3]Charité - Universitätsmedizin Berlin, Department of Neuroradiology, Berlin, Germany

Background and Aims: Beyond the acute phase, limited information about the impact of the perfusion status on early outcome is available for stroke patients. Arterial Spin Labeling (ASL) is a non-invasive perfusion imaging technique. We evaluated the diagnostic and prognostic benefit of ASL perfusion imaging compared to Diffusion Weighted Imaging (DWI).
Method: 144 stroke patients were screened for the following inclusion criteria: DWI lesion (s) in the middle cerebral artery territory, onset to imaging $\leq$7 days. ASL perfusion status (hypo-, hyper- or symmetric) and volumes of DWI and ASL lesions were assessed. Perfusion alteration either 1) matched, 2) exceeded or 3) showed less information than DWI. A binary logistic regression for early outcome (mRS 0–2 versus 3–6 at discharge) was calculated. Model 1 included DWI lesion volume, age, ipsilateral stenosis, initial NIHSS and treatment. Model 2 added ASL perfusion status. ROC curves were calculated and AUCs compared.
Results: 38 patients were included (median: age 70 years; admission NIHSS: 4; mRS at discharge: 1; pharmacological/endovascular treatment: 29%). Perfusion alteration was classified as 1) in 16%, 2) in 60% and 3) in 24% of patients when compared to DWI. As for outcome prediction, model 1 showed an AUC of 0,88 (95% CI [0,77–0,99]; max. accuracy 87%). Model 2 showed an AUC of 0,96 (95% CI [0,91–1]; max. accuracy 95%). The difference missed significance ($p = 0{,}083$).
Conclusion: We found that ASL perfusion imaging in subacute stroke may improve outcome prediction beyond DWI lesion and clinical parameters, pointing at a future role of this noninvasive biomarker in stroke imaging.

AS22-048

IMAGING – OTHER THAN HYPERACUTE

CAROTID WEB: A MISDIAGNOSED AND UNDERRECOGNIZED CAUSE OF ISCHEMIC STROKE

P.C. Gasperin[1], V.M. Vedana[1], L.P. Conzatti[1], M.E. Zandona[1], G.H. Tomasi[1], B.C.D. Portal[1], L.C.P. Marrone[1], M. Brandao[1], A. Rocha[1], A.R. Massaro[1] and J.C. da Costa[1]
[1]BraIns- Pontificia Universidade Catolica do Rio Grande do Sul, Neurology, Porto Alegre, Brazil

Background and Aims: A carotid web (CW) is a thin, membrane-like shelf of tissue that extends from the wall of the carotid artery into the lumen, usually at the origin of the internal carotid artery. CW is commonly misdiagnosed as atherosclerotic plaque or dissection. Our aim was to review all patients at our institution diagnosed with CW and to describe their major clinical and neuroimaging features.
Method: We evaluated 10 patients with carotid web and analyzed the major neuroimaging features and compared with their clinical presentation including the association with TIA or stroke and treatment with thrombolytic therapy. Age was described by its mean and standard deviation, while categorical variables were described by their absolute and relative frequencies. Data was analyzed using SPSS 24.0.
Results: The mean age was 62.6 years; more than half of patients were women (60%). The major stroke risk factors found were: hypertension (40%), diabetes (20%), dyslipidemia (70%) and smoking (40%). Fibromuscular dysplasia was found in 3 patients. Stroke occurred in half of them whereas prior or recurrent TIA was observed in only 2 patients. CW was frequently found in the bulbar region and sometimes may occur bilaterally. Stenting treatment was proposed in 80% and IV rtPA was used in one patient with good outcome.
Conclusion: Presence of stroke risk factors may lead to misdiagnosis. CW may account for a significant proportion of otherwise cryptogenic stroke.

AS22-049

IMAGING – OTHER THAN HYPERACUTE

TICI, HICI, AICI – IS THERE A BETTER SCORE FOR PERFUSION ASSESSMENT?

P. Cimflova[1,2], O. Volny[2,3], V. Szeder[4], J.W. Sayre[5], J. Vanicek[1] and J.L. Saver[6]
[1]St. Anne's University Hospital Brno, Department of Medical Imaging, Brno, Czech Republic
[2]International Clinical Research Center, Stroke Research Program, Brno, Czech Republic
[3]St. Anne's University Hospital Brno, Department of Neurology, Brno, Czech Republic
[4]UCLA Stroke Center, Division of Interventional Neuroradiology, Los Angeles, USA
[5]UCLA School of Public Health, Department of Biostatistics, Los Angeles, USA
[6]UCLA Stroke Center, Department of Neurology, Los Angeles, USA

Background and Aims: Thrombolysis In Cerebral Infarction (TICI) is the standard for reporting the angiographic results of mechanical thrombectomy in acute ischemic stroke. However, it describes only the territory behind the occlusion. We aimed to devise a score representing the perfusion of the whole anterior circulation or affected hemisphere and tested its relevancy to clinical outcome.
Method: Two novel scores were proposed: Anterior circulation In Cerebral Infarction (AICI) assessing the perfusion in anterior circulation

as no perfusion up to complete perfusion (0–3) with a category 2c for near complete perfusion and Hemispheric perfusion In Cerebral Infarction (HICI) evaluating perfusion in MCA (2 points for each 1/3 of the territory), ACA (1 point), PCA territory (1 point) and collateral filling (0–2 points).
60 angiograms of consecutive patients who underwent stent-retriever thrombectomy for ischemic stroke in anterior circulation were retrospectively analyzed and the level of perfusion was assessed on the final DSA run using TICI, HICI and AICI.
Spearmańs rho correlations and p-values of scores and clinical outcome defined as 90-day modified Ranking Scale were calculated. Good radiological outcome was defined as AICI 2b-3, HICI 0–2 and TICI 2b-3 and mRS 0–2 represented good clinical outcome.
Results: In analyzed cohort the mean age was 70 years, 48% women, median NIHSS 16 (IQR = 12–19), median ASPECTS 8 (IQR 7–9). Forty patients received IV-tPA.
Correlation of TICI 2b-3 and mRS 0–2 was 0.44 ($p = 0.042$), AICI 2b-3 and mRS 0–2 was 0.51 ($p = 0.016$), HICI 0–2 and mRS 0–2 was 0.45 ($p = 0.068$).
Conclusion: There is no superiority of novel scores over traditional TICI.

AS22-052

IMAGING – OTHER THAN HYPERACUTE

OUTCOME PREDICTION BY VOLUME OF ISCHEMIC BRAIN IN MALIGNANT MIDDLE CEREBRAL ARTERY INFARCTION TREATED BY DECOMPRESSIVE HEMICRANIECTOMY

C. Boehme[1], C.F. Freyschlag[2] and M. Knoflach[1]
[1]Med. Universität Innsbruck, Department of Neurology, Innsbruck, Austria
[2]Med. Universität Innsbruck, Department of Neurosurergy, Innsbruck, Austria

Background and Aims: Malignant middle cerebral artery (MCA) stroke represents a life-threatening condition due to its space-occupying character. Outcome of surgical treatment was assessed in well-designed trials and showed evidence in favour of decompressive hemicraniectomy. However, the optimal timeframe for decompressive surgery remains debatable and no objective criteria were found to aid this decision. We analysed early imaging characteristics in MCA-infarction and their relation to the patients' outcome.
Method: We carried out a retrospective analysis of 34 consecutive patients undergoing decompressive hemicraniectomy. We used volumetric analysis to determine the initial infarction volume and subsequently, the volumes on the first and third postoperative day (pod1 and 3). The extent of craniectomy and the time between onset and surgery were recorded. Outcome was measured using modified Rankin Scale (mRS) and favourable outcome was defined by a six-month mRS ≤ 3.
Results: The median age was 53.5 years (range 25–72), the median time from symptom onset to surgical intervention 38 hours (10–150) and the male/female ratio 2:1. Favourable outcome was achieved in seven patients (20%). The median ischemic volumes were 250 cc (106–418) preoperatively, 315 cc (141–505) on pod1 and 349 cc (177–617) on pod3, respectively. Within the first 24 hours, the infarction volume rose significantly ($p = 0.0003$). This rise in infarction volume was associated with outcome ($p < 0.0001$). In multivariable analysis, the infarction volume on pod3 ($p = 0.014$) and age ($p = 0.018$) emerged as significant outcome predictors.
Conclusion: Volumetric analysis of the infarction predicts the outcome of patients undergoing decompressive hemicraniectomy for malignant MCA-infarction.

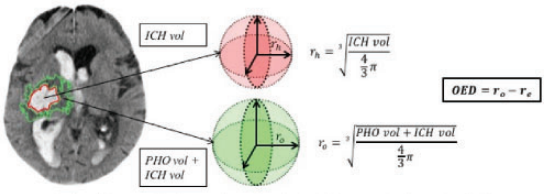
AS22-053

IMAGING – OTHER THAN HYPERACUTE

OEDEMA EXTENSION DISTANCE IN INTRACEREBRAL HAEMORRHAGE: ASSOCIATION WITH BASELINE CHARACTERISTICS AND LONG-TERM OUTCOME

R. Hurford[1], A. Vail[2], W.C. Ziai[3], J. Dawson[4], S.B. Murthy[5], X. Wang[6], C.S. Anderson[6], D.F. Hanley[3] and A.R. Parry-Jones[7]
[1]Department of Clinical Neurosciences, Addenbrooke's Biomedical Campus- University of Cambridge, Cambridge, United Kingdom
[2]Division of Population Health- Health Services Research & Primary Care, Manchester Academic Health Science Centre- University of Manchester, Manchester, United Kingdom
[3]Department of Neurology, Johns Hopkins University, Baltimore, USA
[4]Institute of Cardiovascular and Medical Sciences, Queen Elizabeth University Hospital- University of Glasgow, Glasgow, United Kingdom
[5]Division of Stroke and Neurocritical Care, Weill Cornell Medical College/New York Presbyterian Hospital, New York City, USA
[6]Neurological and Mental Health Division, George Institute for Global Health, Sydney, Australia
[7]Division of Cardiovascular Sciences- School of Medical Sciences, Manchester Academic Health Science Centre- University of Manchester, Manchester, United Kingdom

Background and Aims: Oedema extension distance (OED) is a derived parameter that reduces the sample size required to demonstrate reduction in oedema in early-phase intracerebral haemorrhage (ICH) trials by 75%. Our aim was to identify acute predictors of OED and determine association of OED with long-term clinical outcomes.
Method: Using VISTA-ICH and INTERACT1 datasets, we calculated OED (figure) at baseline and at 72 h. Using linear and ordinal regression (underlying assumptions validated), we tested for associations between OED at baseline or 72 h and mRS scores at 90 days, adjusting for other factors at baseline and 72 h, respectively.



PHO vol: perihaematomal oedema volume; ICH vol: ICH volume; OED: oedema extension distance

Results: 1014 cases had all data required for analyses. Mean (SD) OED at 72 h was 0.54 (0.21) cm and mean increase from baseline was 0.25 (0.18) cm. OED at 72 h was greater with lobar ICH and both increasing baseline haematoma volume and increasing baseline OED. Increasing age and IVH were associated with lower OED at 72 h ($p \leq 0.001$ for all). Change in OED from baseline to 72 h (but not OED at 72 h) was independently associated with mRS scores at 90 days (OR[95% CI] = 2.2[1.1 to 4.4]; $p = 0.02$) in multifactorial analysis.
Conclusion: Increase in OED over 72 h is independently associated with worse mRS at 90 days. OED may thus be a useful surrogate outcome measure in early phase anti-inflammatory trials in ICH.

AS22-056

IMAGING – OTHER THAN HYPERACUTE

DETECTION AND CHARACTERIZATION OF SMALL INFARCTS IN THE CAUDATE NUCLEUS ON 7 TESLA MRI. THE SMART-MR STUDY

R. Ghaznawi[1], J. de Bresser[1], Y. van der Graaf[2], T. Witkamp[1], M. Zwartbol[1], M. Geerlings[2] and J. Hendrikse[1]
[1]UMC Utrecht, Radiology, Utrecht,The Netherlands
[2]UMC Utrecht, Epidemiology, Utrecht, The Netherlands

Background and Aims: Small infarcts are among the key imaging features of cerebral small vessel disease (CSVD), but remain largely undetected on conventional 1.5t MRI scans. The use of 7t MRI scans enables detection of these small infarcts. We aimed to establish imaging criteria for the detection of small infarcts in the caudate nucleus on 7t MRI; to determine intra-and inter-rater agreement; and to estimate the frequency in patients with symptomatic atherosclerotic disease.
Method: Based on our assessment in 90 patients (68 ± 8 years), we defined imaging criteria for cavitated and non-cavitated small infarcts in the caudate nucleus. Intra- and inter-rater agreement was measured in a separate set of patients with atherosclerotic disease ($n = 23$).
Results: Intra- and inter-rater agreement was very good/excellent for presence (Cohen's kappa: 1.00/0.86), number (intraclass correlation coefficient: 0.99/0.98) and individual locations (Dice similarity coefficient: 0.96/0.88) of small infarcts. In the 90 patients more infarcts were detected (12 patients (13%); 20 cavitated, 1 non-cavitated; mean size 5.2 mm; Figure 1), compared to 48 primary care patients not selected on disease status (1 patient (2%); 1 cavitated; $p = 0.031$).

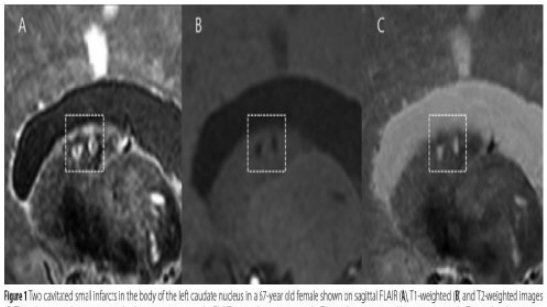


Figure 1 Two cavitated small infarcts in the body of the left caudate nucleus in a 67-year old female shown on sagittal FLAIR (**A**), T1-weighted (**B**) and T2-weighted images (**C**). These lesions are hypointense with a hyperintense rim on the FLAIR image, hypointense on the T1-weightec image and hyperintense on the T2-weighted image.

Conclusion: We established reliable imaging criteria for the detection of small infarcts in the caudate nucleus on 7t MRI that can be used in future studies to provide new insights into the pathophysiology of CSVD.

AS22-058

IMAGING – OTHER THAN HYPERACUTE

REGIONAL FRACTIONAL ANISOTROPY CORRELATES WITH NATIONAL INSTITUTES OF HEALTH STROKE SCALE SYMPTOMS

M. Visser[1], C. Levi[1], A. Bivard[1] and M. Parsons[1]
[1]The University of Newcastle, Faculty of Health and Medicine, Newcastle, Australia

Background and Aims: The aim of this study was to validate diffusion-weighted imaging as a clinical tool by investigating whether white matter fractional anisotropy (FA) can be used to differentiate between stroke patients with and without symptoms after stroke on each item of the National Institutes of Health Stroke Severity Scale (NIHSS).
Method: Diffusion-weighted images and NIHSS scores were obtained from 14 ischaemic stroke patients (age 70.3 ± 12.70; lesion size 25.7 ± 30.8 mL) in the first 48 hours after symptom onset. The NIHSS was recorded at the time of imaging. FA-values were calculated for ipsilesional (IL) and contralesional (CL) regions-of-interest corresponding to each NIHSS item corresponding to speech, sensory and motor deficits. Patients were dichotomised according to their NIHSS score on each item (no symptoms: $NIH = 0$, with symptoms: $NIH \leq 1$). The Mann-Whitney U test was used to determine differences in FA between groups. Predictive accuracy was determined using an ROC-curve.
Results: Sensory cortex FA hemisphere was significantly lower in patients with sensory deficits (IL: $p = 0.02$, AUC 0.875 and CL: $p = 0.028$, AUC 0.854). The FA of Broca's area was lower in patients without language deficits (IL: $p = 0.018$, $AUC = 0.878$). No significant differences were found in any motor-related items ($p > 0.05$), however the predictive accuracy of IL primary motor cortex was high for the items motor arm and leg (IL: $AUC = 0.825$ and IL: $AUC = 0.714$, respectively).
Conclusion: Region-specific FA accurately identifies patients with and without symptoms. These findings indicate that diffusion-weighted imaging can have prognostic value across a range of stroke-related symptoms and is a valuable research tool.

AS22-059

IMAGING – OTHER THAN HYPERACUTE

MRI BIOMARKERS AND COGNITIVE PERFORMANCE IN PATIENTS WITH ASYMPTOMATIC CAROTID STENOSIS: ARE THEY REALLY ASYMPTOMATIC?

A.P. CAMARGO[1], P. Henrique Rodrigues da Silva[2], D. Giansante Abud[1], L. Henrique Castro-Afonso[1], R. Ferranti Leoni[2] and O. M Pontes-Neto[1]
[1]Faculdade de Medicina de Ribeirão Preto - University of São Paulo, Neuroscience and Behavioral Science, Ribeirão Preto, Brazil
[2]FFCLRP - University of São Paulo, Departamento de Física e Matemática, Ribeirão Preto, Brazil

Background and Aims: Cognitive impairment has been associated with asymptomatic carotid stenosis (CS). The effects of carotid stenosis on brain volume, connectivity and regional perfusion can be investigated by MRI and may precede clinical cognitive decline in these patients. We aimed to assess changes in Gray Matter (GM) volume, Cerebral Blood Flow (CBF) and Functional Connectivity (FC) and their relation to cognitive decline in a group of patients with severe asymptomatic carotid stenosis.
Method: 13 patients (72 ± 9 years, 8 women) with asymptomatic CS, and 10 healthy elderly (59 ± 8 years, 5 men) volunteers were evaluated with 3T MRI, including 3DT1, BOLD-fMRI and Pseudo-continuous Arterial Spin Labeling (pCASL). Resting-state Brain Networks (RSBNs) were assessed using Independent Component Analysis. FC was assessed by Pearson correlation. All subjects underwent a comprehensive neuropsychological battery.
Results: GM volume in patients showed significant reduction when compared to controls. Whole-brain analysis indicated CBF reduction in both left and right temporal GM lobes, and internal structure GM in patients comparing to controls. Patients showed disruption of RSBNs. In addition, there was significant correlation between CBF values and MMSE I in bilateral hippocampus, left posterior parahippocampal cortex, and left posterior temporal fusiform cortex. Preliminarily, the FC was significant correlated with attention, information processing speed, verbal memory and executive functions.
Conclusion: We have identified preclinical abnormalities in GM volume, CBF, RSBNs and RS-FC in patients with asymptomatic carotid stenosis. MRI have great potential as biomarker of the disease progression

providing additional information to predict cases at risk of stroke and further cognitive decline.

AS22-060

IMAGING – OTHER THAN HYPERACUTE

DIFFUSION-WEIGHTED IMAGING OF EARLY SECONDARY LESION GROWTH AFTER ENDOVASCULAR THERAPY OR THROMBOLYSIS IN PATIENTS WITH ISCHEMIC STROKE

R.G. Sah[1], C. D d'Esterre[2], N. Forkert[3], M. Hafeez[2] and P. Barber[2]
[1]Foothill Medical Center- University of Calgary, Departments of Clinical Neurosciences, Calgary- ALB, Canada
[2]University of Calgary, Clinical Neurosciences, Calgary, Canada
[3]University of Calgary, Radiology, Calgary, Canada

Background and Aims: To determine whether acute ischemic stroke (AIS) patients with early reperfusion from intra-arterial therapy (IAT) or thrombolysis demonstrate early secondary infarct growth and to investigate the effects of recanalization status based on TICI on ischemic stroke lesion volume growth.
Method: 47 AIS patients were imaged after treatment within 4 hours (baseline) and 24hours (follow-up) on a 3.0T MR. Baseline and follow-up lesion volumes were segmented using common thresholds for diffusion-weighted images (DWI) and apparent diffusion coefficient (ADC) maps were obtained from diffusion tensor MRI. Absolute lesion volume growth was calculated. Patients were categorized according to TICI score.
Results: 4 patients did not have follow-up MR, while 9 patients did not have a lesion at baseline and follow-up. There was DWI growth of 26.1% (IQR: 20.4, 268.9) in non-recanalized ($n = 8$) compared to recanalised ($n = 26$) 37.4% (IQR: 21.2, 137.2) groups. Whereas for ADC, infarct volume change was found to be 87.6% (IQR: 38.0, 159.9) in non-recanalized compared to 116.9% (IQR: 29.0, 399.0) in recanalised groups. Further, within recanalized group were categorised in poor ($n = 6$) with TICI 1, 2a and good ($n = 20$) reperfusion with TICI > 2 based on TICI score. Absolute lesion volume growth from ADC tended to be greater for TICI > 2b ($n = 20$) [131.6% (IQR: 24.6, 410.6)] compared to TICI 1,2a ($n = 6$) [46.7% (IQR: 32.4, 312.4)], while the DWI absolute lesion volume growth was TICI > 2b [37.1.7% (IQR: 37.1, 118.9)] and TICI 1,2a was [37.4% (IQR: 20.3, 186.5)].
Conclusion: Despite successful recanalization, substantial secondary infarct growth occurs in patients and maybe mitigated with neuroprotection strategies.

AS20-001

INTRACEREBRAL HEMORRHAGE

TREATMENT STRATEGY BASED ON EXPERIENCE OF TREATING INTRACRANIAL INFECTIOUS ANEURYSMS

J.S. Ahn[1], J.C. Park[1], W. Park[1] and B.D. Kwun[1]
[1]Asan Medical Center, Department of Neurosurgery, Seoul, Republic of Korea

Background and Aims: Intracranial infectious aneurysms (IIAs) are a very rare but unique subtype of potentially life-threatening vascular lesion. However, there is no widely accepted standard protocol for their management. We reviewed our treatment experiences of IIAs from 2001 to 2015 and proposed a treatment strategy for future use.
Method: We retrospectively reviewed 25 patients with 33 IIAs. All patients had predisposing infectious disease for which the causative organism had been identified.
Results: There were 12 patients with ruptured IIAs and 13 with unruptured IIAs. Of these, 17 (68%) had infective endocarditis, and *viridans group streptococci* (40%) were the most common causative organisms. All patients underwent antibiotic therapy and 17 IIAs in 13 patients resolved with intravenous antibiotic therapy. However, 16 IIAs in 12 patients required neurosurgical treatment, including parent artery occlusion with glue or coils, endosaccular coiling, or microsurgery. The mean size of IIAs that responded to intravenous antibiotics (4.1 ± 2.2 mm) was smaller than that for IIAs with no response (7.5 ± 3.1 mm) ($p = 0.01$). Two patients had treatment-related complications: an acute cerebral infarction after parent artery occlusion and a rupture of the IIA during antibiotic therapy. There was no recurrence or mortality.
Conclusion: All patients with IIAs should undergo appropriate antibiotic therapy. In cases with unruptured IIA, patients can be managed using medical therapy with antibiotics alone for 4–6 weeks. However, neurosurgical treatment should be considered in cases of ruptured IIA or unruptured IIA that does not respond to antibiotic therapy.

AS20-002

INTRACEREBRAL HEMORRHAGE

PATIENTS PRESENTING WITH LOBAR AND DEEP INTRACEREBRAL HAEMORRHAGE HAVE DIFFERENT DEMOGRAPHIC, PHYSIOLOGICAL, BASIC INFLAMMATORY AND METABOLIC PROFILES

D. Gill[1], R. Lobo[1], B. Lonergan[1], P. Sivakumaran[1], G. Mahir[1], I. Ali[1], A. Rossiter[1], S. Rabinowicz[1], S. Basetti[1], E.L. Goh[1] and R. Veltkamp[2]
[1]Imperial College Healthcare NHS Trust, Medicine, London, United Kingdom
[2]Imperial College London- United Kingdom, Division of Brain Sciences, London, United Kingdom

Background and Aims: The lobar and deep subtypes of intracerebral haemorrhage (ICH) differ in their underlying pathophysiology. We investigate whether these differences are reflected in the demographic, physiological, inflammatory and metabolic profiles of patients presenting with deep and lobar bleeds.
Method: This was a single-centre retrospective study on consecutive patients with spontaneous ICH who presented to Imperial College Healthcare NHS Trust (ICHNT) between October 2010 and September 2014 inclusive. The following parameters were compared between the two cohorts using the Wilcoxon rank-sum test: age, sex, clotting profile, neutrophil count, C-reactive protein, blood glucose, haematoma volume, presence of intraventricular extension, Glasgow Coma Scale, body temperature, systolic and diastolic blood pressures, heart rate, respiratory rate and oxygen saturation at the time of presentation. A Bonferroni correction was applied for multiple testing, with a $p < 0.0024$ cut off used to demonstrate a statistically significant difference.
Results: A total of 307 (64.8% male, median age 70.2) and 315 (50.3% male, median age 73.5) patients presented with deep and lobar haemorrhages respectively. As compared to patients presenting with lobar haemorrhages, those with deep bleeds were more commonly male, with smaller haematoma volume, higher systolic and diastolic blood pressure, lower neutrophil count and lower blood glucose. No statistically significant differences were observed for any of the other considered parameters.
Conclusion: Differences in the demographic, physiological, basic inflammatory and metabolic characteristics of patients presenting with deep

and lobar haemorrhages are reflective of their underlying pathophysiology.

AS20-003

INTRACEREBRAL HEMORRHAGE

EFFECT OF UNTREATED HYPERTENSION ON IN-HOSPITAL OUTCOMES AMONG INTRACEREBRAL HEMORRHAGE PATIENTS

A. Divani[1], M. Hevesi[1] and E. Bershad[2]
[1]University of Minnesota, Neurology, Minneapolis, USA
[2]Baylor College of Medicine, Nerurology, Houston, USA

Background and Aims: Hypertension is a strong independent risk factor for intracerebral hemorrhage (ICH), but the impact of pre-hospital hypertension control on in-hospital mortality is unknown. The aim of this study was to determine the association between untreated-hypertension and in-hospital outcome among ICH patients.
Method: We analyzed data from 490 consecutive ICH patients seen at six tertiary care hospitals over a 5-year period and categorized as: of normotension ($n = 120$), treated-hypertension (treated-HTN, $n = 314$), and untreated-hypertension (untreated-HTN, $n = 56$). Demographics, symptom onset, laboratory tests, and CT imaging were documented alongside in-hospital treatments, complications, length of stay, and in-hospital mortality.
Results: Admission systolic blood pressure was significantly higher in those with a history of untreated-HTN compared with the other two groups ($p < 0.01$). Those with a history of untreated-HTN were younger, had lower rates of anticoagulant use ($P < 0.01$), antiplatelet use ($p < 0.01$), and hyperlipidemia ($p < 0.01$) than subjects with treated-HTN. However, untreated-HTN subjects had similar age and equivalent rates of the three measures when compared to normotensive subjects. In multivariate analysis, we observed untreated-HTN, age ≥ 65 years, ≥ 3 outpatient antihypertensive medications, and hematoma volumes ≥ 30 ml significantly associated with increase mortality. In contrast, mortality was lower among patients receiving ≥ 3 antihypertensive medications while in-hospital.
Conclusion: Subjects with untreated-HTN were younger and had fewer comorbidities compared with treated-HTN, and were similar when compared to normotensives. After considering relevant factors, untreated-HTN subjects demonstrated significantly increased in-hospital mortality following ICH when compared with normotensive individuals. As such, untreated-hypertension is an important target for ICH mortality prevention.

AS20-005

INTRACEREBRAL HEMORRHAGE

RANDOMISED TRIALS OF STROKE DUE TO INTRACEREBRAL HAEMORRHAGE: SYSTEMATIC REVIEW OF TRIAL CHARACTERISTICS, RISK OF BIAS, SAMPLE SIZE, AND EFFECT SIZE

A. Tamborska[1], M.T.C. Poon[2] and R. Al-Shahi Salman[2]
[1]University of Edinburgh, College of Medicine and Veterinary Medicine, Edinburgh, United Kingdom
[2]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Lacking treatments for intracerebral haemorrhage (ICH) with unequivocal benefit in randomised controlled trials (RCTs) may be due to treatment efficacy or RCT design.
Method: We searched the Cochrane Stroke Group Trials Register in December 2015 for RCTs involving adults with ICH and reporting clinical outcome (s). RCTs were at lower risk of bias (RoB) if they met ≥ 2 criteria: randomisation described, blinding used, or primary outcome specified. We used chi-square or non-parametric tests to compare RCT characteristics, a random effects model to pool effect estimates in higher vs. lower RoB RCTs, Wald tests to compare the pooled estimates, and $p < 0.05$ statistical significance threshold. We registered this systematic review (PROSPERO CRD42016051103).
Results: 136 eligible RCTs had the following characteristics: phase I/II (57%), single-centre (76%), acute treatment (98%), drug interventions (49%), placebo controlled (24%), primary outcome dead or disabled (30%) and median sample size 77 (IQR 47–160). RCTs explained randomisation (46%), blinded treatment allocation (24%) and specified the primary outcome (24%) such that 38 (28%) were at lower RoB. RCTs at lower RoB were significantly more likely to be: published in English, published recently, phase III/IV, multicentre, and report death or disability as the primary outcome. In multiple linear regression, phase III/IV and multicentre design were the only independent associations with larger sample size. RCTs at lower RoB had smaller pooled treatment effect sizes regardless of treatment type ($p < 0.01$) and whether death/disability or neurological impairment was the primary outcome.
Conclusion: 72% of ICH RCTs are at higher RoB, which biases results.

AS20-010

INTRACEREBRAL HEMORRHAGE

MORTALITY AND FUNCTIONAL PROGNOSIS OF INTRACEREBRAL HEMORRHAGE ASSOCIATED WITH ANTITHROMBOTIC AGENTS: COMPARISON AMONG DIRECT ORAL ANTICOAGULANTS, WARFARIN, AND ANTIPLATELETS

T. Adachi[1], H. Hoshino[1], M. Takagi[1], S. Fujioka[2] and C. Arakawa[1]
[1]Tokyo Saiseikai Central Hospital, Neurology, Tokyo, Japan
[2]Saiseikai Misumi Hospital, Neurosurgery, Uki, Japan

Background and Aims: Direct oral anticoagulants (DOACs) reduce intracranial hemorrhage compared with warfarin. However, mortality and functional prognosis of intracranial hemorrhage did not show improvement in phase III trials. We evaluated the mortality and functional prognosis of cerebral hemorrhage following treatment with antithrombotic agents including DOACs, warfarin, and antiplatelets.
Method: The participants ($n = 1193$) were patients with acute cerebral hemorrhage enrolled in our stroke database. Risk factors of stroke, type of cerebral hemorrhage, antithrombotic agents, mortality rate, and functional prognosis (modified Rankin score: mRS) were registered. The mortality rate and mRS were compared between patients treated with DOACs ($n = 18$), warfarin ($n = 79$), antiplatelets ($n = 234$), warfarin and antiplatelets mixture ($n = 7$), and no antithrombotic agents ($n = 862$).
Results: The mortality rates are shown in the table. The mortality rates between patients treated with DOACs and those treated with no antithrombotic agents were comparable. Moreover, the mortality rate of DOACs-treated patients was significantly lower than those treated with other antithrombotic agents. Finally, the mRS at discharge was comparable among all groups.
Conclusion: Treatment with DOACs provides an advantage over other agents by reducing the mortality rate of cerebral hemorrhage.

AS20-012

INTRACEREBRAL HEMORRHAGE

SENSITIVITY AND SPECIFICITY OF FLUID-BLOOD LEVEL FOR ANTICOAGULANT ASSOCIATED INTRACEREBRAL HEMORRHAGE (AAICH)

A. Almarzouki[1], D. Werring[1] and D. Wilson[1]
[1]Univeristy College London, Stroke Research Centre, LONDON, United Kingdom

Background and Aims: Intracerebral haemorrhage (ICH) is a life-threatening emergency whose incidence has increased over recent years, mainly due to an increase in the use of oral anticoagulants. Computerized tomography (CT) remains the most reliable method for detecting ICH in emergency settings. Fluid-blood levels within the haematoma, as revealed by CT, have been suggested as a marker for anticoagulant associated ICH (AAICH). However, the diagnostic and prognostic value of this finding remain uncertain.
Method: The fluid-blood level within the haematoma on CT was defined using the following features: 1) upper compartment hypodense to brain; 2) lower compartment hyperdense to brain; and 3) a sharply defined horizontal interface between upper and lower compartments. The prevalence of CT-defined fluid-blood in ICH was compared between AAICH and non-AAICH patients, blind to anticoagulant status. The association of fluid-blood levels with six-months mortality.
Results: Of 855 participants with ICH, 18 (2.1%) had fluid-blood levels identified using acute CT imaging. Of these 18, 15 (83.3%) were taking anticoagulants. Of the whole cohort, 360/855 (42.1%) were associated with anticoagulant use. The specificity of blood-fluid level for AAICH was 99.4%; the sensitivity was 4.2%. Presence of a fluid-blood level was associated with an increased risk of death at six months (OR 5.099, 95%CI 1.272- 20.444, $p < 0.022$).
Conclusion: A CT-defined fluid-blood level has a high specificity for OAC-ICH, but the sensitivity is very low. The fluid-blood level should alert clinicians to the possibility of AAICH, but its absence is not useful in excluding AAICH. A fluid-blood level is associated with higher mortality.

AS20-014

INTRACEREBRAL HEMORRHAGE

BASELINE CHARACTERISTICS OF PATIENTS IN THE TRANEXAMIC ACID FOR PRIMARY INTRACEREBRAL HAEMORRHAGE-2 (TICH-2) TRIAL: AN INTERIM ANALYSIS

Z. Kang Law[1], K. Flaherty[1], P. Scutt[1], J.P. Appleton[1], P.M. Bath[1] and N. Sprigg[1]
[1]University of Nottingham, Stroke- division of clinical neuroscience, Nottingham, United Kingdom

Background and Aims: Haematoma expansion leads to worse outcome in intracerebral haemorrhage (ICH). Tranexamic acid (TA), a haemostatic agent, may prevent haematoma expansion.
Method: The TICH-2 trial is an ongoing multicentre prospective double blind randomised controlled trial recruiting patients presenting within 8 hours of primary ICH to receive intravenous TA or placebo. Primary outcome is modified Rankin Scale (mRS) at day 90 and secondary outcomes include haematoma expansion at 24 hours, day 7 National Institute of Health Stroke Scale (NIHSS), day 90 and 365 Barthel Index, quality of life, cognition and mood assessments.
Results: As of November 2016, 1795 patients were recruited from United Kingdom (n = 1544) as well as Italy, Georgia, Switzerland, Malaysia, Ireland, Turkey, Sweden and Denmark (n = 251). Randomisation characteristics include: age 68.8 (13.8) years; male 1002 (55.8%); premorbid modified Rankin Scale 0 [0,1]; time from onset to randomisation 3.6 [2.6, 5.0] hours; NIHSS 13 [7, 19]; Glasgow coma scale 15 [12, 15] systolic blood pressure (SBP) 173 (28) mmHg; intraventricular haemorrhage 581 (32.5%) and prior antiplatelet 465 (26.2%). Haematoma location was supratentorial deep in 1034 (59%), supratentorial lobar in 552 (31.5%) and infratentorial in 117 (6.7%). 149 (8.5%) patients had CT angiography, and 31 (20.8%) were spot sign positive.
Conclusion: TICH-2 is the largest trial of tranexamic acid in primary intracerebral haemorrhage. The trial is projected to achieve its recruitment target of 2000 patients by May 2017.

AS20-015

INTRACEREBRAL HEMORRHAGE

SOLAR ACTIVITY INFLUENCE ON MORTALITY FROM HEMORRHAGIC STROKE

T. Shagjaa[1], V. Efremov[2] and O. Luvsannorov[1]
[1]Mongolian National University of Medical Sciences, department of neurology, Ulaanbaatar, Mongolia
[2]Rostov state medical university, Department of neurology and neurosurgery, Rostov-on-Don, Russia

Background and Aims: Solar activity is changing all the time, following well known periodic patterns like size and numbers of sunspots, flares and coronal mass ejections. The changes on the sun cause effects in space and on Earth's surface. Depending on electromagnetic conditions of the Earth magnetosphere some of this can affect the human body.
Method: Goal of this study to estimate mortality from intracranial hemorrhage in clinical hospitals of Ulan-Bator city of Mongolia in relation to solar activity by the solar cycle on yearly basis for the 2000,2001,2002,2014 years when solar activity were extremely high and 2008,2009,2010 years when solar activity were extremely low.
This study was conducted with 499 cases of death from intracranial hemorrhage during the increasing and decreasing phase of solar activity. Cases of death were classified according to ICD – 10.
Results: During increasing solar activity, target group of year were 5th decide of life. Common location of hemorrhage during higher solar activity were hemispheric especially left. Also loss of consciousness during higher solar activity period more frequent.
Common cause of intracerebral hemorrhage during the higher solar activity were arterial hypertension. Mortality within the first day during the higher solar activity years 2000–2002 were 36.4% and during lower solar activity years 2008–2010 were 39.1% and in 2014 were solar activity extremely high were 39.0%. There is strong correlation between herniation to the ventricles and solar activity phase ($p < 0.001$).
Conclusion: Influence of solar activity to the location of intracerebral hemorrhage and mortality within the first day was statistically significant ($p < 0.05$).

AS20-018

INTRACEREBRAL HEMORRHAGE

HAEMATOMA VOLUME MEASUREMENT TECHNIQUES AND IMAGING FACTORS ASSOCIATED WITH DISCREPANCIES: THE INTERACT 2 STUDY

C. Delcourt[1], C. Carcel[1], S. Sato[2], D. Zheng[1], H. Arima[1], R. Al-Shahi Salman[3], C. Stapf[4], M. Parsons[5], S. Zhang[1], L. Davies[6], T. Robinson[7], R. Lindley[1], J. Chalmers[8] and C. Anderson[1]
[1]The George Institute, Neurology and Mental Health Division, Sydney, Australia

[2]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Osaka, Japan
[3]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[4]Université de Montréal, Department of Neurosciences, Montreal, Canada
[5]University of Newcastle, Hunter Medical Research, Newcastle, Australia
[6]The University of Sydney, Faculty of Medicine, Sydney, Australia
[7]University of Leicester, Leicester Royal Infirmary, Leicester, United Kingdom
[8]The George Institute, Chalmers Center, Sydney, Australia

Background and Aims: Haematoma volume is a major determinant of outcome in patients with intracerebral haemorrhage (ICH). Manual techniques to estimate ICH volume from haematoma length (A), width (B) and height (C) are widely used. We examined the discrepancy in ICH volume between two manual techniques and a computer-assisted planimetric technique using the MIStar software. We examined associations between these discrepancies and imaging parameters.
Method: ICH volume was determined from baseline INTERACT2 CT scans using the ABC/2 and modified ABC/2 (mABC/2: C derived by comparing each CT slice within the ICH to the slice with the largest ICH) methods and MIStar. Associations with discrepancies between the methods were assessed using crude and adjusted linear regression models ($p < 0.01$ level of significance). Factors examined included location, volume, irregularity, heterogeneity, intraventricular extension, subarachnoid extension (SAH), white matter lesions and atrophy.
Results: 2084 patients had ICH volume measurements. The median volumes (ml) were 10.7 (MIStar), 11.1 (ABC/2) and 7.8 (mABC/2). The median discrepancy between ABC/2 and Mistar (ml) was 0.34 and between mABC/2 and MIStar was 2.4. Irregular ICH and ICH with SAH showed significant discrepancies between ABC/2 and MIStar ($p < 0.001$ both) and mABC/2 and MIStar ($p < 0.001$ and $p = 0.007$). Larger ICH led to significant discrepancy between mABC/2 and MIStar ($p < 0.001$) but not between ABC/2 and MIStar ($p = 0.07$).
Conclusion: Irregular ICH and those with SAH are associated with significant differences in ICH volume between manual and planimetric techniques. Large ICH are associated with significant differences in ICH volume between mABC/2 and the planimetric technique.

AS20-020

INTRACEREBRAL HEMORRHAGE

THE INFLUENCE OF NICOTINE AND ALCOHOL USE ON INTRACEREBRAL HEMORRHAGE

J. Sembill[1], M. Sprügel[1], S. Gerner[1], V. Beuscher[1], A. Giede-Jeppe[1], P. Hoelter[2], H. Luecking[2], J. Kuramatsu[1] and H. Huttner[1]
[1]University Hospital Erlangen, Neurology, Erlangen, Germany
[2]University Hospital Erlangen, Neuroradiology, Erlangen, Germany

Background and Aims: The influence of nicotine and/or alcohol use (licit drug use, LDU) on outcome measures after intracerebral hemorrhage (ICH) is insufficiently established. We investigated drug-specific associations with (i) neuroradiological and clinical parameters and (ii) functional long-term outcome after ICH.
Method: This observational cohort study analyzed consecutive spontaneous ICH patients ($n = 554$) from our prospective institutional ICH registry over a 5-year study period (01/2010–12/2014). We compared no-LDU patients with LDU patients, and patients using only nicotine, only alcohol, or both. To account for baseline imbalances we reanalyzed cohorts after propensity score (PS) matching.
Results: Prevalence of LDU was 197/554 (35.6%), comprising of 94/554 (17.0%) with only nicotine use, 33/554 (6.0%) with only alcohol use, and 70/554 (12.6%) with alcohol and nicotine use. LDU patients were younger (65[56–73] *versus* 75[67–82], $p < 0.01$), less often female ($n = 61/197$[31.0%] *versus* $n = 188/357$[52.7%], $p < 0.01$), had more often prior myocardial infarction ($n = 29/197$[14.7%] *versus* $n = 24/357$[6.7%], $p < 0.01$) and in-hospital complications (Sepsis/SIRS: $n = 95/197$[48.2%] *versus* $n = 98/357$[27.5%], $p < 0.01$; pneumonia: $n = 89/197$[45.2%] *versus* $n = 110/357$[30.8%], $p < 0.01$). Reanalysis after PS matching revealed no significant differences in neuroradiological or clinical parameters, in-hospital complications or long-term outcome (mortality: $n = 48/150$[32.0%] *versus* $n = 45/150$[30.0%], $p = 0.71$; mRS = 0–3: $n = 56/150$[37.3%] *versus* $n = 53/150$[35.3%], $p = 0.72$).
Conclusion: Nicotine use, alcohol use, as well as their combination were associated with significant differences in clinical and radiological baseline characteristics. However, adjusting for unevenly balanced baseline parameters revealed no differences in in-hospital parameters and functional long-term outcome after ICH.

AS20-022

INTRACEREBRAL HEMORRHAGE

INCIDENCE OF INTRACEREBRAL HEMORRHAGES DECREASED BY ONE THIRD OVER 10 YEARS IN HUNGARY – ANALYSIS OF THE NEUROHUN 2004–2013 DATABASE

D. Bereczki[1], A. Ajtay[1], D. Sisak[1] and F. Oberfrank[2]
[1]Semmelweis University, Depatment of Neurology, Budapest, Hungary
[2]Hungarian Academy of Sciences, Institute of Experimental Medicine, Budapest, Hungary

Background and Aims: Stroke mortality has been decreasing continuously in Hungary since 1980. Decrease in incidence as well as in case fatality might be in the background. Of all strokes about 10% are intracerebral hemorrhages, with much higher case fatality than ischemic strokes. We analyze the 10-year trend in the incidence and case fatality of intracerebral hemorrhages (ICH) in Hungary.
Method: Hungary has a single-payer health insurance system covering the whole population of 10 million inhabitants. In the framework of the Hungarian Brain Research Program we created the anonymized NEUROHUN database from medical reports submitted for reimbursement purposes to the National Health Insurance Fund from all hospitals and outpatient services throughout the country for the ten-year period between 2004 – 2013. ICD-10 codes were used for diagnoses. The annual number of intracerebral hemorrhages were analyzed in the 2004–2013 period. Thirty-day and one-year case fatality were also calculated.
Results: In this 10-year period 52,443 persons were treated with intracerebral hemorrhage (ICD-10: I61-I62), and a further 6,611 patients with both ICH and subarachnoid hemorrhage. Crude incidence continuously decreased from 71/100.000 inhabitants/year in 2004 to 46/100.000 inhabitants/year in 2013. Case fatality was stable with values of 39% at 30 days and 52% at one year.
Conclusion: The 36% decrease in the incidence of ICH in Hungary over this 10-year period is possibly the result of more effective treatment of hypertension in the population. Decreasing incidence of ICH in the population is a major component of the overall decrease in stroke mortality in Hungary.

AS20-023

INTRACEREBRAL HEMORRHAGE

CLINICO-EPIDEMIOLOGICAL CHARACTERISTICS OF INTRACEREBRAL HEMORRHAGE IN A SOUTHERN AREA OF PORTUGAL

H. Nzwalo[1,2], J. Nogueira[1], C. Felix[3], P. Guilherme[3], P. Abreu[1], F. Ferreira[3], A. Marrreiros[1], L. Thomassen[2,4] and N. Logallo[2,4]
[1]University of Algarve, Biomedical Sciences and Medicine, Faro, Portugal
[2]University of Bergen, Clinical Medicine, Bergen, Norway
[3]Centro Hospitalar do Algarve, Neurology, Faro, Portugal
[4]Haukeland University Hospital, Neurology- Centre for Neurovascular Diseases, Bergen, Norway

Background and Aims: Intracerebral hemorrhage (ICH) is the second most common type of stroke and is characterized by high 30-day case fatality. Despite this,.
the number of studies describing the characteristics and mortality of ICH is relatively scarce. Therefore, we described the clinico-epidemiological characteristics and short-term mortality of spontaneous ICH (SICH) in Algarve, Portugal.
Method: Patients with SICH consecutively admitted to the only public hospital of Algarve from 2009 to 2015 were retrospectively included into the study. Patients with non SICH (traumatic, hemorrhagic transformation, structural lesions) were excluded. Sociodemographics, risk factors, radiological, medical complications and type of medical care were recorded. Logistic regression analysis was performed to identify factors independently associated with 30-day mortality.
Results: 549 patients were included, 349 (63.6%) men (mean age 71.4 years), 200 women (mean age 74.5 years). On admission, 120 patients (21.9%) were comatose (GCS $\leq$ 9). Hematoma location was: deep (56.1%), lobar (27.3%), cerebellar (9.5%), brainstem (4.2%), others (2.9%). Frequent risk factors were hypertension (94%), use of antithrombotic treatment (34.6%), diabetes (29.5%) and unhealthy alcohol use (17.5%). 217 patients (39.5%) did not receive stroke unit (SU) care. The 30-day mortality was 34.4%. Independent predictors of death were older age, previous stroke, use of vitamin K-antagonists, GCS $\leq$ 9 at presentation, high hematoma volume/admission blood glucose, ventricular dissection, medical complications and non-admission to SU.
Conclusion: The demographics and clinico-radiological characteristics of SICH were comparable to earlier European studies. The 30-day mortality was high but within the range reported worldwide (13.1–61.0%, median 40.4%). SU care was independently associated to lower mortality and should, therefore, be promoted.

AS20-024

INTRACEREBRAL HEMORRHAGE

PRIMARY INTRAVENTRICULAR HEMORRHAGE IN THE CLEAR III TRIAL

S. Nelson[1], A. Mould[2], R. Thompson[3], R. Dlugash[2], I. Awad[4], D.F. Hanley[2] and W. Ziai[2]
[1]Johns Hopkins University, Neurology, Baltimore, USA
[2]Johns Hopkins University, Brain Injury Outcomes Division, Baltimore, USA
[3]Johns Hopkins University, Johns Hopkins Bloomberg School of Public Health, Baltimore, USA
[4]University of Chicago, Neurosurgery, Chicago, USA

Background and Aims: Intraventricular hemorrhage (IVH) occurs as a primary disease or due to intracerebral hemorrhage (ICH) with IV extension. IV thrombolysis may improve outcomes in certain populations. We evaluated whether patients with primary IVH from CLEAR III trial (Clot Lysis Evaluation of Accelerated Resolution of Intraventricular Hemorrhage) benefitted from IV thrombolysis.
Method: Patients with primary IVH on independent imaging adjudication versus those with a parenchymal source were compared by clinical variables, IV alteplase response, and outcomes including modified Rankin scale (mRS), Barthel Index (BI), National Institutes of Health Stroke Scale (NIHSS) and extended Glasgow Outcome Scale (eGOS) at 30, 180 and 365 days using Wilcoxon rank-sum tests.
Results: Of 500 subjects enrolled in CLEAR III, 33 (6.6%) had primary IVH. These patients had larger enrollment IVH volumes (median (IQR): 34.2 mL(23.3–57.7) versus 21.1 mL(12.7–35.3); $p = 0.0008$) but experienced similar IVH removal (56.4%(30.6–82.1) versus 58.1%(34.7–77.1); $p = 0.90$) compared to subjects with ICH plus IVH. Total study agent doses, days mechanically ventilated, and days in intensive care were similar for patients with primary IVH and without. Primary IVH patients achieved better outcomes for NIHSS, mRS, BI, and eGOS at days 30, 180, and 365 (all $p < 0.01$). Primary IVH patients who received IV alteplase (14, 42.4%) versus placebo (19, 57.6%) had similar outcomes at all time points (all $p > 0.05$) and also had no difference in IVH volume removal ($p = 0.49$).
Conclusion: In CLEAR III, patients with primary IVH achieved better long-term outcomes than those without. Primary IVH may be a presenting factor associated with improved prognosis.

AS20-028

INTRACEREBRAL HEMORRHAGE

RISK FACTORS FOR INTRACEREBRAL HEMORRHAGE IN THE YOUNG: A CASE-CONTROL STUDY

R. Kivioja[1,2,3], A. Pietilä[4], R.J. Koivunen[1,5], A.S. Havulinna[4], V. Salomaa[4], S. Curtze[1,2] and T. Tatlisumak[1,2,6,7]
[1]University of Helsinki, Clinical Neurosciences- Department of Neurology, Helsinki, Finland
[2]Helsinki University Hospital, Department of Neurology, Helsinki, Finland
[3]University of Helsinki, Clinicum, Helsinki, Finland
[4]National Institute for Health and Welfare, -, Helsinki, Finland
[5]Päijät-Häme Central Hospital, Department of Anesthesiology, Lahti, Finland
[6]Sahlgrenska University Hospital, Department of Neurology, Gothenburg, Sweden
[7]Institute of Neuroscience and Physiology, Sahlgrenska Academy at the University of Gothenburg, Gothenburg, Sweden

Background and Aims: Risk factors for young-onset intracerebral hemorrhage (ICH) are not fully established. We analyzed the risk factors for ICH in young individuals in a single center case-control study.
Method: Patients with non-traumatic ICH at the age of 25–49 years (Helsinki ICH in the Young Study) were compared with sex- and age-matched (5-year bands) stroke-free controls from a population-based cohort study (FINRISK) from the same geographical area. Risk factors assessed included hypertension, diabetes mellitus type 1 (T1D) and 2 (T2D), cardiac disease, current smoking, heavy alcohol use, active malignancy, family history of stroke, high LDL-cholesterol, low HDL-cholesterol, high triglycerides, and antiaggregation, warfarin and statin therapies. We analyzed risk factors in a logistic regression model of all etiologies and separately risk factors for ICH of hypertensive or unknown etiologies, adjusting for sex and age.
Results: A total of 305 patients (124 females and 181 males) with ICH were compared with 672 controls (272 females and 400 males). All risk factors except for warfarin therapy, high triglycerides (in all etiologies), and T2D (in hypertensive or unknown etiologies) were statistically significant in univariate analysis. In multivariate analysis, independent risk

factors for ICH of all etiologies were cardiac disease (odds ratio 4.42, 95% confidence interval 1.27–15.34), hypertension (3.86, 2.61–5.71), and T1D (3.49, 1.28–9.52). In ICH of unknown or hypertensive etiology (n = 190), hypertension (6.85, 4.51–10.40), cardiac disease (4.56, 1.07–19.38), and T1D (3.77, 1.28–11.11) had statistically significant associations.
Conclusion: In the young, hypertension, cardiac diseases, and T1D appear as risk factors for ICH.

AS20-029

INTRACEREBRAL HEMORRHAGE

FACTORS ASSOCIATED WITH INCREASED PERIHEMORRHAGIC EDEMA EVOLUTION AFTER INTRACEREBRAL HEMORRHAGE

B. Volbers[1], A. Giede-Jeppe[1], S. Gerner[1], J. Sembill[1], J. Kuramatsu[1], S. Lang[2], H. Lücking[2], D. Staykov[3] and H. Huttner[1]
[1]University of Erlangen-Nuremberg, Neurology, Erlangen, Germany
[2]University of Erlangen-Nuremberg, Neuroradiology, Erlangen, Germany
[3]Hospital of the Brothers of St. John, Neurology, Eisenstadt, Austria

Background and Aims: Growing evidence suggests a significant impact of perihemorrhagic edema (PHE) evolution on outcome after intracerebral hemorrhage (ICH). So far, ICH volume on admission could be identified as main factor influencing PHE evolution. However, detailed analyses are missing.
Method: Patients with spontaneous supratentorial ICH were retrospectively identified. Patients were dichotomized according to a) median peak PHE volume and b) median PHE evolution between day 1 and 3. The impact of multiple parameters was analyzed using a) logistic regression and b) additional propensity score-matching (PSM) accounting for age, ICH volume and location. ICH and PHE volume were obtained using a validated threshold-based semiautomatic algorithm.
Results: 292 patients were included. Median age was 70 (IQR 62.3–78) years, median ICH volume on admission 17.7 (IQR 7.9–40.2) mL. Multivariable logistic regression revealed peak ICH volume (Exp (B) 1.097(95%CI 1.068–1.126), age (Exp (B) 0.968(95%CI 0.941–0.996), initial PHE increase up to day 3 (Exp (B) 1.063(95%CI 1.023–1.104) and lymphocyte count on day 4 after admission (Exp (B) 0.415(95%CI 0.199–0.866) as independent predictors of a peak PHE volume above median. In the PSM-cohort (n = 124) initial PHE increase (Exp (B) 1.060(95%CI 1.018–1.103) and neutrophil-to-lymphocyte ratio on day 6 (Exp (B) 1.236(95%CI 1.034–1.477) remained significant predictors. Initial PHE increase up to day 3 (PSM-cohort, n = 224) was predicted by rebleed volume (Exp (B) 1.156(95%CI 1.078–1.240) and fever burden on days 2 and 3 (Exp (B) 1.529(95%CI 1.142–2.048).
Conclusion: Amongst others, rebleed volume and inflammatory parameters associated with infectious complications seem to play an important role in PHE evolution. Those parameters may represent therapeutic targets which should be further evaluated in prospective trials.

AS20-031

INTRACEREBRAL HEMORRHAGE

THE EFFECT OF ANTICOAGULANT AND ANTIPLATELET THERAPY ON THE OCCURRENCE OF PRIMARY INTRACEREBRAL HEMORRHAGE

A. Lucic Prokin[1], A. Pakoci[2], S. Popovic[1], Z. Zivanovic[3], A. Jovanovic[1] and N. Popovic[3]
[1]Clinical Center of Vojvodina, Emergency Center, Novi Sad, Serbia
[2]Faculty of Medicine- University of Novi Sad- Serbia, Faculty of Medicine, Novi Sad, Serbia
[3]Clinical Center of Vojvodina, Clinic of Neurology, Novi Sad, Serbia

Background and Aims: Many studies found that anticoagulant and antiplatelet drugs are risk factors for primary intracerebral hemorrhage (pICH). The presented study aims at determing the effect of anticoagulant (AC) and antiplatelet therapy (AT) on the occurrence of pICH, localization of bleeding and outcome of pICH.
Method: Retrospective study included 246 adult patients with first time diagnosed pICH, hospitalized at the Clinic for Neurology and the Emergency Centre in Novi Sad, from January 2014 to December 2015. Patients were divided into three groups: AC, AT and without AC/AT.
Results: 157 males (63.8%) and 89 (36.2%) females with mean age of 67.9 were enrolled in the study. 50 (20.3%) patients were on AT, and 20 (8.2%) on AC, while the other 176 (71.5%) didn't take AC/AT in the premorbid period. The most common risk factor was hypertension (97.2%). Supratentorial localization dominated in all groups. The only risk factor that significantly corelated with pICH localization was alcohol abuse. There was no statistically significant difference in NIHSS score on admission or mRS at discharge among groups. AC users had the highest mortality rate in the first 24 hours (OR = 2.5). Patients in the other two groups recorded a significant tendency for survival ($p < 0.000$) (OR = 1.5).
Conclusion: Previous ishemic stroke with antiplatelet therapy use, hypertension and alcohol abuse were important risk factors for pICH. Early mortality was specific for AC users.

AS20-032

INTRACEREBRAL HEMORRHAGE

EARLY MOBILISATION AFTER INTRACEREBRAL HAEMORRHAGE: ASSOCIATION WITH SURVIVAL AND BLOOD PRESSURE

J. Rowland[1], C. Heal[2], R. Collins[3], G. Smith[3], U. Hammerbeck[4], A. Vail[2] and A. Parry-Jones[1]
[1]University of Manchester, Division of Cardiovascular Sciences- School of Medical Sciences- Faculty of Biology- Medicine and Health, Manchester, United Kingdom
[2]University of Manchester, Division of Population Health- Health Services Research & Primary Care- School of Health Sciences- Faculty of Biology-Medicine and Health, Manchester, United Kingdom
[3]Salford Royal NHS Foundation Trust, Greater Manchester Neurosciences Centre, Salford, United Kingdom
[4]University of Manchester, Division of Nursing- Midwifery & Social Work-School of Health Sciences- Faculty of Biology- Medicine and Health, Manchester, United Kingdom

Background and Aims: The AVERT study demonstrated that early mobilisation after stroke worsens outcome and suggested particular detriment in intracerebral haemorrhage (ICH). A plausible mechanism could be increased, or more variable, blood pressure. We assessed associations between time to first mobilisation, survival, and subacute blood pressure in ICH patients presenting within 24 h to our UK Comprehensive Stroke Centre.
Method: We extracted demographic, clinical and imaging data from 475 consecutive patients between 04/06/2014 and 30/07/2016. Time to first mobilisation (defined as walking, standing, or sitting out-of-bed) was extracted from electronic records. After excluding patients (n = 53) who died by 24 h or with missing covariate data, we used multifactorial logistic regression to evaluate the association between time to first mobilisation and death by 30 days.

Results: Unifactorial analysis showed later mobilisation was associated with increased mortality OR(95% CI) = 9.28 (2.86 to 30.13); $p < 0.001$). Adjustment for risk factors substantially attenuated this OR(95% CI) = 1.43(0.36 to 5.60); $p = 0.61$). We did not find a difference in the mean (group difference (95%CI) = 4.59 (−.37 to 9.54); $p = 0.07$) or SD (group difference (95%CI) = 1.07(−2.03 to 4.17);$p = 0.5$) of subacute blood pressure between early (<24 h) and late (>24 h) mobilisers.
Conclusion: Our unadjusted analysis tallies with pre-AVERT clinical consensus; that late mobilisation is associated with worse outcome. However, this association was fully accounted for by case mix. Further adjustment for unrecorded confounding, which can only be achieved within a randomised trial, may explain the results of AVERT. We did not find evidence of increased levels, or variation, of blood pressure with early mobilisation.

AS20-034

INTRACEREBRAL HEMORRHAGE

INTRACEREBRAL HAEMORRHAGE OUTCOMES AND THEIR PROGNOSTIC FACTORS: PRELIMINARY RESULTS FROM A PROSPECTIVE STUDY IN VILNIUS

A. Gavrilova[1], I. Slautaitė[2], A. Sabestinaitė[3], B. Viesulaitė[4], R. Masiliūnas[1] and D. Jatužis[1]
[1]Vilnius University Hospital Santariskiu Klinikos, Neurology Department, Vilnius, Lithuania
[2]Republican Vilnius University Hospital, Neurology Department, Vilnius, Lithuania
[3]Vilnius University, Medical Faculty, Vilnius, Lithuania
[4]Klaipėda Seamen's Hospital, Neurology Department, Klaipėda, Lithuania

Background and Aims: Intracerebral heamorrhage (ICH) is an important neurological condition, amounting to around 10 percent of all strokes. We aimed to evaluate the ICH outcomes and their prognostic factors in a prospective study in Vilnius, Lithuania.
Method: Patients admitted with ICH in two Vilnius University hospitals were investigated from November 2015 until March 2016. Epidemiological, anamnestic and laboratory test data were collected. Physical examination was performed on admission and on discharge, and complications were documented. Early outcomes on discharge were assessed using modified Rankin Scale (mRS). Prognostic values were assessed using logistic regression and ROC curve.
Results: Out of 93 patients (44 (47.3%) female, mean age 64,5 ± 12,7 y) enrolled, bad outcomes (mRS 4–6) were documented in 55 (67,1%) patients, 19 (20,4%) of whom were deceased. The prognostic variables predictive of mortality were ICH volume ($p = 0{,}016$, OR 1,018; AUC 0,688, $p = 0{,}017$), female gender ($p = 0{,}044$, OR 3,005; AUC 0,367, $p = 0{,}076$), arrhythmia on admission ($p = 0{,}014$, OR 4,333; AUC 0,656, $p = 0{,}054$), and total NIHSS score ($p < 0{,}001$, OR 1,171; AUC 0,853, $p < 0{,}001$). Every additional NIHSS motor deficit point increased mortality risk 1,4-fold ($p < 0{,}001$, AUC 0,797); every additional aphasia point increased mortality risk 3,3-fold ($p < 0{,}001$, AUC 0,829). Low hemoglobin levels ($p = 0{,}002$) and low Glasgow coma scale score ($p < 0{,}001$) were also associated with increased risk of death.
Conclusion: Bad outcome was observed in more than one half of the ICH patients. Larger ICH, female gender, arrhytmia on admission and greater NIHSS score predicted higher mortality rates. We continue collecting data on long-term outcomes and brain imaging.

AS20-035

INTRACEREBRAL HEMORRHAGE

PRE-STROKE HOSPITAL CONTACTS FOR PATIENTS WITH INTRACEREBRAL HAEMORRHAGE: AN OBSERVATIONAL STUDY USING LINKED AUSTRALIAN STROKE CLINICAL REGISTRY AND HOSPITAL DATA FROM QUEENSLAND

D. Cadilhac[1,2], M. Kilkenny[1,2], R. Grimley[3], V. Sundararajan[4], T. Johnston[5], B. Grabsch[2], A. Thrift[1], N. Lannin[6], C. Anderson[7], G. Donnan[2], S. Middleton[8] and N. Andrew[1]
[1]Monash University, School of Clinical Sciences at Monash Health, Clayton, Australia
[2]Florey Institute of Neuroscience and Mental Health, Stroke, Melbourne, Australia
[3]University of Queensland, Medicine, Brisbane, Australia
[4]St Vincent's Hospital, Medicine, Melbourne, Australia
[5]Queensland Health, Statistical Analysis and Linkage Unit, Brisbane, Australia
[6]La Trobe University, Occupational Therapy, Melbourne, Australia
[7]The George Institute for Global Health, Neuroscience, Sydney, Australia
[8]Australian Catholic University and St Vincent's Hospital, Nursing Research Insitute, Sydney, Australia

Background and Aims: Little is known about the frequency of contacts with hospitals prior to an intracerebral haemorrhage (ICH) and if there were missed opportunities for stroke prevention. We determined the number of emergency presentations or admissions to hospital within three months prior to an ICH and describe if risk factors were the reason for contacts.
Method: Australian Stroke Clinical Registry (AuSCR) data obtained in Queensland (2009–13; where there is the greatest coverage) were linked to Emergency Department (ED) and hospital admissions datasets. The first stroke registered in the AuSCR was the index event. A three month 'look-back' period was evaluated. Comorbidities were derived using ICD-10 coding. Descriptive statistics performed.
Results: Among 5,616 registrants, 705 (13%) had an ICH (51% male, 50% aged 75 + years, 80% first-ever events). Within three months prior to their ICH, 86 (12%) registrants had 136 ED presentations (median time to last presentation before ICH: 17 days) and 153 (22%) experienced 211 hospital admissions (median time to admission before ICH: 34 days). Very few patients had a risk factor recorded as the primary diagnosis in ED presentations (1% hypertension, 3% atrial fibrillation, 0.1% diabetes). A larger proportion of patients had a pre-ICH hospital admission discharge diagnostic code for stroke risk factors: 18% hypertension, 9% atrial fibrillation, 10% diabetes.
Conclusion: About one in five patients with ICH have contact with hospitals three months prior to this major event. Some who were admitted to hospital, had important stroke risk factors, especially hypertension, that should be addressed to mitigate subsequent ICH.

AS20-037

INTRACEREBRAL HEMORRHAGE

COMPUTED TOMOGRAPHY FEATURES AND OUTCOMES OF NON-VITAMIN K ANTAGONIST ORAL ANTICOAGULANT-RELATED INTRACEREBRAL HEMORRHAGE COMPARED TO INTRACEREBRAL HEMORRHAGE ON WARFARIN AND ASA

T. Patil[1], S. Al-Zahrani[1], J.Y.W. Chen[1], A. Alharbi[1], N. Zamir[1], C.S. Kase[2] and A. Shoamanesh[1]
[1]McMaster University/Population Health Research Institute, Medicine, Hamilton, Canada
[2]Emory University, Neurology, Atlanta, USA

Background and Aims: Increasing use of non-vitamin K antagonist oral anticoagulants (NOACs) has led to greater numbers of NOAC-related intracerebral hemorrhage (NOAC-ICH) presenting to hospital. Comparative data on computed tomography (CT) characteristics and outcomes of NOAC-ICH relative to ICH occurring on warfarin (warfarin-ICH) or acetylsalicylic acid (ASA-ICH) are limited outside of clinical trials.
Method: Consecutive ICH patients admitted to Hamilton Health Sciences between 01/2010–12/2016 were reviewed for cases of NOAC-ICH and controls consisting of warfarin-ICH and ASA-ICH. Hematoma expansion (HE) was defined as >6 ml or >33% growth between baseline and follow-up CT within 72 h.
Results: Cases consisted of 8 NOAC-ICH and controls of 46 warfarin-ICH and 48 ASA-ICH with median ages of 78, 74 and 74y($p = 0.28$), respectively. Relative to warfarin-ICH and ASA-ICH, NOAC-ICH had over-representation of deep location (63% vs. 21%, $p = 0.01$ and 30%, $p = 0.08$ respectively), underrepresentation of IVH(25% vs. 67%, $p = 0.02$; 48%, $p = 0.23$) and fluid level (0% vs. 25%, $p = 0.11$; 13%, $p = 0.28$) on CT, and lower ICH volumes (median 7 ml[IQR 2–31], vs. 28 ml[9–81], $p = 0.04$; 24 ml[8–52], $p = 0.06$) and total combined Barras density/shape scores (4[1–8] vs. 8[5–10], $p = 0.04$; 7[4–9], $p = 0.05$) at presentation. HE occurred in 33% of NOAC-ICH, 50% of warfarin-ICH($p = 0.60$) and 33% of ASA-ICH($p = 1.0$). NOAC-ICH had 6-fold increased age-adjusted odds of a good outcome (mRS ≤ 4) at discharge relative to warfarin-ICH(OR 6.2, 95%CI 1.0–38.2) and 7-fold odds relative to ASA-ICH(7.2, 1.2–41.9), as well as 15-fold and 16-fold increased age-adjusted odds of disposition to home or a rehabilitation facility relative to warfarin-ICH(14.8, 1.6–139.2) and ASA-ICH(16.4,1.8–150.8), respectively.
Conclusion: NOAC-ICH may have favorable CT characteristics and outcomes compared to warfarin-ICH and ASA-ICH. Limited by small sample size, our findings require validation in larger datasets.

AS20-038

INTRACEREBRAL HEMORRHAGE

REVERSAL OF DABIGATRAN BY IDARUCIZUMAB IN CASES OF INTRACRANIAL HAEMORRHAGE IN GERMANY – A NATIONAL CASE COLLECTION

M. Grond[1], P. Kermer[2], C. Eschenfelder[3] and H.C. Diener[4]
[1]Kreisklinikum Siegen, Department of Neurology, Siegen, Germany
[2]Nordwestkrankenhaus Sanderbusch, Department of Neurology, Sande, Germany
[3]Boehringer Ingelheim Pharma GmbH & Co. KG, Medical Affairs Germany, Ingelheim am Rhein, Germany
[4]University Hospital Essen, Department of Neurology, Essen, Germany

Background and Aims: In a report on non-traumatic non-vitamin K antagonist oral anticoagulant-associated intracranial haemorrhage (ICH), haematoma expansion was observed in 38% and mortality was 28% (Purrucker et al. *JAMA Neurol.* 2016). Idarucizumab is a monoclonal antibody fragment that rapidly reverses the anticoagulant effects of dabigatran. We summarize the German national experience with idarucizumab in patients treated with dabigatran presenting with ICH.
Method: Retrospective data were collected from German neurological/neurosurgical departments administering idarucizumab from January 2016 following product launch.
Results: In the first 8 months until August 2016, 12 patients with atrial fibrillation treated with dabigatran presented with ICH (eight intracerebral, three subdural and one subarachnoid). Median age was 77 years. Surgical intervention was necessary in four individuals. All 12 received idarucizumab according to the prescribing information. There was no haematoma growth in 10 out of 12 patients on follow-up computed tomography scans. Mortality was low; one patient died – an individual who presented with massive bleeding (134.5 mL haematoma volume) and signs of herniation on admission. Overall, outcome was favourable with a median National Institutes of Health Stroke Scale improvement of 5.5 points at discharge. Modified Rankin score was 0–3 in eight out of 12 patients. Results for an updated set of approximately 30 ICH patients will be presented at the meeting.
Conclusion: Idarucizumab application appears to help prevent haematoma growth and might reduce mortality and/or improve outcome in cases of haemorrhagic stroke. This case collection adds important clinical information until further robust data from large prospective registries become available.

AS20-040

INTRACEREBRAL HEMORRHAGE

INCIDENCE AND SHORT-TERM OUTCOME FROM INTRACEREBRAL HEMORRHAGE IN A SOUTHERN REGION OF PORTUGAL

H. Nzwalo[1,2], J. Nogueira[1], C. Felix[3], P. Guilherme[3], A. Baptista[4], L. Almeida[5], T. Figueiredo[1], F. Ferreira[3], A. Marreiros[1], L. Thomassen[2,6] and N. Logallo[2,6]
[1]University of Algarve, Biomedical Sciences and Medicine, Faro, Portugal
[2]University of Bergen, Clinical Medicine, Bergen, Portugal
[3]Centro Hospitalar do Algarve, Neurology, Faro, Portugal
[4]Centro Hospitalar do Algarve, Emergency and Intensive Care, Faro, Portugal
[5]Centro Hospitalar do Algarve, Internal Medicine, Faro, Portugal
[6]Haukeland University Hospital, Neurology- Centre for Neurovascular Disease, Bergen, Norway

Background and Aims: The incidence rates of spontaneous intracerebral hemorrhage (SICH) are variable. Methodological and population differences account for this variability. Data on the incidence of SICH is scarce in Portugal. Therefore, we conducted a prospective study to determine the incidence and short outcome of SICH in a southern region of the country.
Method: Recommended criteria for stroke incidence studies were used. First-ever SICH cases in inhabitants of the oriental Algarve (280,081 inhabitants) between 1st January 2015 and 31st December 2015 were identified. Combination of active and passive methods and multiple sources of information was used. Crude and age standardized rates for the European population were calculated. Short-term outcome was measured by the modified Rankin Scale [(mRS) good outcome mRS ≤ 2, poor outcome mRS 3–5 and death = 6].
Results: 82 first-ever SICH patients were identified; mean age was 72.3 ± 12.8 years; 53 (64.6 %) were males. Majority were deep (50%) and lobar (36.7%). Eight (9.7%) were using anticoagulants (4 using novel

hypocoagulants). The overall crude annual incidence rate was 34.4/100000 (95% confidence interval 27.4–42.8; $P < 0.001$); higher in men (47,2/100000) than women (23,1/100000). When standardized to the European population, the overall incidence was 15,1/100000 (95% confidence interval 3.6–18.9; $P < 0.05$); 26,9 and 10.9/100000 for men, women respectively. In-hospital mortality was 37.17%. The majority (61.2 %) of survivors had mRS ≥ 3.

Conclusion: The incidence of SICH in Algarve is close to the rates recently found in Europe. Men are at higher risk than women. In-hospital mortality is high and the survivors are severely incapacitated.

AS20-042

INTRACEREBRAL HEMORRHAGE

HYPERTENSIVE CARDIOMYOPATHY IS ASSOCIATED WITH HYPERTENSIVE BLEEDING ETIOLOGY IN PATIENTS WITH SPONTANEOUS INTRACEREBRAL HEMORRHAGE

L.P. Pallesen[1], J. Wagner[1], J. Barlinn[1], K. Barlinn[1], A. Prakapenia[1], T. Siepmann[1], M. Weise[2] and V. Puetz[1]
[1]University Hospital/TU-Dresden, Neurology, Dresden, Germany
[2]University Hospital/TU-Dresden, Medical Clinic, Dresden, Germany

Background and Aims: Arterial hypertension is the most frequent cause for spontaneous intracerebral hemorrhage (sICH) and may cause hypertensive cardiomyopathy as an important comorbidity. We sought to analyze the frequency of hypertensive cardiomyopathy on transthoracic echocardiography (TTE) in patients with hypertensive sICH compared with other sICH etiologies.

Method: We performed a retrospective, single-center, observational cohort study. We included all consecutive patients with sICH who were admitted to our tertiary stroke center from 2010 until 2013. As part of our standardized diagnostic work-up, all patients with sICH receive TTE. Data acquisition was performed via electronic chart review including demographic characteristics, baseline NIHSS scores and neuroradiological findings. Hypertensive sICH was defined as typical localization of hemorrhage in patients with arterial hypertension and no other definitive causes for sICH. Hypertensive cardiomyopathy was defined as left ventricular hypertrophy on TTE without other underlying structural cardiac pathologies.

Results: Of 392 patient included in the study period, all data was available in 193 (49%) patients (mean age 69 years [$\pm$12 years]), 62% male, median baseline NIHSS score 8 [IQR 3–15]). 152 patients (79%) had hypertensive sICH and 41 (21%) patients had further sICH etiologies. In total, 124 patients (64%) had hypertensive cardiomyopathy. Compared with patients with non-hypertensive sICH, hypertensive cardiomyopathy was more frequent in patients with hypertensive sICH (106/152 [70%] vs. 18/41 [44%], Risk Ratio 1.6, 95%CI 1.10 – 2.28; $p < 0.01$).

Conclusion: In patients with sICH, hypertensive cardiomyopathy on TTE is associated with hypertensive bleeding etiology.

AS20-043

INTRACEREBRAL HEMORRHAGE

IMPLICATION OF THE USE OF ANTIDEPRESSANTS IN THE NEUROLOGICAL DETERIORATION OF PATIENTS WITH INTRACEREBRAL HEMORRHAGE

M. Terceño[1], J. Serena[1], I. Bragado[1], S. Bashir[1] and Y. Silva[1]
[1]Dr. Josep Trueta Hospital, Neurology, Girona, Spain

Background and Aims: Antidepressants that produce serotonin transport inhibition (STI) have been related to the risk of gastrointestinal bleeding. Recent studies have postulated its implication with the risk of presenting an intracerebral hemorrhage (ICH) and a higher morbimortality.

We studied the relationship between early neurological deterioration (END) and late (LND) with STI in patients with HIC admitted to our center.

Method: A total of 294 patients were prospectively included. Demographic variables, previous treatments, neuroimaging, clinical and follow-up at 3 months were evaluated using the modified Rankin scale (mRs).

Results: 9.5% of them were taking some STI when the ICH occurred. There were no statistically significant differences in age, sex, etiology, topography and volume of ICH, baseline NIHSS and 24 hours later.

In contrast, patients with STI intake had a statistically significant higher frequency of END and LND (46.4 vs 25.4%, p: 0.019 and 15.4 vs 4.9%, p: 0.32 respectively) and contrast extravasation (CE) through computed tomography angiography (47.1% vs 20%, p: 0.013).

At 3 months, patients with STI intake presented worse functional prognosis, although with no statistically significant differences (mRs 0–2: 25.9 vs 39%, p: 0.131).

In the logistic regression, STI intake was the only predictor of LND (OR: 3.582 95% CI (1.027–12.488)).

Conclusion: STI intake is an independent factor of LND in patients with ICH and maybe related to a worse functional prognosis al 3 months. Larger studies are needed to test this hypothesis.

AS20-044

INTRACEREBRAL HEMORRHAGE

LEFT ATRIAL APPENDAGE CLOSURE: A THERAPEUTIC OPTION FOR PATIENTS WITH INTRACRANIAL HEMORRHAGE AND ATRIAL FIBRILLATION

A. Martínez-Domeño[1], F. Fayos[1], D. Arzamendi[2], P. Camps-Renom[1], L. Prats-Sánchez[1], D. Guisado-Alonso[1], R. Delgado-Mederos[1] and J. Martí-Fàbregas[1]
[1]Hospital De La Santa Creu I Sant Pau, Neurology, Barcelona, Spain
[2]Hospital De La Santa Creu I Sant Pau, Cardiology, Barcelona, Spain

Background and Aims: The use of oral anticoagulants is controversial in patients with a history of atrial fibrillation (AF) and intracranial hemorrhage (ICH), given the risk of bleeding recurrence. We present the experience of our center in percutaneous left atrial appendage closure (LAAC), an alternative to long-term anticoagulation in this context.

Method: We conducted an observational, retrospective and unicentric study. LAAC was performed in patients with ICH who required long-term oral anticoagulation due to a diagnosis of non-valvular atrial fibrillation between 2013 and 2016. The risk of ischemic and hemorrhagic events was estimated using the CHA_2DS_2Vasc and HAS-BLED scores. We recorded periprocedural complications, ICH recurrence, cerebral or systemic embolism, and mortality after closure and during follow-up. Finally, we recorded the use of antithrombotics after the procedure.

Results: LAAC was performed in 9 patients (7 men, 2 women). Amplatzer Amulet device was used in 7 patients and Amplatzer Cardiac Plug in 2 other patients. The mean age was 72.7 $\pm$ 8.2 years. LAAC was performed within the first month after the ICH in 4 patients. Median CHA_2DS_2Vasc score was 4, and median HAS-BLED score was 3. No patient had periprocedural complications. During a mean follow-up of 15 months (range 3 to 26), no ischemic or hemorrhagic events were recorded. All patients received antiplatelet therapy after the procedure (5 Clopidogrel, 4 Aspirin).

Conclusion: In the present series, LAAC was a safe and effective alternative for patients with ICH requiring anticoagulation due to Atrial Fibrillation.

AS20-045

INTRACEREBRAL HEMORRHAGE

CEREBRAL MICROEMBOLISM IN PATIENTS WITH INTRACEREBRAL HEMORRHAGE: A PILOT STUDY

E.C. Rocha[1], C. Rouanet[1], D. Reges[1], V. Gagliardi[1], R. Valiente[1] and G. Silva[1]
[1]Universidade Federal de São Paulo, Neurology, São Paulo, Brazil

Background and Aims: Ischemic lesions in intracerebral hemorrhages (ICH) are frequent, occurring in 25 to 35% of cases. Several uncertainties exist regarding such lesions etiology and their relationship with intracranial emboli. This pilot study aims to evaluate the frequency of spontaneous microembolic signals (MES) on transcranial Doppler (TCD) in patients admitted with acute ICH.
Method: We have evaluated eight consecutive cases of acute ICH prospectively and monitored each middle cerebral artery (MCA) for 1 hour on days one, three and seven of admission. TCD was performed using 2 MHz probes.
Results: Fifty percent of patients were female and the mean age was 57,62 +/- 12.8. MES were detected in six out of eight patients (75%) (Table 1)..
Conclusion: In conclusion, a high prevalence of MES was identified in this pilot study of patients admitted with acute ICH. Further research is needed to identify the mechanism for cerebral microembolism in patients with ICH and whether it is related to ischemic lesions in these patients.

AS20-048

INTRACEREBRAL HEMORRHAGE

IMPACT OF SEIZURES AND STATUS EPILEPTICUS ON HOSPITAL UTILIZATION, IN-HOSPITAL MORTALITY, PALLIATIVE CARE, HOSPITAL CHARGES AND LENGTH OF STAY AMONG INTRACEREBRAL HEMORRHAGE (ICH) PATIENTS

M.R. Afzal[1], M.A. Qureshi[1], G. Rodriguez[1], R. Khatri[1], A. Maud[1], I.A. Qureshi[1] and S. Cruz-Flores[1]
[1]Texas Tech University Health Sciences Center, neurology, El Paso, USA

Table (AS20-045)

Patient	Sex	Age	Location	ICH Volume	Max SBP first 24 h	NIHSS	Total MES ipsilateral to ICH	Total MES contralateral to ICH
1	Female	65	Basal ganglia	7	190	18	0	0
2	Male	58	Lobar	17	140	0	3	0
3	Female	72	Lobar	70	160	21	6	3
4	Female	66	Lobar	35	212	21	1	0
5	Male	54	Thalamus	5	174	2	0	1
6	Female	68	Lobar	10	169	0	0	2
7	Male	42	Lobar	18	178	1	0	0
8	Male	36	Thalamus	10	273	14	4	0

Table (AS20-048)

	In-hospital mortality™	Palliative care ™	DNR™
OR (95%CI)	OR (95%CI)	OR (95%CI)	
ICH	Reference	Reference	Reference
ICH with seizures	0.79 (0.74 - 0.84)	0.99 (0.93–1.06)	1.07 (1.00–1.13)
ICH with status epilepticus	1.21 (1.19–1.36)	1.34 (1.19–1.50)	1.20 (1.07–1.36)

	Ventriculostomy*	Ventriculoperitoneal shunting *	Intracranial pressure monitoring*	Craniectomy*	Craniotomy*
OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	OR (95%CI)	
ICH	Reference	Reference	Reference	Reference	Reference
ICH with seizures	0.88 (0.79–0.97)	1.06 (0.85–1.32)	1.29 (1.05–1.59)	1.39 (1.05–1.84)	1.14 (0.99–1.33)
ICH with status epilepticus	1.18 (1.01–1.39)	1.46 (1.08–1.99)	1.25 (0.99–1.74)	1.17 (0.74–1.84)	1.25 (0.96–1.63)

Background and Aims: To determine effect of seizures/status epilepticus in ICH patients on resource hospital utilization.
Method: We selected intracerebral hemorrhage patient from Nationwide Inpatient Sample database for years 2011–2014 using codes (DX1 = 431, 432.0, 432.1, 432.9) from the International Classification of Diseases, 9th edition. ICH patients with in-hospital seizures (DX = 345 or 780.3) or status epilepticus (DX = 345.3) were determined by using secondary (Dx2. . .. Dx25) ICD-9 codes. Baseline variables where compared and OR were adjusted for age, gender, race, comorbidities.
Results: Of 391,778 patients with ICH, 341,242 (87.1%), 48,075 (12.3%), and 2,461 (0.6%) did not have seizures/status epilepticus, had seizures, or had status epilepticus, respectively..
Conclusion: ICH patients with seizures and status epilepticus represent 12% and 0.6% of cases yet have higher rate of in-hospital complications/procedures, length of stay, in-hospital charges, and in-hospital mortality.

AS20-049

INTRACEREBRAL HEMORRHAGE

DOOR-TO-NEEDLE TIME OF PROTHROMBIN COMPLEX CONCENTRATE ADMINISTRATION IN PATIENTS WITH INTRACEREBRAL HAEMORRHAGE USING VITAMIN K ANTAGONISTS: AN OBSERVATIONAL STUDY

E. Zock[1,2], R. Kleyweg[1], H. Kerkhoff[1], J. Bakker[3], M. Bijlsma[2], P. Voskamp[4], V. van Bavel[5] and D. van de Beek[2]
[1]Albert Schweitzer hospital, Neurology, Dordrecht, The Netherlands
[2]Academic Medical Centre, Neurology, Amsterdam, The Netherlands
[3]Albert Schweitzer hospital, Radiology, Dordrecht, The Netherlands
[4]Leiden University Medical Centre, Clinical Epidemiology, Leiden, The Netherlands
[5]St. Elisabeth hospital, Neurology, Tilburg, The Netherlands

Background and Aims: Prothrombin complex concentrate (PCC) is supposed to reduce the risk of haematoma expansion and mortality after intracerebral haemorrhage in patients taking vitamin K antagonists (VKA-ICH) and should therefore be given without delay.
We explored associations between door-to-needle time and door-to-adequate-reversal time of VKA reversal using PCC versus mortality in patients with ICH.
Method: A retrospective single-centre observational study containing 112 patients with 113 episodes of VKA-ICH.
Results: Ninety-one of 113 episodes (81%) were treated with PCC (median dose, 1000 IU). Fifty-one of 112 patients (46%) died during hospital stay. Median International Normalized Ratio (INR) before and after PCC administration was 3.2 (IQR 2.5 – 4.0) and 1.3 (IQR 1.2 – 1.5). Median door-to-needle and door-to-adequate-reversal times were 72 (IQR 36 – 119) and 173 (IQR 116 – 382) minutes. Shorter door-to-needle times were significantly associated with lower Glasgow Coma Scores (Spearman's rho $p = 0.018$). Univariable logistic regression analysis showed significant associations between higher mortality and shorter door-to-needle time ($p = 0.05$), lower Glasgow Coma Score ($p < 0.0001$), higher ICH volume ($p < 0.0001$), higher age ($p = 0.05$) and higher INR before PCC administration ($p = 0.002$). On multivariable logistic regression analysis, shorter door-to-needle times remained significantly associated with higher mortality after correction for age, Glasgow Coma Score, ICH volume and INR before PCC administration ($P < 0.0005$). There was no association between door-to-adequate reversal time and mortality ($p = 0.07$).
Conclusion: These results suggest that patients with VKA-ICH with a poor neurological state are treated faster with PCC. The probability of dying of these patients is higher.

AS20-050

INTRACEREBRAL HEMORRHAGE

HOSPITAL-SPECIFIC RATES OF EARLY DO-NOT-RESUSCITATE ORDER USE PREDICT PATIENT-LEVEL OUTCOMES FOR INTRACEREBRAL HEMORRHAGE

K. Niknam[1], D. Madhok[2], J. Vitt[3], J.C. Hemphill- III[3] and A.S. Kim[3]
[1]University of California- San Francisco, Department of Epidemiology and Biostatistics, San Francisco, USA
[2]University of California- San Francisco, Department of Emergency Medicine, San Francisco, USA
[3]University of California- San Francisco, Department of Neurology, San Francisco, USA

Background and Aims: Do-not-resuscitate (DNR) orders are commonly applied to patients with intracerebral hemorrhage (ICH), but hospital variation in early DNR use may influence outcomes independent of patient-level factors.
Method: We identified all patients admitted from the emergency department to any non-federal hospital in California with a primary discharge diagnosis of ICH using data submitted to the Office of Statewide Health Planning and Development (OSHPD). Early DNR was defined as an order placed within 24 hours of hospital admission. We derived a case-mix-adjusted DNR index for each hospital based on observed and expected DNR rates of early DNR use as predicted by a logistic model that incorporated patient demographics, insurance status, number of comorbidities, and intubation or mechanical ventilation, and compared in-hospital mortality across quartiles of this index using Cuzick's test of trend. Generalized estimating equations were used to evaluate patient and hospital-level predictors of in-hospital mortality.
Results: We identified 66,585 ICH patients treated at 128 hospitals. Early DNR rates ranged from 3% to 50%, and in-hospital mortality ranged from 16% to 38%. Hospitals in the lowest quartile of the case-mix-adjusted DNR index had lower in-hospital mortality rates for ICH (Q1 25.6% Q2 26.6% Q3 26.8% Q4 29.2%, $P < 0.001$). A 10% increase in the hospital-specific DNR rate was associated with a 23% increase in odds of in-hospital mortality (95%CI: 9%-37%, $P < 0.001$).
Conclusion: In-hospital mortality after ICH is significantly influenced by how often early DNR orders are applied at a given hospital, even after accounting for individual-level prognostic factors.

AS20-051

INTRACEREBRAL HEMORRHAGE

CONSERVATIVE VERSUS SECONDARY SURGICAL TREATMENT OF CEREBELLAR INTRACEREBRAL HEMORRHAGE LARGER THAN 3 CENTIMETERS

S.D. Singh[1], F.H.B.M. Schreuder[2], K.M. van Nieuwenhuizen[1], K. Kanselaar-Martens[2], W.M. Jolink[1], C.J.M. Klijn[2], G.J.E. Rinkel[1] and H.B. Brouwers[1]
[1]University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands
[2]Radboud University Medical Center, Department of Neurology, Nijmegen, The Netherlands

Background and Aims: Guidelines advocate hematoma evacuation in patients with spontaneous cerebellar intracerebral hemorrhage (ICH) >3 cm. We studied case-fatality in patients with cerebellar ICH > 3 cm who did not undergo immediate hematoma evacuation, but received

external ventricular drainage (EVD) only or initial conservative treatment.

Method: We included consecutive patients with cerebellar ICH >3 cm at two academic hospitals between 2008 and 2015. Patients who died or underwent hematoma evacuation <24 hours (h) were excluded because of probable confounding by indication. We determined patient characteristics, hematoma volumes, EVD placement, secondary hematoma evacuation, and in-hospital and 3-month case-fatality.

Results: Of 122 patients with cerebellar ICH, 94 had a hematoma >3 cm of whom 11 (12%) died <24 h and 28 (30%) underwent hematoma evacuation <24 h. Of the 55 (59%) patients initially treated conservatively (mean age 72 ± 14, 55% female), 10 (18%) received an EVD; seven (70%) <24 h and three (30%) >24 h. Seven (13%) patients underwent secondary hematoma evacuation (>24 h), in two after EVD failure <24 h (2/7 EVDs <24 h, 29%). All patients who underwent secondary hematoma evacuation had a decrease in Glasgow Coma Scale score of at least two points prior to surgery. Overall case-fatality was in-hospital 18% and at three months 36%.

Conclusion: Approximately two third of patients conservatively treated with cerebellar ICH >3 cm is alive at three months. 13% underwent secondary hematoma evacuation and less than one third of patients initially treated with an EVD underwent postponed hematoma evacuation. Additional (randomized) data are warranted to assess the role of surgery in the initial treatment of cerebellar ICH >3 cm.

AS20-052

INTRACEREBRAL HEMORRHAGE

INTRACEREBRAL HEMORRHAGE OF IATROGENIC ORIGIN: INCIDENCE, MANAGEMENT AND OUTCOME

S. Lorenzano[1], O. Burattini[1], A. Anzini[1], M. De Michele[1], A. Pieroni[1] and D. Toni[1]

[1]Sapienza University of Rome, Department of Neurology and Psychiatry-Unità di Trattamento Neurovascolare- Policlinico Umberto I Hospital, Rome, Italy

Background and Aims: Evidences suggest that incidence of hypertensive ICH is decreasing while there is an opposite trend for ICH of iatrogenic origin due to an increasing use of antithrombotic drugs. Aim of the study was to evaluate the relationship between antithrombotic therapy and ICH in terms of incidence and intra-hospital mortality.

Method: A retrospective analysis on patients admitted to the Emergency Department of the Policlinico Umberto I Hospital with a diagnosis of ICH was performed.

Results: Out of 467 patients,352(75.4%) had non-traumatic ICH. Of these,134(38.1%) were on antithrombotic therapy: 85(63.4%) on antiplatelets (ASA,44.8%) and 55(41%) on anticoagulants (warfarin,19.4%; direct oral anticoagulants, only 2 cases). Patients on antithrombotic therapy were older and had more comorbidities (AF, dyslipidemia and diabetes) than those not receiving antithrombotics."Antidotes" were administered to 13.4% of all patients (20.9% of those on antithrombotics and 8.3% of those not receiving antithrombotics). Mean values of systolic and diastolic BP at admission and 6 hours after admission tend to be lower in antithrombotic-related ICH. Antithrombotic therapy before the index ICH(39.6% vs.24.3%; OR 4.06, 95%CI 1.40–11.76, p = 0.010),particularly antiplatelet therapy, was found to be an independent predictor of intra-hospital mortality along with lower values of diastolic BP at 6 hours after admission and larger hematoma volume at 12 hours.

Conclusion: In our cohort, antithrombotic therapy, particularly antiplatelet therapy, resulted as an independent predictor of intra-hospital mortality in patients with non-traumatic ICH. The use of treatments aiming at limiting antithrombotic activity was overall not sufficient. The availability of specific antidotes for direct oral anticoagulants could allow a safer use of these drugs and limit consequences of possible related ICH.

AS20-055

INTRACEREBRAL HEMORRHAGE

PROGNOSTIC VALUE OF HEMATOMA VOLUME FOR 3-MONTHS OUTCOME IN NONTRAUMATIC INTRACEREBRAL HEMORRHAGE

H. Magerova[1], I. Sarbochova[1], P. Jansky[1], M. Horejsi[1], L. Martinkovic[1] and A. Tomek[1]

[1]2nd Faculty of Medicine- Charles University and Motol University Hospital, Neurology, Prague, Czech Republic

Background and Aims: Predictive models for intracerebral hemorrhage (ICH) are mainly dealing with 30-day mortality. There are less data concerning factors affecting the long-term and functional outcome. The aim of our study was to determine the prognostic value of baseline ICH volume for 3-months functional outcome of ICH.

Method: Hematoma volume was measured using 3D Slicer in 89 patients with nontraumatic ICH. Hematoma location was categorized as lobar, deep brain (including basal ganglia and thalamus), brainstem and cerebellum. Outcome of interest was 3-months functional outcome classified as good (modified Rankin Scale (mRS) 0–2) and poor (mRS 3–6).

Results: Mean hematoma volume was 18.37 ml. In total, chance of good outcome was reduced by 4,3% for each ml of ICH volume. HR for poor outcome was 1.045 (95% CI 1.011–1.080, p = 0.009) for each ml. Strongest association of volume and outcome was found in deep hematoma where chance of good outcome was reduced by 27.3% with each ml, HR for poor outcome was 1.277 (95% CI 1.082–1.507, p = 0.004). In lobar hematoma HR for poor outcome was 1.010 (95% CI 0.979–1.041, p = 0.54). Considering other baseline characteristics, HR for poor outcome according to NIH Stroke Scale (NIHSS) was 1.284 (95% CI 1.159–1.422, p < 0.001), according to age 1.055 (95% CI 1.026–1.084, p < 0.001).

Conclusion: Hematoma volume, in itself, is not crucial predictor of unfavorable outcome. It plays an important role in strategic locations significantly affecting severity of neurological deficit that is, together with age, critical for 3-months outcome of ICH patients.

AS20-056

INTRACEREBRAL HEMORRHAGE

ADMISSION LEUCOCYTOSIS IS NOT ASSOCIATED WITH ELEVATED INFLAMMATORY MARKERS IN PATIENTS WITH SPONTANEOUS INTRACEREBRAL HEMORRHAGE

I. Iwuchukwu[1], D. Nguyen[2], V. Tran[3], H. McGrade[4], V. Sabharwal[4], M. Talahama[4], A. Velander[4], G. Ciccotto[4] and O. Sulaiman[5]

[1]Ochsner Medical Center, Neurocritical Care- Ochsner Clinic Foundation Institute of Translational Research, New Orleans, USA
[2]Ochsner Medical Center, Ochsner Clinic Foundation Institute of Translational Research, New Orleans, USA
[3]Ochsner Medical Center - University of Queensland, Ochsner Clinic Foundation Institue of Translational Research, New Orleans, USA
[4]Ochsner Medical Center, Neurocritical Care, New Orleans, USA
[5]Ochsner Medical Center, Neurosurgery- Ochsner Clinic Foundation Institute of Translational Research, New Orleans, USA

Background and Aims: Admission leucocytosis (AL), a marker of inflammation, is a proposed predictor of outcomes in patients with spontaneous intracerebral hemorrhage (sICH). However, it is unclear if there is a relationship between AL and elevated pro-inflammatory cytokines in patients with sICH. We aim to determine the association of AL and quantitative levels of pro-inflammatory cytokines in patients with sICH.
Method: Patients diagnosed with ICH within 24 hrs of symptom onset were consented and blood samples collected in Na EDTA tubes. Plasma samples were used to quantitatively measure levels of IL-6, MMP-9, MMP-3 and MMP-2 using Bioplex Luminex platform and Elisa assay. All protein concentrations were measured in ρg/ml. We defined AL as WBC $>$12,000/ml. Demographics and clinical data were collected. T-Test and Fischer Exact Test were appropriate was used for statistical analysis.
Results: Of the measured cytokines, a higher level of IL-6 was detected in patients with AL; however it was not statistically significant (114.24 vs 35.95, $p=0.051$). MMP-9 (24.6×10^3 vs 38.12×10^3 $p=0.49$), MMP-2 (62.34×10^3 vs 56.73×10^3 $p=0.77$), MMP-3 (47.90×10^3 vs 35.64×10^3 $p=0.499$). Mean age and gender did not differ between patients with and without AL. There was no statistical difference in 30 day mortality between groups (50% vs 28.5% $p=0.42$).
Conclusion: In our cohort, AL was not associated with higher plasma levels of pro-inflammatory cytokines. In addition there was no statistically significant difference in 30-day mortality between groups. Further analysis of our data is planned for different time points (72 and 120 hrs) post symptom onset.

AS20-057

INTRACEREBRAL HEMORRHAGE

BLOOD PRESSURE MONITORING IN ACUTE PHASE OF INTRACEREBRAL HEMORRHAGE

S. Vidale[1], C. Pini[2], S. Bellocchi[3], D. Pellegrino[2] and A. Marco[4]
[1]Sant'Anna Hospital, San Fermo della Battaglia, Italy
[2]Sant'Anna Hospital, Geriatrics, San Fermo della Battaglia, Italy
[3]Sant'Anna Hospital, Neurosurgery, San Fermo della Battaglia, Italy
[4]Sant'Anna Hospital, Neurology, San Fermo della Battaglia, Italy

Background and Aims: Intracerebral hemorrhage has a high mortality rate in the first month after the event. Previous studies demonstrated the association between poor outcome and clinical severity at admission, site and size of lesion and rebleeding. Blood pressure (BP) could have a potential role in the outcome, but previous investigations had no conclusive results. Aim of the study was the evaluation of the possible influence of BP variability on clinical outcome in hemorrhagic strokes.
Method: All patients admitted to our Stroke Unit for spontaneous intracerebral hemorrhage between January 2014 and January 2015 were enrolled. Demographical and clinical data, vascular risk factors and radiological findings were registered. A standardized 24-hours BP monitoring was performed within 48 hours from symptom onset. The variability was calculated as mean weighted standard deviation of BP. T-test and chi-square test were performed for statistical analysis.
Results: A total of 42 patients were enrolled (median age: 72 years; male: 71%). Antithrombotics or anticoagulant treatment was present in half of patients. We observed a moderate severity at admission (NIH: 10). 4 patients died during hospitalization. We observed a significant association between higher mean values of nocturnal BP and clinical severity at admission (p trend <0.01) and a concomitant association between non-dipper status and clinical outcome (OR: 2.143; 95%CI: 1.238 – 2.733; $p<0.01$).
Conclusion: Preliminary results of this study confirmed the influence of BP trend on clinical severity at admission and functional outcome. Further studies are required to investigate the influence of a prompt therapeutical pressure intervention on clinical outcome.

AS11-001

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

ASSESSING COGNITION IN APHASIA IS NOW A REALITY: THE COGNITIVE ASSESSMENT FOR APHASIA APP

K. Wall[1], T. Cumming[2], S. Koenig[3], A. Pelecanos[4] and D. Copland[1]
[1]The University of Queensland, Centre for Clinical Research, Brisbane, Australia
[2]University of Melbourne, The Florey Institute for Neuroscience and Mental Health, Melbourne, Australia
[3]Katana Simulations Pty Ltd, N/A, Adelaide, Australia
[4]QIMR Berghofer Medical Research Institute, Statistic Unit, Brisbane, Australia

Background and Aims: Pen-and-paper cognitive tests are commonly used in stroke. These tests are often linguistically loaded: individuals need adequate receptive and expressive language skills to complete them. Consequently, individuals with aphasia are often excluded from post-stroke cognition studies due to the language deficits confounding the results.
We developed a non-immersive virtual reality cognitive assessment for stroke survivors, the Cognitive Assessment for Aphasia App (C3A), designed to be inclusive of individuals with aphasia. We explored the feasibility and user acceptance of the C3A compared to pen-and-paper based cognitive tests.
Method: Participants undertook a battery of pen-and-paper cognitive tests and the C3A. Feasibility was ascertained by quantifying missing data for all tests, and time-taken was recorded for the C3A. The user acceptance for the C3A was evaluated by participants' preferred testing method, enjoyment and perceived task difficulty. The associations between user acceptance outcomes and age, education and computer-smartphone-tablet experience were explored.
Results: Sixty-four stroke participants (35 with aphasia, 29 without aphasia) and 32 controls participated in the study. Thirteen participants were unable to complete all the pen-and-paper tests, whereas only one participant with aphasia was unable to complete the C3A tasks. Only 14% of participants preferred the pen-and-paper tests, which did not significantly differ between groups ($p=0.38$). Ninety-five percent of participants were neutral or enjoyed the C3A and 4% perceived it to be very difficult. Older age was negatively associated with user acceptance measures.
Conclusion: The C3A appears to be a feasible cognitive assessment for stroke survivors with and without aphasia, and is preferred to standard pen-and-paper testing.

AS11-003

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

TIME-OF-DAY COULD AFFECT COGNITIVE SCREENING PERFORMANCE IN OLDER PATIENTS WITH TIA AND STROKE

S. Mazzucco[1], L. Li[1], M.A. Tuna[1], S.T. Pendlebury[1], R. Frost[1], R. Wharton[1] and P.M. Rothwell[1]
[1]University of Oxford, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom

Background and Aims: The impact of time-of-day on cognitive performance of older patients with limited cognitive reserve after TIA or stroke, and on short cognitive tests, such as the Montreal Cognitive Assessment (MoCA), is unknown. We retrospectively studied whether

morning versus afternoon assessment might affect the classification of patients aged 70 or older as severe (SCI), mild (MCI), and no (NCI) cognitive impairment by the MoCA.
Method: Morning (12 pm or earlier) versus afternoon (later than 12 pm) proportions of SCI (MoCA score <20), MCI (MoCA score 25–20), and NCI (MoCA score ≥ 26) were compared in a cohort of patients aged ≥ 70, attending a rapid-access TIA/stroke clinic.
Results: Of 278 patients, 113 (40.6%) were tested in the morning and 165 (59.4%) in the afternoon. The proportion with SCI was greater in the afternoon than in the morning (10.9% versus 1.8% respectively, $p = 0.004$), with no difference in age, education, diagnosis, disability or vascular risk factors.
Conclusion: Time-of-day appears to affect cognitive performance of older patients after TIA and minor stroke. If our cross-sectional findings are confirmed in cross-over studies with repeated testing, timing of assessments should be considered in clinical practice and in research studies.

AS11-004

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

LONG-TERM COGNITIVE IMPAIRMENT FOLLOWING STROKE: RESULTS FROM THE 3 YEAR ARCOS-IV FOLLOW-UP STUDY

S. Mahon[1], R. Krishnamurthi[1], K. Jones[1], V. Feigin[1], P. Parmar[2] and E. Witt[2]
[1]School of Public Health & Psychosocial Studies Faculty of Health & Environmental, National Institute for Stroke and Applied Neurosciences, Auckland, New Zealand
[2]School of Public Health & Psychosocial Studies Faculty of Health & Environmental, Department of Biostatistics, Auckland, New Zealand

Background and Aims: Stroke has the potential to erase a lifetime of experiences or abilities in an instant. There is evidence that stroke should be considered a long-term condition, with many stroke survivors still experiencing adverse outcomes years after their stroke. Cognitive impairment is one of the most frequently reported consequences of stroke, affecting up to 70% of stroke survivors. Existing longitudinal data >1 year after stroke on cognitive outcomes is limited.
Method: This population-based follow-up study examined cognitive impairment in the ARCOS-IV cohort, 3 years following stroke. Participants who agreed to further follow-up, completed face to face cognitive, psychological and health-related outcome measures.
Results: The greatest proportion (84%) of 257 participants exhibited below average cognitive functioning as indicated by a MOCA score of <26 ($m = 20$). Regression analysis found age, employment status and stroke type to be significant predictors of long-term impairment. Specific regression models for the Neuropsychological Assessment Battery (NAB) showed females more likely to have spatial impairment than males ($p = 0.0178$), and those who had a PACI ($p = 0.0448$) compared to LACI. Younger patients were more likely to have language impairment compared to older ($p = 3.57$ x10–6). Retired/unemployed were more likely to have executive function impairment than those who were employed ($p = 0.0061$).
Conclusion: A considerable proportion of 3-year stroke survivors experienced cognitive impairment. Early identification of cognitive domains that independently contribute to outcomes post- stroke will inform the development of interventions to manage and/or cope with such deficits. Future research should focus on preventing/managing the long-term consequences of stroke, improving overall outcomes for stroke survivors.

AS11-005

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

THE UTILITY OF THE DEVELOPMENT OF A COGNITIVE THERAPY PROGRAM FOR STROKE PATIENTS

A. Martín-Montes[1], P. Martínez-Sánchez[1], B. Fuentes[1], M. Hernández-Barral[1], A. Frank-García[1] and E. Díez-Tejedor[1]
[1]University Hospital La Paz, Neurology, Madrid, Spain

Background and Aims: Cognitive impairment is a frequent complication in stroke survivors. Cognitive therapy could have an important role in post-stroke recovery. Aim: to evaluate the benefits of a cognitive therapy program for stroke survivors.
Method: Prospective cohort pilot study including patients admitted to a cognitive therapy program during 2014–2015. This program was settled as weekly sessions during 3 months focused on the restoration of the impaired cognitive functions. We analyse the change in the neuropsychological evaluations before and after the completion of the cognitive therapy and we compared them with a control group composed by patients participating in other observational study with cognitive evaluations at six months after stroke. Results were transformed in z-scores according to age and education level. The comparisons among groups were done by means of ANOVA test for repeated measurements.
Results: A total of 24 patients were analysed (mean age 42 years; 75% male), 10 of them received cognitive therapy and 14 were controls matched by stroke subtype, age and gender. At baseline the cognitive domain more severely impaired were phonological verbal fluency, (PVF) (54.2%), semantic verbal fluency (SVF) (50%) and alternating attention (AA) (41,7%), being these the domains which obtained more benefits with cognitive therapy: (PVF: *z-score* pre-therapy -1,39; post-therapy -1,05; $p = 0,83$; SVF: *z-score* pre-therapy -1,63; post-Therapy -1,4; $p = 0,4$; AA: *z-score* pre-Therapy -1,09; post-therapy-0,94; $p = 0.18$).
Conclusion: Cognitive therapy is feasible and could be beneficial to improve cognitive function in stroke survivors. Further studies with larger sample size would be useful to confirm the results of this pilot study.

AS11-007

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

THE FUNCTIONAL NEUROANATOMY UNDERLYING THE MONTREAL COGNITIVE ASSESSMENT: HIGH-DIMENSIONAL MULTIVARIATE MODELLING OF THE RELATIONSHIP BETWEEN COGNITIVE PERFORMANCE AND INFARCT ANATOMY IN ACUTE ISCHAEMIC STROKE

R. Perry[1], A. Haysom[2], T. Xu[2], A. Jha[2] and P. Nachev[2]
[1]National Hospital for Neurology & Neurosurgery- Queen Square-, Department of Neurology, London, United Kingdom
[2]University College London, Institute of Neurology, London, United Kingdom

Background and Aims: The Montreal Cognitive Assessment (MoCA) is widely used for assessing a patient's cognitive ability following a stroke. Interpretation of each component of the test depends on assumptions about the cognitive domain that is being tested and how this domain maps onto the anatomy of the brain. Traditional lesion-mapping studies have relied on the concept that a given cognitive task isolates a single

cognitive domain, which then maps onto a single brain area. In many instances this is too much of an oversimplification to be useful clinically. To understand the anatomical correlate of a given cognitive impairment, we need to relate cognitive performance on a given task to the pattern of damage across the whole brain. A successful model must include non-linear interactions between remote areas.

Method: We studied 383 unselected patients admitted to University College Hospital with acute ischaemic stroke in whom diffusion-weighted imaging within 10 days of presentation disclosed an explanatory acute ischaemic infarct, and where a Montreal Cognitive Assessment (MOCA) had been performed within the same interval.

Results: Automated non-linear brain image registration and lesion segmentation were used to derive voxel-wise binary maps of damage, transformed into Montreal Neurological Institute standard stereotactic space. Bayesian multivariate regression and classification models estimated with Markov Chain Monte Carlo methods were used to derive probabilistic maps of neural dependence of individual MoCA tasks.

Conclusion: By quantifying the change in predictive performance with varying the number of input features, we confirm that high-dimensional modelling outperforms more reductive approaches in predicting cognitive impairment in acute stroke.

AS11-011

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

PET IMAGING OF CEREBRAL AMYLOID LOAD AND COGNITION IN TIA AND MINOR STROKE

M.M. Kubiak[1], S.T. Pendlebury[1], K. Bradley[2] and P.M. Rothwell[1]
[1]Centre for Prevention of Stroke and Dementia, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom
[2]Oxford University Hospitals NHS Trust, Nuclear Medicine, Oxford, United Kingdom

Background and Aims: Stroke is associated with a doubling of dementia risk but the contribution of neurodegenerative pathology to vascular cognitive impairment is uncertain. Amyloid load on PET (positron emission tomography) is a marker of Alzheimer-type pathology. Previous studies of amyloid load in vascular cognitive impairment are conflicting, and may be confounded by lesional cognitive effects of more major stroke. We therefore studied amyloid load versus cognitive function after TIA and minor stroke.

Method: Consecutive consenting patients with TIA/minor stroke (Oxford Vascular Study) underwent PET with Flutemetamol (^{18}F) imaging during 12-months follow-up. Cognitive function was defined as normal (MoCA $\geq$ 25) or cognitively impaired (MoCA $<$ 25, MMSE $\geq$ 20). ^{18}F-Flutemetamol-binding (automated analysis of regional/global standardized uptake value ratios - SUVr) was defined as positive as SUVr $>$ 2SD relative to pons in two cortical regions or SUVr $>$ 3SD in one region.

Results: Among 19 TIA/stroke patients who underwent ^{18}F-PET (mean age/SD = 78.0/5.4, 50%male), mean time to scan 198 days, 3 (15.8%) were amyloid positive (2 global, 1 regional). Of 9 patients with normal cognition (mean age/SD/MOCA = 76.3/5.3/26.9) two were amyloid-positive (high regional uptake). Of 10 cognitive impairment (mean age/SD/MOCA = 79.3/5.4/20.4), one was positive (high global uptake). There was no significant correlation between MoCA or between recall subscore and global SUVr in either group. One 'positive control' with Alzheimer's dementia showed the expected high global uptake.

Conclusion: Amyloid load was low in cognitively normal and impaired TIA/minor stroke patients, confirming the one previous study of ^{18}F-PET. Follow-up studies are required to determine whether amyloid pattern predicts cognitive decline.

AS11-013

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

DEPRESSION AT ONE MONTH AFTER STROKE PREDICTS REDUCED FUNCTION AT ONE YEAR IN PATIENTS WITH A MINOR STROKE

R. Mughal[1], S. Makin[2], E. Bailey[3], K. Shuler[4], F. Doubal[5], M. Dennis[4] and J. Wardlaw[4]
[1]University of Medicine, CMVML, Glasgow, United Kingdom
[2]Glasgow University, Institute of Cardiovascular and Medical Sciences, Glasgow, United Kingdom
[3]University of Glasgow, CMVML, Glasgow, United Kingdom
[4]University of Edinburgh, CCBS, Edinburgh, United Kingdom
[5]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: After major stroke, post-stroke depression impairs functional recovery. We assessed whether a similar effect might occur after minor stroke.

Method: We recruited consecutive patients with a minor stroke (defined as The National Institutes of Health Stroke Scale (NIHSS) $<$7),recorded clinical details, Addenbrooke's cognitive examination (ACE-R)) and the Beck Depression Index (BDI) III (score $\geq$9 indicates depression) at 1 month post-stroke. At 1 year, whilst blind to inital clinical details, we recorded the modified Rankin scale (mRS,$\geq$2 indicating reduced function, 6 = death) in all patients. We calculated the odds ratio (OR) of an mRS $\geq$ 2per BDI point adjusting for pre-selected confounding factors.

Results: At 1 month, 66/143 (46%)of patients had a BDI of $\geq$ 9; there was no statistically significant association with age, sex, vascular risk factors, stroke severity (NIHSS), ACE-R, or mRS at hospital discharge. All had mRS recorded at 1 year, five had died. 44/66 (66%) of patients with a BDI $\geq$ 9 had an mRS $\geq$ 2, compared to 33/77(42%) of patients with a BDI $<$ 9, p = 0.001. On multivariable analysis, the statistically significant association between BDI at 1 month and mRS at 1 year remained after adjustment for age, NIHSS, and mRS on hospital discharge, with OR for mRS $\geq$ 2 per point increase on BDI of 1.04(95 CI 1.00–1.09, p = 0.035).

Conclusion: At one month after minor stroke, a higher BDI depression score independently predicts poor function at one year, similar to the association between depression and dependency in severe stroke.

AS11-016

LANGUAGE AND VASCULAR COGNITIVE IMPAIRMENT

VASCULAR DEMENTIA VERSES ALZHEIMER'S DISEASE – HOW TO DIFFERENTIATE

P. Harman[1], C. Law[2], S. Shah[3], A. Richard[4] and I. Grunwald[5]
[1]Southend University Hospital NHS Foundation Trust, Research and Development, Southend, United Kingdom
[2]Stanford University, Systems Neuroscience and Pain Lab, Stanford, United Kingdom
[3]Southend university hospital, Stroke Medicine, Southend, United Kingdom
[4]Anglia Ruskin University, Anglia Ruskin University, Chelmsford, United Kingdom
[5]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Radiology, Southend, United Kingdom

Background and Aims: Here, we evaluated if Resting state (RS) fMRI can be performed with sufficient quality on a 1.5T MRI scanner in clinical routine to identify various types of dementia (e.g. vascular dementia, Alzheimer's dementia). We report first feasibility results.
Method: In a cross sectional cohort of patients with cognitive impairment due to known cause, structural and functional images were acquired on a dedicated MRI scanner with 1.5T and an 8 channel parallel imaging coil. An EPI GRE resting state sequence was used. Subjects were instructed to keep their eye closed and to not think of anything in particular. High resolution T1 weighted 3D FSPGR images were added to the routine dementia protocol in order to obtain anatomical images for core registration of the fMRI data. fMRI images were then analysed using proprietary software by evaluating spontaneous low frequency fluctuations, functional connectivity and interactions between distant brain regions. In addition, a cognitive test battery was performed.
Results: We found that connectivity and network integrity diminished in the elderly and that this was especially pronounced in AD. Also in all our patients with AD we could confirm that the default mode network (DMN) was particularly affected, which is characteristic for the disease. There was also a correlation between functional structures and performance on cognitive assessments. Inter-hemispheric synchronization of neuronal signaling was observed in regard to disease severity.
Conclusion: We were able to demonstrate disease specific findings in AD. Further collection of data may in the future identify characteristic features for other types of dementia.

AS06-004

SYSTEMATIC REVIEW AND META-ANALYSIS

DIFFUSION-WEIGHTED IMAGING LESIONS IN INTRACEREBRAL HEMORRHAGE DUE TO SMALL VESSEL DISEASE

M. Boulanger[1], R. Schneckenburger[1], C. Join-Lambert[2], D. Werring[3], W. Duncan[4], J. Hodel[5], M. Zuber[2] and E. Touze[1]
[1]Normandie Université- CHU Caen, Neurology, Caen, France
[2]Université Paris Descartes- Hôpital Saint Joseph, Neurology, Paris, France
[3]Stroke Research Group- Department of Headache- Brain Injury and Rehabilitation, Institute of Neurology-, London, United Kingdom
[4]Stroke Research Group- Department of Headache- Brain Injury and Rehabilitation, Institute of Neurology, London, United Kingdom
[5]Hôpital Henri Mondor, Neuroradiology, creteil, France

Background and Aims: Whether Diffusion-Weighted Imaging (DWI) lesions in acute intracerebral hemorrhage (ICH) is specific for a type of ICH remains unclear.
Method: We undertook a systematic review and contacted authors to compare the prevalence of DWI lesions within three months after ICH onset between (1) lobar and deep ICH and (2) cerebral amyloid angiopathy (CAA)-related ICH and hypertension-related ICH. We also explored predictors of DWI lesions. Two reviewers independently assessed study eligibility and risk of bias and collected data. Studies were combined in random effects meta-analysis.
Results: The prevalence of DWI lesions ranged from 0% to 33% in patients with CAA-related ICH and from 10% to 28% in patients with hypertension-related ICH. There was no difference in the prevalence of DWI lesions in 9 studies involving 671 lobar ICH (155 [23.1%] of whom had DWI lesions) and 650 deep ICH (162 [24.9%] of whom had DWI lesions) (unadjusted OR = 1.09, 95% CI = 0.82–1.44, $I^2 = 0\%$). Five studies including 323 CAA-related ICH (68 [21.1%] of whom had DWI lesions) and 397 hypertension-related ICH (83 [20.9%] of whom had DWI lesions) found no association between DWI lesions and presumed etiology of ICH (unadjusted OR = 1.24, IC 95% = 0.74–2.10, $I^2 = 30\%$). Radiological markers of small vessel disease (leukoaraiosis, microbleeds) and previous ICH but not conventional vascular risk factors were predictors of DWI lesions.
Conclusion: DWI lesions in patients with acute ICH appear to be indicative of the severity of the underlying microangiopathy but do not seem to point for some specific etiology.

AS06-006

SYSTEMATIC REVIEW AND META-ANALYSIS

CURRENT STATUS OF INTRAVENOUS TISSUE PLASMINOGEN ACTIVATOR DOSAGE FOR ACUTE ISCHEMIC STROKE: AN UPDATED SYSTEMATIC REVIEW

X. Wang[1], S. You[2], S. Sato[3], Y. Jie[4], C. Carcel[5], D. Zheng[5], S. Yoshimura[5], C. Anderson[5], R. Lindley[6], E.C. Sandset[7], T. Robinson[8], J. Chalmers[9] and V.K. Sharma[10]
[1]The George Institute for Global Health, Sydney, Australia
[2]The Second Affiliated Hospital of Soochow University, Department of Neurology, Suzhou, China
[3]National Cerebral and Cardiovascular Centre, Department of Cerebrovascular Medicine, Osaka, Japan
[4]Nanjing First Hospital- Nanjing Medical University, Department of Neurology, Nanjing, China
[5]The George Institute for Global Health, Neurological and Mental Health, Sydney, Australia

[6]The George Institute for Global Health, Neurological and Metal Helath, Sydney, Australia
[7]Oslo University Hospital, Department of Neurology, Oslo, Norway
[8]University of Leicester, Department of Cardiovascular Sciences and NIHR Biomedical Research Unit for Cardiovascular Diseases, Leicester, United Kingdom
[9]The George Institute for Global Health, Professional Unit, Sydney, Australia
[10]National University Hospital, Yong Loo Lin School of Medicine-National University of Singapore and Division of Neurology-, Singapore, Singapore

Background and Aims: The optimal dose of recombinant tissue plasminogen activator (rtPA) for acute ischemic stroke (AIS) remains controversial, especially in Asian countries. We aimed to update the evidence regarding the use of low-dose versus standard-dose rtPA.
Method: We performed a systematic literature search across MEDLINE, Embase, Central, PsycINFO, and CINAHL, from inception to 22nd August 2016 to identify all related studies. The outcomes were death or disability (defined by modified Rankin Scale 2–6), death, and symptomatic intracerebral hemorrhage (sICH). Where possible, data were pooled for meta-analysis with odds ratios (OR) and corresponding 95% confidence intervals (CI) by means of random or fixed-effects meta-analysis.
Results: We included 26 observational studies and one randomized controlled trial with a total of 23,210 patients. Variable doses of rtPA were used for thrombolysis of AIS in Asia. Meta-analysis showed that low-dose rtPA was not associated with increased risk of death or disability (OR 1.13, 95%CI 0.95–1.33), or death (OR 0.86, 95%CI 0.74–1.01), or decreased risk of sICH (OR 1.06, 95%CI 0.65–1.72). The results remained consistent when sensitivity analyses including only low-dose and standard-dose rtPA or only Asian studies were performed.
Conclusion: Our review showed little difference between the outcomes or the risk profile in the studies using low-dose and/or standard-dose rtPA for AIS. Low-dose rtPA was not shown to be associated with the risk of death or disability, death alone, or sICH.

AS06-013

SYSTEMATIC REVIEW AND META-ANALYSIS

NON INVASIVE VENTILATORY CORRECTION IN PATIENTS WITH ACUTE ISCHEMIC STROKE: A SYSTEMATIC REVIEW AND META-ANALYSIS

G. Tsivgoulis[1,2], A. Alexandrov[2], A. Katsanos[1,3], K. Barlinn[4], R. Mikulik[5], V. Lambadiari[6], C. Zompola[1], M. Chondrogianni[1], A. Tsivgoulis[1], A. Bonakis[1] and A. Alexandrov[2,7]
[1]National and Kapodistrian University of Athens School of Medicine, Second Department of Neurology, Athens, Greece
[2]University of Tennessee Health Science Center, Department of Neurology, Memphis- TN, USA
[3]University of Ioannina School of Medicine, Department of Neurology, Ioannina, Greece
[4]Carl Gustav Carus Hospital Dresden, Department of Neurology, Dresden, Germany
[5]St. Anne's Hospital and Masaryk University, Neurology Department, Brno, Czech Republic
[6]National and Kapodistrian University of Athens School of Medicine, Second Department of Internal Medicine, Athens, Greece
[7]Australian Catholic University, School of Nursing, Sydney, Australia

Background and Aims: Even though current guidelines suggest that non-invasive ventilator correction (NIVC) could be considered for acute ischemic stroke (AIS) patients with obstructive sleep apnea (OSA), available evidence are conflicting with no adequately powered randomized clinical trial (RCT) being available up to date.
Method: We conducted a systematic review and meta-analysis of all available literature data evaluating the effect of NIVC on neurological improvement based on decrease in NIHSS-score, vascular events (recurrent stroke, transient ischemic attack, myocardial infarction and unstable angina) and mortality during the follow up period.
Results: We identified 4 RCTs and 1 prospectively matched observational cohort, comprising a total of 389 patients (59.8% males, mean age: 64.4 years). The risk of both performance and detection bias was considered high in most of the included RCTs due to the lack of blinding in participants, personnel and/or outcome assessors. The mean decrease in NIHSS scores during the first (≤ 30) days of AIS was found to be greater in NIVC-treated patients in comparison to controls (SMD = 0.38, 95%CI: 0.11–0.66; p = 0.007). However, no significant differences were detected between NIVC-treated AIS patients and controls on both the risk of vascular events (RR = 0.53, 95%CI: 0.25–1.14, p = 0.11) and mortality (RR = 0.71, 95%CI: 0.37–1.36, p = 0.30). No evidence of heterogeneity ($I^2 = 0\%$, p for Cochran Q > 0.50) or publication bias were detected in all analyses.
Conclusion: NIVC appears to be associated with greater short-term neurological improvement in AIS patients with OSA. This finding deserves further investigation within the settings of an adequately powered, sham-control, randomized clinical trial.

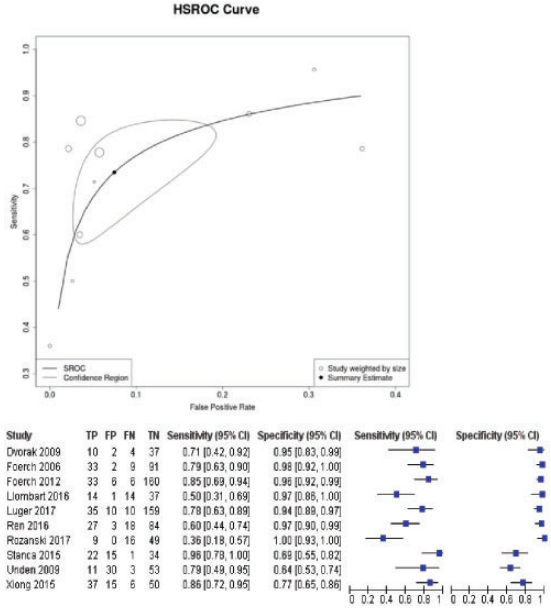
AS06-021

SYSTEMATIC REVIEW AND META-ANALYSIS

EXERCISE INTERVENTIONS TO IMPROVE SECONDARY VASCULAR RISK FACTORS IN PATIENTS WITH STROKE AND TIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

C. Wang[1], J. Redgrave[1], M. Shafizadehkenari[2], A. Majid[1] and A. Ali[3]
[1]University of Sheffield, Neurosciences, Sheffield, United Kingdom
[2]Shefffield Hallam University, Department of sports engineering research, Sheffield, United Kingdom
[3]Sheffield Teaching Hospitals Foundation NHS Trust, Geriatrics and Stroke, Sheffield, United Kingdom

Background and Aims: Aerobic exercise has many health benefits and may reduce secondary vascular risk factors. We systematically reviewed the effect of exercise interventions on vascular risk after stroke or transient ischaemic attack (TIA).
Method: We reviewed 16 medical databases for randomised controlled trials evaluating exercise interventions on vascular risk factors or secondary vascular events after stroke or TIA, compared to control. Risk factors included systolic and diastolic blood pressure (SBP & DBP), body mass index (BMI), total cholesterol (TC), low-density lipoprotein cholesterol (LDL-C), high-density lipoprotein cholesterol (HDL-C) and fasting blood glucose (FBG). Adverse events were reported. Measures of variability were calculated if not provided directly and entered into Review Manager 5.3 for meta-analysis.
Results: Fifteen studies (n = 684) were analysed. Meta-analysis of 9 studies (intervention n = 175, control n = 171) reporting blood pressure revealed significant reductions in SBP (6.17 mmHg, 95% CI -9.43 to -2.91, $I^2 = 17\%$) and DBP (3.51 mmHg, 95% CI -5.66 to -1.36, $I^2 = 37\%$) associated with exercise interventions. Exercise did not result in significant improvements in BMI, TC, LDL-C, HDL-C or FBG. One trial reported reductions in secondary vascular events with exercise but was insufficiently powered. No adverse events were reported among intervention groups.



Conclusion: Exercise interventions resulted in clinically meaningful reductions in SBP and DBP. Further study is required to evaluate if these interventions prevent secondary vascular events after stroke and TIA.

AS06-024

SYSTEMATIC REVIEW AND META-ANALYSIS

GLIAL FIBRILLARY ACIDIC PROTEIN BLOOD BIOMARKERS TO DIAGNOSE INTRACEREBRAL HAEMORRHAGE IN PATIENTS WITH SYMPTOMS OF ACUTE STROKE: SYSTEMATIC REVIEW AND META-ANALYSIS

L.A. Perry[1], T. Lucarelli[2], J.C. Penny-Dimri[2], M. McInnes[3], P. Kwan[1], S. Davis[1] and B. Yan[1]

[1]Royal Melbourne Hospital, Melbourne Brain Centre, Melbourne, Australia

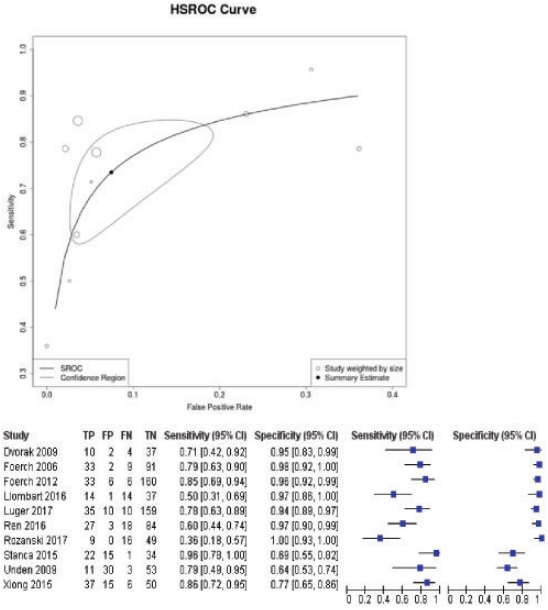
[2]Monash University, School of Medicine, Melbourne, Australia

[3]Ottawa Hospital Research Institute, Radiology, Ottawa, Canada

Background and Aims: Glial fibrillary acidic protein (GFAP) is a promising biomarker for stroke differential diagnosis. We assessed the accuracy of blood GFAP biomarkers to differentiate intracerebral haemorrhage (ICH) from ischaemic stroke (IS) and mimics.

Method: We searched Medline, Embase, and the Cochrane Library, without language restriction, from inception to December 2016. We included studies that investigated the diagnostic accuracy of GFAP blood biomarkers to differentiate ICH from ischaemic stroke (IS) and mimics. Study quality was assessed using the QUADAS-2 tool. Heirarchical summary receiver operating characteristic (HSROC) modelling was used to synthesise results and generate summary estimates. Heterogeneity was explored in a meta-regression by inputting predefined covariates into the HSROC model. We assessed accuracy within the first hour after stroke in a subgroup analysis.

Results: Our search returned 199 unique results of which 10 studies (318 ICH, 826 IS or mimic) were included. The overall quality of evidence was moderate. Reported sensitivity ranged from 0.14–0.94, and specificity from 0.77–1.00. The primary analysis resulted in an area under the HSROC curve (AUC) of 0.904 (95% CI 0.878–0.931). Differences in assay subtype, but not the other covariates, partially explained between-study heterogeneity ($p = 0.038$). The secondary analysis included 3 studies (52 ICH, 121 other) with sensitivity ranging from 0.14–0.85 and specificity from 0.96–1.00, AUC = 0.822 (95% CI 0.614–1.000).



Conclusion: GFAP is a highly specific diagnostic biomarker for ICH. Test accuracy is affected by assay subtype and time from symptom onset. Sensitivity estimates from the first hour after stroke are imprecise and warrant further study.

AS06-049

SYSTEMATIC REVIEW AND META-ANALYSIS

TREATMENT OF UNRUPTURED INTRACRANIAL ANEURYSMS: SYSTEMATIC REVIEW AND META-ANALYSIS OF RISKS AND RISK FACTORS

A.M. Algra[1], M.D.I. Vergouwen[1], J.P. Greving[2] and G.J.E. Rinkel[1]
[1]UMC Utrecht Brain Center Rudolf Magnus, Neurology and Neurosurgery, Utrecht, The Netherlands
[2]UMC Utrecht Division Julius Center for Health Sciences and Primary Care, Epidemiology, Utrecht, The Netherlands

Background and Aims: Preventive treatment of unruptured intracranial aneurysms (UIA) carries a risk of serious complications. We conducted a systematic review and meta-analysis to assess complication risk of endovascular and neurosurgical treatment of UIAs and their risk factors.
Method: We searched PubMed, EMBASE and Cochrane for studies published between 01–01-2000/01-01-2017, reporting on risks and outcome following preventive UIA treatment. Eligibility was restricted to studies including ≥50 patients undergoing endovascular treatment (including device-use) or clipping for saccular UIAs. Per treatment modality, we assessed morbidity and mortality rates at 30 days, and obtained risk or odds ratios with 95%CI for treatment risk factors. Results were pooled by random-effects meta-analysis and stratified by methodological quality (high quality study defined as ≥7 points on the Newcastle-Ottawa Scale).
Results: After screening 5423 publications, we identified 642 articles for full-paper assessment. Preliminary results are shown for all articles published in 2016 (n = 81); 31 studies were eligible, comprising 49167 patients with 50470 UIAs. Two of 31 studies had a prospective design; five were of high quality. For endovascular treatment (n = 16) morbidity was 5.1%; 95%CI:4.2–6.0 and mortality 1.1%; 95%CI:0.7–1.6. For clipping (n = 17), pooled morbidity rate was 12.2%; 95%CI:9.1–15.2 and mortality 1.7%; 95%CI:0.5–2.8. Full results, including risk factor analysis will be presented during the conference.
Conclusion: Of the vast amount of observational evidence on UIA treatment only a minority is methodologically rigorous. The most recent data continue to show considerable risks. Based on meta-analysis of risk factors for complications (to be presented) detailed studies on risk factors should be performed to build a prediction model.

AS09-001

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

INTER-RATER RELIABILITY FOR THROMBOLYSIS IN CEREBRAL INFARCTION WITH TICI 2C CATEGORY

O. Volny[1,2], P. Cimflova[3] and V. Szeder[4]
[1]St. Anne's University Hospital and Faculty of Medicine- Masaryk University, First Department of Neurology, Brno, Czech Republic
[2]St. Anne's University Hospital, International Clinical Research Center, Brno, Czech Republic
[3]St. Anne's University Hospital and Faculty of Medicine- Masaryk University, Department of Medical Imaging-, Brno, Czech Republic
[4]David Geffen School of Medicine- University of California, Department of Neurointerventional Radiology, Los Angeles, USA

Background and Aims: Thrombolysis in Cerebral Infarction (TICI) with 2b/3 (>50% of occluded territory/complete reperfusion) has been regarded as a successful angiographic outcome. To account for near-perfect angiographic results, the category TICI 2c (near complete reperfusion) has been introduced. Since the degree of inter-rater reliability for TICI with 2c category remains poorly studied, we strived to evaluate the agreement among stroke treating specialists.
Method: All consecutive patients, who underwent stent-retriever thrombectomy for acute ischemic stroke in the period between I/2014 to IV/2016 at the Department of Neurointerventional Radiology, were analysed. DSA images were interpreted using previously reported modified TICI score with TICI 2c (near complete reperfusion). All DSA runs were scored independently by stroke treating specialist, by consensus of neuroradiologist and stroke neurologist, and by consensus of neurointerventional fellow and attending. Reliability analysis was performed using Krippendorff's alpha (K-alpha).
Results: Sixty-one patients were included into analysis of inter-rater agreement. Mean age was 70 years (SD ± 12), 48% were women, and median admission National Institutes of Health Stroke Scale was 16 (IQR = 12–19). Median admission ASPECTS was 8 (IQR 7–9). Forty patients (65%) received intravenous thrombolysis. Agreement for complete modified TICI scale (compared with consensus of neurointerventional fellow and attending) was: fair for stroke physician (K-alpha 0.36), moderate for neuroradiologist (K-alpha 0.48), and moderate for neurointerventional fellow (K-alpha 0.56). Agreement increased to almost perfect when evaluated by consensus of stroke neurologist and neuroradiologist (K-alpha 0.82).
Conclusion: Inter-rater agreement for modified TICI increased to almost perfect when scored by consensus of stroke treating specialists.

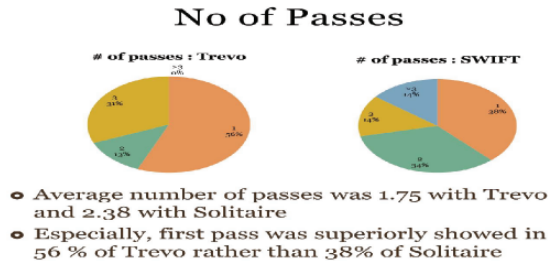
AS09-002

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

AN EFFICACY COMPARISON BETWEEN TREVO AND SWIFT WITH IA THROMBOLYSIS IN ACUTE ISCHEMIC STROKE

S.Y. Chung[1], S.H. Jang[1], M.S. Park[1] and J.G. Kim[2]
[1]Eulji University Hospital, Neurosurgery, Daejeon, Republic of Korea
[2]Eulji University Hospital, Neurology, Daejeon, Republic of Korea

Background and Aims: Recent reports have indicated that mechanical thrombectomy may have potential to treat acute ischemic stroke. However, few comparative studies of thrombectomy devices are reported. We compared safety and effectiveness between Trevo and SWIFT devices in acute ischemic stroke patients.
Method: A retorospectiv study comparing clinical, radiological, and functional outcome of 37 patients with angiographically verified occlusion excluding ICA. Patients were treated either with Trevo or Solitaire according to neurointerventionalist preference. Successful recanalization was defined as TICI grade 2b to 3 and clinical outcome was assessed as NIHSS.
Results: Revascularization was tried in 16 patients with Trevo and in 21 with Solitaire. The lesions were MCA occlusion 33 and BA 4 patients. Successful recanalization was achieved in 88% of patients by Trevo compared with 76% of patients by Solitaire. Average number of passes was 1.75 with Trevo and 2.24 with Solitaire. And especially, first pass was superiorly showed in 58.3 % of Trevo rather than 36.4% of Solitaire and patients treated with Trevo had a shorter treatment time. In outcome, most of patients treated with stent retrievers (58%and 59% in each) had achieved improved scores of NIHSS in both groups without significant differences (F/U NIHSS <7). Rate of symptomatic ICH related with procedure was 8.3% for Trevo versus 11.1% for Solitaire.



Conclusion: No significant differences in functional outcomes and symptomatic ICH could be demonstrated between Trevo and Solitaire. However, patients treated with Trevo had a better revascularization rate, lower number of passes and a shorter treatment time than Solitaire. Further studies will be needed.

AS09-003

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

FEASIBILITY OF TRANSBRACHIAL CAROTID CANNULATION OF A PARTICULAR LONG GUIDE-SHEATH IN EMERGENCY THROMBECTOMY FOR ACUTE ISCHEMIC STROKE IN THE ANTERIOR CEREBRAL CIRCULATION

K. Yoshioka[1], T. Mori[1], Y. Tanno[1], S. Kasakura[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital Stroke Center, Stroke Treatment, Kamakura- Kanagawa, Japan

Background and Aims: Clinical outcome in acute ischemic stroke (AIS) patients depends on onset-to-reperfusion time. Therefore, in case of emergency thrombectomy (ET), difficult carotid access leads to worse clinical outcome. Transfemoral approach is common but limited by aortic or peripheral artery conditions and then transbrachial or -radial access is an alternative one. The aim of our study was to investigate the feasibility of transbrachial carotid cannulation (TCC) of a particular long guide-sheath in ET for AIS in the anterior cerebral circulation (ACC).
Method: We included in our retrospective study patients who underwent transbrachial ET as the first line in the ACC with a particular long guide-sheath (MSK-guide7.5x90, 0.088(ID)) from October 2011 to Jun 2016. We evaluated the patient's baseline features, sides of occlusion vessels, types of aortic arch (AA), success rate of carotid cannulation and puncture to carotid cannulation time (PTCC_time).
Results: Twenty two patients matched our inclusive criteria and were analyzed. Mean age was 77.5 years, 15 patients (68%) were men, 14 left-sided lesions (64%) were involved. There were 11 patients (50%) with type3 AA, 6 (27%) with type2 AA and one with type1 AA. Among them, 4 patients had a bovine arch. Success rate of TCC was 100% and mean PTCC_time was 13 minutes (6–18).
Conclusion: TCC of a particular long guide-sheath was feasible for ET in the ACC and AA type or peripheral artery conditions didn't affect procedures.

AS09-004

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

INTRA-ARTERIAL THROMBECTOMY IN ACUTE ISCHAEMIC STROKE WITH LARGE VESSEL OCCLUSION - A RETROSPECTIVE COMPARATIVE COHORT IN HONG KONG

R. Li[1], W.K.W. Leung[2], R.Y.T. Ng[3], S.W.H. Cheng[1], E.S.W. Yeung[1], C.N. Lee[1], M. Au Yeung[1] and C.M. Cheung[1]
[1]Pamela Youde Nethersole Eastern Hospital, Department of Medicine, Hong Kong, Hong Kong S.A.R.
[2]Pamela Youde Nethersole Eastern Hospital, Department of Radiology, Hong Kong, Hong Kong S.A.R.
[3]Pamela Youde Nethersole Eastern Hospital, Department of Neurosurgery, Hong Kong, Hong Kong S.A.R.

Background and Aims: Recent positive trials have shifted the paradigm of acute ischaemic stroke (AIS) management, supporting intra-arterial thrombectomy (IAT) in addition to intravenous (IV) thrombolysis for patients who suffer from large vessel occlusions (LVO). Due to scarcity of data in Chinese patients, we retrospectively analyzed the outcome of AIS patients who underwent IAT and those who only received IV thrombolysis in a Hong Kong regional hospital.
Method: Between April 2014 and July 2016, all AIS patients admitted to the Pamela Youde Nethersole Eastern Hospital due to LVO in the anterior circulation were recruited. Subjects who underwent IAT, regardless of whether IV thrombolysis was given, were allocated to the intervention group. Those who only received IV thrombolysis were assigned as controls. Subjects who did not receive any form of thrombolysis were excluded. The primary outcome was the 90-day modified Rankin scale (mRS) and stroke related mortality.
Results: 115 patients were identified for analysis. 86 (74.8%) received IV thrombolysis only. 27 (23.5%) underwent IAT, among which 13 (48.1%) received IV thrombolysis beforehand. The A-Direct-Aspiration-First-Pass-Technique (ADAPT) method was used in 25 (92.6%) IAT subjects, while the Stentreiver was used in 13 (48.1%). At 90 days, 19 (70.1%) subjects in the intervention group had mRS 0–3, compared with 41 (47.7%) controls (OR 2.6, $p = 0.04$). There was no statistical difference in mortality.
Conclusion: Our study of Hong Kong Chinese patients echoed the results of large international trials, demonstrating the benefit of IAT in addition to IV thrombolysis for AIS patients with LVO in terms of functional outcome.

AS09-006

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

UTILITY OF TRANSBRACHIAL ACCESS FOR CAROTID ARTERY STENTING

T. Mori[1], Y. Tanno[1], S. Kasakura[1], K. Yosioka[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital, Stroke Treatment, Kamakura, Japan

Background and Aims: Transfemoral access is usually used for carotid artery stenting (CAS). However, aortic arch or peripheral artery conditions occasionally limit its access. Transbrachial access has been developed for neuroendovascular intervention. The aim was to investigate whether transbrachial access with guide-sheaths specifically designed for transbrachial carotid cannulation (TCC) (MSK-guide, Medikit, Japan) for carotid artery stenting (CAS) was seldom limited by aortic arch or peripheral arterial conditions.

Method: We Included in our retrospective study patients who underwent elective transbrachial CAS (Tb_CAS) with the guide-sheaths between June 2011 and April 2016, and evaluated used devices and procedural success rate.
Results: One hundred sixty-nine patients were analyzed. Successful TCC and stable positioning was achieved in 106 cases of the right common carotid artery (CCA) and in 63 cases of the left CCA. The Spider filter was used in 103 and the Filterwire EZ in 55 and the Angioguard in 11 cases. The Shiden balloon was used in 158 and the RX-Genity in 4 and the Gateway in one, the Aviator in one, Coyote in one and none in 4 for predilatation. The CarotidWallstent was used in 129, the Precise in 29, the Protégé in 10 cases and the Driver in one case. The bovine type or type 3 aortic arch didn't limit TCC. Peripheral artery conditions such as aortic aneurysms or iliac artery occlusions didn't affect it.
Conclusion: Tb_CAS with guide-sheaths specifically designed for TCC was not limited by the arch type nor peripheral arterial conditions.

AS09-007

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

FEASIBILITY AND SAFETY OF DIRECT CATHETER-BASED THROMBECTOMY IN THE TREATMENT OF ACUTE ISCHEMIC STROKE. COOPERATION OF CARDIOLOGISTS, NEUROLOGISTS AND RADIOLOGISTS. PROSPECTIVE REGISTRY PRAGUE-16

P. Widimsky[1], B. Koznar[2], T. Peisker[3], P. Vasko[3], J. Vavrova[2], F. Rohac[2], J. Kroupa[2] and I. Stetkarova[4]
[1]Charles University- Third Medical Faculty, Cardiology, Prague, Czech Republic
[2]University Hospital Kralovske Vinohrady, Cardiology, Prague, Czech Republic
[3]University Hospital Kralovske Vinohrady, Neurology, Prague, Czech Republic
[4]Charles University- Third Medical Faculty, Neurology, Prague, Czech Republic

Background and Aims: The study aim was to evaluate the role of direct catheter-based thrombectomy (d-CBT, without thrombolysis) and its feasibility and safety when performed in cooperation of neurologists, cardiologists and radiologists.
Method: Prospective observational registry of acute stroke interventions indicated by a neurologist and performed within interventional cardiology department. The primary outcome was functional neurologic recovery (mRs 0–2) at 90-days. A total of 115 consecutive patients (mean age 66 years) have been enrolled, 84 patients underwent d-CBT and 31 patients bridging thrombolysis with immediate catheter intervention (TL-CBT).
Results

	d-CBT (n = 84)	TL-CBT (n = 31)
Angiographic success (TICI 2b-3 flow)	69%	81%
Neurologic recovery (mRs 0–2 after 90 days) in all patients	36%	52%
Neurologic recovery in patients with isolated MCA occlusion	51%	71%
Symptomatic intracranial bleeding (NIHSS rise $\geq$ 4)	3.6%	6.5%

Conclusion: Acute stroke interventions performed in close cooperation of cardiologists, neurologists and radiologists were feasible and safe. Direct catheter-based thrombectomy may be considered in patients with contraindications for thrombolysis or in patients with very short CT – groin puncture times, but bridging thrombolysis remains an important part of the treatment strategy for patients without contraindications. A randomized trial is needed to better evaluate the role of direct catheter-based thrombectomy.

AS09-008

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

PERI-PROCEDURAL MANAGEMENT TO PREVENT CEREBRAL HYPERPERFUSION SYNDROME FOLLOWING ELECTIVE CAROTID ARTERY STENTING

K. Yoshioka[1], T. Mori[1], Y. Tanno[1], S. Kasakura[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital Stroke Center, Stroke Treatment, Kamakura, Japan

Background and Aims: Cerebral hyperperfusion syndrome (CHS) is a serious complication after carotid artery stenting (CAS). The aim of our study was to evaluate the efficacy of our current peri-procedural management to prevent CHS following elective CAS.
Method: Included in our retrospective study were patients with symptomatic or asymptomatic carotid artery stenosis who underwent elective CAS, after more than 30 from onset if symptomatic, from January 2012 to Jun 2016. CHS was defined as one or more symptoms of 1)ipsilateral pulsatile headaches, 2)convulsion, 3)hemiparesis without new ischemic lesions as procedural complications. Evaluated were the patient's baseline features, presence of CHS and administered medications. Patients started to take Yokukansan (TJ-54) 2.5 g tid on the previous day of CAS and continued for one week, etizolam 1 mg or suvorexant 20 mg at bedtime on the previous day and just before CAS. Patients underwent blood sampling oxygen extraction fraction (OEF) measurement, SPECT and transcranial color corded sonography just after CAS to find cerebral hyperperfusion phenomenon (CHP). If CHS was detected, the patients continued to take etizolam 1 mg bid for three days after CAS, their systolic blood pressure were managed to be lower than 140 mmHg.
Results: One hundred - forty patients were analyzed. Mean age was 75 years old, 108(77%) were men. CHP was detected in 39(27.9%) patients and one patient among them complained weak ipsilateral headache resolving within a few hours. Neither cerebral hemorrhages nor brain edemas were occurred. No CHS led to worse outcome.
Conclusion: Our current peri-procedural management had effect on preventing CHS following elective CAS.

AS09-009

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TRANSITORY RECTANGULAR ALOPECIA AFTER DURAL FISTULA EMBOLIZATION. AN UNUSUAL (AND UNDEREPORTED) ADVERSE EVENT OF ENDOVASCULAR NEUROINTERVENTION

R. García Ruiz[1], A. González Manero[1], J. Silva Fernández[2], I. Rueda Medina[1], L. Turpín Fenoll[1], E. Camacho Garrido[3], A. Santos Pinto[1], B. Espejo Martínez[1], A. Vadillo Bermejo[1], R.M. Manzano Pablos[3] and E. Botia Paniagua[1]

[1]Hospital General La Mancha Centro, Neurology, Alcázar de San Juan, Spain

[2]Hospital General La Mancha Centro, Endocrinology, Alcázar de San Juan, Spain

[3]Hospital General La Mancha Centro, Dermatology, Alcázar de San Juan, Spain

Background and Aims: Endovascular Neurointervention is a burgeoning discipline with adverse events that are frequently underreported. This is the case with Transitory Rectangular Alopecia, a non-cicatricial form of radiodermatitis which turns all the follicles into catagen, causing a characteristic, well defined rectangular plaque of alopecia in the area of scalp that received the highest dose of radiation. Age, total dose and genetic and hormonal factors play a role. We report the case of a patient presenting with rectangular alopecia after a dural fistula embolisation.

Method: We report the case of a 64 year old man who underwent endovascular embolization to treat a dural fistula. He was admitted to our hospital three days later because of acute confusional state. During inhospital stay, his relatives complaint of finding unusual amounts of hair on the pillow.

Results: Two weeks after embolization of a dural fistula, our patient started on hair loss. Although during the first days nothing unusual could be seen on the examination, the patient progressively developed a well-defined rectangular plaque of alopecia with a strongly positive hair pull test in the parieto-occipital region. On trichoscopy, dystrophic hair shafts were observed in the follicular orifices, with no exclamation mark hairs.

Conclusion: Alopecia after radiotherapy is extensively documented; however, few reports have been published on alopecia after diagnostic and therapeutic endovascular procedures and the condition is probably underdiagnosed. Owing to its cumulative effect, it must be noted for future interventions. Despite being reversible, it may cause alarm, so it should be mentioned among the possible adverse events.

AS09-010

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ONSET NATIONAL INSTITUTE OF HEALTH STROKE SCALE AND 24 HOURS CLINICAL IMPROVEMENT STRONGLY PREDICT FUNCTIONAL INDEPENDENCE IN ELDERLY STROKE PATIENTS TREATED WITH MECHANICAL THROMBECTOMY

A. Davoli[1], G. Koch[1], C. Motta[1], M. Diomedi[1], V. D'Agostino[1], S. Napolitano[1], D. Samà[1], D. Konda[2], D. Morosetti[2], E. Pampana[2], R. Gandini[2] and F. Sallustio[1]

[1]Tor Vergata Hospital, Neuroscience- Stroke Center, Roma, Italy

[2]Tor Vergata Hospital, Diagnostic Imaging - Interventional Radiology and Neuroradiology, Roma, Italy

Background and Aims: Skepticism toward treatment of elderly with acute ischemic stroke has led to a small number of patients included in intravenous thrombolysis and endovascular stroke treatment randomized controlled trials. We evaluated safety and efficacy of endovascular treatment in elderly patients with acute ischemic stroke.

Method: Patients were divided into two groups based on their age: over 80 ($\geq$80) and under 80 ($\leq$79). Baseline and procedural characteristics, safety outcomes such as intracranical haemorrhage (ICH) and mortality and efficacy outcomes such as successful reperfusion and 3 months good clinical outcome were compared between the two groups. Mutivariable analysis was performed to identify predictors of clinical outcome.

Results: 157 patients were included in the under 80 group and 62 in the over 80 group. Intravenous thrombolysis was used more frequently and onset-to-reperfusion time was shorter in the over 80 group (67.7% vs 52.8%, p = 0.04; 318.7 ± 128.7 vs 282 ± 53.5, p = 0.02) whereas no differences were found between groups in successful reperfusion (69% vs 63%, p = 0.4), good clinical outcome (30.6% vs 34.3, p = 0.6), any and symptomatic ICH (37% vs 37.5%, p = 1.00; 11% vs 14%, p = 0.6) and mortality (40.3% vs 29.2%, p = 0.1). Multivariable analysis revealed onset NIHSS and 24 hours clinical improvement (OR, 0.65; 95% CI, 0.44 to 0.96; p = 0.03; OR, 141.13; 95% CI, 2.96 to 6720.7; p = 0.01) as independent predictors of 3 months functional independence in the over 80 years.

Table 1. Procedural characteristics

	Under 80 (n=157)	Over 80 (n=62)	p
I.V. Thrombolysis (%)	83(52.8)	42(67.7)	0.04
I.V. Heparin (%)	44(28)	27(43.5)	0.03
General Anesthesia (%)	93(59.2)	21(33.8)	<0.001
Stent retriever use (%)	45(28.6)	8(13)	0.01
Thromboaspiration device use (%)	77(49)	39(63)	0.07
Rescue device use (%)	42(26.7)	19(30.6)	0.6
Onset-groin puncture time (mean±SD)	239.7±117.7	219±52.5	0.1
Onset-reperfusion time (mean±SD)	318.7±128.7	282±53.5	0.02
Groin-reperfusion time (mean±SD)	78.5±60.7	60±28.5	0.009
Device attempts (mean±SD)	2.8±2	2.1±1.3	0.01

Table 2. Safety and efficacy outcomes

	Under 80 (n=157)	Over 80 (n=62)	p
Successful reperfusion (%)	99(63)	43(69)	0.4
24 hs follow-up ASPECTS (mean±SD)	3.5±2.5	5±2.7	<0.001
Any ICH[a] (%)	59(37.5)	23(37)	1.000
SAH[b]	2(3.3)	2(8.6)	0.3
HI[c]-1	6(10.1)	3(13)	0.7
HI-2	6(10.1)	3(13)	0.7
PH[d]-1	22(37.2)	4(17.3)	0.1
PH-2	23(38.9)	11(47.8)	0.6
Symptomatic ICH (%)	22(14)	7(11)	0.6
mRS≤2 (%)	54(34.3)	19(30.6)	0.6
mRS≤3 (%)	74(47.1)	21(33,8)	0.09
Global mortality (%)	46(29.2)	25(40.3)	0.1
Mortality due to neurological deterioration	33(21)	9(14.5)	0.3

[a] Intracranial haemorrhage;

[b] Subarachnoid haemorrhage;

[c] Haemorrhagic Infarction;

[d] Parenchymal haematoma;

Table 3. Univariate analysis of potential factors affecting 3 month functional outcome in the two groups

	Under 80			Over 80		
	mRS≤2 (n=54)	mRS≥3 (n=103)	p	mRS≤2 (n=19)	mRS≥3 (n=43)	p
Age (mean±SD)	61.5±13.2	66.1±8.9	0.01	84.3±4.3	85.1±4.2	0.5
Onset NIHSS (mean±SD)	16.7±4.1	18.9±3.9	0.001	15.3±5	19±3.3	<0.001
Baseline glycemia	117±38	143±62	0.005	137±37	134±33	0.7
Baseline SBP	139±20	149±29	0.03	157±25	143±21	0.03
Baseline DBP	79±12	83±15	0.04	81±15	78±15	0.5
IV thrombolysis(%)	32(59)	51(49.5)	0.3	13(68.4)	29(67.4)	1.000
IV heparin(%)	14(26)	29(28)	0.8	9(47.3)	18(41.8)	0.7
General Anesthesia (%)	32(59)	61(59)	1.00	8(42.1)	16(37.2)	0.7
Onset groin puncture time (mean±SD)	229±126	241±89.1	0.4	234±60.3	211±47	0.1
Onset reperfusion time (mean±SD)	295 ±138	327±91	0.08	275.3±61	286±50	0.5
Groin-to-reperfusion time (mean±SD)	69±55	83.1±47	0.1	43.3±22.7	68±28	0.001
Stentriever (%)	18(33)	30(29)	0.5	2(10.5)	6(14)	1.000
Thromboaspiration device (%)	33(61)	71(69)	0.3	15(79)	20(46.5)	0.02
Rescue device (%)	11(20)	31(30)	0.2	2(10.5)	17(39.5)	0.03
24 hs clinical improvement (%)	43(79.5)	26(25)	<0.001	17(89.4)	9(21)	<0.001
24 hs NIHSS difference	-9.2±5.1	0.6±8.6	<0.001	-8.6±4.5	0.8±8	<0.001
TICI ≥2b (%)	44(81.5)	55(53)	0.001	17(89.4)	26(60.4)	0.03
Device attempts (mean±SD)	2.1±1.4	3.1±1.8	<0.001	1.7±1.3	2.3±1.5	0.1
Baseline ASPECTS (mean±SD)	8.2±1.5	6.8±2.2	<0.001	9.1±1.5	7.4±2.6	0.003
24 hs follow-up ASPECTS (mean±SD)	5.5±2	2.5±2.2	<0.001	7±1.5	4±2.5	<0.001
Good collateral flow (%)	40(74)	47(45.5)	<0.001	17(89.4)	22(51)	0.004
Any ICH (%)	10(18.5)	46(44.5)	0.001	3(15.7)	19(44)	0.04
Symptomatic ICH (%)	0	22(21)	<0.001	0	8(18.6)	0.09

Conclusion: Our findings confirm to not withhold endovascular treatment for stroke in elderly. Major determinants of outcome in this subgroup are presentation NIHSS and 24 hours clinical improvement.

AS09-012

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTORS FOR THE DISTAL EMBOLIZATION DURING THE ENDOVASCULAR THROMBECTOMY FOR ACUTE STROKE PATIENTS

C.H. Kim[1] and D.S. Choi[2]
[1]Gyeongsang National University Hospital, Neurology, Jinju, Republic of Korea
[2]Gyeongsang National University Hospital, Radiology, Jinju, Republic of Korea

Background and Aims: The occurrence of recanalization by endovascular thrombectomy (EVT) is strongly linked with the improvement of clinical outcome in acute ischemic stroke patients with a large artery occlusion. Lack of recanalization may happen as a result of distal embolization by clot fragmentation during the procedure. We aim to identify the predictors for the distal embolization during the EVT.
Method: We evaluated consecutive acute ischemic stroke patients who underwent EVT from February 2016 to December 2016 in our institution. Patients in whom distal embolization was not identifiable due to the failure of recanalization (TICI grade 0) were excluded. The occurrence of distal embolization was defined as newly developed occlusion of any arterial branches on the final angiography after EVT.
Results: A total of 109 patients (mean age, 70.3 ± 10.5; male, 49.5%) were included in this study. Distal embolization occurred in 54 patients (49.5%). The type of guiding catheter and procedural time were related with distal embolization on a univariate analysis with a crude OR of 3.27 (95% CI 1.23–8.65) and 1.01 (95% 1.00–1.03). Both using a non-balloon guiding catheter and prolonged procedural time were independently associated with the occurrence of distal embolization after adjusting covariates with an adjusted OR of 3.12 (95% CI 1.14–8.59), and 1.01 (95% CI 1.00–1.02), respectively.
Conclusion: The risk of distal embolization is affected by the type of guiding catheter and procedural time. Using a balloon guiding catheter and shortening procedural time may provide the reduction of distal embolization during the EVT.

AS09-013

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

MECHANICAL THROMBECTOMY IN BASILAR ARTERY OCCLUSIONS: THE EXPERIENCE OF AN IRISH COMPREHENSIVE STROKE CENTRE

J. McCabe[1,2], Y. Lee[2], A. O'Shea[3], A. O'Hare[2], P. Brennan[3], D. Williams[2] and J. Thornton[3]
[1]Mater Misericordiae University Hospital, Stroke, Dublin, Ireland
[2]Beaumont Hospital, Stroke, Dublin, Ireland
[3]Beaumont Hospital, Neuroradiology, Dublin, Ireland

Background and Aims: High quality evidence exists for the role of thrombectomy in patients with large artery occlusions in the anterior circulation, but there is a dearth of evidence for its efficacy in basilar artery occlusions (BAO).
Method: All patients referred to our centre with BAOs treated with endovascular therapy between 2012–2016 were included in this retrospective study. The clinical notes of each case were reviewed.
Results: 20 patients were identified (13 male, 7 female). The mean age was 56.4 years. 11 patients (55%) received intravenous thrombolysis. The mean NIHSS in those patients where it was recorded was 16.4 (range 7–33, n = 11). Stent-retrievers were used in the majority of cases (n = 19), although the Penumbra 3-D separator was the sole device used in 1 patient. The median time from symptom onset to first pass thrombectomy in the cases with accurate documentation was 440 minutes (range 162–3120, n = 17). Recanalisation rates (TICI 2b-3) and a good functional outcome (modified Rankin score of 0–2) at 3 months were achieved in 65% (n = 13) and 25% (n = 5) of patients respectively. The mortality rate was 30% (n = 6) at 3 months. There was 1 procedure-related complication (stent entanglement) and symptomatic intracranial haemorrhage occurred in 1 patient.
Conclusion: BAOs are associated with a high mortality and poor functional outcome. Effective therapeutic interventions are lacking for this devastating condition. In this series thrombectomy was a safe effective therapy that achieved recanalisation in the majority of cases and was attributable to a good functional outcome in a moderate proportion of patients. Randomised control trials are required to establish the efficacy of this novel therapeutic intervention.

AS09-016

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

MINOR STROKE SYNDROMES IN LARGE VESSEL OCCLUSIONS – SAFETY AND EFFICACY OF MECHANICAL THROMBECTOMY

M. Messer[1], S. Mustanoja[2], L.U. Krause[3], M. Petersen[3], P. Lindsberg[2], S. Lowens[4], K. Lappalainen[5], M. Möhlenbruch[6], P. Ringleb[1] and S. Nagel[1]

[1]University Hospital Heidelberg, Department of Neurology, Heidelberg, Germany
[2]Helsinki University Hospital, Neurology, Helsinki, Finland
[3]Klinikum Osnabrück, Neurology, Onsabrück, Germany
[4]Klinikum Osnabrück, Radiology, Onsabrück, Germany
[5]Helsinki University Hospital, Neuroradiology, Helsinki, Finland
[6]University Hospital Heidelberg, Neuroradiology, Heidelberg, Germany

Background and Aims: Safety and efficacy of mechanical thrombectomy (MT) in patients with large vessel occlusions (LVO) presenting with minor stroke syndromes (MSS; NIHSS $< / = 5$) is unclear.
Method: From three different stroke centers, MSS patients with LVO (ICA, M1 and M2) who received an acute recanalization therapy, were identified and divided into three groups: MT immediately (MT-I), MT after early neurological deterioration (MT-END) and patients who received IV only (IV). The primary efficacy endpoint was good outcome after 3 months measured on the modified Rankin scale (mRS 0–2) and the primary safety endpoint was symptomatic intracerebral hemorrhage (sICH) defined by ECASSII.
Results: Between 2002 and 2016 189 patients could be included (62 in MT-I, 22 in MT-END and 105 in IV). Patients in the MT-END group had the most ICA and tandem occlusions (47.6% vs. 27.5% for MT-I vs. 15.2% for IV), whereas the most M2 occlusion were in the IV group (67.6% vs. 4.8% for MT-END vs. 30.6% for MT-I, all $p < 0.001$). TICI2b/3 was achieved in 90.3% in MT-I vs. 77.3% in MT-END ($p = 0.12$) and stenting was more often performed in MT-END (45.5% vs. 12.9%, $p = 0.001$). Rates of good outcome were highest in MT-I (87.1% vs. 50% in MT-END vs. 73.3% in IV, $p = 0.002$) and mortality was lowest in IV and MT-I as compared to MT-END (1% vs. 3.2% vs. 13.6%. $p = 0.009$). Rates of sICH however, were similar in all groups (2.9%, 3.2%, 4.5%, $p = 0.9$).
Conclusion: The observed benefit-safety profile favors immediate MT in MMS patients with LVO to prevent END.

AS09-017

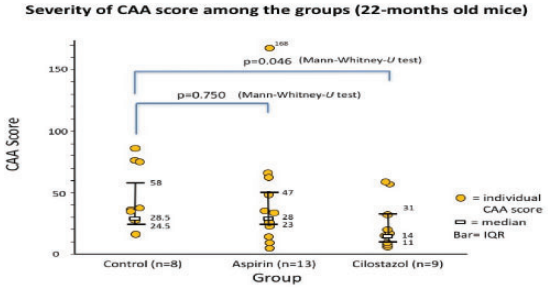
NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

LOW-DOSE PHOSPHODIESTERASE III INHIBITOR (CILOSTAZOL) REDUCES THE VASCULAR AMYLOID BURDEN IN AMYLOID-B PROTEIN PRECURSOR TRANSGENIC MICE

Y. Yakushiji[1], K. Kawamoto[1], K. Uchihashi[2], Y. Nagaishi[1], S. Kohei[1], Y. Tsugitomi[3], S. Aoki[2] and H. Hara[1]

[1]Saga University Faculty of Medicine, Division of Neurology- Department of Internal Medicine, Saga, Japan
[2]Saga University Faculty of Medicine, Department of Pathology and Microbiology, Saga, Japan
[3]Saga University Faculty of Medicine, Department of Internal Medicine, Saga, Japan

Background and Aims: A recent study reported that relatively high dose cilostazol (0.3%) promoted drainage of cerebrovascular Amyloid-β protein (Aβ) in Amyloid-β Protein Precursor (APP) Transgenic Mice. We investigated whether low dose cilostazol (0.01%) can decrease microhemorrhage and Aβ deposition in the brain using APP transgenic mice.
Method: At baseline, 12-month old female APP23 mice were randomly assigned to control group (vehicle), aspirin group (0.01% aspirin), and cilostazol group (0.01% cilostazol). Presence and number of cerebral microhemorrhage, area of senile plaque, and severity of vascular amyloid burden were evaluated using coronal sections through whole brain of 14-months old and 22-months old mice. The severity of vascular amyloid burden was quantified with cerebral amyloid angiopathy (CAA) score (=number of Aβ positive vessel in cortex and hippocampus $\times$ severity of amyloid burden of each Aβ positive vessel).
Results: Findings of 14-months old mice showed no differences in each outcome among 3 groups. In 22-months old mice, there were no differences in prevalence of cerebral microhemorrhage or area of senile plaque among 3 groups. Regarding CAA score, no difference was seen between control group and aspirin group, while it was significantly lower in cilostazol group compared to control group (figure: cilostazol group vs. control group, median [IQR], 14 [11–31] vs. 28.5 [24.5–58], $p = 0.046$, Mann-Whitney-*U* test)



Conclusion: Our study showed that cilostazol, even in low dose (0.01%), could reduce the vascular amyloid burden without increasing cerebral microhemorrhage, in APP Transgenic Mice. Our findings added further evidence of that cilostazol would be a promising therapeutic approach for CAA.

AS09-018

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

GEOGRAPHIC DISSEMINATION OF ENDOVASCULAR TREATMENT FOR STROKE IN CATALONIA

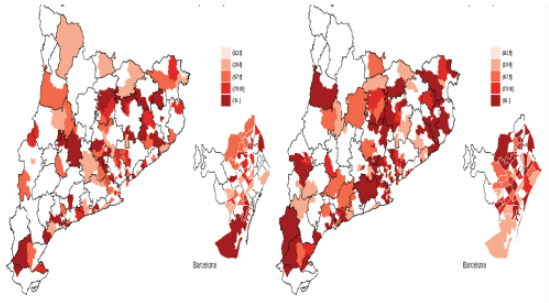
S. ABILLEIRA[1], N. PÉREZ DE LA OSSA[2], M. RIBÓ[3], P. CARDONA[4], X. URRA[5], E. GIRALT-STEINHAUER[6], D. CÁNOVAS[7], P. CAMPS-RENOM[8], C. TEBÉ[9] and M. GALLOFRÉ[10]

[1]Agency for Health Quality and Assessment of Catalonia, Stroke Programme, Barcelona, Spain
[2]HOSPITAL UNIVERSITARI GERMANS TRIAS I PUJOL, STROKE UNIT, BADALONA, Spain
[3]HOSPITAL VALL D'HEBRON, STROKE UNIT, BARCELONA, Spain
[4]HOSPITAL UNIVERSITARI DE BELLVITGE, STROKE UNIT, HOSPITALET DE LLOBREGAT, Spain
[5]HOSPITAL CLÍNIC, STROKE UNIT, BARCELONA, Spain
[6]HOSPITAL DEL MAR, NEUROLOGY, BARCELONA, Spain
[7]HOSPITAL PARC TAULÍ, NEUROLOGY, SABADELL, Spain
[8]HOSPITAL DE LA SANTA CREU I SANT PAU, NEUROLOGY, BARCELONA, Spain
[9]Institut d'Investigació Biomèdica de Bellvitge, STATISTICS, HOSPITALET DE LLOBREGAT, Spain

[10]Agency for Health Quality and Assessment of Catalonia, STROKE PROGRAMME, BARCELONA, Spain

Background and Aims: Endovascular treatment (EVT) was recently established as a new standard of care in acute ischemic stroke (AIS) patients with large artery occlusions. It is likely though that access to EVT is not yet equitable. We describe 2011 to 2015 variation in use of EVT for AIS in Catalonia according to inner/outer metropolitan rings and small health areas.
Method: We used registry data to identify all EVT for AIS performed in Catalonia from 2011 to 2015. The SONIIA registry is a government-mandated, population-based and externally audited data base that includes all reperfusion therapies for AIS. We linked EVT cases identified in the registry with the Central Registry of Insured Persons to obtain the basic health area of residence for each patient. We worked out age- and sex-standardized EVT rates over time according to different territorial segmentation patterns (metropolitan rings and basic health areas).
Results: Age- and sex-standardized EVT rates increased significantly from 3.9*100,000 (95% CI: 3.4–4.4) in 2011 to 6.8*100,000 (95% CI: 6.2–7.6) in 2015. Such increase occurred in inner and outer metropolitan rings as well as provinces although a persistent geographic centrifugal gradient is seen, with higher rates in the inner metropolitan area. Changes in EVT access across small health areas over time were more subtle although there was a rather generalized increase of standardized EVT rates (figure).

Figure. Age- and Sex-standardized EVT rates *100,000 inhabitants (left: 2011, right: 2015)



Conclusion: Between 2011 and 2015, temporospatial dissemination of access to EVT was seen in Catalonia. Territorial differences though remain. Mapping of EVT is essential to assess equity.

AS09-020

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

UK OUTCOMES FROM MECHANICAL THROMBECTOMY (MT): COMPARISON OF INTRAVENOUS THROMBOLYSIS WITH MT VERSUS MT ALONE FROM THE SAFE IMPLEMENTATION OF THROMBOLYSIS IN STROKE-THROMBECTOMY REGISTRY (SITS-TBY)

J.S. Balami[1], P.M. White[2], P. McMeekin[3], C. Roffe[4], J. Chembala[4], A. Clifton[5], E. Littleton[6], R. Veltkamp[7], A. Dixit[8], D. Flynn[9], K. Halvorsrud[9], C. Price[2], K.R. Lees[10] and G.A. Ford[11]
[1]University of Oxford and Norfolk and Norwich University Hospital NHS Trust, Centre for Evidence-Based Medicine, Oxford, United Kingdom
[2]Newcastle University, Stroke Research Group- Institute of Neuroscience, Newcastle, United Kingdom
[3]Northumbria University, School of Health- Community and Education Studies, Northumbria, United Kingdom
[4]Keele University, Stroke Research in Stoke- Institute for Applied Clinical Studies, Keele- Staffordshire, United Kingdom
[5]St George's University Hospitals NHS Foundation Trust, Clinical Radiology, London, United Kingdom
[6]Queen Elizabeth Hospital Birmingham, Neurology, Birmingham, United Kingdom
[7]Imperial College London, Faculty of Medicine- Department of Medicine, London, United Kingdom
[8]The Newcastle Upon Tyne NHS Foundation Trust, Older People's Medicine, Newcastle, United Kingdom
[9]Newcastle University, Institute of Health & Society, Newcastle, United Kingdom
[10]University of Glasgow, Institute of Cardiovascular and Medical Sciences, Glasgow, United Kingdom
[11]Oxford University Hospitals NHS Foundation Trust and University Of Oxford, Radcliffe Department of Medicine, Oxford, United Kingdom

Background and Aims: Is mechanical thrombectomy (MT) alone an effective and safe for treatment of acute large artery occlusive stroke (LAO)?
To examine the UK experience of functional outcome and safety of combined MT/IVT compared with MT alone for the treatment of LAO stroke.
Method: Data contributed to SITS-TBY from 19 United Kingdom centres were analysed. Recanalisation rate, functional outcome (mRS 0–2), symptomatic intracerebral haemorrhage (sICH) and mortality at 90 days were compared.
Results: 393 patients were treated with combined MT/IVT; 96 had MT-alone. Patients treated with MT/IVT were younger; median 66 yrs (range 52–75) vs MT-alone 69 (54 -76). Baseline NIHSS was similar 16 (IQR 10–21) vs 17 (10–22). Onset-to-treatment time was similar at 236 (92–298) vs. 241 (200–303) mins. There were no statistical differences in the recanalisation rate (TICI 2b/3) [65% vs 60%; $p = 0.49$); 90-day functional outcome (mRS 0–2) [49% vs 45%; $p = 0.452$]; sICH (1.3% vs 1.4%; $p = 1.0$) and parenchymal haematoma (PH2) [2% vs 1.4%; $p = 1.0$] across both groups, but 90-day mortality was lower in the IVT/MT group (19% vs 30%, $p = 0.002$). Median length of stay was 6 days in both groups.
Conclusion: Treatment with MT-alone results in similar functional outcomes to combined IVT/MT. We found a difference in mortality rate but not in sICH. The mortality difference may relate to cohort differences, impact of the reasons why IVT could not be given in the MT only group (co-morbidities) or 33% missing outcome data, but merits clarification in trials and larger observational studies.

AS09-021

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

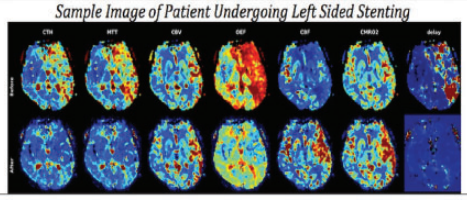
CAROTID ARTERY STENTING IMPROVES CAPILLARY TRANSIT TIME HETEROGENEITY IN PATIENTS WITH CAROTID ARTERY STENOSIS

E.M. Arsava[1], M.B. Hansen[2], B. Kaplan[1], A. Arat[3], A. Peker[3], R. Gocmen[3], K.K. Oguz[3], M.A. Topcuoglu[1], L. Østergaard[2] and T. Dalkara[1]
[1]Hacettepe University Faculty of Medicine, Department of Neurology, Ankara, Turkey
[2]Institute of Clinical Medicine- Aarhus University, Center of Functionally Integrative Neuroscience and MINDLab, Aarhus, Denmark
[3]Hacettepe University Faculty of Medicine, Department of Radiology, Ankara, Turkey

Background and Aims: The influence of carotid revascularization on cerebral microvascular flow dynamics is a relatively unexplored field. In this study, we determined the influence of carotid artery stenting on capillary transit time heterogeneity (CTH) together with other perfusion metrics among patients with carotid artery stenosis.
Method: A consecutive series of patients with carotid artery stenosis were prospectively evaluated with perfusion-weighted magnetic resonance imaging prior to and following carotid artery stenting. CTH, MTT, CBV, OEF, CBF, CMRO2 and delay were determined throughout the ipsilateral middle cerebral artery territory and normalized to the contralateral side. The median change in perfusion parameters in gray matter, white matter and the entire territory was then evaluated by Wilcoxon test. The influence of baseline luminal diameter and stenosis degree on this change was also determined by correlation analyses.
Results: The study population was comprised of 28 patients with a median (interquartile range) luminal diameter of 0.95 (0.70–1.4) cm and 76 (68–80) % stenosis. Carotid artery stenting led to a significant decrease in CTH in the ipsilateral middle cerebral artery territory ($p = 0.013$; Table). The change was significant both in the gray and white matter. The degree of improvement in capillary heterogeneity was inversely correlated with the baseline luminal diameter ($r = -0.43$; $p = 0.023$) and positively correlated with the degree of stenosis ($r = 0.33$; $p = 0.086$).

p-value (Wilcoxon test)	Entire territory	Gray Matter	White Matter
CTH	0.013	0.007	0.019
MTT	0.009	0.006	0.013
CBV	0.005	0.011	0.001
OEF	0.004	0.004	0.005
CBF	0.006	0.004	0.011
CMRO2	0.616	0.891	0.452
Delay	<0.001	<0.001	<0.001

Sample Image of Patient Undergoing Left Sided Stenting



Conclusion: Our study discloses that carotid artery stenting, apart from its established efficacy in the prophylaxis of future vascular events, is also critical for restoration of the microvascular dysfunction in the cerebral tissue secondary to stenosis within the proximal arterial tree.

AS09-022

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTING OUTCOMES AFTER RECANALIZATION THERAPY IN BASILAR ARTERY OCCLUSIVE DISEASE: THE PITTSBURGH OUTCOMES AFTER STROKE THROMBECTOMY VERTEBROBASILAR (POST-VB) SCORE

A. Jadhav[1], S. Rangaruju[2], D. Campbell[2], J. Ritvonen[3], M. Borchert[4], H. Silvennoinen[5], J. Gerber[4], V. Pütz[4], S. Reza[2], D. Haussen[2], R. Nogueira[2], D. Strbian[3], T. Jovin[1] and P. Lindsberg[3]
[1]University of Pittsburgh, Neurology and Neurological Surgery, Pittsburgh, USA
[2]Emory University, Neurology, Atlanta, USA
[3]University of Helsinki, Neurology, Helsinki, Finland
[4]Technische Universität Dresden, Neurology, Dresden, Germany
[5]University of Helsinki, Radiology, Helsinki, Finland

Background and Aims: Basilar artery occlusion (BAO) leads to high rates of morbidity and mortality. Post treatment stroke burden and patient features may inform clinical course. We sought to develop a prognostic score to predict outcomes after BAO.
Method: The derivation cohort was obtained from a prospectively maintained database of patients with BAO treated endovascularly at center A ($N = 59$). Logistic regression was performed to identify any independent predictors of good outcome (90-day mRS, 0–3). Factors were weighted based on β-coefficients to derive the Pittsburgh Outcomes After Stroke Thrombectomy Vertebrobasilar (POST VB) score. The POST-VB score was then validated in a separate cohort of BAO patients treated at 3 other centers.
Results: In the derivation cohort, predictors ($P < 0.1$) of good outcome included final brainstem infarct volume on post treatment MRI (in cm3, $\beta = -1.067$, $P < 0.01$) and age (years, $\beta = -0.114$ $P = 0.011$). The POST-VB score was calculated as age $+ 10 \times$ final infarct volume. The Hosmer Lemeshow test of the model demonstrated a good fit ($p = 0.92$). POST-VB accurately predicted good outcomes in the derivation (AUC = 0.91) as well as in the 3 validation cohorts (center B, $n = 37$: AUC = 0.89; center C, $n = 38$: AUC = 0.78; center D, $n = 49$: AUC = 0.8). Across the entire dataset, a POST-VB <49 was associated with an 88.2% chance of good outcome (mRS 0–3 at 90 days) while a POST-VB score ≥ 125 was associated with 4.2% chance of good outcome.
Conclusion: The POST-VB score accurately predicts outcome following recanalization therapy for acute stroke due to BAO across three independent validation cohorts and thus may aid in guiding post-interventional care.

AS09-025

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ANALYSIS OF OUTCOMES IN GROUP OF THE PATIENTS AFTER ENDOVASCULAR TREATMENT DUE TO ISCHEMIC STROKE WITH RELATION TO COLLATERALS STATUS ASSESSED ON CTA

G. Krastev[1], J. Haring[1], A. Klepanec[2], M. Mako[1], J. Haršány[2], M. Rusina[2], R. Lackovič[1], L. Mokošová[1], I. Zajičková[1], Z. Števková[1], Ž. Kovácsová[1], P. Došeková[1], J. Cisár[1], Ľ. Beňová[1] and M. Cabúková[1]
[1]Faculty Hospital Trnava, Neurology, Trnava, Slovak Republic
[2]Faculty Hospital Trnava, Radiology, Trnava, Slovak Republic

Background and Aims: The presence of good collaterals on CT angiography (CTA) is a well-known predictor of favorable outcome in acute ischemic stroke. In our analysis, we focused on the clinical outcome and radiological findings in the group of patients treated with endovascular techniques or combined endovascular treatment and intravenous thrombolysis due to ischemic stroke in the anterior circulation
Method: In our database of 100 patients treated with mechanical thrombectomy or combined mechanical thrombectomy and intravenous thrombolysis between November 2015 and November 2016, we retrospectively identified patients with ICA, M1 and M2 occlusion. Among those we analysed collateral status on single phase CTA using MAAS collateral grading scale and Tan collateral score. Subsequently, we focused on collateral status and clinical outcome of the patients after the endovascular procedure and on three months follow-up. The subanalysis of the selected patients involved clinical and radiological outcome in patients treated with aspiration technique versus combined endovascular

treatment (aspiration and stent-retriever). We have focused also on patients fulfilling "top-tier" criteria for endovascular treatment and their clinical and radiological outcome.
Results: Graded collateral status can be a useful predictor for clinical outcome in acute ischemic stroke patients. Patients with poor collateral status are at high risk for worsening.
Conclusion: Collateral status can be a useful predictor for selection of the patients with proximal large vessel occlusion in anterior circulation for endovascular treatment and identification tool for predicting good clinical outcome in acute ischemic stroke.

AS09-026

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

CAROTID PLAQUE CHARACTERISTICS ASSOCIATED WITH HYPOTENSION AND BRADYCARDIA IN PATIENTS UNDERGOING ANGIOPLASTY AND STENTING: LOOKING FOR A PREDICTIVE MODEL TO PREVENT HEMODYNAMIC DEPRESSION

M.R. de Torres Chacón[1], E. Zapata-Arriaza[2], F. Moniche[2], I. Escudero Martínez[2], P. Algaba[1], E. Ferrete Ruiz[1], A. Domínguez Mayoral[3], M.Á. Gamero García[3], S. Pérez Sánchez[3], A. González García[4] and J. Montaner Villalonga[1]
[1]Biomedicine Institute Seville IBIS, Neurología, Sevilla, Spain
[2]University Hospital Virgen del Rocío, Neurology, Seville, Spain
[3]University Hospital Virgen Macarena, Neurology, Seville, Spain
[4]University Hospital Virgen del Rocío, Neuroradiology, Seville, Spain

Background and Aims: Hemodynamic depression (HD), mainly hypotension and/or bradycardia, is a common and often transient complication during carotid angioplasty and stenting (CAS) due to glomus stimulation. However, occasionally may lead to significant complications like asystolia or hemodynamic stroke. To define predictors related to plaque characteristics would allow identifying patients at high risk of HD.
Method: Consecutive CAS treated patients from a single University Hospital (2002 to 2013) were included. Blood pressure and heart rate were recorded before and after CAS. Hypotension was considered when systolic blood pressure decreased >30 mmHg and bradycardia when heart rate is <40 bpm. HD is defined as the presence of hypotension and bradycardia.
Results: From 699 treated patients, hypotension occurred in 253 (36.2%), bradycardia in 315 (45.1%) and HD in 211 (30.2%). Hypotension and bradycardia were associated with calcified plaques ($p = 0.013$ and $p = 0.024$) and those closer to glomus ($p < 0.001$ both). After Cox regression analysis, plaques closer to glomus were independent predictors for bradycardia (OR 4 [2.2–7.2] $p = < 0.001$) and also for hypotension in combination with calcified plaques (OR 3.4 [1.8–6.6] $p < 0.001$ and OR 1.42 [1.02–1.96] $p = 0.036$). Closer location to glomus and medial and anterior plaque wall position were predictors for HD (OR 3.3 [1.7–6.4] $p = < 0.001$ and OR 1.5 [1.08–2.16] $p = < 0.017$).
Conclusion: Calcified plaques and those located near the glomus and on carotid's medial and anterior wall are related with high risk of developing HD during CAS. These characteristics are easily identified, allowing close CAS monitoring to avoid HD.

AS09-027

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TRANSFER VERSUS DIRECT ENDOVASCULAR THERAPY IN A NATIONWIDE REGISTRY: THE NATIONAL ACUTE STROKE ISRAELI REVASCULARIZATION (NASIS-REVASC) REGISTRY

N. Bornstein[1], R.R. Leker[2], A. Horev[3], D. Orion[4], G. Raphaeli[5], H. Hallevi[6], D. Tanne[4] and Y. Amsalem[7]
[1]Shaare-Zedek Medical Center, Brain Division, Jerusalem, Israel
[2]Hadassah-Hebrew University Medical Center, Neurology, Jerusalem, Israel
[3]Soroka Medical Center, Neurology, Beer Sheva, Israel
[4]Chaim Sheba Medical Center, Neurology, Tel-Hashomer, Israel
[5]Rabin Medical Center, Neurology, Petah Tikvah, Israel
[6]Tel Aviv Medical Center, Neurology, Tel Aviv, Israel
[7]Shaare-Zedek Medical Center, Radiology, Jerusalem, Israel

Background and Aims: Arrival of patients to endovascular capable centers must be rapid, since delays hamper time-sensitive stroke treatments. We aimed to assess in a nationwide registry time-to-treatment among patients with emergent large vessel occlusion (ELVO) directly admitted (direct-EVT) versus transferred to endovascular capable centers (transfer-EVT).
Method: Clinical and radiological data of consecutive, prospectively enrolled patients, with ELVO treated with endovascular therapy (EVT) included in the National Acute Stroke ISraeli Revascularization (NASIS-REVASC) registry in 6 comprehensive stroke centers were analyzed. Stroke subtypes were categorized according to TOAST criteria. Neurological deficits assessed using the NIH stroke scale (NIHSS), vessel recanalization using the final thrombolysis in cerebral infarction (TICI) scale, and functional outcome using the modified Rankin scale (mRS). Excellent outcome was defined as a mRS ≤ 1 at hospital discharge and 90 days post-stroke.
Results: Among 272 patients treated with EVT (with or without t-PA) 201 were direct-EVT and 71 transfer-EVT. Time of symptom onset to groin puncture was 230 [IQR 150, 325] in direct-EVT vs. 320 [IQR 273–388] in transfer EVT patients ($p < 0.001$) and time to groin puncture was <4.5 hrs in 63% of direct-EVT vs. 24% of transfer-EVT; $p < 0.001$). Excellent outcome at hospital discharge and 3 months were (21% vs. 16%, $p = 0.45$ and 42% vs. 33%, $p = 0.45$) respectively.
Conclusion: Transfer-EVT was associated in a nationwide registry with prolonged time of symptom onset to groin puncture. These findings emphasize the need for efficient protocols for inter-facility transfer as well as for selecting patients shipped directly to endovascular capable centers.

AS09-029

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DIRECT MECHANICAL INTERVENTION VERSUS BRIDGING THERAPY IN LARGE ARTERY ANTERIOR CIRCULATION STROKE: A POOLED ANALYSIS OF TWO REGISTRIES

S. Bellwald[1], W. Ralph[2], M. Arnold[1], R. von Martial[1], C. Bernasconi[1], P. Mordasini[3], R. Chapot[4], U. Fischer[1] and J. Gralla[3]
[1]University Hospital of Bern- Inselspital, Neurology, Bern, Switzerland
[2]Alfried Krupp Krankenhaus- Essen, Neurology, Essen, Germany

[3]University Hospital of Bern- Inselspital, Neuroloradiology, Bern, Switzerland
[4]Alfried Krupp Krankenhaus- Essen, Radiology and Neuroradiology, Essen, Germany

Background and Aims: Randomized controlled trials have shown that mechanical thrombectomy (MT) plus best medical treatment improves outcome in stroke patients with large vessel occlusion (LVO) in the anterior circulation (AC). Whether direct MT is equally effective as bridging thrombolysis (combined intravenous thrombolysis (iv-tPA) and MT) remains unclear.
Method: We compared clinical and radiological outcomes at 3 months in 286 bridging patients with 134 patients receiving direct MT for LVO AC stroke from two large prospective registries (study period Essen: 06/2012–08/2013, respectively Bern 02/2009–08/2014). We matched all patients from the direct MT group who would have qualified for iv-tPA with controls from the bridging group, using multivariate and propensity score methods. Functional independence was defined as modified Rankin Scale of 0–2.
Results: 111 patients from the direct MT group would have qualified for bridging thrombolysis, but were treated with MT only. Baseline characteristics did not differ from the bridging cohort, except for higher rates of hyperglycemia ($P < 0.001$), coronary heart disease ($p = 0.028$) and shorter intervals from symptom onset to endovascular therapy ($p < 0.001$) in the MT group. Functional independence, mortality and intracerebral hemorrhage (ICH) rates did not differ ($p > 0.46$). After multivariate and propensity score matching functional independence, mortality, and ICH rates were similar.
Conclusion: In this matched pair analysis, based on two large registries there was no difference in outcome in patients with LVO AC stroke treated with direct mechanical intervention compared to those treated with bridging thrombolysis. A randomized trial comparing direct MT with bridging therapy will address this topic soon.

AS09-030

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ADDITIONAL TRANSVENOUS ONYX EMBOLIZATION FOR RESIDUAL DURAL ARTERIOVENOUS FISTULAS AFTER TRANSVENOUS COIL EMBOLIZATION

J. Yeon[1] and J. Pyoung[2]
[1]Samsung Medical Center, Neurosurgery, Seoul, Republic of Korea
[2]Samsung Medical Center, Radiology, Seoul, Republic of Korea

Background and Aims: The purpose of the present study is to investigate the safety and effectiveness of additional transvenous onyx embolization for residual dural arteriovenous fistulas (DAVFs) after transvenous coil embolization.
Method: We reviewed the data of all intracranial DAVFs treated with transvenous coil embolization. Ten DAVFs were treated with additional transvenous onyx embolization for residual DAVFs involving the cavernous sinus ($n = 6$) and transverse-sigmoid sinus ($n = 4$).
Results: Complete occlusion by additional transvenous onyx embolization could be achieved in 8 of 10 residual DAVFs. None of the 10 patients developed complications directly related to transvenous onyx embolization.
Conclusion: Transvenous onyx embolization could be a useful adjunct of transvenous coil embolization.

AS09-031

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TEN-YEAR SINGLE CENTER EXPERIENCE OF ENDOVASCULAR REVASCULARIZATION THERAPY IN EMEMERGENT LARGE VESSEL OCCLUSIVE STROKE: DOOR-TO-PUNCTURE AS A KEY TIME METRIC FOR FAVORABLE OUTCOME

Y.H. Hwang[1], Y.W. Kim[1], D.H. Kang[2] and Y.S. Kim[2]
[1]Kyungpook National University Hospital, Department of Neurology, Daegu, Republic of Korea
[2]Kyungpook National University Hospital, Department of Radiology, Daegu, Republic of Korea

Background and Aims: Delays in door-to-puncture can affect outcome of endovascular therapy (EVT). We aimed to describe our ten-year experience of EVT with emphasis on time-related factors.
Method: Based on our prospectively maintained EVT registry ($n = 602$), three consecutive periods were defined based on the implementation of quality improvement (QI) program and the changes in the primary modality of first angiographic imaging: (1) period 1 (May 2006 to December 2009; $n = 138$); (2) period 2 (January 2010 to August 2012; $n = 159$); and (3) period 3 (September 2012 to April 2016; $n = 305$; figure).
Results: Overall, successful reperfusion (mTICI 2b-3, post-procedure) and favorable outcome (mRS 0–2 or equal to prestroke mRS, at 3-month) was achieved in 452 patients (75.1%) and 311 patients (51.7%), respectively. A trend for increase in successful reperfusion and favorable outcome over periods was observed (46.4% in period 1 vs. 85.6% in period 3, $p < 0.001$; 37.0% in period 1 vs. 57.7% in period 3, $p < 0.001$). Also, significant trends for shorter door-to-picture and door-to-puncture times over periods were observed ($p < 0.001$, respectively; figure). In multivariable analysis, each 10-minute decrease in door-to-puncture was independently associated with favorable outcome (OR 0.95, $p = 0.004$).
Conclusion: Upward trend in successful reperfusion and better outcome were observed along with improvement in intrahospital workflow to decrease door-to-puncture time, which emphasizes the importance of incessant QI program of EVT workflow.

AS09-033

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

RETRIEVER WIRE SUPPORTED CAROTID ARTERY REVASCULARIZATION (REWISED CARE) – A NOVEL INTERVENTIONAL APPROACH TOWARDS TANDEM LESIONS IN ACUTE ISCHEMIC STROKE

D. Behme[1], I.L. Maier[2], M. Knauth[1], J. Liman[2] and M. Psychogios[1]
[1]Georg-August-Universitß Göttingen, Neuroradiology, Göttingen, Germany
[2]Georg-August-Universitß Göttingen, Neurology, Göttingen, Germany

Background and Aims: About 20% of stroke cases with LAO present with a tandem occlusion. The cervical internal carotid artery occlusion can be treated in an antegrade or a retrograde manner. We here report a novel approach utilizing the wire of the stent-retriever (placed within the intracranial thrombus) as the stent guiding-wire, which allows for a "simultaneous" treatment of the tandem occlusion.

Method: Four patients were treated utilizing the so called ReWiSed CARe technique. A 8F guide is placed in the CCA proximal to the occluded ICA, the ICA occlusion site is passed with a 0.014 inch wire and a 0.021 inch microcatheter. The microcatheter is placed distal to the thrombus. Afterwards a stent retriever (Preset, Phenox) is deployed within the thrombus and the stenting of the extracranial ICA is performed utilizing the retriever-wire of the intracranial deployed stent-retriever. The retriever is consecutively used for aspiration and stent retrieval thrombectomy after stent placement in the carotid artery. Notably, the implanted carotid stent has to be passed with the guide/intermediate catheter before thrombectomy

Results: Carotid stent deployment was successful in all patients; median time from groin to recanalization was 60 min (49–70 min). 3/4 had a TICI2b and 1/4 a TICI3 result. There were no complications associated to the procedure.

Conclusion: ReWiSed Care offers a novel approach for the interventional treatment of tandem occlusions. It allows for a swift carotid and intracranial revascularization. Its potential to shorten stroke interventions qualifies the technique to become the standard procedure in stroke with underlying tandem occlusion.

AS09-034

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

COMPARISON OF PERIPROCEDURAL COMPLICATIONS AND LONG-TERM OUTCOME OF INTRACRANIAL ANGIOPLASTY ALONE OR WITH STENTING OF PERFORATOR-BEARING ARTERIES IN THE ANTERIOR AND POSTERIOR CIRCULATION

A. Aycil[1], R. Weber[2], R. Chapot[3], M. Wallocha[3], P. Stracke[3], J. Hadisurya[2] and H. Nordmeyer[3]

[1]Gemeinschaftspraxis Aycil & Kilicli, Internal Medicine, Mülheim, Germany

[2]Alfried Krupp Krankenhaus Essen, Neurology, Essen, Germany

[3]Alfried Krupp Krankenhaus Essen, Radiology and Neuroradiology, Essen, Germany

Background and Aims: Detailed analysis of the randomized controlled SAMMPRIS trial showed a higher periprocedural complication rate due to perforator strokes in the posterior versus anterior brain circulation in patients with symptomatic intracranial stenosis treated with the Wingspan stent. It remains debated whether angioplasty alone or in combination with other stent types yield similar results.

Method: We retrospectively compared periprocedural complication rates and long-term clinical outcome in 60 patients with stenosis of the M1-segment of the middle cerebral artery (80 treatments) versus 68 patients with stenosis of the V4-segment of the vertebral artery or the basilar artery (77 treatments) treated with angioplasty alone or with stenting from 01/2007 to 02/2015 in a high-volume neuro-interventional center. Univariate and multivariate Cox regression analyses were performed to estimate the crude and adjusted hazard ratio (aHR) with 95% confidence interval (CI).

Results: New symptomatic periprocedural strokes occurred significantly more often in patients with posterior (14.3%) versus anterior (5.0%) stenosis (HR 9.23, 95%CI 1.10–77.67, aHR 11.62, 95%CI 1.16–116.12). Asymptomatic new diffusion-weighted lesions on MRI, hemorrhage and dissection did not differ. There was no significant difference in recurrent stroke and good functional outcome during a median follow-up of 19 months, while mortality was higher in the posterior (11.7%) versus anterior (1.3%) circulation (HR 9.43, 95%CI 1.08–82.51, aHR 8.26, 95%CI 0.82–83.68).

Conclusion: Similar to SAMMPRIS we found a significant higher periprocedural symptomatic stroke rate in treatment of perforator-bearing arteries in the posterior circulation and higher mortality during follow-up.

AS09-035

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DIRECT THROMBECTOMY VS. BRIDGING THERAPY FOR PATIENTS WITH EMERGENT LARGE VESSEL OCCLUSIONS: RESULTS FROM THE NATIONAL PROSPECTIVE NASIS-REVASC REGISTRY

R. Leker[1], N.E. Yaghmour[1], J. Cohen[2], P. Gavriliuc[1], D. Tanne[3], G. Telman[4], G. Raphaeli[5], H. Hallevi[6], N. Borenstein[6] and A. Horev[7]

[1]Hadassah-Hebrew University Medical Center, Neurology, Jerusalem, Israel

[2]Hadassah-Hebrew University Medical Center, Neurosurgery, Jerusalem, Israel

[3]Chaim Sheba Medical Center, Neurology, Ramat Gan, Israel

[4]Rambam Medical Center, Neurology, Haifa, Israel

[5]Rabin Medical Center, Neurology, Petach Tikva, Israel

[6]Tel Aviv Medical Center, Neurology, Tel Aviv, Israel

[7]Soroka Medical Center, Neurology, Beer Sheva, Israel

Background and Aims: We aimed to determine whether bridging provides additional benefits over primary thrombectomy in patients with emergent large vessel occlusion (ELVO).

Method: Consecutive, prospectively enrolled patients, with ELVO presenting within 4 hours of symptom onset entered into the National Acute Stroke ISraeli registry of patients undergoing revascularization (NASIS-REVASC) were included. Patients treated with bridging were compared to those treated with direct thrombectomy (DT). Neurological deficits were assessed with NIHSS and recanalization was determined using the TICI scale. Excellent outcome was defined as a modified Rankin score ≤ 1 at discharge and day 90.

Results: Of 272 patients that underwent thrombectomy in NASIS-REVASC, 201 were treated within 4 hours and included in the analysis. Of those, 115 (57%) underwent bridging with tPA and 86 (43%) underwent direct thrombectomy. Atrial fibrillation was more common in the DT group (46% vs. 30%, $p = 0.03$) but other risk factors, demographics, stroke severity and subtypes as well as baseline and final TICI scores and time to thrombectomy did not differ. Mortality rates, discharge destinations, short and long term excellent outcome rates also did not differ. On multivariable regression analysis treatment modality did not significantly modify the odds ratio of excellent outcome at discharge or day 90. Similarly, treatment modality did not modify the chances for early major recovery, discharge home or in-hospital mortality.

Conclusion: Primary thrombectomy and bridging resulted in equally high survival and excellent outcome rates. Our results suggest that the benefits of primary thrombectomy in such critically ill patients may bypass the need for bridging therapy.

AS09-036

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

SAFETY OF ENDOVASCULAR THROMBECTOMY IN ACUTE ISCHEMIC STROKE IN PATIENTS RECEIVING VITAMIN K ANTAGONISTS

N. Cayuela[1], B. Lara[1], H. Quesada[1], L. Cano[2], M. de Miquel[3], R. Barranco[3], S. Aixut[3], L. Aja[3], A. Lüttich[3], F. Rubio[1] and P. Cardona[1]

[1]Hospital Universitary de Bellvitge, Neurology, BARCELONA, Spain
[2]Hospital de Mollet, Neurologia, Barcelona, Spain
[3]Hospital Universitary de Bellvitge, Endovascular Neuroradiology, BARCELONA, Spain

Background and Aims: The use of intravenous thrombolysis in acute ischemic stroke is contraindicated for anticoagulated patients with an international normalized ratio (INR) of >1.7. Thrombectomy as primary endovascular treatment is an option in these patients. Here we present a retrospective analysis, in a homogeneous cohort of patients, of efficacy and safety of endovascular thrombectomy in vitamin K antagonists anticoagulated patients

Method: Three hundred and ten patients with ischemic stroke undergoing endovascular thrombectomy as primary treatment between January 2010-September 2016 were retrospectively reviewed from our hospital database. Patients were categorized according to the INR: >1.7 (n = 29) and ≤1.7 (n = 281). Baseline characteristics, successful reperfusion (thrombolysis in Cerebral Infarction score, 2b-3), hemorrhagic transformation, symptomatic intracranial hemorrhage (SICH) and functional outcome at 3 months were analyzed and compared between both groups

Results: Intracranial hemorrhage was observed in 12 of the 29 patients (41%) with an INR >1.7 and in 97 of the 281 patients (34%) with an INR ≤1.7 (p = .69). Neither were differences between groups regarding the development of SICH (p = .37). Successful reperfusion and modified Rankin Scale score of 0 to 2 at 3 months did not differ between groups (p = .23 and 1 respectively)

Conclusion: Primary endovascular thrombectomy in acute ischemic stroke in anticoagulated patients with an INR > 1.7 seems safe without an increase in the risk of suffer from hemorrhagic transformation or SICH. According to these resuls, therapies for reverse anticoagulation after thrombectomy would not be justified

AS09-039

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

IMPACT OF THE THROMBECTOMY TRIALS ON THE MANAGEMENT AND OUTCOME OF LARGE VESSEL STROKE: A SINGLE-CENTER EXPERIENCE

T.H. Cho[1], F. Florin[1], L. Viannay[2], B. Gory[2], L. Mechtouff-Cimarelli[1], R. Riva[2], E. Ong[1], P.E. Labeyrie[2], L. Derex[1], M. Hermier[2], L. Chamard[2], R. Ameli[2], Y. Berthezène[2], N. Nighoghossian[1] and F. Turjman[2]

[1]Université Lyon 1- Hospices Civils de Lyon, Neurology, Lyon, France
[2]Université Lyon 1- Hospices Civils de Lyon, Neuroradiology, Lyon, France

Background and Aims: Randomized trials (RT) have recently validated the superiority of mechanical thrombectomy (MT) over standard medical care, including intravenous thrombolysis (IVT). However, their impact on routine clinical care remains undetermined.

Method: Using a prospective observational registry, we assessed: (1) the clinical and radiological characteristics of all consecutive patients treated with MT; (2) the outcome of patients with M1-occlusion, treated with or without MT. Two periods were compared: before (2013–2014) and after (2015–2016) the publication of RT.

Results: Endovascular procedures significantly increased between the two periods (84 vs 313, p < 0.0001). In 2015–2016, patients had a higher age (median(IQR): 69(58–80) vs 67.5(52.5–74); p = 0.007), a shorter delay from symptom onset to reperfusion (232(181.2–299.8) vs 270(201.5–345); p = 0.02) related to a shorter intrahospital delay to MT initiation (69.5(48.3–95) vs 117.5(78.8–157.5); p = 0.0002), and higher rates of reperfusion (69.3% vs 47%; p = 0.0003). Conversely, no significant differences in NIHSS scores, ASPECTS-diffusion scores, delay to IVT or intracranial haemorrhage were found. In 2015–2016, patients with M1-occlusion were treated with MT more often than in 2013–2014 (86% vs 29.5%, respectively; p < 0.0001), and a trend for improved outcomes was observed (shift analysis, lower modified Rankin scale scores: OR = 1.45; 95% CI = 0.97–2.19; p = 0.07).

Conclusion: Following the publication of RT, thrombectomy was rapidly implemented with significant improvement in treatment delay and reperfusion rates. Patients with M1-occlusion showed a trend for better outcomes.

AS09-040

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

A TISSUE BASED APPROACH IN THE TREATMENT OF ACUTE ISCHEMIC STROKE PATIENTS WITH WAKE-UP OR > 6 HOURS "LAST SEEN WELL" STROKES

T. Santos[1], A. Carvalho[1], M. Rodrigues[2], A. Cunha[2], T. Gregório[3], L. Paredes[3], H. Morais[1], J. Pinheiro[1], M. Veloso[4], S. Castro[2], P. Barros[4] and M. Ribeiro[2]

[1]Centro Hospitalar de Vila Nova de Gaia/Espinho, Neurology, Vila Nova de Gaia, Portugal
[2]Centro Hospitalar de Vila Nova de Gaia/Espinho, Imagiology, Vila Nova de Gaia, Portugal
[3]Centro Hospitalar de Vila Nova de Gaia/Espinho, Stroke Unit, Vila Nova de Gaia, Portugal
[4]Centro Hospitalar de Vila Nova de Gaia/Espinho, Stroke Unit-Neurology, Vila Nova de Gaia, Portugal

Background and Aims: Ischemic stroke is a dynamic condition in which several factors contribute to the rate and extention of infarction. A tissue-window approach is based on physiological perfusion status and may allow the treatment of selected patients with favourable prognosis that would not be candidates if only time criteria were considered.
Our aim was to analyze outcome and safety of mechanical thrombectomy in patients admitted with anterior circulation strokes outside the conventional time-window (wake–up strokes and strokes presenting between 6–24 hours), and compare with group admitted <6 hours.

Method: Transversal, retrospective study to evaluate several demographic, imagiological and outcome variables of patients that underwent mechanical thrombectomy with late presenting (>6 hours, including wake-up) strokes. Selection criteria included a significant clinical-imaging mismatch, which was determined by an ASPECTS ≥ 8 and a NIHSS ≥ 12. We kept image selection as simple and as fast as possible, using non-enhanced CT with the support of CT-angiography to prove a small infarct core

Results: 156 patients were treated with mechanical thrombectomy, 145 due to anterior circulation strokes. A successful recanalization (TICI 2b/3)

was obtained in 92,3% of patients >6-hour and in 86,6% in the group <6-hour (p = 0,530). A favourable clinical outcome (mRSscore at 90 days ≤ 2) was found in 61,5% and 64,7%, respectively (p = 0,760). In >6 hour group,1(3,8%) patient presented a symptomatic intracranial hemorrhage and the mortality at 90 days was 0%.
Conclusion: Mechanical thrombectomy can be as safe and as effective in appropriately selected patients admitted with more than 6 hous from the symptoms onset, using a simple imaging protocol selection.

AS09-041

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ENDOVASCULAR TREATMENT FOR ISOLATED DISTAL MIDDLE CEREBRAL ARTERY OCCLUSIONS: EVIDENCE FROM THE ITALIAN ENDOVASCULAR REGISTRY

F. Arba[1], S. Testa[2], P. Nencini[3], A. Rosi[4], S. Nappini[4], N. Limbucci[4], V. Saia[5], F. Sallustio[6], A. Saletti[7], M. Bergui[8], G. Pracucci[1], D. Inzitari[1], D. Toni[9] and S. Mangiafico[4]
[1]University of Florence, NEUROFARBA, Florence, Italy
[2]Santo Stefano Hospital, Accident and Emergency Department, Prato, Italy
[3]Careggi University Hospital, Stroke Unit and Neurology, Florence, Italy
[4]Careggi University Hospital, Interventional Neuroradiology Unit, Florence, Italy
[5]Ospedale Santa Corona, Neurology/Stroke Unit, Pietra Ligure, Italy
[6]Fondazione Policlinico Tor Vergata, Comprehensive Stroke Center, Rome, Italy
[7]Sant'Anna University Hospital, Neuroradiology Unit, Ferrara, Italy
[8]Le Molinette Hospital, Interventional Neuroradiology, Torino, Italy
[9]La Sapienza University, Neurovascular Unit, Rome, Italy

Background and Aims: Background: Mechanical thrombectomy is efficacious in proximal arterial occlusions of the anterior circulation in acute stroke, however, data about distal middle cerebral artery occlusions (M2-MCA) remain controversial. We investigated safety and efficacy of mixed endovascular procedures (thrombectomy and intraarterial thrombolysis) on M2-segment compared to isolated proximal middle cerebral artery (M1-MCA) occlusions.
Method: Methods: Data were obtained from the Italian Endovascular Registry, a multicenter-clinical based resource. Patients were classified into M1-MCA or isolated M2-MCA with cerebral angiography. We analyzed adverse events, recanalization (scored using Thrombolysis in Cerebral Ischaemia (TICI) score), and functional status 90 days after the index stroke. We retained statistically significant variables from the univariate analysis in logistic and ordinal regression models adjusting for age, sex, stroke severity, and onset-to-groin-puncture-time.
Results: 1253 patients [mean (±SD) age 65.4 (±13.4) years, 571 (46%) males] had M1-MCA (937;75%) or M2-MCA (316;25%) occlusions. Patients with M2-MCA had lower National Institutes of Health Stroke Scale (16 vs 18; $p < 0.001$), received less thrombectomy procedures (83% vs 98%; $p < 0.001$) and were more frequently treated with endovascular lytic agents (37% vs 15%; $p < 0.001$). TICI 2b/3 was achieved in 25% of M2-MCA vs 26% of M1-MCA ($p = 0.566$). M1-MCA patients had more likely distal embolization of the clot (7% vs 3%; OR = 2.60; 95%CI = 1.22–5.56). There were no differences on functional outcomes between M1-MCA and M2-MCA patients on logistic and ordinal regression models.
Conclusion: Although with substantial differences in procedures, endovascular treatment of the M2-MCA appears to be safe and effective compared to M1-MCA occlusions. Our results support the use of endovascular approaches for M2-MCA occlusions.

AS09-042

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ENDOVASCULAR TREATMENT FOR ACUTE ISCHAEMIC STROKE IN WALES

G.A. Malik[1], Y. Joshi[2], S. Halpin[6], C.L. Gan[6], S. Nair[6], H. Shetty[8], T.A.T. Hughes[1], S. Ahmad[1], R. Dewar[5], H. Bhat[3], M.Y. Bhat[4], P. Jones[7] and M. Wani[9]
[1]University Hospital of Wales, Department of Neurology, Cardiff, United Kingdom
[2]Addenbrooke's Hospital- Cambridge University Hospitals- Cambridge, Department of Neuroradiology, Cambridge, United Kingdom
[3]University Hospital of Wales, Department of Neuroradiology, Cardiff, United Kingdom
[4]University Hospital of Wales, Department of Stroke Medicine, Cardiff, United Kingdom
[5]Prince Charles Hospital, Department of Stroke Medicine, Merthyr Tydfil, United Kingdom
[6]Princess of Wales Hospital, Department of Stroke Medicine, Bridgend, United Kingdom
[7]Royal Gwent Hospital, Department of Stroke Medicine, Newport, United Kingdom
[8]Bronglais General Hospital, Department of Stroke Medicine, Aberystwyth, United Kingdom (9)Morriston Hospital, Department of Stroke Medicine, Swansea, United Kingdom

Background and Aims: Endovascular treatments are recommended as the treatment of choice for acute ischaemic stroke caused by embolic large artery occlusion.
The results of the first 60 endovascular treatments (EVT) performed at Wales' only Endovascular treatment centre, the University Hospital of Wales in Cardiff, are presented.
Method: From hospital records baseline demographic and clinical data, NIHSS, rates of intravenous thrombolysis, Thrombolysis in Cerebral Infarction (TICI) score, type of anaesthesia used, complications and lengths of stay in ICU, acute and rehabilitation settings, and discharge destination, for patients treated between January 2012 and August 2016 were recorded. The modified Rankin score (mRS) at 90 days was imputed from the same records.
Results: 60 patients (33 male, mean (SD) age 60 (16) years), median (range) baseline NIHSS 17 (7–30) were treated with EVT (97% with thrombectomy alone, 3% with thrombectomy + Intra-arterial thrombolysis (IAT)). Intravenous bridging thrombolysis was given in 71%. 84% of occlusions were in the anterior circulation.
Revascularization was successful (TICI 2b/3) in 69%. The mean (SD) time from admission to thrombectomy was 135 (131) minutes. The mean (SD) length of stay in ICU was 5 (3.9) days, in acute stroke services 9 (11) days, and in a rehabilitation unit 49(67) days. 94% of survivors were discharged home. 43% had an mRS ≤ 2 at 90 days. The mortality was 20%. Symptomatic intracranial haemorrhage (sICH) within 10 days occurred in 3%.
Conclusion: More than 40% of treated patients had a good outcome (mRS ≤ 2). The next challenge is to improve service delivery to better the door-to-thrombectomy time and the outcomes.

AS09-043

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE IN OCTOGENARIANS

M. Tinková[1], P. Malý[1], H. Parobková[2] and O. Bradáč[3]
[1]Central Military Hospital, Military University Hospital Prague, Prague 6, Czech Republic
[2]Central Military Hospital, Radiodiagnostic, Prague 6, Czech Republic
[3]Central Military Hospital, Neurochirurgy, Prague 6, Czech Republic

Background and Aims: Stroke in very old patients has a relative poor prognosis, even after recanalizing therapy. In the present study, we aimed to evaluate mortality and outcomes in patients ≥80 years treated with endovascular therapy (EVT).
Method: Data from retrospectively collected database were analysed comparing elderly (80 years od older) versus nonelderly patients in whom endovascular stroke treatment in anterior circulation was performed between January 2016 and August 2016.
Results: We included 14 patients older than 80 years and compared them with 34 patients who were younger than 80. Between the 2 cohorts, there was no significant difference in NIHSS (16 ± 4 vs. 14 ± 9, p = 0.253), time from onset to recanalisation (270 ± 82 vs. 298 ± 104 min, p = 0.396) and good reperfusion TICI 2b-3 (13/14 vs. 29/34, p = 0.656). Elderly patients had more often atrial fibrillation (11/14 vs. 13/34, p = 0.024) and leukoaraiosis Fasecas grade 2–3 (9/14 vs. 11/34, p = 0.414). Elderly patiens had significantly lower rates of good outcomes mRS 0–2 (7.1 %, 1/14, vs. 35,2%, 12/34, p = 0.046) and higher mortality (71,4% 10/14 vs.25, 7% 9/34, p = 0.001). Age ≥ 80 years (OR 9.84; 95 % CI 1.06–90.26; p = 0.044) and glycemia on admission ≥ 8.5 mmol/l (OR 7.66; 95 % CI 1.38–42.56; p = 0.020) were identified as independent predictors of poor otcome by mutiple regression analysis.
Conclusion: Endovascular treatment in very old patients is associated with higher mortality rates and lower likelihood of clinical benefit. Although some older patients may still benefit from EVT.

AS09-044

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

EARLY CAROTID ARTERY STENTING FOR SYMPTOMATIC STENOSIS: DOŃT BLAME THE TECHNIC

J. Alcalde-Lopez[1], E. Zapata-Arriaza[1], A. Cayuela[2], J. Ortega-Quintanilla[1], I. Gutierrez[1], I. Escudero-Martínez[3], J. De la Torre[3], F. Mancha-Molina[4], A. Vega-Salvatierra[4], M. Francisco[3], J. Montaner[5] and A. González[1]
[1]Hospital Universitario Virgen del Rocío, Neurorradiología Intervencionista, Sevilla, Spain
[2]Área de Gestión Sanitaria Sur de Sevilla, Sevilla, Spain
[3]Hospital Universitario Virgen del Rocío, Unidad de Ictus. Servicio de Neurología, Sevilla, Spain
[4]Instituto de Investigación Biomédica de Sevilla IBiS, Laboratorio de investigación Neurovascular, Sevilla, Spain
[5]Instituto de Investigación Biomédica de Sevilla IBiS. Hospital Universitario Virgen del Rocío y Macarena, Servicio de Neurología, Sevilla, Spain

Background and Aims: The American Heart Association recommended in 2006 that revascularization for symptomatic carotid artery stenosis should ideally occur within 14 days of an ischemic event. Our aim is to determine the safety of carotid angioplasty and stenting (CAS) in early phase after stroke onset and to evaluate CAS outcomes in our institution.
Method: All consecutive patients with acute ischemic stroke who underwent CAS due to extracranial carotid stenosis ≥70% were included [from 2000 to 2016]. We assessed 30 days morbidity and mortality of the procedure in early (≤14 days after stroke onset) vs delayed phase (>15–180 days after stroke onset). Patients who undergo CAS and/or mechanical thrombectomy for acute ischemic stroke treatment were not included
Results: We identified 1.227 patients with symptomatic carotid stenosis who underwent CAS. Early/Delayed CAS was performed in 291/936 patients respectively. There were no significant differences between early vs delayed CAS in transient ischemic attack (5.2 vs 3.9%) (p = 0.332), minor stroke 1.4% vs 0.5% (p = 0.142) and major stroke 0.7% vs 0.6% (p = 0.594). Two patients (0.7%) died after early CAS and 8 patients (0.9%) after delayed CAS (p = 0.563). Morbidity (any stroke) and mortality rates were 2.2% (2.7% in early vs 2% delayed CAS; p = 0.468).
Conclusion: CAS could be performed safely in the early phase after an ischemic stroke with low clinical complication rates. Further studies are needed to validate CAS safety conducted in the acute phase of ischemic stroke.

AS09-045

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

EARLY REPERFUSION IN ACUTE ISCHEMIC STROKE USING PUSH AND FLUFF TECHNIQUE IN SOLITAIRE DEVICE: TECHNICAL ASPECTS AND DISCUSSION

G. Goel[1], A. Mahajan[1], B. Das[1], A. Garg[2], A.R. Bansal[2], J. Sehgal[2] and A. Jha[3]
[1]Medanta - The Medicity, Institute of Neurointervention, Gurgaon, India
[2]Medanta - The Medicity, Institute of Neurology, Gurgaon, India
[3]Medanta - The Medicity, Institute of Neuroscience, Gurgaon, India

Background and Aims: The most important key to success rate in acute ischemic stroke management is early reperfusion. Solitaire stent has been one of the most commonly used stent retriever device (SRD) in stroke. There is pressing need to have better technique for successful clot retrieval. We have replaced standard unsheathing technique in solitaire device with push and fluff technique (PFT) and reviewed reperfusion success and outcome at 90 days
Method: All ischemic stroke patients from December 2015 to December 2016, who were eligible for thrombectomy using SRD were included in the study. Seventeen consecutive stroke patients (median age 48 year) were treated with PFT using Solitaire AB 4/40. All were anterior circulation stroke. Mechanical reperfusion using other device was not included in the study. Clinical outcome was assessed in terms of modified Ranskin Scale (mRS).
Results: First pass reperfusion was achieved in 12 (70.59%) patients; rest required two passes for recanalization. Median puncture to reperfusion time was 32 minutes. We achieved mTICI3 reperfusion in 14 patients (82.35%), in rest mTICI2b reperfusion achieved. Good outcome (mRS 0–2) at 90 days noted in 14 patients (82.35%). Procedure related mild vasospasm seen in 4 (23.53%) patients which resolved spontaneously or required a small dose of nimodopine (0.5 mg). Small thrombus formation was seen in one patient which may be due to intimal injury and was treated with abciximab
Conclusion: The PFT is a safe technique and leads to optimization of wall apposition and cell size configuration, resulting in higher chances of first-pass reperfusion.

AS09-047

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

COMPLETE BRAIN REPERFUSION IS REQUIRED TO MAXIMIZE THE BENEFITS OF ENDOVASCULAR THERAPY IN ACUTE STROKE

Á. Chamorro[1], J. Blasco[2], A. López-Rueda[2], S. Amaro[1], L. San Román[2], X. Urra[1], L. Llull[1], A. Renú[1], S. Rudilosso[1], C. Laredo[1], V. Obach[1], A.M. Planas[3], E.C. Leira[4] and J. Macho[2]
[1]Hospital Clínic, Neurosciences Stroke Comprehensive Center, Barcelona, Spain
[2]Hospital Clínic, Department of Neuroradiology, Barcelona, Spain
[3]Institute for Biomedical Research of Barcelons- IDIBAPS, Department of Brain Ischemia and Neurodegeneration, Barcelona, Spain
[4]University of Iowa Carver College of Medicine, Division of Cerebrovascular Diseases- Department of Neurology, Iowa City, USA

Background and Aims: The overall efficacy of mechanical thrombectomy on stroke outcomes is suboptimal despite high rates of "successful" recanalization, although that angiographic outcome included both complete and near-complete reperfusion. We tested the hypothesis that complete reperfusion would have a better outcome than near-complete reperfusion.
Method: Single-center retrospective cohort. Subjects were stroke patients treated with mechanical thrombectomy who underwent longitudinal multimodal brain imaging and functional assessment at day 90. The study predictors were modified Thrombolysis in Cerebral Infarction (mTICI) scores on cerebral angiography and included mTICI 3 (complete reperfusion), and mTICI 2b (>50% <100% reperfusion). Principal outcomes included "early dramatic recovery" (>8 points fall in NIHSS score or <2 at 24h) and "infarct growth" on DWI-MRI. Results were adjusted for baseline NIHSS score, target occlusion, infarct core volume, pretreatment alteplase, time to recanalization and collateral profile.
Results: 166 of 347 (48%) patients receiving mechanical thrombectomy met the study criteria, including 53 (32%) patients with mTICI 2b, and 74 (45%) mTICI 3. mTICI 3 resulted in less infarct growth ($P = 0.008$) and increased adjusted odds of an early dramatic recovery, adjusted OR 2.53 (95% CI 1.09 to 5.83) compared with mTICI 2b.
Conclusion: Complete reperfusion (mTICI 3) maximizes the benefits of mechanical thrombectomy in acute stroke, and therefore should be the angiographic target in every patient. The current paradigm of accepting as "successful reperfusion" angiograms with either mTICI 2b or mTICI 3 is misleading for trials and clinical practice alike since it includes subsets of patients with different outcomes.

AS09-049

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

NATIONWIDE EVALUATION OF ALL COMPREHENSIVE STROKE CENTERS IN THE CZECH REPUBLIC ON MECHANICAL THROMBECTOMY PROCEDURES IN ACUTE STROKE

O. Volny[1], M. Bar[2], A. Krajina[3], P. Cimflova[4], L. Kasickova[5], R. Herzig[6], D. Sanak[7], O. Skoda[8], A. Tomek[9], D. Skoloudik[10], D. Vaclavik[11], J. Neumann[12] and R. Mikulik[13]
[1]ICRC - St. Annés University Hospital, Brno, Czech Republic
[2]University Hospital Ostrava, Comprehensive Stroke Center and Department of Neurology, Ostrava, Czech Republic
[3]University Hospital and Faculty of Medicine- Charles University, Department of Radiology, Hradec Kralove, Czech Republic
[4]St. Annés University Hospital and Faculty of Medicine- Masaryk University, Department of Medical Imaging, Brno, Czech Republic
[5]University Hospital Ostrava, Department of Neurology, Ostrava, Czech Republic
[6]Charles University in Prague- Faculty of Medicine in Hradec Kralove, Department of Neurology, Hradec Kralove, Czech Republic
[7]Palacky University Medical School, Department of Neurology, Olomouc, Czech Republic
[8]3rd Medical Faculty- Charles University, Department of Neurology, Prague, Czech Republic
[9]Charles University- 2nd Medical Faculty, Department of Neurology, Prague, Czech Republic
[10]Faculty of Health Science- Palacky University Olomouc, Department of Nursing, Olomouc, Czech Republic
[11]Vitkovice Hospital, Department of Neurology, Ostrava, Czech Republic
[12]Chomutov Hospital, Department of Neurology, Chomutov, Czech Republic
[13]– International Clinical Research Centre- St. Annés University Hospital, Stroke Research Program, Brno, Czech Republic

Background and Aims: Mechanical thrombectomy (MT) has been established as a standard of care in acute ischemic stroke. We systematically evaluated standard operating procedures in all comprehensive stroke centers in the Czech Republic.
Method: Online questionnaire survey based on the International Multi-Society Consensus Document (http://www.ajnr.org/content/37/4/E31.long) was distributed to all centers. It included 64 questions on imaging, logistic and training standards related to MT (http://www.click4-survey.cz/s/11405/b7228b47).
Results: Complete data were obtained from all 15 centers. Standard operating procedures are used in 14 centers. Specialized stroke unit is available in 14 centers, 24/7 CT is available in all centers and 24/7 MRI in 11 centers. Admission imaging in time window <6 hours includes: CT/CTA in 11, CT/CTA/CTP in 6, MRI/MRA in 2 centers; beyond 6 hours: CT/CTA is performed in 7, CT/CTA/CTP in 14, MRI/MRA in 5 centers. Early ischemic changes are evaluated in all centers (by ASPECTS) and leptomeningeal collaterals are scored before neurointervention in 8 of the centers. Interventionalists are available 24/7 in all centers. Door-to-groin time <60 min is monitored in 14 and door-to-reperfusion <90 min in 10 centers. Analgosedation is preferred over general anesthesia in all centers. Reperfusion is assessed dominantly by using TICI 2b/3. Fourteen centers enter data into registries (SITS-TBY). Approximately 1,000 MTs (range: 34–126/center) were performed in 2016 (in 2015: 866; in 2014: 590; in 2013: 510 procedures). There are 46 neurointerventional trainees and 64 interventionalists providing MT.
Conclusion: The Czech republic has high availability of expertise to perform mechanical thrombectomy. This corresponds to high implementation of mechanical thrombectomy in acute stroke treatment.

AS09-050

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DIRECT TRANSFER TO ANGIO-SUITE TO REDUCE DOOR-TO-PUNCTURE TIME IN THROMBECTOMY FOR ACUTE STROKE

M. Ribó[1], S. Bori[2], M. Rubiera[2], A. Tomasello[3], P. Coscojuela[3], M. Muchada[2], J. Juega[2], N. Rodriguez[2], J. Pagola[2], D. Rodriguez-Luna[2] and C.A. Molina[2]
[1]Spain
[2]Hospital Vall d'Hebron, Stroke Unit- neurology, Barcelona, Spain
[3]Hospital Vall d'Hebron, Neuroradiology, Barcelona, Spain

Background and Aims: We aim to evaluate feasibility and safety of a direct transfer to angio-suite protocol of stroke candidates for endovascular treatment (EVT).
Method: We studied in-hospital workflow metrics of admitted stroke patients who underwent endovascular treatment (12 months). Patients followed 3 possible protocols: direct transfer to: emergency-room (DTER), CT-room (DTCT) or angio-suite (DTAS, only last 4 months if admission NIHSS > 9 and time from onset<4.5 hours) according to staff/suite availability and arrival pre-alert. DTAS patients underwent Xpert-CT in the angio-suite before femoral puncture. Dramatic improvement was called if NIHSS dropped >10 points at 24 hours.
Results: 201 patients were included: 87 DTER(43.3%), 74 DTCT(36.8%), 40 DTAS, no significant baseline differences
Ten DTAS patients (25%) did not received EVT: 3 (7.5%) showed ICH on Xpert-CT and 7 (17.5%) did not present treatable occlusions on initial angiogram.
Mean door-to-puncture time was significantly shorter in DTAS (17 ± 8 minutes) than in DTCT group (60 ± 29) ($p < 0.01$) and significantly longer in DTER (90 ± 53) than in any other group ($p < 0.01$).
Among patients who received EVT there were no differences in onset-to-admission time ($p = 0.21$),procedural time ($p = 0.88$) or recanalization rate ($p = 0.27$). However onset-to-puncture (DTAS:197 ± 72 minutes, DTCT:224 ± 142, DTER:279 ± 156; $p = 0.01$) and symptom-to-recanalization times (DTAS:257 ± 74 minutes, DTCT:279 ± 146, DTER:355 ± 158; $p < 0.01$) where longer in DTER group. At 24 hours there were no differences in median NIHSS ($p = 0.81$), however the rate of dramàtic clinical improvement was significantly higher in the DTAS group, DTAS 53.3%, DTER 24.4%, DTCT 27.5% ($p = 0.01$).
Conclusion: In stroke patients presenting in the early window, direct transfer and triage in angio-suite seems feasible, safe and significantly reduces in-hospital workflow times.

AS09-052

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DOES INTRA-VENOUS THROMBOLYSIS SPEED MECHANICAL THROMBECTOMY REVASCULARIZATION?

G. Charbonnier[1], L. Bonnet[1], F. Vuillier[1], B. Bouamra[1], C. Iosif[2], A. Biondi[2] and T. Moulin[1]
[1]Besancon University Hospital, Neurology, Besançon, France
[2]Besancon University Hospital, Neuroradiology and Vascular Radiology, Besançon, France

Background and Aims: Two procedures have to be initiated in the management of acute ischemic stroke with proximal occlusion: intravenous thrombolysis (IVT) and mechanical thrombectomy (MT), both of which shouldn't delay each other. The aim of this study was to evaluate the impact of IVT on the MT procedure by evaluating its duration and revascularization score.
Method: All patients who presented an acute ischemic stroke and benefited from a MT in CHRU Besançon between 1st of January 2015 and the 31st of December 2016 were included. They were divided in 2 groups, "IVT plus MT group" and "MT-only group". We measured the procedure duration and the revascularization score at intervention end (mTICI 0 – 2A vs. mTICI 2B – 3).
Results: Eighty-seven patients were included in the IVT plus MT group and 25 patients in the MT-only group. The mean time of intervention was shorter in the IVT plus MT group (50.3 mn) vs. the MT-only group (69.7 mn), $p = 0.013$. The revascularization scores were similar in both groups (65.5% mTICI 2B-3 in the IVT and MT group vs. 61.5% in the MT group, $p = 0.89$).
Conclusion: MT procedure in patients who received IVT ends sooner. Whether this is linked to the IVT or to patient's characteristics is yet to be determined.

AS09-053

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

HYPERACUTE EXTRACRANIAL INTERNAL CAROTID ARTERY REVASCULARIZATION: CHOOSING THE BEST OF THREE DIFFERENT APPROACHES

N. Rodríguez-Villatoro[1], D. Rodriguez-Luna[1], M. Ribó[1], P. Coscojuela[2], J. Pagola[1], M. Muchada[1], S. Boned[1], J.M. Juega[1], M. Rubiera[1], C.A. Molina[1] and A. Tomasello[2]
[1]Vall d'Hebrón hospital, Neurology-Stroke Unit, Barcelona, Spain
[2]Vall d'Hebrón hospital, Neuroradiology Department, Barcelona, Spain

Background and Aims: Hyperacute carotid revascularization during endovascular treatment (EVT) of acute stroke is a current challenge. When a self-expanding stent (SES) is placed, the main concern is the need of early antiplatelet therapy and its risk of hemorrhagic transformation (HT). Balloon-expanding stents (BES), without initial antiplatelet loading, might solve the problem, although SES restenting is needed in subacute phase. We studied differences in patency of internal carotid artery (ICA) and HT between angioplasty alone and angioplasty + stenting.
Method: We prospectively studied 78 consecutive acute stroke patients with high-grade extracranial ICA lesion, who underwent urgent EVT < 8 h from symptom onset. ICA lesion was treated with angioplasty alone (AA) or angioplasty + stenting (SES or BES). Studied outcomes were: ICA patency and HT rates at 24 h, and stroke recurrence during 1 year.
Results: Mean age was 65.7 ± 13.6years and median time from symptom-onset 220[153–330] minutes. Forty-two (53.8%) received iv-tPA and 77(98.7%) intracranial thrombectomy. Thirty-six (46.2%) underwent AA and 42(53.8%) stenting: 29 SES (69%), 13 BES (31%). No significant differences in baseline characteristics were observed. At 24 hours patients who underwent AA showed higher rate of >50% restenosis or reocclusion than those who underwent stenting (69.4% vs. 19%; $p < 0.001$). There were no differences in HT or stroke recurrence. Although patency (82.7% vs. 75.2%; $p = 0.22$) and HT (24.1% vs. 30.8%; $p = 0.74$) were similar in SES and BES , all HT were asymptomatic in BES group.
Conclusion: Hyperacute extracranial ICA stenting seems to have a lower risk of restenosis compared to angioplasty, without increasing HT. Balloon-expanding stents are a promising alternative to conventional carotid stents.

AS09-054

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTORS OF CLINICAL OUTCOME AFTER SUCCESSFUL MECHANICAL THROMBECTOMY IN ACUTE MIDDLE CEREBRAL ARTERY OCCLUSION

T. Peisker[1], P. Vasko[1], B. Koznar[2], F. Rohac[2], M. Labos[3], P. Widimsky[2] and I. Stetkarova[1]
[1]Third School of Medicine - Charles University - Hospital Královské Vinohrady, Neurology, Prague 10, Czech Republic
[2]Third School of Medicine - Charles University - Hospital Královské Vinohrady, Cardiology, Prague 10, Czech Republic

[3]Third School of Medicine - Charles University - Hospital Královské Vinohrady, Radiology, Prague 10, Czech Republic

Background and Aims: Mechanical thrombectomy become a standard treatment of arterial occlusion in anterior cerebral circulation when initiated up to 6 hours after stroke onset. Nevertheless existing data demonstrate clinical benefit in patients treated after this time window.
Method: We retrospectively analysed 55 cases of successful mechanical recanalization of acute occlusion of distal internal carotid artery and/or middle cerebral artery. These parameters were evaluated: age, gender, initial NIHSS, ASPECTS on inaugural CT, presence of leptomeningeal collaterals (LMC) on CTA, thrombus localization, administration of thrombolytics and delay from stroke onset to groin puncture (intervention in 15 cases was initiated later than 6 hours after last seen normal). Subsequently we compared these parameters with functional outcome according to Rankin scale (mRS) in 90 days. Good clinical outcome was considered as mRS 0–2.
Results: LMC were significantly more frequently displayed in patients with the favourable clinical outcome than in those with the poor outcome (91 % vs. 62 %, $p = 0{,}014$). Initial NIHSS tightly correlated with final clinical outcome (13,7 vs. 16,9, $p = 0{,}03$). Low ASPECTS showed non-significant tendency to unfavourable outcome, but only four patients with ASPECTS < 7 were included. No other evaluated factors were significantly associated with final outcome.
Conclusion: Presence of LMC and initial NIHSS can predict functional outcome of patients after mechanical recanalization of arterial occlusion in anterior cerebral circulation. Further research of their application in a scoring system for patients presented later in the course of acute ischemic stroke is warranted.
Supported by the Charles University Research Project Progress Q35

AS09-055

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

"FLYING INTERVENTIONIST" - A NOVEL CONCEPT FOR STROKE CARE IN RURAL AREAS

F. Kraus[1], G.J. Hubert[1] and R.L. Haberl[1]
[1]Städtisches Klinikum München, Neurology, München, Germany

Background and Aims: Endovascular therapy (EVT) is beneficial for selected patients with acute ischemic stroke. Recent data have shown time-dependency with greater benefit for earlier recanalisation. Fast treatment for patients in remote areas stays challenging.
To analyse data from a large telestroke network regarding time delays in secondary transfer and show the necessity for a new model in which patients eligible for EVT are treated on-site by an interventionist transferred by helicopter.
Method: TEMPiS is a telestroke unit network with 2 hub and 19 spoke hospitals. Data of network's teleconsultation/thrombolysis-registry were analysed to calculate decision for EVT- to-groin-puncture-time. Calculations of time-delays within the novel concept ("flying interventionist") were based on travel-distances to spoke, usual helicopter speed (220 km/h) and estimated extra delay of 45 min for embarking/disembarking, foot transfer to angiography suite, patient's preparation for the procedure.
Results: Current data from TEMPiS-patients eligible for EVT transferred to one of the hub hospitals show a time delay of 2 h:50 min from decision-for-EVT-to-groin-puncture. Overall expected time delay in all patients in the network treated by "flying interventionist" were calculated with 1 h:10 min, leaving a net difference of 100 min in favour of the new model.
Conclusion: Covering sparsely populated regions with EVT is a challenge for stroke care systems all over the world. Bringing the interventionist by helicopter to the patient rather than transferring him to an ECC in a time-consuming procedure may shorten time-delays to EVT substantially. However, this "flying interventionist" model also may entail risks, especially a higher rate of periprocedural EVT-complications because of the use in a non-routine setting.

AS09-058

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

THROMBOLYSIS-STOP IN THROMBECTOMY PATIENTS? REAL-LIFE DATA FROM GERMAN STROKE CENTRES

L. Kellert[1], G. Thomalla[2], C. Nolte[3], F. Wollenweber[4], F. Dorn[5], P. Ringleb[6], J. Fiehler for the German Stroke Registry GSR[7]
[1]Klinikum der Universität München- Ludwig-Maximilians University-Munich- Germany and Institute for Stroke and Dementia Research-Klinikum der Universität München- Ludwig-Maximilians University Munich- Germany and Department of Neurology- Heidelberg University Hospital- Heidelberg- Germany, Neurology, Munich, Germany
[2]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany
[3]Charité-Universitätsmedizin Berlin- Campus Benjamin Franklin- Berlin Institute of Health BIH, Neurology, Berlin, Germany
[4]Institute for Stroke and Dementia Research- Klinikum der Universität München- Ludwig-Maximilians University, Neurology, Munich, Germany
[5]Klinikum der Universität München- Ludwig-Maximilians University, Neuroradiology, Munich, Germany
[6]Heidelberg University Hospital, Neurology, Heidelberg, Germany
[7]University Medical Center Hamburg-Eppendorf, Diagnostic and Interventional Neuroradiology, Hamburg, Germany

Background and Aims: In clinical trials endovascular thrombectomy (ET) was combined with intravenous thrombolysis (IVT) in most patients. We aimed to analyse how German stroke centres proceed with IVT in case of ET in clinical routine.
Method: We performed a national multicentre online survey consisting of 20 questions and open for reply from 20/12/2016 to 9/1/2017.
Results: Overall, we received 110 replies with complete or partial answered questions, 84 (79%) from neurologists and 22 (21%) from neuroradiologists. 70 centres (68%) treated more than 100 patients with IVT/p.a. and 65 centres (65%) performed more than 50 ET/p.a. 11 centres (12%) stop IVT before ET. 18 centres (19%) stop IVT after ET irrespective of TICI-grade. IVT is withhold without contraindications before ET in 17 (18%) centres (as standard or as an individual decision). A portion of rtPA is given intra-arterial in 37 (38%) centres (as standard or as an individual decision). The importance of IVT in drip-and-ship patients was considered as very important (56%), important (35%), not important (8), needless (1%) and harmful (0%) and in patients treated directly in a comprehensive stroke centre as very important (44%), important (45%), not important (7), needless (4%) and harmful (0%).
Conclusion: The majority of German stroke centres who participate in this survey continue with IVT in case of ET. However we observed a wide heterogeneity with respect to IVT treatment (withhold, stop, continue, restart, given intra-arterial). The nationwide implementation of ET is challenging but also challenging is to ensure rational standardized medical circumstances to ET.

AS09-059

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

CLINICAL OUTCOMES AFTER ENDOVASCULAR TREATMENT FOR LARGE ARTERY ANTERIOR CIRCULATION STROKE IN NONAGENARIANS

S. Bellwald[1], T. Horvath[1], R. von Martial[1], R. Kurmann[1], M.L. Mono[1], P. Mordasini[2], J. Gralla[2], U. Fischer[1], H. Sarikaya[1] and M. Arnold[1]

[1]University Hospital of Bern- Inselspital, Neurology, Bern, Switzerland
[2]University Hospital of Bern- Inselspital, Neuroradiology, Bern, Switzerland

Background and Aims: Little is known about the benefit of endovascular treatment (EVT) in stroke patients aged 90 years (nonagenarians) and older with large vessel occlusion (LVO) in the anterior circulation (AC). Aim of this study was to analyze the functional outcome and safety of EVT in this patients group.
Method: We retrospectively analyzed prospectively collected clinical and radiological data from 38 consecutive patients aged $>=90$ years receiving EVT for LVO AC. Baseline characteristics, radiological outcome after EVT as well as clinical outcome at three months were assessed from July 2008 to January 2017. Recanalization was measured using the Thrombolysis in cerebral infarction (TICI) scale. TICI 2b-3 was defined as complete recanalization. Functional outcome at 3 months was measured using the modified Rankin Scale (mRS). mRS of 0–2 was defined as favorable outcome.
Results: A majority of the 38 patients ($n=24$, 63.2%) were independent before stroke onset (mRS 0–2). Baseline characteristics showed a higher amount of women ($n=24$, 63.2%), preexisting hypertension ($n=28$, 73.7%) and atrial fibrillation ($n=22$, 57.9%) with a median NIHSS of 17 (4–36). Complete recanalization was achieved in 29patients (76.3%). Only 3 of 38 (7.9%) had a favorable outcome at 3 months. Mortality at 3 months was 52.6%. One patient (2.6%) experienced symptomatic intracerebral hemorrhage (ICH).
Conclusion: The vast majority of nonagenarians receiving EVT for LVO AC stroke had an unfavorable outcome after three months despite a low rate of symptomatic ICH.
However, a small selected number of nonagenarians may still benefit from EVT.

AS09-060

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

LOWER PRE-TREATMENT HAEMATOCRIT PREDICTS FUTILE RECANALIZATION IN ACUTE ISCHEMIC STROKE PATIENTS RECEIVING MECHANICAL THROMBECTOMY

L. Blanco Garcia[1], J. Ana[2], U. María[3], P. María[3], A. Hector[4], D.L. Mercedes[3], S. Miguel[5], C. Miguel[6], P. Santiago[7] and A. Juan Francisco[3]

[1]valladolid, Spain
[2]Hospital Clínico Universitario de Valladolid, Neurology, valladolid, Spain
[3]Hospital Clínico Universitario de Valladolid, Neurology, Valladolid, Spain
[4]Hospital Clínico Universitario de Valladolidd, Neurology, Valladolid, Spain
[5]Hospital Clínico de Universitario de Valladolid, Neuroradiology, Valladolid, Spain
[6]Hospital Clínico Universitario de Valladolid, Neuroradiology, Valladolid, Spain
[7]Hospital Clínico Universitario de Valladolid, Nueroradiology, Valladolid, Spain

Background and Aims: The lack of clinical benefit after endovascular reperfusion is an important clinical problem affecting acute ischemic stroke (AIS) patients. We aimed to identify predictors of futile recanalization in AIS patients treated with mechanical thrombectomy, including local and systemic factors.
Method: We studied consecutive AIS patients treated with endovascular reperfusion therapy in a tertiary stroke center. Complete cerebral recanalization was defined as a TICI 2b or 3 after thrombectomy. A day 90 modified Rankin scale score >2 despite complete reperfusion indicated futile recanalization. Pre-treatment clinical, radiological and biological variables, including ASPECTS score, clot burden, collateral status, blood cells count, glomerular filtrate and others, were analysed as potential predictors of futile recanalization.
Results: From January 2015 to September 2016, 133 AIS patients received endovascular therapy. Complete recanalization was obtained in 103 (77%), of whom 45 (44%) did not achieve a good long-term outcome. Univariate analysis identified older age, higher baseline NIHSS score and lower haematocrit as associated with futile reperfusion. A multivariate adjusted logistic regression model identified NIHSS score and low haematocrit (OR 1.17, 95% CI [1.03–1.33], $p=0.016$). as predictors of poor outcome despite complete recanalization.
Conclusion: Lower haematocrit predicted futile arterial recanalization in AIS patients treated with endovascular therapy. This novel finding warrants replication in larger thrombectomy series.

AS09-062

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ENDOVASCULAR RECANALIZATION AND GENDER: DIFFERENCES IN STROKE ETIOLOGY AND OUTCOME BUT NOT IN TREATMENT LATENCY

S. Zweynert[1], C. Leithner[1], C.J. Ploner[1], E. Siebert[2], G. Bohner[2], T. Liebig[2] and J. Sobesky[1]

[1]Charité - Universitätsmedizin Berlin, Department of Neurology, Berlin, Germany
[2]Charité - Universitätsmedizin Berlin, Department of Neuroradiology, Berlin, Germany

Background and Aims: Female gender has been associated with lower rates (Reeves et al. 2008) and later application (Asdaghi et al. 2016) of thrombolysis in acute stroke. Aim of the current study was to investigate gender-related differences of treatment times in patients with large vessel occlusion.
Method: Data were derived from a monocentric registry of 139 patients that underwent endovascular recanalization between 01/2015 and 12/2016. Thrombolysis rate and treatment latency (onset-to-groin-puncture), severity of symptoms (admission NIHSS), outcome at discharge (mRS) and age were collected and analyzed using Pearson's chi-squared- or Mann-Whitney-U-test. Values are displayed as median (male/female). Good outcome was defined as an mRS of 0–2 at discharge; successful recanalization as TICI 2b-3.
Results: Female patients (50%) were older (71/76 years; $p=.015$) and showed higher NIHSS values on admission (14/16.5; $p=.003$). Female gender was associated with a lower rate of good outcome at discharge (52%/25%; $p=.007$). Rate of thrombolysis (63%/63%) and successful endovascular recanalization (75%/77%, $p=.844$) as well as treatment latency were comparable: onset-to-groin-puncture 194/210 min;

p = .872. Cardioembolic stroke was more frequent in women (34%; 71%, p = .001) but was not a significant predictor of outcome in a binary logistic regression (OR 0,527; p = .3). Instead, successful recanalization (OR 10,9; p = .002), gender (OR 4,3; p = .012) and age (OR 0,96 per year; p = .043) were the strongest predictors of outcome.
Conclusion: Gender-related differences of treatment times and recanalization rates were not found. However, outcome was less favorable in female patients. This finding cannot be explained by a higher rate of cardioembolic stroke etiology and has to be elucidated in further studies.

AS09-063

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DETERMINANTS OF IN-STENT THROMBOSIS AND HEMORRHAGIC TRANSFORMATION AFTER INTERNAL CAROTID ARTERY STENTING IN THE SETTING OF HYPERACUTE INTRACRANIAL THROMBECTOMY

M. Requena[1], N. Rodríguez-Villatoro[2], M. Ribo[2], P. Coscojuela[3], J. Pagola[2], M. Muchada[2], S. Boned[2], J.M. Juega[2], M. Rubiera[2], A. Tomasello[3], C.A. Molina[2] and D. Rodríguez-Luna[2]
[1]Hospital Universitari Vall d'Hebron, Department of Neurology, Barcelona, Spain
[2]Hospital Universitari Vall d'Hebron, Stroke Unit- Department of Neurology, Barcelona, Spain
[3]Hospital Universitari Vall d'Hebron, Department of Neuroradiology, Barcelona, Spain

Background and Aims: Although extracranial internal carotid artery (ICA) stenting in the setting of hyperacute ischemic stroke seems to be safe, there could be major complications after this procedure. We aimed to study potential factors associated with in-stent thrombosis or stenosis and hemorrhagic transformation (HT) in this scenario.
Method: We prospectively studied 42 consecutive patients with non-cardioembolic ischemic stroke and high-grade extracranial ICA lesion who underwent ICA stenting during hyperacute intracranial thrombectomy. We recorded relevant demographic, historic, clinical, imaging, and laboratory variables on admission, as well as lipid profile and albumin at fasting blood sample within 24 hours. We explored the relationship between these variables and in-stent thrombosis or stenosis at 24-hour carotid ultrasound or CT angiography as well as HT at 24-hour CT scan.
Results: Mean age was 65.9 ± 15.0 years, median NIHSS score 15 (IQR 8–19), and median ASPECTS 9 (IQR 7–10). Twenty (47.6%) patients received intravenous rt-PA. Median time from symptoms onset to endovascular procedure was 245 (IQR 148–338) minutes. Patients with in-stent thrombosis or >50% degree stenosis at 24 hours (n = 10, 23.8%) received less frequently chronic antiplatelet treatment (10.0% vs. 46.9%, $p = 0.036$) and had higher total cholesterol levels (193.0 ± 55.6 vs. 158.4 ± 37.3 mg/dL, $p = 0.043$) than patients without. HT occurred in 11 (26.2%) subjects at 24 hours and 3 (7.1%) were symptomatic. No variable was found to be associated with HT.
Conclusion: In the setting of ICA stenting during hyperacute intracranial thrombectomy, chronic antiplatelet treatment and low total cholesterol levels are potential protector factors of acute in-stent thrombosis or >50% stenosis at 24 hours.

AS09-064

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

THE YIELD OF ANTIPLATELET RESISTANCE IN EXTRACRANIAL NEUROINTERVENTIONALISM

M. Muchada[1], N. Rodriguez[1], M. Requena[2], A. Montoya[3], S. Boned[1], J. Juega[1], D. Rodriguez-luna[1], D. Hernandez[3], C.A. Molina[1], M. Ribo[1], M. Rubiera[1] and A. Tomasello[3]
[1]Hospital Vall Hebron, Stroke Unit- Neurology, Barcelona, Spain
[2]Hospital Vall Hebron, Neurology, Barcelona, Spain
[3]Hospital Vall Hebron, Neuroradiology, Barcelona, Spain

Background and Aims: Antiplatelet aggregometry (AA) is frequently used to determine the antiplatelet function in patients with intracranial and coronary stenting, but its relevance in carotid and vertebral stents is unknown. Our aim was to determine the yield of antiplatelet resistance (AR) in this group of patients, the relationship with clinical outcomes and whether this relationship depends on changes in the antiplatelet management.
Method: We studied a total of 282patients. Platelet function was tested in 174patients who were enrolled. Platelet function was assessed with the VerifyNow-assay using Aspirin and P2Y12 cartridges before stenting. Antiplatelet reactivity was defined using the cut-off values ARU ≥ 550 as Aspirin resistance and PRU ≥ 220 as Clopidogrel resistance. Periprocedural complications and stent permeability at 24hours and 3months were analyzed. We also evaluated the effect of antiplatelet management after the test in all these parameters.
Results: A total of 91 patients (53.2%) showed AR, 31Aspirin resistance (18.8%) and 75Clopidogrel resistance (46.3%). Aspirin dose after the test was increased in 14patients (45.2%). In 15patients (20%) with Clopidogrel resistance the dose was increased, in 12patients (16%) just an extra-loading dose was administrated and in 4patients (5.3%) we made both. At 24hours,one patient showed stenosis > 50% and another an occlusion (0.6%,0.6% respectively). At 3months 7patients had stenosis > 50% (5%) and stenting related recurrence was observed in 3(2.1%). No significant differences in AA were observed across the different groups in the variables of evolution, recurrence and complications studied.
Conclusion: The yield of antiplatelet resistance in our series was 53.2%. More studies are needed to determine the clinical impact of AA and recommendation of management.

AS09-066

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

MECHANICAL TROMBECTOMY AND HISTOPATHOLOGICAL STUDY OF THE CLOT IN A SERIES OF CASES OF SEPTIC EMBOLISM

F. Hernández-Fernández[1], L. Rojas-Bartolomé[1], J. García-García[1], O. Ayo-Martín[1], J.D. Molina-Nuevo[2], R. Barbella-Aponte[3], C. Romero-Sánchez[1], G. Serrano[4], E. Juliá-Molla[2], M.J. Pedrosa-Jiménez[2] and T. Segura[1]
[1]Hospital General Universitario Albacete, Neurology, Albacete, Spain
[2]Hospital General Universitario Albacete, Radiology, Albacete, Spain
[3]Hospital General Universitario Albacete, Anathomical Pathology, Albacete, Spain
[4]Hospital General Universitario Albacete, Investigation Unit, Albacete, Spain

Background and Aims: Management of ischemic stroke secondary to septic embolisms (SE) remains challenging, due to the lack of specific recommendations and gravity of the underlying pathology.
The aim of this study is to describe the presence of SE in a series of mechanical thrombectomy (MT), analyzing technical complexity and clinical prognosis with respect the rest of the patients, resulting from systematic study of the histology of the clot, and the microbiological study in selected cases.
Method: Anatomo-pathological study of the retrieved clot in a MT series, completing with Gram stain in those cases with high clinical suspicion or greater histological inflammation.
Technical complexity in SE with respect the rest of the series was evaluated by analyzing time of the procedures, number of passes, and use of definitive intracranial stent (DIS).
Results: Along 24 months, bacteria were detected in the retrieved clot in four out of 96 patients (global incidence 4.3%). Two cases were finally diagnosed of infective endocarditis, while the remaining two were diagnosed of urinary tract infection and respiratory septicemia, respectively. Three patients (75%) required DIS in order to achieve successful recanalization.
These procedures were significantly longer (65.5-vs.-137.7 minutes, $p = 0.01$), needed a higher number of passes (2.1-vs-5.8, $p < 0.001$), and delivery of DIS more frequently (5.4%-vs-75%, $p = 0.03$), with respect the rest of the series. No differences regarding clinical prognosis were found.
Conclusion: In our series, systematic anatomo-pathological study of the MT samples allowed a higher proportion of SE diagnosis in comparison with previous reports.
MT in stroke patients with SE were significantly more complex and required more frequently DIS.

AS09-067

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ASSOCIATION OF INTRACRANIAL ARTERY TORTUOSITY AND THROMBECTOMY PROCEDURE DURATION

K. Treurniet[1], E. Santos[2], O. Berkhemer[1], W. van Zwam[3], A. van der Lugt[4], R. van Oostenbrugge[5], D. Dippel[6], Y. Roos[7], H. Marquering[1,2] and C. Majoie[1]
[1]Academic Medical Center- University of Amsterdam, Radiology, Amsterdam, The Netherlands
[2]Academic Medical Center- University of Amsterdam, Biomedical Physics & Engineering, Amsterdam, The Netherlands
[3]Maastricht University Medical Center, Radiology, Maastricht, The Netherlands
[4]Erasmus University Medical Center, Radiology, Rotterdam, The Netherlands
[5]Maastricht University Medical Center, Neurology, Maastricht, The Netherlands
[6]Erasmus University Medical Center, Neurology, Rotterdam, The Netherlands
[7]Academic Medical Center- University of Amsterdam, Neurology, Amsterdam, The Netherlands

Background and Aims: Time to reperfusion is one of the largest determinants of outcome in patients with an ischemic stroke. Intracranial vessel tortuosity can be a complicating factor during mechanical thrombectomy (MT) and delay reperfusion. We aim to research the association of the 3D tortuosity of the proximal intracranial anterior circulation in the affected hemisphere with procedure duration.
Method: We included patients from the MR CLEAN study who underwent MT. Using baseline thin-slice NCCT and/or follow-up CTA in conjunction with baseline CTA, a centerline was manually drawn by a trained observer (KT). The centerline ranges from the carotid foramen to approximately 1 cm distal to the end of the observed occlusion. Patients were excluded if combined imaging data was insufficient to perform this task. The 3D Tortuosity of the drawn centerlines was subsequently calculated and the procedure duration extracted from the MR CLEAN database. The association between 3D tortuosity (continuous) and duration of the MT procedure (minutes) extracted from the MR CLEAN database was determined with linear regression adjusted for age.
Results: Of the 217 patients in MR CLEAN who underwent MT in MR CLEAN, 189 centerlines could be completed. Their median tortuosity was 2.49 (inter-quartile range: 2.28–2.73). After adjustment for age, we found a significant association of tortuosity and procedure duration (Beta = 18.9, *95%CI 2.35–35.4*).
Conclusion: Increased intracranial tortuosity is associated with longer procedure duration of MT for patients with an anterior circulation proximal occlusion.

AS09-073

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ANAT-SCORE FOR THE PREDICTION OF FUNCTIONAL OUTCOME AFTER MECHANICAL THOMBECTOMY IN ACUTE ISCHEMIC STROKE PATIENTS WITH CONTRAINDICATIONS TO IV THROMBOLYSIS

N. Trampe[1], R. Hoepner[1], R. Gold[1], C. Lukas[2] and C. Krogias[1]
[1]Ruhr University Bochum, Neurology- St. Josef-Hospital, Bochum, Germany
[2]Ruhr University Bochum, Radiology - St. Josef-Hospital, Bochum, Germany

Background and Aims: The combined treatment with iv thrombolysis (IVT) and mechanical thrombectomy (MT) represents the evidence based treatment for acute ischemic stroke patients with emergent large vessel occlusion (ELVO). However, a significant proportion of ELVO patients show contraindications to IVT. Since effectiveness of treatment with MT alone in this particular subgroup remains unclear, we aimed to identify prognostic factors contributing to a functional outcome with modified Rankin Scale (mRS) ≤ 3.
Method: Prospectively collected data were used in this single-center retrospective study. By ROC-analysis we identified the cut-off-values in four prognostic factors: ASPECT-Score, NIHSS-Score, Age, Time-to-Treatment (ANAT). For each fulfilled positive prognostic factor a patient receives one point in the ANAT-Score (min = 0; max = 4).
Results: Over a period of 18 months 39 ELVO-patients (age = 74.2 ± 12.5y, male = 23; mean NIHSS-admission = 15.1 ± 5.8) with contraindications to IVT (18% effective anticoagulation, 15% malignant disease, 13% recent surgery) were identified and treated with MT alone in our comprehensive stroke center.
ROC-Analysis revealed the following prognostic thresholds: ASPECT ≥ 9; NIHSS ≤ 19; Age ≤ 77; Time ≤ 2 h. The higher the ANAT-Score the higher the probability to achieve functional outcome of mRS ≤ 3. The cut-off value of ≥ 3 points in the prognostic ANAT-Score significantly distinguished patients according to their achieved functional outcome (fisher-exact-test: $p = 0.026$; PPV = 65%, NPV = 73%).
Conclusion: The simply assessable ANAT-Score provides valid prognostic information and may help the clinician in making treatment decisions in ELVO patients who do not meet the top-tier evidence criteria for recanalization treatment.

AS09-074

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

MECHANICAL THROMBECTOMY USING THE NEW ERIC IS SIMILARLY EFFECTIVE COMPARED TO THE ESTABLISHED STENT RETRIEVERS IN PATIENTS WITH ACUTE ISCHEMIC STROKE AND LARGE VESSEL OCCLUSION

P. Gruber[1], T. Kahles[2], S. Zeller[2], C. Garcia-Esperon[2], J. Anon[3], M. Diepers[3], K. Nedeltchev[2] and L. Remonda[3]
[1]Kantonsspital Aarau, Institut für Neuroradiologie/Klinik für Neurologie, Aarau, Switzerland
[2]Kantonsspital Aarau, Klinik für Neurologie, Aarau, Switzerland
[3]Kantonsspital Aarau, Institut für Neuroradiologie, Aarau, Switzerland

Background and Aims: Mechanical thrombectomy in patients with acute ischemic stroke and proximal vessel occlusion in the anterior circulation using stent retrievers (SR) is highly effective and safe. The new Embolus Retriever with Interlinked Cages (ERIC®), designed to prevent the captured clot from shearing off during retraction, demonstrated efficacy and safety in smaller case series. The aim of this study was to asses efficacy of ERIC® compared to SR in acute stroke patients with large vessel occlusion of the anterior circulation at the Stroke Center of Cantonal Hospital Aarau (Switzerland).
Method: A single-center, open-label, retrospective cohort study of 135 consecutive patients with proven acute large vessel occlusion of the anterior circulation between 01/2014 – 06/2016. Primary outcome was successful recanalization (TICI 2b/3). Secondary outcome was good clinical outcome at discharge and 90 days (mRS Score of 0–2). Uni- and multivariate statistics were performed.
Results: 89 patients were treated with ERIC®. Successful recanalization rates were comparable in ERIC® (88%) and SR (80%) treated patients (OR: 1.74, CI: 0.74–4.12, $P = 0.2$). Clinical outcome was similarly beneficial in both groups (ERIC®® 52%, SR 34%, OR: 2.09, CI: 0.99–4.4, $p = 0.052$).
Conclusion: ERIC® and SR show to be similarly effective in acute ischemic stroke with large vessel occlusion. ERIC® might further strengthen the current armentarium of mechanical thrombectomy devices.

AS09-075

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TEMPORAL TRENDS IN RESOURCE UTILIZATION AND OUTCOMES OF ENDOVASCULAR TREATMENTS FOR ACUTE ISCHEMIC STROKE IN ITALY

V. Saia[1], G. Pracucci[2], D. Toni[3], D. Inzitari[2], P. Nencini[2], S. Vallone[4], A. Zini[5], L. Castellan[6], L. Malfatto[7], R. Tassi[8], P. Cerrato[9], M. Bergui[10], C. Motto[11], G. Bernava[12], D. Mardighian[13], S. Nappini[14], N. Limbucci[14], R. Padolecchia[15], T. Tassinari[1] and S. Mangiafico[14]
[1]Santa Corona Hospital, Neurology and Stroke Unit, Pietra Ligure, Italy
[2]AOU Careggi, NEUROFARBA, Firenze, Italy
[3]Hospital Policlinico Umberto I, Neurology and Psychiatry Dept., Roma, Italy
[4]AO S. Agostino Estense, Interventional Neuroradiology Unit, Modena, Italy
[5]AO S. Agostino Estense, Neuroscience, Modena, Italy
[6]IRCCS San Martino-IST, Neuroradiology, Genova, Italy
[7]IRCCS San Martino-IST, Neurology, Genova, Italy
[8]Le Scotte Hospital, Stroke Unit, Siena, Italy
[9]Le Molinette Hospital, Neurology and Stroke Unit, Torino, Italy
[10]Le Molinette Hospital, Neuroradiology, Torino, Italy
[11]Niguarda Hospital, Neurology, Milano, Italy
[12]Policlinico G. Martino, Neuroradiology, Messina, Italy
[13]Spedali Civili, Neuroradiology, Brescia, Italy
[14]AOU Careggi, Interventional Neuroradiology Unit, Firenze, Italy
[15]Santa Corona Hospital, Neuroradiology, Pietra Ligure, Italy

Background and Aims: Endovascular treatment (ET) for acute ischemic stroke (AIS) is rapidly evolving due to recent trials publication and the introduction of new devices. We aimed to evaluate temporal trends in resources utilization and outcomes of ET in Italy.
Method: The Italian Registry of ET in AIS consecutively collects data of patients treated with ET in 41 tertiary stroke centres. Efficacy measures are 3-month $mRS \leq 2$, and TICI score 2b-3. Safety measures include symptomatic intracranial haemorrhage (s-ICH), procedural adverse events and death.
Results: From 2011 to 2015, 2478 patients were treated, median age 70 years, 53% male patients. Median baseline NIHSS was 18. TICI 2b-3 was achieved in 70%, and 3-months $mRS \leq 2$ in 43% of patients. S-ICH and procedural adverse events accounted respectively for 8% and 5%. Death rate was 19.7%. There was a dramatic increase of patients treated with ET from 275 in 2011 to 939 in 2015. A significant raise in median age from 67 to 72 yo, along with female gender was recorded. A steady decline in time to groin puncture from 265 to 236 minutes was observed through years. Posterior circulation occlusion falls from 22% in 2011 to 12% in 2015, while a significant increase in the use of thromboaspiration devices was observed. Complete recanalization significantly increase from 66% in 2011 to 76% in 2015.
Conclusion: Data from a large prospective cohort of patients show significant changes in clinical practice of AIS management over time. Our results highlight the value of a prospective national registry in the planning of health resources.

AS09-081

NEUROINTERVENTION – EXCLUDING CLINICAL TRIAL RESULTS

CRUSHING THE CLOT: AUDIT OF REFERRALS FOR THROMBECTOMY FROM AN IRISH ACUTE TERTIARY HOSPITAL

E. Moloney[1] and K. Mc Grath[1]
[1]University Hospital Limerick, Clinical Age Assessment Unit, Limerick, Ireland

Background and Aims: The positive results from thrombectomy trials including ESCAPE, MR CLEAN and REVASCAT have altered the acute management of stroke. Thrombectomy is time dependent. The development of thrombectomy pathways for acute stroke care in hospitals at considerable distance from thrombectomy centres has proved challenging, particularly within a 6 hour window. University Hospital Limerick serves a population of approximately 400,000 patients with an average of 400 strokes per year. Referral for thrombectomy is to Beaumont hospital Dublin,200 km away.
Method: All acute ischaemic stroke cases referred for thrombectomy from October 2014 to February 2016 were reviewed. Demographic data, transfer time, time to thrombectomy and outcomes were recorded.
Results: 543 acute ischaemic strokes were admitted to UHL during this time. Ten were suitable for thrombectomy. Seven subsequently underwent thrombectomy. 3 patients were excluded on assessment in Beaumont Hospital as CT angiogram imaging was not available locally. These patients

represented 1.2% of total acute ischaemic strokes admitted to UHL in this timespan. Median age of patients was 62.8 years. Time to transfer via ambulance was equivalent to helicopter, approximately 1 hour 40 minutes. Delays in referral included time to CT angiography, time to contact the tertiary centre and distance needed to travel.
Conclusion: Although referral for thrombectomy is feasible a considerable distance away from a tertiary site, the number of eligible patients is much lower. Given the positive outcomes with thrombectomy trials, a national strategy is required to optimise the location of tertiary centres so that significantly higher numbers of patients are eligible to receive this life saving intervention.

AS23-002

NEUROSONOLOGY

ASSOCIATION BETWEEN INCIDENTAL CEREBRAL MICROBLEEDS AND TRANSCRANIAL DOPPLER DERIVED PULSATILITY INDEX IN ELDERLY INDIVIDUALS WITH NORMAL COGNITION

S.M. Kim[1], Y. Yang[1], S.W. Ha[1], J.H. Han[1] and D.E. Kim[1]
[1]Veterans Health Service Medical Center, Neurology, Seoul, Republic of Korea

Background and Aims: Microbleeds are one of important feature of cerebral small vessel disease. Although pulsatility index (PI), measured by transcranial Doppler (TCD) ultrasound has been considered as a predictor of cerebral small vessel disease such as white matter lesions, it is still unclear whether PI is associated with cerebral microbleeds. Therefore, we explored the association between PI measured by TCD ultrasound and cerebral microbleeds in cognitively normal individuals.
Method: We performed TCD and magnetic resonance imaging in 148 cognitively normal elderly individuals who were visited neurologic clinic due to headache. The patients with history of clinical stroke (including lacunar and hemorrhagic stroke) or transient ischemic attack were excluded. We investigated the association between middle cerebral artery (MCA) PI with microbleeds. The mean MCA PI by averaging bilateral MCA PI was used for study. The severity of white matter lesions was rated using the age-related white matter changes scale (ARWMC scale).
Results: Cerebral microbleeds were present in 28 of 148 participants (18.9%) with a total of 45 microbleeds. The presence of cerebral microbleeds was associated with age ($p < 0.001$), white matter lesions ($p < 0.001$) and MCA PI ($P = 0.03$). After adjusting demographic and clinical variables by multiple logistic regression analysis, MCA PI was significantly associated with cerebral microbleeds (odds ratio, 1.11 per 0.1 increase in PI; 95% CI, 1.01–1.29; $p = 0.03$)
Conclusion: Our present study findings show that mean MCA PI was associated with cerebral microbleeds. This suggests that mean MCA PI in cognitively normal elderly patients may serve as a marker of cerebral microbleeds related small-vessel disease.

AS23-003

NEUROSONOLOGY

MEASUREMENTS DISTAL TO THE STENOSIS CAN BE USEFUL TO DETECT CAROTID NEAR-OCCLUSION ON CAROTID ULTRASOUND

E. Johansson[1], M. Chaudhry[2], H. Benhabib[2], W. Herod[3], M. Machnowska[2], R. Maggisano[3], R. Aviv[2] and A. Fox[2]
[1]Umea University, Pharmacology and Clinical Neuroscience, Umeå, Sweden
[2]University of Toronto, Departement of Medical Imaging- Sunnybrook Health Science Centre, Toronto, Canada
[3]University of Toronto, Division Vascular Surgery- Sunnybrook Health Science Centre, Toronto, Canada

Background and Aims: Carotid near-occlusion (stenosis causing distal collapse on angiography) is sometimes diagnosed on ultrasound by low flow velocities in the stenosis, but is sometimes mistaken for ≥50% stenosis when the peak systolic velocity (PSV) is high (≥125 cm/s) in the stenosis. The aim of this study was to assess how often near-occlusion is misdiagnosed as ≥50% stenosis on ultrasound and if any ultrasound parameter can separate near-occlusion with high PSV from ≥50% stenosis.
Method: Patients examined with computed tomography angiography and carotid ultrasound performed within 30 days were included. The angiographies were reviewed for near-occlusion by two blinded experts. Velocities in the stenosis, common carotid artery and ≥1.5 cm distal to the stenosis were analyzed.
Results: Cohort comprised 39 patients with a near-occlusion and 45 with ≥50% stenosis. 77% (30/39) of near-occlusions had high PSV in the stenosis including 95% (21/22) of those without full collapse and 53% (9/17) with full collapse. Several parameters distal to the stenosis were better at separating near-occlusion with high from ≥50% stenosis (c-statistic ≥0.81) than all parameters in the stenosis or common carotid artery (c-statistic ≤0.72). In cases with high PSV in the stenosis, a PSV distal to the stenosis of ≤51 cm/s indicated near-occlusion with 64% sensitivity and 94% specificity (c-statistic 0.84).
Conclusion: Near-occlusion is often misdiagnosed as ≥50% stenosis on ultrasound due to high PSV in the stenosis. However, distal velocity measurements may be useful as an additional tool for separating near-occlusion with high PSV in the stenosis from ≥50% stenosis.

AS23-004

NEUROSONOLOGY

DUPLEX ULTRASOUND EVALUATION OF THE VERTEBROBASILAR SYSTEM IN PATIENTS COMPLAINING OF ISOLATED VERTIGO OF UNEXPLAINED ETIOLOGY

H.P. Bienfait[1], M. Lansink[2], H. Vriesema[2] and B. van Esch[3]
[1]Gelre Hospitals, Neurology, Apeldoorn, The Netherlands
[2]Gelre Hospitals, Clinical Neurophysiology, Apeldoorn, The Netherlands
[3]Gelre Hospitals- Apeldoorns Duizeligheids Centrum ADC, ENT, Apeldoorn, The Netherlands

Background and Aims: Vertebrobasilar disease or insufficiency is a catchall term to indicate a hemodynamic cause of all cases of posterior circulation ischemia. Common symptoms such as dizziness are often misattributed to posterior circulation ischemia. In order to optimize the yield of additional Duplex Ultrasound (DUS) evaluation
Method: In a prospective descriptive study we collected data in our community based hospital, also a tertiary national referral centre for vertigo, over a period of four years from all patients , who had DUS evaluation of the vertebrobasilar system. We evaluated a selection of patients with isolated vertigo of unexplained etiology.DUS was performed by an experienced vascular technician on a ATL HDI 5000 and Philips IU22 with the use of L9-3, C5-1 and S5-1 transducers. DUS results were categorized non-pathological, stenotic, occlusion, steal or dissection.
Results: Over a period of four years we performed DUS evaluations of the vertebrobasilar system in 344 patients. 119 patients were lost to follow up or were finally diagnosed otherwise. Isolated vertigo complaints without a known origin was present in 57 of the remaining 225 patients.DUS evaluation showed stenotic or occlusive lesions in 11 patients, but those

were regarded as not associated with symptoms of vertigo. In the remaining patients, no pathology was found such as stenotic or occlusive lesions, dissections or subclavian steal phenomenon.
Conclusion: In the workup of patients complaining of isolated vertigo of unexplained etiology we do not recommend the use of DUS.

AS23-008

NEUROSONOLOGY

PREDICTION OF COLLATERAL CIRCULATION FAILURE DURING INTRAOPERATIVE CLAMPING IN PATIENTS SUBMITTED TO CAROTID ENDARTERECTOMY: TRANSCRANIAL COLOUR-CODED DUPLEX MONITORING

J. Serena[1], P. Rodriguez[2], B. Alemany[1], M. Reina[1], L. Pardo[1], G. Blasco[3], J. Puig[3], O. Andrés[2], M. Terceño[1] and Y. Silva[1]
[1]Hospital Universitari Dr. Josep Trueta, Neurology, Girona, Spain
[2]Hospital Universitari Dr. Josep Trueta, Vascular Surgery, Girona, Spain
[3]Hospital Universitari Dr. Josep Trueta, Neuroradiology IDI, Girona, Spain

Background and Aims: Difference in intra-arterial pressure in internal carotid artery (IAP-ICA) pre- and post-clamping of the common carotid artery (CCA) is commonly used in carotid endarterectomies as a marker of poor cerebral perfusion and as indication of carotid shunt. We analyse the correlation between fall in IP-CCA and collateral circulation (CC) patterns using transcranial colour-coded duplex (TCCD).
Method: 100 consecutive patients submitted to carotid endarterectomy. Preoperative and intraoperative TCCD. Invasive measurement of IAP-ICA and IAP-CCA pre/post-clamping of CCA. Analysis of post-clamping percentage decrease in IAP-ICA and TCCD parameters (intracranial collateral circulation pattern [CC], mean-velocity [MV], peak-systolic velocity [PSV], end-diastolic velocity [EDV], PSV/EDV, and pulsatility-index [PI] in middle cerebral artery [MCA]) at six different moments: pre-clamping, 1 and 10 minutes post-clamping, shunt, immediately on declamping, and 10 minutes post-declamping.
Results: 59.5% of patients presented ipsilateral CC. The correlation between invasive systolic pressure pre/post-clamping of CCA and ICA and the MV in MCA was weak (r-Spearman 0.32–0.42). Arterial clamping led to a fall in the MV in MCA (pre/post clamping: 39.1+/-13.4 vs. 26.3+/-15.0 cm/s), partially recovered at 10 minutes (33.2+/-15.4), improving with shunt (32.0+/-11.1 cm/s). The fall in the MV in MCA after clamping correlated with pattern of the anterior CC (MV in MCA in patients without CC vs. with CC: 40.7 ± 25.7 vs. 4.9 ± 43.2; $p < 0.001$), without association with posterior or contralateral CC.
Conclusion: Measurement of IAP-ICA and IAP-CCA does not adequately reflect the intracranial haemodynamic situation. There is an excellent correlation between the pattern of CC studied during pre-clamping TCCD and post-clamping ipsilateral MV in MCA.

AS23-010

NEUROSONOLOGY

TRANSCRANIAL DOPPLER SCREENING FOR STROKE RISK IN CHILDREN WITH SICKLE CELL DISEASE: A SYSTEMATIC REVIEW

S. Mazzucco[1], M. Diomedi[2], A. Qureshi[3], L. Sainati[4] and S.T. Padayachee[5]
[1]University of Oxford, Oxford, United Kingdom
[2]University of Rome Tor Vergata, Stroke Unit- Department of Systems Medicine, Rome, Italy
[3]Children's Hospital-Oxford University Hospital Foundation Trust, Paediatric Haematology and Oncology Service, Oxford, United Kingdom
[4]University of Padua, Pediatric Haematology and Oncology Service-Dipartimento della Donna e del Bambino, Padua, Italy
[5]Guy's & St Thomas' NHS Foundation Trust, Ultrasonic Angiology Department, London, United Kingdom

Background and Aims: Sickle Cell Disease (SCD) is a leading cause of paediatric stroke worldwide. Annual Transcranial Doppler (TCD) screening for affected children is standard practice. However, the need for TCD surveillance could override the accuracy of the screening, affecting the correct stratification of stroke risk and subsequent clinical management. We aimed to review the available evidence on TCD screening for SCD children and adolescents, with a particular focus on screening rates and practices in European countries.
Method: A multidisciplinary panel ran a systematic review according to a list of clinically relevant questions (PROSPERO protocol registration: CRD42016050549). Quality of the evidence was rated using GRADE.
Results: Thirty-three studies published in English or French were included (5 randomised controlled trials, 8 experimental and 20 observational studies). The quality of evidence was rated as moderate or high most of the times. TCD is an effective screening tool for primary prevention of stroke in SCD children. There is no high quality evidence on the effectiveness of alternative screening methods, such as imaging-TCD with or without angle correction or magnetic resonance angiography, nor of screening children on hydroxyurea and with genotypes other than HbSS and HbS/β0. No European data were found on screening rates or practices.
Conclusion: High quality studies on alternative screening methods, and on screening applicability to specific subgroups of patients are urgently needed. Considering the low awareness of the disease in European countries and the lack of data on screening practices, clinicians need up-to-date guidelines for more uniform and evidence-based surveillance of children with SCD.

AS23-013

NEUROSONOLOGY

ULTRASOUND CHARACTERISTICS OF NON-OBSTRUCTIVE CAROTID ATHEROSCLEROSIS IN CRYPTOGENIC STROKE IN YOUNG ADULTS

R. Buon[1], B. Guidolin[1], A. Jaffre[1], M. Lafuma[1], M. Barbieux[1] and V. Larrue[1]
[1]Hôpital Universitaire de Toulouse, Neurology, Toulouse, France

Background and Aims: Cryptogenic stroke (CS) is the most common subtype of ischemic stroke in young adult. We investigated the prevalence and ultrasound characteristics of Non-Obstructive (stenosis < 50%) Carotid Atherosclerosis (NOCA) in young adults with CS.
Method: Patients aged 18–54, treated in a tertiary hospital for first-ever CS in the carotid artery territory, were prospectively enrolled from January 2016 to October 2016. CS was diagnosed using the ASCOD classification system.
Results: Of 148 patients with first-ever ischemic stroke, 70 had CS, including 44 patients with carotid artery territory CS. NOCA was found in 22/44 (50%) patients. All plaques but one were echolucent. NOCA was bilateral in 15 patients, and unilateral in 7 patients. All unilateral plaques were on the symptomatic side. The plaque volume was 2.3 times greater on the symptomatic side than on the asymptomatic side ($p < 0.001$). The threshold value of 0.161 cm3 had a sensitivity of 100% and a specificity of 81.3% to discriminate the symptomatic side.
Conclusion: NOCA is common in young adults with CS. Measurement of plaque volume with carotid ultrasound may help to identify symptomatic NOCA.

AS23-015

NEUROSONOLOGY

LONGITUDINAL INVESTIGATION OF MICROEMBOLIC SIGNAL OR HIGH INTENSITY TRANSIENT SIGNAL (MES OR HITS) IN SYMPTOMATIC EXTRACRANIAL CAROTID PLAQUES WITH MILD STENOSIS (<50% STENOSIS)

I. Putri[1], A. Cheng[2] and T. Richards[3]
[1]UCL, Institute of Neurology, London, United Kingdom
[2]UCL Hospital, Vascular Surgery Department, London, United Kingdom
[3]UCL Hospital, Vascular, Vascular and Endovascular Surgeon, United Kingdom

Background and Aims: This study aims to detect the MES or HITS in symptomatic mild carotid stenosis (<50% stenosis) and relate to plaques profile based on ultrasonography (Gray-Weale plaque classification).
Method: Symptomatic extracranial carotid plaques with mild stenosis (<50% stenosis) patients recruite from the HASU at UCL Hospital or patient who come to ultrasound clinics or outpatient clinics. The patient will be investigate for one hour monitoring of MES or HITS detection by using TCD. Period suspicious of embolic signals at bilateral simultaneous middle cerebral artery monitoring with dual-gated 2-MHZ pulsed wave probes (Doppler-Box^{TM} X; DWL) were assessed by the software.
Results: on going study
Conclusion: Ischaemic stroke patient with mild extracranial carotid stenosis (due to <50% stenosis) is believe to be better outcome by medical therapy and the patients have lower risk of stroke recurrence. On the other hand, over the last decades there has been a paradigm shift on the imaging-based risk stratification of carotid disease from static measurements of carotid artery stenosis to characterization of the dynamic biological process occuring within carotid plaques and improved risk stratification of patients with both high-and low-degree carotid artery stenosis. The modality of imaging that has been used are various numbers (CT, MRI, ultrasonography, and PET) to characterize the pathological characteristics of plaques. There is increasing evidence that active, unstable plaques in the carotid arteries are more prone to embolization, regardless of the degree stenosis.

AS23-017

NEUROSONOLOGY

CEREBRAL AUTOREGULATION IN MIGRAINE WITH AURA

C. Gollion[1], N. Nasr[1], N. Fabre[1], M. Barège[1] and V. Larrue[1]
[1]Toulouse University Hospital, Department of Neurology, Toulouse, France

Background and Aims: Migraine with aura (MA) is independently associated with a two-fold increase in the risk of stroke. This association might be related to an impairment of cerebral autoregulation (CA) which normally maintains cerebral blood flow independent of arterial pressure variations.
Method: Patients aged 30–55 fulfilling ICHD-3 beta criteria for MA, and gender- and age-matched healthy controls without history of migraine were prospectively enrolled. Patients and controls with history of stroke or a disease potentially impairing CA were excluded. We calculated CA by using two different methods: transfer function analysis, and the correlation coefficient index Mx. The transfer function phase and gain reflect responses of cerebral blood flow velocity to fast fluctuations of arterial blood pressure (ABP), whereas Mx also reflects responses to slower ABP fluctuations. Mx is thus an index of both dynamic and static CA.
Results: 22 MA patients (median 39.5 years ; IQR 12,5 years) and 22 controls (39 ; 9,75) were included. Transfer function parameters and Mx were not different between patients and controls. However, Mx was inversely correlated with age in patients ($R = -0.42$, $P = 0.049$), but not in controls ($R = -0.11$, $P = 0.64$). Mx was strongly and inversely correlated with MA duration ($R = -0.63$, $P = 0.0016$), suggesting impairment of CA early in the course of MA and its improvement with disease duration.
Conclusion: The strong correlation between MA duration and CA efficiency, as assessed by Mx, suggests an early and transient impairment of CA during the course of the disease, which might account for the increased risk of stroke in young subjects with MA.

AS23-019

NEUROSONOLOGY

IMPAIRED CEREBRAL HEMODYNAMICS AND FRAILTY IN PATIENTS WITH PRE-EXISTING ATHEROSCLEROTIC DISEASE

M. Lutski[1,2], S. Haratz[3], G. Weinstein[4], U. Goldbourt[5] and D. Tanne[3,5]
[1]Department of Epidemiology and Preventive Medicine- School of Public Health- Sackler Faculty of Medicine, Tel Aviv University, Tel-Aviv, Israel
[2]Israeli Center for Disease Control, Ministry of Health, Ramat Gan, Israel
[3]The Joseph Sagol Neuroscience Center, Sheba Medical Center- Tel Hashomer, Ramat Gan, Israel
[4]School of Public Health- Faculty of Social Welfare and Health Sciences, University of Haifa, Haifa, Israel
[5]Department of Epidemiology and Preventive Medicine- School of Public Health- Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

Background and Aims: Recent studies suggest that impaired cerebrovascular reactivity (CVR) is associated with a higher risk of stroke and impaired cognitive functions. We tested whether impaired CVR is associated with frailty among men.
Method: A subset of 327 men with chronic coronary heart disease (CHD) who previously participated in a BIP trial (1990 to 1997) underwent a neurovascular status evaluation by ultrasound 14.6 ± 1.9 yrs. and were evaluated 19.9 ± 1.0 yrs. after baseline for frailty. Frailty status was measured according to the physical phenotype developed by Fried and was categorized into non-frail, pre-frail and frail. CVR was measured using the breath-holding index with Transcranial Doppler and carotid large-vessel disease using ultrasound. Subjects were categorized into normal (≥ 0.69) or impaired (<0.69) CVR and also into tertiles of CVR, with cut-off points at ≤ 0.57, 0.58–0.94 and >0.95. We assessed ORs for increasing frailty by CVR tertiles using ordered logistic regression.
Results: Frailty was found among 43.0% of subjects at the bottom tertile, 30.1% at the middle tertile and 26.9% at the top tertile of CVR (p for trend $= 0.004$). After adjustment the estimated OR (95%CI) for increasing frailty for subjects at the bottom tertile was 2.50 (1.43–4.36) and for those at the middle tertile 1.31 (0.76–2.25), as compared to the top CVR tertile. When CVR was analyzed as a dichotomy variable, the estimated for increasing frailty for subjects at the impaired CVR group was 2.09 (1.33–3.28), as compared to the normal CVR group.
Conclusion: Impaired CVR was associated with a higher adjusted risk of late-life frailty among patients with CHD.

AS23-021

NEUROSONOLOGY

SPONTANEOUS PARTIAL RECANALIZATION OF EXTRACRANIAL INTERNAL CAROTID ARTERY ATHEROMATOUS OCCLUSION

C. Lopes[1], R. Santos[1], C. Ferreira[1], P. Abreu[1] and E. Azevedo[1]
[1]Centro Hospitalar de São João, Neurology, Porto, Portugal

Background and Aims: Spontaneous recanalization of extracranial internal carotid artery (ICA) atheromatous occlusion has been rarely reported. We aimed to assess the frequency of partial recanalization of these lesions using carotid ultrasound in patients with ischemic stroke.
Method: Carotid ultrasound exams of patients with acute ischemic stroke due to ICA occlusion, over a period of 12 years, were retrospectively reviewed. Selection criteria: cases with proximal occlusions (velocity and morphologic ultrasound criteria) with follow-up exams. Exclusion criteria: suspected or confirmed dissection, embolic occlusion, or proximal recanalization with suggestion of persistence of a more distal occlusion.
Results: From 518 stroke patients with symptomatic ICA occlusion, 241 had a proximal atheromatous extracranial ICA occlusion; 82 of these had a follow-up exam, and in 11 there was partial recanalization with segmental stenosis and significant blood flow acceleration. None of the patients were previously submitted to mechanical thrombectomy or other carotid endovascular procedures. Mean time of follow-up exam was 15.1 months in the cases remaining occluded and 8.3 months in the partial recanalization group. In 3 of these, therapeutic revascularization was performed and the transcranial Doppler revealed normalization of previous intracranial blood flow collateralizations.
Conclusion: We confirmed the occurrence of occasional spontaneous partial recanalization of atheromatous extracranial ICA occlusion in patients with ischemic stroke. This suggests that it might be appropriate to schedule at least one follow-up exam in patients with recent ICA occlusion, since after partial recanalization the patient might be candidate to revascularization treatment of the carotid stenosis for secondary stroke prevention.

AS24-001

NURSING AND CARERS

INTERMITTENT PNEUMATIC COMPRESSION DEVICES FOR THROMBOEMBOLISM PREVENTION IN ACUTE STROKE ARE USUALLY NOT USED CORRECTLY: WHICH PRACTICAL MEASURES RESULT IN MARKEDLY IMPROVED PROVISION?

S. Hart[1] and R. Parakramawansha[1]
[1]University of Edinburgh, Stroke, Edinburgh, United Kingdom

Background and Aims: Following the CLOTS 3 Trial, intermittent pneumatic compression devices (IPC) should be considered for venous thromboembolism prophylaxis for acute stroke patients according to National Guidelines in many countries including the UK. This new technology is often not used correctly as shown in an initial clinical audit. Practical interventions aimed to ensure correct, effective IPC use were implemented, followed by re-audit.
Method: Acute Stroke Unit (ASU) inpatients prescribed IPCs were audited as follows: sleeves present on both legs, correct size, connected pump tubing and a functioning pump. In response a program of nurse training followed before a second clinical audit. Training then widened to all multidisciplinary staff, with novel interventions at bedside charts, followed by a third audit.
Results: All parameters of IPC provision improved substantially between first audit in 2015 ($n = 33$), second ($n = 310$) and third ($n = 166$) clinical audits in 2016. Comparing first and third audits, correct IPC application improved: both sleeves on patient (52% vs 85%), pump functioning (42% vs 82%), tubing connected (45% vs 95%). 100% adherence to every aspect of IPC application improved between second and third audits (15% vs 50%). Likewise accurate IPC medication chart prescription improved (25% vs 94%).
Conclusion: IPC provision is a new advance for stroke patients and was initially rarely administered correctly by nursing staff. However all measures of provision improved substantially between clinical audits. This study is important because it reveals high incidence of incorrect use of IPCs on the ASU, and importantly, practical steps that dramatically improved delivery of this service will be defined.

AS24-002

NURSING AND CARERS

QUALITY OF LIFE IN SELF-SUFFICIENT PATIENTS AFTER STROKE

T. Fadrna[1,2] and D. Skoloudik[1,2]
[1]Cerebrovaskularni poradna s.r.o., Neurology, Ostrava, Czech Republic
[2]Faculty of Health Sciences- Palacký University Olomouc, Center for Research and Science- Department of Nursing, Olomouc, Czech Republic

Background and Aims: Self-sufficiency is the main goal of acute stroke treatment but quality of life could be decreased even in self-sufficient patients. The study aimed to assess a quality of life of self-sufficient post-stroke patients compared to control group.
Method: Self-sufficient patients examined in the neurosonology laboratory for carotid stenosis, aged 50–80 years, without severe disease during last 12 months, without dementia or psychiatric disease including severe depression were included to the study after signing the informed consent. Patients with a history of stroke were allocated to the Group A, stroke-free patients were allocated to the control Group B. All patients filled in 2 standardized quality of life questionnaires (WHOQOL-BREF, EQ-5D-3L) after study enrollment.
Results: Totally 502 out of 584 consecutive patients passed inclusion and exclusion criteria. Out of them 344 patients filled in both quality of life questionnaires completely – 145 post-stroke patients (78 males, aged 70.4 ± 7.0 years), 199 control group patients (86 males, aged 68.9 ± 8.3 years). Post-stroke patients did not differ from patients in control group in any domain of WHOQOL-BREF questionnaire – physical health ($p = 0.09$), psychological status ($p = 0.45$), social relationships ($p = 0.34$), environment ($p = 0.45$); in evaluation of quality of life ($p = 0.16$), present health status ($p = 0{,}57$), health status satisfaction ($p = 0.44$), mobility ($p = 0.22$), self-service ($p = 0.07$), activities of daily living ($p = 0.23$), pain ($p = 0.53$) nor anxiety ($p = 0.63$).
Conclusion: Self-sufficient post-stroke patients have not decreased quality of life.
Supported by Palacký University grant IGA_FZV_2016_004.

AS24-003

NURSING AND CARERS

FACTORS INFLUENCING QUALITY OF LIFE IN PATIENTS WITH CAROTID STENOSIS

T. Fadrna[1,2] and D. Skoloudik[2]
[1]Cerebrovaskularni poradna s.r.o., Neurology, Ostrava, Czech Republic
[2]Faculty of Health Sciences- Palacký University Olomouc, Center for Science and Reseach- Department of Nursing, Olomouc, Czech Republic

Background and Aims: Quality of life belongs to the main endpoints in stroke studies. The study aimed to identify risk factors affecting the quality of life of patients with carotid stenosis in primary and secondary stroke prevention.
Method: Self-sufficient patients with carotid artery stenosis, aged 50–80 years, without any serious illness, dementia or psychiatric disorders were selected to the study. Patients completed two standardized quality of life questionnaires (WHOQOL-BREF, EQ-5D-3L) and visual pain scale. Anamnestic data, medication, education, social situation, blood pressure and body mass index (BMI) were recorded. Logistic regression was used to identify factors affecting the individual domains of quality of life questionnaires.
Results: Totally 344 patients out of 584 consecutive patients met the inclusion criteria and full-filled both quality of life questionnaires (164 men, mean age 69.7 ± 7.8 years). Independent predictor of worse quality of life in all items was a pain (OR = 0.593–0.841, $p<0.01$), blood pressure in the physical health domain (OR = 0.961, $p = 0.03$), female gender in the psychological domain (OR = 0.524, $p = 0.44$), male gender in the social relationships domain (OR = 0.543, $p = 0.48$). Factors positively influencing the satisfaction with the quality of life were living with a partner (OR = 2.403, $p<0.01$), higher education level (OR = 1.654, $p<0.01$) and lower blood pressure (OR = 1.044, $p = 0.01$). Factors negatively influencing mobility were age (OR = 0.962, $p = 0.03$), male gender (OR = 0.492, $p = 0.01$), living without a partner (OR = 0.491, $p = 0.04$), lower education (OR = 0.691, $p<0.01$) and higher BMI (OR = 0.893, $p<0.01$).
Conclusion: Pain, blood pressure, BMI, education, living with a partner, sex, and age affect the quality of life in patients with carotid stenosis.
Supported by Palacký University grant IGA_FZV_2016_004.

AS24-005

NURSING AND CARERS

PREDICTOR AND LONG-TERM SURVIVAL OF PATIENTS DISCHARGED TO NURSING HOMES AFTER STROKE: THE SOUTH LONDON STROKE REGISTER

A. Bisquera[1], A. Rudd[1], C. Wolfe[1] and Y. Wang[1]
[1]King's College London, Division of health and social care research, London, United Kingdom

Background and Aims: We aim to examine factors associated with being discharged to nursing homes after stroke and assess the long-term survival of these patients.
Method: First-ever strokes registered between 1995 and 2015 in the South London Stroke Register (SLSR) were examined. Baseline data included sociodemographics, case mix, prior risk factors, acute stroke processes, and discharge destination, with up to 20 years follow-up after stroke. Multiple logistic regressions were used to determine factors associated with being discharged to nursing homes as compared to private homes. Survival curves were estimated with Kaplan-Meier methods, and survival analyses were undertaken using Cox Proportional-hazards models.
Results: 342 patients were discharged to nursing, sheltered or residential homes, and 2563 to private homes in the SLSR between 1995 and 2015. Older age (odds ratio (OR): 1.06 (95% CI: 1.03–1.10)), living in nursing, sheltered or residential home pre-stroke (OR: 25.16 (10.44–60.59)) and incontinence of urine (OR: 3.11 (1.45–6.66) were significantly associated with being discharged to nursing homes. Patients discharged to nursing homes had a shorter median survival time of 2.5 years (vs 10 years for those in private homes) and 50% increased risk of death (hazard ratio (HR): 1.49 (1.27–1.74)) after adjustment for socio-demographics, case mix and stroke subtype.
Conclusion: A number of factors were associated with being discharged to nursing homes after stroke such as age, living conditions pre-stroke and urinary incontinence. Patient in nursing homes had poorer survival and increased risk of death as compared to those in private homes.

AS24-007

NURSING AND CARERS

CARERS' EXPERIENCES, NEEDS AND PREFERENCES DURING INPATIENT STROKE REHABILITATION: A SYSTEMATIC REVIEW OF QUALITATIVE STUDIES

E. Lynch[1], J. Luker[2], S. Bernhardsson[3], C. Murray[4], J. Bernhardt[5] and M. Shannon[6]
[1]University of Adelaide, School of Nursing, Adelaide, Australia
[2]University of South Australia, Sansom Institute of Health Research, Adelaide, Australia
[3]Region Västra Götaland, Research and Development Centre for Primary Health Care, Gothenburg, Sweden
[4]University of South Australia, Occupational Therapy, Adelaide, Australia
[5]Florey Institute of Neuroscience and Mental Health, Stroke Division, Melbourne, Australia
[6]Florey Institute of Neurosciences and Mental Health, Stroke Division, Melbourne, Australia

Background and Aims: To report and synthesise the experiences, needs and preferences of carers of stroke survivors undergoing inpatient rehabilitation.
Method: Data sources: MEDLINE, CINAHL, Embase, PsycINFO and Web of Science were searched to March 2016. Reference lists of relevant publications were searched. No language restrictions were applied.
Study selection, appraisal and data extraction: Eligible qualitative studies reported the experiences of carers of stroke survivors who underwent inpatient rehabilitation. Selection, quality appraisal, and data extraction were undertaken by two or more reviewers. The search yielded 3532 records; 93 full-text publications were assessed for eligibility and 34 documents (33 studies) were included. Comprehensiveness of reporting was assessed using the COREQ framework. All text in studies' results and discussion sections were extracted for analysis.
Data synthesis: Extracted texts were analysed inductively using thematic synthesis.
Results: Seven analytical themes, covering 56 descriptive themes, were developed that related to the carers' experiences, needs and preferences: (1) Overwhelmed with emotions; (2) Recognition as a stakeholder in recovery; (3) Desire to be heard and informed; (4) Persisting for action and outcomes; (5) Being legitimate clients; (6) Navigating an alien culture and environment; (7) Managing the transition home.
Conclusion: This systematic review provides new insights into the experiences, needs and preferences of carers of stroke survivors undergoing inpatient rehabilitation. Carers experienced distress as they navigated a foreign culture and environment without adequate communication and processes in place for their inclusion. We recommend deliberate efforts to provide a more inclusive environment that better supports and prepares carers for their new role.

AS24-009

NURSING AND CARERS

NUTRITIONAL STATUS IMPACT ON STROKE OUTCOME

L.E. Fidel[1], E. Sanjuan[2], J.C. Portilla[1], M. Holguin Mohedas[1], N. Hidalgo Jimenez[1], M. Rubiera[2] and I. Casado Naranjo[1]
[1]Hospital San Pedro de Alcantara, Stroke Unit, Caceres, Spain
[2]Hospital Vall Hebron, Stroke Unit, barcelona, Spain

Background and Aims: Malnutrition has been associated with a worse outcome in stroke. Its frequency is not well established and sometimes the impact is not considered. We aimed to explore nutritional status (NS) after acute stroke and its impact on stroke outcome at 90 days.
Method: We evaluated consecutive acute stroke patients admitted to the Stroke Unit. We analyzed baseline demographics, vascular risk factors (RF), anthropometric parameters and stroke characteristics. We determined NS at baseline and 90 days by Mini Nutritional Assessment (MNA) to detect patients at malnutrition risk (MR)–score < 24 points. Stroke outcome was considered with Modified Rankin scale (mRs) and Barthel index (BI) at 90 days.
Results: We included 98 patients, 46 women (46,9%). Mean age:76,3 $\pm$ 6,6y.o. Ischemic stroke:85,7%. Median baseline NIHSS was 3(IR 2–6). Previous RF: hypertension 65(66,3%), diabetes 20(20,4%), atrial fibrillation 13(13,3%), dyslipidemia 53(54,1%), alcohol consumption 35(37,7%), smoking 17(17,4%) and body mass index 28,5 $\pm$ 5,1. Baseline Charlson Index was 1,6 $\pm$ 1,5. Dysphagia was present in 7 patients (7,1%). On admission, MR was present in 30,6% while at 90days increased to 43,9%. We observed a decrease in MNA of 1,6 (95%CI 0,75–2,4), $p < 0{,}001$. Baseline factors associated with MNA at 90days were: MNA ß 0,6(CI 95% 0.3,0.8), age ß -0,1(CI 95% -0.3,-0.01), female gender ß -1,9(CI 95% -3.6,-0,2), atrial fibrillation ß -2,7(CI95% -5.2,-0,2) and NIHSS ß -0,3(CI95% -0.5,-0.1). mRs at 90 days was $<= 2$ in 78(79,6%). MNA score at 90 days was independently associated with BI at 90days $r^2 = 0{,}30$ $p < 0{,}0001$ adjusted by gender, age, atrial fibrillation and baseline NIHSS.
Conclusion: In our series, worse nutritional status at 90days after the stroke was associated with a worst stroke outcome.

AS24-014

NURSING AND CARERS

STROKE UNIT NURSING CARE - CHANGING FROM A GENERAL WARD TO A DEDICATED STROKE UNIT

R. Kelly[1], S. Walsh[1], J. Harbison[1] and D. Bradley[1]
[1]St. James's Hospital, Stroke, Dublin, Ireland

Background and Aims: Dedicated stroke units, staffed by appropriately skilled staff, are the cornerstone of modern stroke care. In August 2015, the Acute Stroke Unit in our university teaching hospital was moved from a six-bedded bay on the acute medical admissions floor to a dedicated 7-bedded Hyper-Acute Stroke Unit (HASU) geographically associated with the Emergency and Radiology Departments. This allowed the optimisation of several aspects of the acute stroke service. This new unit previously operated as a general observation ward for medical admissions.
Method: This presentation will describe the process in the upskilling of the experienced general nursing staff that were in situ prior to development of the HASU by the stroke multidisciplinary team.
Results: Formal teaching sessions based on the curriculum from national existing stroke education study days were delivered to this group by the stroke clinical nurse specialists, and included detailed talks and practical demonstrations by the stroke multi- disciplinary (physiotherapy, occupational therapy, speech and language therapy, and clinical nutrition) team prior to the new unit opening. An ongoing continuous formal education programme is delivered by the Consultants, Nurse Specialists, and stroke specialised MDT, including neurological and cardiac monitoring and a teaching schedule to keep the team up to date on current developments in all areas of stroke management and research.
Conclusion: A learning environment, with a daily teaching ward round, a collaborative culture, and inclusion with inpatient care planning has increased stroke nursing knowledge and confidence within this HASU, allowing timely service development and optimal monitoring and management of acute stroke patients.

AS24-015

NURSING AND CARERS

THE IMPACT OF STROKE CARE ON PATIENTS AND CAREGIVERS: RESULTS FROM MIXED METHODS RESEARCH AS PART OF AN INTEGRATED STROKE PRACTICE UNIT (ISPU) IN LOUISIANA

P. Commiskey[1] and K. Gaines[1]
[1]Vanderbilt University Medical Center, Neurology, Nashville, USA

Background and Aims: Fifteen million people have a stroke each year worldwide. One-third of those are left permanently disabled from physical and cognitive impairments, and their caregivers also experience psychological and health quality impacts. Across the continuum, stroke patients and caregivers often face a poorly coordinated care system with differing geography and personnel and limited communication and collaboration.
Method: To address this, an Integrated Stroke Practice Unit (ISPU) Model integrating technology and real time care response from symptom onset through 12-months post- discharge was implemented at Ochsner Medical Center in New Orleans, Louisiana as part of a Centers for Medicare & Medicaid Services (CMS) Health Care Innovation Award (#1C1CMS331043). This comprehensive stroke care redesign combined an in-hospital component (*Stroke Central*) with a home-based, outpatient component (*Stroke Mobile*), that utilized Registered Nurse and Lay Health Educator Care Teams to proactively follow and assess quality of life indicators, including depression (patients) and caregiver strain among those who completed 12 visits ($n = 192$) between February 2013-December 2015. In addition, a series of in-depth structured interviews ($n = 2$) and focus groups ($n = 3$) were held with patients and caregivers from October-December 2015 to discuss stroke care experiences and assess needs as part of this ISPU.
Results: Both patients and caregivers reported difficulty with transitions of care while in-hospital. Caregivers also reported lack of support in the days and weeks following hospital discharge, particularly in coordinating patient care.
Conclusion: This presentation will describe both quantitative (assessment of patient depression and caregiver strain) and quantitative (interviews and focus groups) results from this innovative ISPU.

AS30-001

ONGOING TRIALS

EFFICACY OF FLUOXETINE- A RANDOMISED CONTROLLED TRIAL IN STROKE, THE EFFECTS STUDY IN SWEDEN

A.S. Rudberg[1], E. Isaksson[1] and E. Lundström[1]
[1]Karolinska institutet, Department of clinical neurosciences, Stockholm, Sweden

Background and Aims: Animal studies have shown that fluoxetine may improve post-ischaemic brain injury in many ways that augment neuroplasticity. In the FLAME trial 118 patients with ischaemic stroke were randomised to fluoxetine 20 mg or placebo for 3 months. At day 90 the frequency of independent patients [modified Rankin scale (mRS) of 0–2] was significantly higher in the fluoxetine group (26 % vs. 9 %, $p = 0.015$). But the FLAME trial was small, and there is a need for larger studies.
Aim: Functional outcome measured by mRS at month 6 post-stroke after 20 mg fluoxetine or placebo daily.
Method: A randomised controlled trial of 1500 stroke patients. EFFECTS started in October 2014. Up to today EFFECTS have expanded

to 31 sites in Sweden. We aim to recruit 1500 patients by 2018 and if we succeed EFFECTS will be the largest randomised stroke study ever conducted in Sweden. EFFECTS collaborate with two other studies – FOCUS (UK), and AFFINITY (Australia, New Zealand and probably Vietnam). A core protocol was developed with minor variations to national settings. Each trial is run and funded independently and will report its own results.
Results: To ESOC 2017 we intend to present preliminary baseline data including number of patients recruited, age, gender and type of stroke.
Conclusion: EFFECTS is an ongoing trial. If fluoxetine is shown to be safe and effective in promoting functional recovery, it could be rapidly, widely and affordably implemented in routine clinical practice and reduce the burden of disability due to stroke.

AS30-002

ONGOING TRIALS

EFFICACY OF ALOGLIPTIN (DPP-4 INHIBITOR) FOR THE SECONDARY PREVENTION AFTER ISCHEMIC STROKE OR TIA WITH TYPE 2 DIABETES MELLITUS

R. Tanaka[1], K. Yamashiro[1], M. Nobukazu[1], N. Kazuyuki[2], S. Yosiaki[3], U. Yuji[1], O. Yasuyuki[2], H. Nobutaka[1] and U. Takao[3]
[1]Juntendo University, Neurology, Tokyo, Japan
[2]Juntendo University Shizuoka University, Neurology, Shizuoka, Japan
[3]Juntendo University Urayasu Hospital, Neurology, Chiba, Japan

Background and Aims: This study is to explore the efficacy of alogliptin, DPP-4 inhibitor, for the secondary prevention after ischemic stroke or TIA with type 2 diabetes mellitus.
Method: Participants were patients who had a symptomatic ischemic stroke or transient ischemic attack (TIA) with type 2 diabetes mellitus (within 6 months from onset to randomization). The participants who recieved insulin were excluded. These patients were randomized to either receive or not receive alogliptin. The primary endpoint was a recurrence of ischemic stroke. Cognitive decline was also assessed by MMSE or MoCA.
Results: A total 77 patients were enrolled in this study. Average age was 68.6 ± 9.7 in alogliptin group, 67.6 ± 11.4 in non alogliptin group. Over median follow-up period of 2 years, treatment with alogliptin was found to be associated with a lower rate of the primary endpoint (recurrence of ischemic stroke) than that observed in the control group (event rate-$= 2.6\%$ in alogliptin vs 7.7% in control, $P = 0.33$). There were no significant event differences between both groups such as acute coronary syndrome, any stroke and all cause of death. The cognitive decline was significantly lower in alogliptin group than in control (ΔMMSE 1.1 ± 2.5 vs -0.12 ± 1.7, $p = 0.06$, ΔMoCA 2.0 ± 2.5 vs 0.75 ± 1.47, $p = 0.04$).
Conclusion: While this study was too underpowered to determine the effect of alogliptin, the result failed to show the efficacy of alogliptin for the secondary stroke prevention. However, alogliptin showed beneficial effects for the cognitive decline after stroke.

AS30-003

ONGOING TRIALS

THE BLEEDING WITH ANTITHROMBOTIC THERAPY STUDY 2 (BAT2): RATIONALE AND STUDY PROTOCOL

S. Sato[1], T. Hirano[2], M. Sasaki[3], H. Daida[4], T. Hamasaki[5], Y. Hasegawa[6], M. Koga[7], S. Nagahiro[8], K. Nagatsuka[9], K. Ogasawara[3], Y. Okada[10], S. Okuda[11], N. Sakai[12], J.C. Takahashi[1], Y. Yamaguchi[1], Y. Yakushiji[13], H. Yamamoto[14], S. Yasuda[15] and K. Toyoda[1]
[1]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita- Osaka, Japan
[2]Kyorin University, Department of Stroke and Cerebrovascualr Medicine, Tokyo, Japan
[3]Iwate Medical University, Division of Ultrahigh Field MRI- Institute for Biomedical Sciences, Morioka, Japan
[4]Juntendo University, Department of Cardiovascular Medicine, Tokyo, Japan
[5]National Cerebral and Cardiovascular Center, Department of Data Science, Suita- Osaka, Japan
[6]St. Marianna University, Division of Neurology- Department of Internal Medicine, Kawasaki, Japan
[7]National Cerebral and Cardiovascular Center, Division of Stroke Care Unit, Suita- Osaka, Japan
[8]Tokushima University, Department of Neurosurgery, Tokushima, Japan
[9]National Cerebral and Cardiovascular Center, Department of Neurology, Suita- Osaka, Japan
[10]National Hospital Organization Kyushu Medical Center, Department of Cerebrovascular Medicine and Neurology- Clinical Research Institute, Fukuoka, Japan
[11]National Hospital Organization Nagoya Medical Center, Department of Neurology, Nagoya, Japan
[12]Kobe City Medical Center General Hospital, Department of Neurosurgery, Kobe, Japan
[13]Saga University, Department of Neurology, Saga, Japan
[14]National Cerebral and Cardiovascular Center, Center for Advancing Clinical and Translational Sciences, Suita- Osaka, Japan
[15]National Cerebral and Cardiovascular Center, Department of Cardiovascular Medicine, Suita- Osaka, Japan

Background and Aims: With growing use of oral antithrombotics for prevention of stroke and cardiovascular diseases, bleeding complications including intracranial haemorrhage have become serious concerns. The aims of this study are to determine the incidence and details of bleeding complications in patients with cerebro- or cardiovascular diseases receiving oral antithrombotics and to develop risk-stratification models to predict bleeding risk.
Method: The Bleeding with Antithrombotic Therapy Study 2 (BAT2) is an investigator initiated, prospective, multicentre, observational study (Clinical Trial Registration: http://www.clinicaltraial.gov. Unique identifier: NCT02889653). Six thousand individuals with cerebro- or cardiovascular diseases who start or continue oral antiplatelets or anticoagulants (vitamin K antagonists or direct oral anticoagulants) will be enrolled in this study across the Network for Clinical Stroke Trials (NeCST). They will have multimodal magnetic resonance imaging of the brain at baseline and be followed up every 6 months for 2 years. The primary outcome is major bleeding defined by the International Society on Thrombosis and Haemostasis (ISTH). The secondary outcomes are clinically relevant non-major bleeding, haemorrhagic event details, and ischaemic events. Funding is from the Japan Agency for Medical Research and Development (AMED) which is Japanese governmental research fund.

Results: Since October, 2016, site set-up in the study is ongoing with 32 of 50+ centres actively recruiting patients. The study is ongoing through 2020.
Conclusion: This study will provide data regarding bleeding events in patients taking oral antithrombotics for prevention of cerebro- and cardiovascular diseases as well as novel risk stratification models for bleeding risk of those.

AS30-004

ONGOING TRIALS

PLATELET-ORIENTED INHIBITION IN NEW TIA AND MINOR ISCHEMIC STROKE (POINT): A PROSPECTIVE, RANDOMIZED, DOUBLE-BLIND, MULTI-CENTER, INTERNATIONAL TRIAL

M. Farrant[1]
[1]University of California San Francisco, Neurology, San Francisco, USA

Background and Aims: Ischemic stroke and other vascular outcomes occur in 10–20% of patients in the 3 months following a TIA or minor ischemic stroke; the commonest antithrombotic treatment used for these patients is aspirin. The primary specific aim of POINT is to determine whether clopidogrel 75 mg/day by mouth after a loading dose of 600 mg is effective in improving survival free from ischemic vascular events (ischemic stroke, myocardial infarction, and ischemic vascular death) at 90 days when subjects are randomized within 12 hours of time last known free of new ischemic symptoms in patients receiving aspirin 50–325 mg/day.
Method: The primary null hypothesis is, in patients with TIA or minor ischemic stroke treated with aspirin 50–325 mg/day, there is no difference in the event-free survival at 90 days in those treated with clopidogrel (600 mg loading dose then 75 mg/day) compared to placebo when subjects are randomized within 12 hours of time last known free of new ischemic symptoms. The primary outcome event is defined as a composite outcome—ischemic stroke, myocardial infarction, or ischemic vascular death. Subjects are 18 years or older, with high-risk TIA (ABCD2 score > 4) or minor ischemic stroke (NIHSS ≤ 3) followed for 90 days from randomization.
Results: Enrollment ongoing: 4131 of 5840 subjects have been enrolled at 242 sites (31DEC2016). *Last Subject In* projected September 2018.
Conclusion: POINT will produce detailed data on treatment effects, medical care and outcomes in a cohort of 5840 subjects with TIA or minor ischemic stroke enrolled at over 300 international clinical sites.

AS30-005

ONGOING TRIALS

INTRA-ARTERIAL BONE MARROW MONONUCLEAR CELLS (BM-MNCS) TRANSPLANTATION IN ACUTE ISCHEMIC STROKE (IBIS TRIAL). A PHASE IIB RANDOMIZED, DOSE-FINDING, CONTROLLED MULTICENTER TRIAL

F. Moniche[1], **I. Escudero**[1], **E. Zapata-Arriaza**[1], **C. Calderon-Cabrera**[2], **J. Martin-Sanchez**[2], **A. Vega-Salvatierra**[1], **F. Mancha**[1], **R. Valverde**[3], **E. Aguera**[3], **I. Herrera**[4], **F. Delgado**[5], **J. de la Torre**[1], **M.A. Gamero**[1], **S. Perez-Sanchez**[1], **P. Piñero**[6], **A. Gonzalez**[7] **and J. Montaner**[1]
[1]MAC•RO Stroke , Stroke Unit, Sevilla, Spain
[2]Hospital Universitario Virgen del Rocio, Hematology Department, Seville, Spain
[3]Hospital Universitario Reina Sofia, Neurology Department, Cordoba, Spain
[4]Hospital Universitario Reina Sofia, Hematology Department, Cordoba, Spain
[5]Hospital Universitario Reina Sofia, Interventional Neuroradiology, Cordoba, Spain
[6]Hospital Universitario Virgen del Rocio, Radiology Department, Seville, Spain
[7]Hospital Universitario Virgen del Rocio, Interventional Neuroradiology, Seville, Spain

Background and Aims: Stroke is the leading cause of long-term disability in adults. Although cell therapy with bone marrow mononuclear cells (BM-MNCs) seems to be safe in stroke patients, the efficacy and the optimal dose of cells to be used in humans is not known. We aim to evaluate efficacy of different doses of BM-MNCs in stroke patients.
Method: A multicenter prospective phase IIb, randomized, controlled (non-treated group as control), assessor-blinded, academic clinical trial of intra-arterial transplantation of autologous BM-MNC in acute ischemic stroke patients. Inclusion criteria: patients between 18 and 80 years with an ischemic stroke within 1–7 days from onset and a NIHSS score of 6–20. Patients are randomized to BM-MNCs transplantation or control group (1:1). In the intervention group, intra-arterial injection of BM-MNCs will be done with two different doses ($2x10^6$/kg or $5x10^6$/kg in 1:1 proportion).
Results: Seventy six patients will be included in the trial, that provides an 80% power to detect a 18% difference in dependence in Rankin scale, based on sample calculation from a previous trial. To date, 12 patients have been already randomized. The primary outcome is the proportion of patients with modified Rankin Scale scores of 0–2 at 180 days. Secondary outcomes include NIHSS and Barthel scores at 6 months, infarct volume, mortality, and seizures. Follow-up for every patient included is planned for 2 years.
Conclusion: This is the first trial to explore efficacy of different doses of intra-arterial autologous BM-MNC in moderate-severe acute ischemic stroke patients. The trial is registered as NCT02178657.

AS30-006

ONGOING TRIALS

THE PARAMEDIC ACUTE STROKE TREATMENT ASSESSMENT (PASTA) TRIAL

C. Price[1], **G.A. Ford**[2], **C. Exley**[3], **D. Flynn**[3], **P. McMeekin**[4], **H. Rodgers**[5], **H. Snooks**[6], **P. Tyrrell**[7] **and L. Vale**[3]
[1]Newcastle University, Newcastle upon Tyne, United Kingdom
[2]Oxford University, Oxford Academic Health Science Network, Oxford, United Kingdom
[3]Newcastle University, Institute of Health and Society, Newcastle upon Tyne, United Kingdom
[4]University of Northumbria, School of Health, Newcastle Upon Tyne, United Kingdom
[5]Newcastle University, Institute of Neuroscience, Newcastle upon Tyne, United Kingdom
[6]Swansea University, College of Medicine, Swansea, United Kingdom
[7]Manchester University, Division of Cardiovascular Sciences, Manchester, United Kingdom

Background and Aims: It is important that stroke patients are assessed quickly. This study is evaluating whether an enhanced assessment by paramedics could speed up thrombolysis treatment and so improve recovery.
Method: Study design: Multicentre cluster randomised trial with cost-effectiveness analysis and parallel process evaluation.
Setting: Ambulance services, emergency departments and stroke units within England and Wales.

Study intervention: A Paramedic Acute Stroke Treatment Assessment (PASTA) pathway initiated by paramedics and continued initially in hospital to facilitate the speed of brain imaging and delivery of thrombolysis when clinically appropriate. It consists of enhanced paramedic information collection, communication, actions and feedback.
Study control: Usual care according to national and local guidelines for the pre-hospital and hospital assessment of suspected stroke.
Randomisation: Ambulance stations within each region randomised to delivering the PASTA pathway or to continue with usual stroke care.
Participants: Adults within 4 hours of confirmed stroke.
Primary outcome: Dependency at 90 days after stroke (modified Rankin Scale)
Process evaluation: Semi-structured interviews with a subsample of participants and staff to gain insight into perceptions and experience of the PASTA pathway.
Sample size: 3640 participants will be needed to detect a 3% absolute difference in mRS 3–6 (poor outcome) to mRS 0–2 (good outcome) with 80% power.
Current study status: This study is currently open in three regional ambulance services: North East England, North West England and Wales. At submission of this abstract, 316 participants have been recruited.
Results: No results obtained currently.
Conclusion: No conclusions made currently.

AS30-009

ONGOING TRIALS

SONOLYSIS IN PREVENTION OF BRAIN INFARCTIONS DURING CAROTID ENDARTERECTOMY (SONOBIRDIE) TRIAL - AN ONGOING RANDOMIZED CONTROLLED TRIAL

P. Kešnerová[1], T. Hrbáč[2], D. Netuka[3], R. Herzig[4], M. Kovář[5], D. Viszlayová[6], V. Nosáľ[7], V. Beneš[8], J. Fiedler[9], V. Přibáň[10], V. Beneš[3], A. Tomek[1], P. Janský[1], T. Fadrná[11], O. Škoda[12], L. Kateřina[13], M. Brozman[14], M. Voško[15], R. Fiala[16] and D. Školoudík[11]

[1]2nd Faculty of Medicine- Charles University and University Hospital Motol, Department of Neurology- Comprehensive Stroke Center-, Prague, Czech Republic
[2]University Hospital Ostrava, Department of Neurosurgery- Comprehensive Stroke Center, Ostrava, Czech Republic
[3]Military University Hospital, Department of Neurosurgery and Neurooncology- Comprehensive Stroke Center, Prague, Czech Republic
[4]Charles University- Faculty of Medicine and University Hospital Hradec Králové, Department of Neurology- Comprehensive Stroke Center, Hradec Králové, Czech Republic
[5]Na Homolce Hospital Prague, Department of Neurology- Comprehensive Stroke Center, Prague, Czech Republic
[6]University Hospital Nitra, Department of Neurology, Nitra, Slovak Republic
[7]Jesenius Faculty od Medicine in Martin- Comenius University Bratislava, Department od Neurology, Martin, Slovak Republic
[8]Regional Hospital Liberec, Department of Neurosurgery, Liberec, Czech Republic
[9]Hospital České Budějovice-a.s., Department of Neurosurgery, České Budějovice, Czech Republic
[10]Faculty of Medicine Charles University and University Hospital Plzeň, Department od Neurosurgery, Plzeň, Czech Republic
[11]Faculty of Health Sciences- Palacký University Olomouc, Center for Research and Science, Olomouc, Czech Republic
[12]Hospital Jihlava, Department of Neurology, Jihlava, Czech Republic
[13]Faculty of Health Sciences- University Palacký Olomouc, Center for Research and Science, Olomouc, Czech Republic
[14]Faculty Hospital Nitra, Department of Neurology, Nitra, Slovak Republic
[15]Kepler Universitätsklinikum GmbH- Linz, Neurologie 2, Linz, Austria
[16]2nd Faculty of Medicine- Charles University and University Hospital Motol, Department of Cardiosurgery- Comprehensive Stroke Center, Prague, Czech Republic

Background and Aims: Surgical risk of carotid endarterectomy (CEA) varies between 2 and 15%. The aim of the study is to demonstrate the safety and effectiveness of sonolysis on the risk reduction of stroke, transient ischemic attack and brain infarction detected using magnetic resonance imaging (MRI) by the activation of endogenous fibrinolytic system during CEA.
Method: Design: a randomized, double-blind, sham-controlled trial.
Scope: international, multi-center trial for patients with $\geq$70% symptomatic or asymptomatic ICA stenosis undergoing CEA.
Inclusion criteria: patients with symptomatic or asymptomatic ICA stenosis $\geq$70% indicated for CEA, a sufficient temporal bone window for TCD, aged 40 - 85 years, functionally independent, signed Informed consent.
Randomization: Consecutive patients will be assigned to the sonolysis or control (sham procedure) group by a computer-generated 1:1 randomization. Pre-study calculations showed that a minimum of 704 patients in each group is needed to reach a significant difference with an alpha value of 0.05 (two-tailed) and a beta value of 0.8 assuming that 10% would be lost to follow-up or refuse to participate in the study (estimated 39 end-points).
Endpoints: The primary endpoint is the incidence of stroke or TIA during 30 days after the CEA and the incidence of new ischemic lesions on brain MRI performed 24 hours after the CEA in sonolysis and control groups.
Analysis: descriptive statistics and linear/logistic multiple regression models will be performed.
Results: Totally 316 patients were randomized in 13 centers between October 2015 and December 2016.
Conclusion: Registration: ClinicalTrials.gov NCT02398734. Supported by Ministry of Health of the Czech Republic grant No. 16–29148A.

AS30-011

ONGOING TRIALS

SWISS TRIAL OF INITIAL DECOMPRESSIVE CRANIECTOMY VERSUS BEST MEDICAL TREATMENT OF SPONTANEOUS SUPRATENTORIAL INTRACEREBRAL HEMORRHAGE A RANDOMIZED TRIAL (SWITCH)

J. Beck[1], C. Fung[1], D. Strbian[2], F. Ringel[3], J. Bressan[4], S. Lerch[4], L. Burkhardt[4], A. Raabe[1] and U. Fischer[4]

[1]Inselspital- Bern University Hospital- University of Bern, Neurosurgery, Bern, Switzerland
[2]Helsinki University Central Hospital, Neurology, Helsinki, Finland
[3]Univeristy Hospital Mainz, Neurosurgery, Mainz, Germany
[4]Inselspital- Bern University Hospital- University of Bern, Neurology, Bern, Switzerland

Background and Aims: Decompressive craniectomy (DC) is beneficial in patients with various diseases including malignant middle cerebral artery (MCA) infarction. In intracerebral hemorrhage (ICH), decompressive craniectomy without hematoma evacuation has only been evaluated in small retrospective studies with a trend towards reduced mortality. However, no randomized trial has ever assessed whether DC is beneficial in ICH. Therefore the prospective randomized SWITCH trial was initiated in October 2014 to determine whether decompressive surgery

and best medical treatment in patients with spontaneous ICH will improve outcome compared to best medical treatment (BMT) alone.
Method: SWITCH is an international multi-center randomized trial. 300 patients will be randomly assigned (1:1) either into DC and BMT or BMT alone. Main inclusion criteria are: spontaneous ICH of deep origin, age $\geq$18 to $\leq$75 years, NIHSS $\geq$ 10 and $\leq$30, GCS $>$ 7 and $<$14 and ICH volume $\geq$ 30 and $\leq$100. The primary endpoint is severe disability and mortality, measured with the modified Rankin score 6 months after ictus.
Results: Currently 24 sites in 5 European countries participate in the trial. So far 30 patients have been randomized. The current recruitment rate is 1.6/center/years. Less than 5% of ICH patients are eligible for the trial.
Conclusion: After initiation of SWITCH we could increase the number of recruiting centers to 24 and currently 30 patients have been randomized into the SWITCH trial. Further centers are still highly welcome and we are convinced that maintaining a high recruitment rate is crucial for a successful completion of the trial.

AS30-013

ONGOING TRIALS

EXTENDING THE TIME FOR THOMBOLYSIS IN EMERGENCY NEUROLOGICAL DEFICITS - THE EXTEND TRIAL

H. Ma[1,2], B. Campbell[3], M. Parsons[4], C. Levi[4], L. Churilov[5], A. Meretoja[5], C. Hsu[6], S. Davis[3] and G. Donnan[2]
[1]Monash Health, Neurology, Clayton, Australia
[2]Florey Neuroscience and Mental Health Research Institutes, Medicine, Melbourne, Australia
[3]Royal Melbourne Hospital, Neurology, Melbourne, Australia
[4]University of Newcastle, Neurology, Newcastle, Australia
[5]University of Melbourne, Medicine, Melbourne, Australia
[6]China Medical University Hospital, Medicine, Taichung, Taiwan R.O.C.

Background and Aims: Background: Current clinical application of thrombolysis in stroke is limited by the 4.5hour time window and not applicable to patients with wake up stroke (WUS). Patient selection using advanced penumbral imaging criteria may allow extension of the therapeutic window.
Objective: To test the hypothesis that perfusion-ischemic core mismatch can be used to select patients with favourable response to thrombolysis beyond conventional time windows.
Method: Design: EXTEND is an investigator-initiated, phase III, randomised, double-blind, placebo controlled trial of intravenous alteplase vs placebo in patients with ischemic stroke 4.5–9 hours from stroke onset and WUS.
Methods: Patients with ischemic stroke within 4.5–9 hours from stroke onset and WUS patients, (WUS defined as the midpoint between time to sleep and awakening with the stroke symptoms less than 9 hours), are eligible for recruitment. Criteria for entry into the trial include perfusion-ischemic core mismatch using a perfusion threshold of Tmax more than 6 sec and a perfusion-ischemic core lesion volume ratio of more than 1.2 and absolute mismatch more than 10 mL. Ischemic core lesion volume must be less than 70 mL. This will be assessed using a fully automated software package (RAPID, Stanford University). Reperfusion/recanalization will be assessed at 24 hours. Safety endpoints include symptomatic intracerebral haemorrhage and death
Results: Outcome measures: The primary endpoint is mRS 0–1 at 90 days. Secondary endpoints will include mRS ordinal analysis, reperfusion, recanalization, quality of life and depression scales.
Conclusion: Trial status: Recruitment is underway in Australasia, Taiwan and Finland. As of January 2017,172 patients were randomised.

AS30-014

ONGOING TRIALS

EMERGENT CAROTID ULTRASOUND IN HYPERACUTE CEREBRAL VESSEL OCCLUSION FOR SELECTING PATIENTS TO BE TREATED WITH ENDOVASCULAR CLOT RETRIEVAL TREATMENT (ECHO-SELECT)

R. Itabashi[1], Y. Shigehatake[1], K. Fukuma[1], K. Endo[1], Y. Yazawa[1] and Y. Matsumoto[2]
[1]Kohnan Hospital, Department of Stroke Neurology, Sendai, Japan
[2]Kohnan Hospital, Department of Neuroendovascular therapy, Sendai, Japan

Background and Aims: RATIONALE: When endovascular therapy is contemplated for acute stroke patients, non-invasive intracranial vascular imaging is recommended as quickly as possible. Computed tomography angiography is widely used because of its short time requirement and lots of information. On the other hand, carotid duplex ultrasound, which is non-invasive and could be performed during initial evaluation in emergency room in a few minutes, is useful to identify proximal intracranial vessel occlusion in anterior circulation. The safety and efficacy of carotid duplex ultrasound as vascular imaging for patients to be treated with endovascular thrombectomy are not well known.
AIMS: The aim of this study is to address the usefulness of carotid duplex ultrasound as non-invasive vascular imaging for acute stroke patients to be treated with endovascular thrombectomy.
Method: DESIGN: This is a single center, prospective, single arm clinical trial. Acute stroke patients with NIHSS score of 6 and ASPECTS of 6, in whom endovascular treatment can be initiated within 6 hours of symptom onset, are enrolled to this study. When proximal vessel occlusion is suspected by carotid duplex ultrasound, patients are transferred to angio suite immediately for emergent endovascular thrombectomy.
Results: STUDY OUTCOMES: The primary efficacy end-point is modified Rankin Scale 0–1 at 90 days. The safety outcome measures are symptomatic intracranial hemorrhage at 24 hours after onset.
Conclusion: DISCUSSION: This trial may provide a useful non-invasive vascular imaging to cut the delay of endovascular thrombectomy for acute ischemic stroke. TRIAL REGISTRATION: UMIN-CTR UMIN000025032 and ClinicalTrials.gov NCT02989376

AS30-015

ONGOING TRIALS

NIH STROKENET EVOLVING TRIAL PROPOSAL PROCESS

J. Broderick[1], Y. Palesch[2], W. Zhao[2], C. Moy[3] and S. Janis[3]
[1]University of Cincinnati, Neurology, Cincinnati, USA
[2]Medical University of South Carolina, Department of Public Health Sciences, Charleston, USA
[3]National Institutes of Health, National Institute of Neurological Disorders and Stroke, Rockville, USA

Background and Aims: The 2012 Stroke Progress Review Group and National Institute of Neurological Disorders and Stroke (NINDS) identified the need for a collaborative multi-center stroke trial network infrastructure that would facilitate rapid development and implementation of NINDS-funded stroke trials focused on key interventions in stroke prevention, treatment, and recovery. The NIH StrokeNet was funded in April 2014, with a National Coordinating Center, a National Data Management Center, and 25 Regional Coordinating Centers. Three working groups (prevention, treatment, and rehabilitation) were established to assist in the development of protocols

Method: Principal Investigators with potential applications submit their concepts to the NINDS scientific representative as well as to the relevant working group for initial discussion. If the project is deemed to be appropriate for StrokeNet, a formal concept proposal is submitted to the NINDS Extramural Science Committee (ESC) for approval to submit an NIH grant application. If approved, the proposed study is referred to the appropriate working group to assess feasibility and to the StrokeNet administration to assist in developing a final budget. The expected time from approval of concept proposal by the NINDS ESC to grant submission is 3 months.
Results: Since May 2014 there have been 23 concept proposals vetted by the working groups. NINDS has approved 17 grant submissions. Three trials that have been funded are TeleRehabilitation, DEFUSE 3, and ARCADIA. Currently, there are 11 trials under NIH review and 3 trials are being revised for resubmission.
Conclusion: The NIH StrokeNet trial proposal process facilitates submission of high quality trial applications to the NIH.

AS30-016

ONGOING TRIALS

PREVENTING COGNITIVE DECLINE AND DEMENTIA FROM CEREBRAL SMALL VESSEL DISEASE - THE LACUNAR INTERVENTION TRIAL 1 (LACI-1)

G. Blair[1], J. Appleton[2], R. Dooley[2], K. Flaherty[2], M. Thrippleton[1], K. Shuler[1], I. Hamilton[1], Y. Shi[1], M. Stringer[1], C. Richardson[2], L. Ryan[2], Z. Law[2], F. Doubal[1], N. Sprigg[2], P. Bath[2] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]University of Nottingham, Stroke Trials Unit- Division of Clinical Neuroscience, Nottingham, United Kingdom

Background and Aims: Lacunar strokes are caused by cerebral small vessel disease (SVD), the underlying pathophysiology of which differs from large artery strokes. Despite this there are no specific treatments to prevent stroke recurrence, cognitive impairment or radiological progression in lacunar stroke and SVD. Cilostazol and isosorbide mononitrate have promising mechanisms of action to support their trialling in SVD. We are performing a phase II trial to assess safety and tolerability of these drugs in patients with lacunar stroke taking standard post-stroke secondary prevention.
Method: 60 lacunar stroke patients are being recruited to a phase II, factorial, dose escalation, prospective, randomised, open-label, blinded endpoint trial in two centres (Edinburgh and Nottingham; 36 patients enrolled to date). Participants are randomised to four groups: cilostazol alone; isosorbide mononitrate alone; isosorbide mononitrate and cilostazol combined; and delayed isosorbide mononitrate and cilostazol combined. Participants take medication for 11 weeks with the dose being titrated up as tolerated. All participants attend three visits for measurements of blood pressure, arterial stiffness, and platelet function; and 40 patients also have cerebrovascular reactivity (CVR) measured by MRI scanning.
Results: Primary Endpoint:
Proportion of patients completing study to target dose
Secondary Endpoints:
Symptoms reported whilst taking medications
Safety outcomes (systemic or intracranial haemorrhage, recurrent vascular events)
Effect of medications on blood pressure, platelet function, arterial stiffness and CVR.
The study is registered ISRCTN12580546; funding is from the Alzheimer's Society, UK.
Conclusion: LACI-1 will inform the design of future trials of cilostazol and isosorbide mononitrate in lacunar stroke (LACI-2), whilst providing data on the drugs' effects on vascular function.

AS30-017

ONGOING TRIALS

PREDICTIVE RISK-MODELLING, EVALUATION, AND DEPLOYMENT FOR INFARCTION OF CEREBRAL TERRITORIES IN NEUROSCIENCE - PREDICTION 2020

V.I. Madai[1], J. Sobesky[2], T. Richards[3] and D. Frey[1]
[1]Department of Neurosurgery, Charité Universitätsmedizin Berlin, Berlin, Germany
[2]Centre for Stroke Research Berlin (CSB), Charité Universitätsmedizin Berlin, Berlin, Germany
[3]Division of Surgery and Interventional Science, University College London, London, UK

Introduction: Stroke has severe public health impact. A reason is the lack of personalized treatment. Here, we propose a software enabling personalized simulation of the vascular tree with prediction of blood flow and perfusion. We will apply the software in a subset of stroke patients with TIA/minor stroke with the question if our software would lead to a change of therapy recommendation. The aim of this study is to evaluate the calculated individual stroke risk score as well as the effect of treatment options.
Methods: Design: multicentric, prospective, observational study. Follow-up: 3 months, 1 year, 3 years. Population: 550 patients. Important inclusion criteria: TIA and/or minor stroke (NIHSS4 and/or mRS >2; embolic stroke. Primary endpoint: Change of recommended treatment strategy. Secondary endpoints: Hypothetical reduction in incidence of: Stroke; TIA; coronary events; mortality. Statistical analysis: Primary endpoint: Group comparison by McNemar-test. Secondary endpoints: Group comparison by McNemar test and time-to-event analyses by Kaplan-Meier curves/ Cox-regression. Sample size calculation: Analyzing 405 patients, the McNemar test will detect a difference with $\alpha = 0.05$; $\beta = 0.2$. A drop-out-rate of $>20\%$ is not expected, we include 550 patients. Study organization: Lead: Charité Universitätsmedizin Berlin. Confirmed participating centres: University College London. Funding: €1.2 m by the German Federal Ministry of Education/Research.
Conclusion: Our study is the first step to validate a precision medicine approach for the treatment of stroke patients. Individual risk scores and personalized simulations of treatment options will empower the treating physician to identify the optimal treatment strategy for each patient.

AS30-020

ONGOING TRIALS

SEARCHING FOR EXPLANATIONS FOR CRYPTOGENIC STROKE IN THE YOUNG: REVEALING THE TRIGGERS, CAUSES, AND OUTCOME

N. Martinez-Majander[1], N. Yesilot[2], F. Palm[3], G. Tsivgoulis[4], H. Numminen[5], B. von Sarnowski[6], U. Waje-Andreassen[7], P. Ylikotila[8], M. Zedde[9], J. Huhtakangas[10], C. Fonseca[11], P. Redfors[12], F.E. de Leeuw[13], A. Pezzini[14], J. Korv[15], S. Schneider[16], C. Tanislav[17], D. Jatuzis[18], P. Martínez-Sánchez[19] and P. Jäkälä[20]
[1]Helsinki University Hospital, Department of Neurology, Helsinki, Finland
[2]Istanbul University, Istanbul Faculty of Medicine - Department of Neurology, Istanbul, Turkey

[3]Klinikum Ludwigshafen, Department of Neurology, Ludwigshafen am Rhein, Germany
[4]National and Kapdistrian University of Athen - Attikon University Hospital, Second Department of Neurology, Athens, Greece
[5]Tampere University Hospital, Department of Neuroscience and Rehabilitation, Tampere, Finland
[6]Ernst-Moritz-Arndt University Medicine, Department of Neurology, Greifswald, Germany
[7]Haukeland University Hospital, Department of Neurology, Bergen, Norway
[8]Turku University Hospital University of Turku, Division of Clinical Neurosciences, Turku, Finland
[9]Arcispedale Santa Maria Nuova - IRCCS, Neurology Unit, Reggio Emilia, Italy
[10]Oulu University Hospital, Department of Neurology, Oulu, Finland
[11]Hospital de Santa Maria University of Lisbon, Department of Neurosciences Neurology, Lisbon, Portugal
[12]Sahlgrenska University Hospital, Department of Neurology, Gothenburg, Sweden
[13]Radboud University Medical Center, Donders Institute for Brain - Cognition and Behaviour - Centre for Neuroscience, Nijmegen, The Netherlands
[14]University of Brescia, Department of Clinical and Experimental Sciences - Neurology Clinic, Brescia, Italy
[15]University of Tartu, Department of Neurology and Neurosurgery, Tartu, Estonia
[16]North Estonia Medical Centre, Department of Neurology, Tallinn, Estonia
[17]Justus Liebig University, Department of Neurology, Giessen, Germany
[18]Center for Neurology - Vilnius University, Department of Neurology and Neurosurgery, Vilnius, Lithuania
[19]IdiPAZ Health Research Institute - La Paz University Hospital - Autonoma of Madrid University, Department of Neurology and Stroke Centre, Madrid, Spain
[20]Kuopio University Hospital, Neuro Center, Kuopio, Finland

Background and Aims: Worldwide, ≈1.3 million annual ischemic strokes (IS) occur prematurely in young adults, exhibiting substantial risk for new cardiovascular events and death. Of these strokes, up to 50% can be regarded as cryptogenic or associated with conditions with poorly proven causality, e.g. patent foramen ovale and coagulopathies. Ongoing multicenter case-control SECRETO study (Searching for Explanations for Cryptogenic Stroke in the Young: Revealing the Etiology, Triggers, and Outcome; NCT01934725) aims to provide novel information on stroke mechanisms and prognosis of cryptogenic young-onset IS.
Method: Patients aged 18–49 years, hospitalized due to first-ever imaging-positive IS of undetermined etiology, are enrolled, examined according to a standardized protocol, and followed for ten years. Patients are 1:1 age- and sex-matched to stroke-free controls. Key elements include centralized reading of echocardiography, ECG and neurovascular imaging, and blood samples for genetic and biomarker analysis. Powered to enable initial analyses on clinical risk factors, cardiac features and biomarkers, we aim to have 600 patient-control pairs enrolled by the end of 2018.
Results: As of December 2016, 137 patients (age 40.0 ± 8.2 years) and 91 controls have been recruited, of which 120 and 65, respectively, have undergone both transthoracic and transesophageal echocardiography. TCD bubble screen was performed to 92 patients and 69 controls. Investigational blood samples were obtained from all cases. 121 patients have completed 3-months, 83 patients 12-months, and 42 patients 24-months follow-up.
Conclusion: SECRETO will likely establish novel mechanisms and prognosis of cryptogenic IS in the young, providing also new directions for therapy development for these patients.

AS30-021

ONGOING TRIALS

IMPROVEMENT OF POSTURAL CONTROL AND MOTOR FUNCION BY VOJTA THERAPY IN EARLY REHABILITATION OF STROKE PATIENTS –A PILOT STUDY AND NEW APPROACH IN STROKE REHABILITATION

C. Epple[1], B. Mauer-Burkhard[1], M.C. Lichti[1], J. Schmidt[1] and T. Steiner[1]
[1]Klinikum Frankfurt Höchst/Hospital Frankfurt Höchst, Department of Neurology, Frankfurt am Main, Germany

Background and Aims: Stroke is the major cause for permanent disability in adults. It is still unclear, which physiotherapeutic approaches are most effective. The Vojta therapy is based on a completely different approach - the reflex locomotion. However to date no study has been performed for stroke.
Method: We designed a RCT to compare Vojta and conventional physiotherapy in patients (n = 40) with acute ischemic (AIS) or hemorrhagic stroke (ICH). We include patients with CT or MRI proven -AIS or ICH within 72 h after onset of symptoms, severe hemiparesis (medical research council scale for muscle strength ≤2) and a premorbid modified Rankin Scale ≤3. Main exclusion criteria are aphasia or dementia. Primary endpoint is an improvement of postural control measured with the trunc control test (TCT) on day 9 after admission to the hospital. Secondary endpoints were improvements of neglect and the arm function (measured with motor evaluation scale for upper extremity in stroke patients [MESUPES]).
Results: We present preliminary results after inclusion of 26 patients (n = 13 per group). The Vojta group achieved a mean improvement of 31% in the TCT, of 31% in the neglect test and 26% in the MESUPES, whereas the control group achieved a mean improvement of 3%, 13% and 3%, respectively.
Conclusion: This is the first RCT comparing Vojta-therapy – a new physiotherapeutic approach using reflex locomotion – with conventional therapy. Preliminary results are promising and showed superiority of Vojta compared to conventional physiotherapy by improving postural control, neglect and arm function.

AS30-022

ONGOING TRIALS

STUDY OF ANTITHROMBOTIC TREATMENT AFTER INTRACEREBRAL HAEMORRHAGE (STATICH)

E. Forfang[1], O.M. Rønning[2], E.L. Glader[3], J. Pennlert[3] and E. Berge[1]
[1]Oslo University Hospital, Dept of Int Medicine, Oslo, Norway
[2]Akershus University Hospital, Department of Neurology, Lørenskog, Norway
[3]Norrlands University Hospital, Medicincentrum, Umeå, Sweden

Background and Aims: Little is known about the benefits and harms of using antithrombotic drugs for prevention of ischaemic events in patients who have had an ICH, and guidelines have variably endorsed both starting and avoiding antithrombotic drugs after ICH.
Method: STATICH is an investigator-led, multicenter, randomised-controlled, open, blinded end-point (PROBE) clinical trial comparing two forms of standard care at multiple hospitals in Norway, Sweden and Denmark. We will include 500 patients with spontaneous, primary ICH who have an indication for antithrombotic drug for the prevention of ischaemic events. Patients with an indication for antiplatelet drugs will

be randomised to antiplatelet drugs vs. no antiplatelet drugs. Patients with atrial fibrillation will be randomised to anticoagulants vs. no anticoagulants (i.e. antiplatelet agents is allowed). The primary effect variable is fatal or non-fatal symptomatic ICH. Secondary effect variables include functional outcome, death, intra- and extracranial bleedings and ischaemic events. The patients will be contacted annually for two years, and then at 5 and 10 years.

Results: We will determine:

1. i) the effect of antithrombotic drugs on the risk of recurrent ICH after the acute phase of ICH.
2. ii) whether there is an interaction between the presence of brain microbleeds on MRI and the effect of antithrombotic drugs on the risk of recurrent ICH.

Conclusion: The trial will be ready to start enrollment before the summer 2017.

AS30-023

ONGOING TRIALS

THE EFFECTIVENESS OF PRISM ADAPTATION TO IMPROVE THE SYMPTOMS OF NEGLECT: PRELIMINARY DATA

J. Petioky[1], T. Vilímovský[2] and L. Vondráčková[1]
[1]Rehabilitation Centre Kladruby, Rehabilitation, Kladruby, Czech Republic
[2]First Faculty of Medicine Charles University, Department of Psychiatry, Prague, Czech Republic

Background and Aims: Visual neglect (VN) has been known as one of the most common symptoms after stroke with incidence reported to be as high as 30%. VN has huge impact on rehabilitation outcomes and the quality of life of patients. Controversy exists as to whether prism adaptation (PA) improves the symptoms of neglect. The purpose of this study is to investigate the efficacy of PA in the rehabilitation of neglect in the post-acute stage.

Method: The total of 15 patients of Rehabilitation center Kladruby will receive a 10-session prism adaptation treatment running three times a week, for 30 minutes. There will be no control group. The primary outcome measures will be the Catherine Bergego Sale (CBS) and the Bell Test administered at the beginning and end of treatment. The Nausea Profile will be administered to control for possible adverse treatment effects.

Results: The total of 8 patients have already participated in the study. Analysis revealed a significant reduction of VN symptoms on both measures before and after treatment, Bell Test: $z = 2{,}536$, $p < .01$, CBS: $z = 2{,}375$, $p < .02$, No significant adverse effects have been observed.

Conclusion: The study provided a promising preliminary evidence for the effectiveness of PA in reducing symptoms of VN during the post-acute stage. Further data will be added during the upcoming months.

AS30-024

ONGOING TRIALS

RESTORE BRAIN STUDY: A RANDOMIZED EFFICACY AND SAFETY TRIAL WITH ORAL S 44819 AFTER RECENT ISCHEMIC CEREBRAL EVENT

C. Bassetti[1], H. Chabriat[2], C. Gruget[3] and D. Hermann[4]
[1]Inselspital Bern, Neurology, Bern, Switzerland
[2]Lariboisiere Hospital, Neurology, Paris, France
[3]Institut De Recherches Internationales Servier, Pit Neuropsychiatrie, Suresnes, France
[4]University Of Duisburg-essen, Neurology, Essen, Germany

Background and Aims: S 44819 is a novel competitive antagonist of the GABAA-α5 receptor that significantly improved motor and cognitive recovery after stroke in several preclinical models. Three phase I clinical trials have been conducted in healthy volunteers showing a good safety profile and a suitable PK of the molecule. Furthermore, a Transcranial Magnetic Stimulation study demonstrated that S 44819 reached human cortex and increased corticospinal excitability by reducing GABAA R-mediated inhibition, potentially beneficial for promoting neuroplasticity in post-stroke (Darmani et al, 2016). Based on these observations, S 44819 emerges as a good candidate to enhance functional recovery in patients after an ischemic stroke.

Method: RESTORE Brain is an international, multicentre, randomized, double-blind, placebo-controlled Phase II study. Five hundred and eighty patients are planned to be randomized across 13 countries to S 44819 or placebo.

Patients will be included between 3 and 6 days after the stroke event based on the main following criteria: 1) 18–80 years old without disability prior to stroke, 2) Acute supratentorial cortical ischemic stroke, 3) NIHSS score between 7 and 20.

The primary objective is to assess the efficacy of S 44819 on functional recovery from ischemic stroke measured with the modified Rankin Scale after 90 days of treatment.

Results: The recruitment of this study is ongoing. Results are expected for late 2018.

Conclusion: The study will provide information on the efficacy and the safety of S 44819, a novel competitive antagonist of the GABAA-α5 receptor to enhance functional recovery after an ischemic stroke.

AS30-025

ONGOING TRIALS

SEROTONIN TRANSPORTER GENE VARIATIONS AND SEQUELAE OF STROKE

A.G. Lauritsen[1], K.L. Kraglund[1], S.P. Johnsen[2], H.N. Buttenschøn[3], G. Andersen[1] and J.K. Mortensen[1]
[1]Aarhus University Hospital, Neurological Department, Aarhus, Denmark
[2]Aarhus University Hospital, Department of Clinical Epidemiology, Aarhus, Denmark
[3]Department of Clinical Medicine, Translational Neuropsychiatry Unit, Aarhus, Denmark

Background and Aims: Within the first year after stroke, 30% are diagnosed with post stroke depression (PSD). The aetiology of PSD is multifactorial, but disruption in the serotonergic neurotransmission is important and have implications for mood and cognition.

Citalopram, a selective serotonin reuptake inhibitor (SSRI), is first line treatment for PSD and may have additional positive effects on regeneration after ischaemic lesions. Variations of the serotonin-transporter-linked polymorphic region (5-HTTLPR) in the *SLC6A4* gene result in variable expression of the serotonin transporter with possible implications for prevalence of depressive symptoms as well as SSRI treatment effects.

We studied the association between the 5-HTTLPR, and depressive symptoms and cognitive impairment after acute ischaemic stroke. Further, we investigated the effects of early citalopram treatment on cognitive function and mental health associated to the 5-HTTLPR.

Method: Overall 268 first-stroke patients (60.2% male, median age 69) were included in a randomised, double-blind, placebo-controlled study of citalopram within median 1.4 days after ischaemic stroke. All were genotyped for the 5-HTTLPR genetic variant (Table 1). Baseline characteristics were collected, and the Symbol Digit Modality Test (SDMT) and the WHO-5 Well-being Index were completed at 1 and 6-months follow-up.

Genotype	Distribution (n=268)
S/S	17.2% (n=46)
S/L_G	6.0% (n=16)
S/L_A	46.3% (n=124)
L_G/L_G	0.4% (n=1)
L_G/L_A	6.3% (n=17)
L_A /L_A	23.9% (n=64)

Table 1: Overall genotype distribution

Results: Between-group comparisons will be performed using the Students t-test including odds-ratios.
Conclusion: Development of mental and cognitive sequelae after stroke may be associated to the 5-HTTLPR, which may also affect SSRI treatment effects.

AS30-026

ONGOING TRIALS

IDENTIFICATION AND CHARACTERIZATION OF CIRCULATING IMMUNE CELLS IN CEREBRAL SMALL VESSEL DISEASE : A SVDS@TARGET PROJECT

D. Kerkhofs[1,2], P. Namsolleck[1], J. Staals[1,2], S. Foulquier[1], G. Blair[3], A. Kopczak[4], L. Onkenhout[5], G.J. Biessels[5], J. Wardlaw[3], M. Dichgans[4], E. Biessen[1], R. van Oostenbrugge[1,2] and . on behalf of the SVDs@target group[1]
[1]Maastricht University, CARIM-School for Cardiovascular Disease, Maastricht, The Netherlands
[2]Maastricht University Medical Centre +, Department of Neurology, Maastricht, The Netherlands
[3]University of Edinburgh, Neuroimaging Sciences and Brain Research Imaging Centre, Edinburgh, United Kingdom
[4]Klinikum der Universität München, Institute for Stroke and Dementia Research, Munich, Germany
[5]Brain Center Rudolf Magnus- University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands

Background and Aims: Cerebral small vessel disease (cSVD) is an age- and cardiovascular risk factor related cerebral microangiopathy. cSVD is a major cause of stroke and dementia and yet there is no targeted treatment. An international consortium of mostly European investigators has launched a major collaborative Horizon 2020 research program ("SVDs@target") aimed to elucidate mechanisms and pathways in different forms of SVDs.
As immune processes and vascular inflammation are considered to represent a major underlying mechanism, we will focus in one of the clinical substudies on the identification and characterization of circulating immune cells in sporadic human SVD and to correlate this with BBB permeability, microvascular function and structural MRI markers.
Method: Blood collected from phenotyped patients with sporadic or genetic cSVDs, recruited through the different clinical studies of the SVD@target consortium, will be used to determine the level and distribution profile of immune cells by flow cytometry analysis. Candidate immune cells will then be analysed in more depth for their activation and differentiation status. The identification of specific immune cell populations, their activation state, and functionality will be related to MRI measures such as BBB permeability, cerebrovascular reactivity and structural parenchymal changes. We aim to include at least 150 patients in the next two years.
Results: The study will start in 2017.
Conclusion: Increased understanding of immune-cell-driven mechanism underlying cSVD will likely offer novel entry points for the development of therapeutic approaches.
Funding: EU Horizon2020 (grant agreement No 666881, SVDs@target)

AS30-027

ONGOING TRIALS

IMAGING NEUROVASCULAR, ENDOTHELIAL AND STRUCTURAL INTEGRITY IN PREPARATION TO TREAT SMALL VESSEL DISEASES. THE INVESTIGATE@SVDS STUDY. PART OF THE SVDS@TARGET PROJECT

G. Blair[1], F. Doubal[1], M. Thrippleton[1], M. Stringer[1], I. Hamilton[1], A. Kopczak[2], J. Staals[3], D. Kerkhofs[3], G.J. Biessels[4], R. Van Oostenbrugge[3], M. Dichgans[2], J. Wardlaw[1] and . On behalf of the SVDs@Target Group[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]Klinikum der Universität München- Ludwig-Maximilians-University Munich, Institute for Stroke and Dementia Research, Munich, Germany
[3]Maastricht University Medical Centre +- Maastricht University, Department of Neurology, Maastricht, The Netherlands
[4]Brain Center Rudolf Magnus- University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands

Background and Aims: Cerebral small vessel diseases (SVDs) are a major cause of stroke and dementia, yet there is no targeted treatment. Progress in understanding the mechanisms that drive microvascular dysfunction and brain damage in SVDs has been elusive. Investigate@SVDs is part of a co-ordinated programme to elucidate key mechanisms common to different SVDs, and determine how these mechanisms contribute to individual SVDs (SVDs@Target Project).
Method: 45 patients with sporadic SVD presentations (stroke, vascular cognitive impairment) and 30 patients with CADASIL will be recruited in Edinburgh, Munich and Maastricht. MRI brain scans will assess microvascular function by measuring blood-brain barrier (BBB) permeability using dynamic contrast enhanced MRI, cerebrovascular reactivity (CVR) as determined by BOLD MRI scan response to hypercapnic challenge, perivascular spaces as determined by visual rating and validated automatic methods, and cerebral pulsatility measured by phase contrast MRI. Remote measurement of blood pressure and its variability (BPv) and systemic arterial stiffness (pulse wave velocity) will help understand the systemic circulation's role in the development of brain microvascular dysfunction. Immune cell activity and plasma inflammatory markers will also be quantified.
Results:
Conclusion: Investigate@SVDs will advance our knowledge of SVD pathophysiology by assessing the factors responsible for altered brain microvascular function in SVD. Specifically, it will assess the relationship between increased BBB permeability, decreased CVR, BPv, immune cell function and clinical and structural features of SVD.
The overall aim is to identify novel targets for SVD prevention and therapy where none currently exist.
Funding: EU Horizon2020 (grant agreement No 666881, SVDs@target)

AS30-028

ONGOING TRIALS

BENCHMARKING IN ACUTE STROKE CARE: A NATIONAL REGISTRY IN THE NETHERLANDS

L. Kuhrij[1], M.W.J.M. Wouters[2], R.M. van den Berg-Vos[3], H.F. Lingsma[4], F.E. de Leeuw[5] and P.J. Nederkoorn[1]
[1]AMC, Neurology, Amsterdam, The Netherlands
[2]DICA, DICA, Leiden, The Netherlands
[3]OLVG, Neurology, Amsterdam, The Netherlands
[4]Erasmus MC, Public Health, Rotterdam, The Netherlands
[5]Radboud UMC, Neurology, Nijmegen, The Netherlands

Background and Aims: A cerebral stroke is one of the most common causes of disability and/or death in the world. There is a need to measure and improve the quality of stroke care. By allowing hospitals insight on for instance process indicators such as door-to-needle time or door-to-groin time and comparing it to a national average, variety can be measured and used to improve quality.
Method: Since 2014, 61.994 patients with cerebral infarction and 8.669 with cerebral haemorrhage have been registered in the Cerebrovascular Accident Benchmark (CVAB). This national clinical audit in the Netherlands, in which 77 hospitals are enrolled, uses structure, process and outcome indicators. To make a reliable comparison between hospitals, case-mix factors are applied. Case-mix factors are factors that influence the outcome but are outside the influence of the hospital.
Results: In 2014, a pilot study in five hospitals using a more extensive registry was launched to determine these case-mix factors. Age, severity of stroke (defined as NIHSS) and type of stroke were statistically significant in affecting outcome such as functional status (defined as modified Rankin Scale) and mortality.
Conclusion: In the preceding years the audit registered throughout the chain of stroke care, meaning from start of stroke symptoms to a year after presentation in the emergency room (ER). Simultaneously, developments in acute stroke care such as intra arterial treatment have proved to be beneficial. Therefore, coming this year only data concerning the acute phase of the stroke (up to three months after presentation at the ER) will be gathered.

AS30-029

ONGOING TRIALS

TIMING OF ORAL ANTICOAGULANT THERAPY IN ACUTE ISCHEMIC STROKE WITH ATRIAL FIBRILLATION - A PROSPECTIVE MULTICENTER REGISTRY-BASED NON-INFERIORITY RANDOMIZED CONTROLLED STUDY (TIMING STUDY)

S. Åsberg[1], Z. Hijazi[2], B. Norrving[3], A. Terént[1], P. Öhagen[4] and J. Oldgren[2]
[1]Uppsala University, Department of Medical Sciences/Cardiovascular Epidemiology, Uppsala, Sweden
[2]Uppsala University, Department of Medical Sciences/Cardiology, Uppsala, Sweden
[3]Lund University, Depertment of Clinical Sciences/Neurology, Lund, Sweden
[4]Uppsala University, Uppsala Clinical Research Center/UCR, Uppsala, Sweden

Background and Aims: Non-vitamin K antagonist oral anticoagulants (NOACs) are recommended for the prevention of recurrent acute ischemic stroke (AIS) in patients with atrial fibrillation (AF). Current guidelines do not provide recommendations on best time-point to start anticoagulation therapy (such as NOACs), other as consensus statements. According to our exploratory pre-TIMING study, initiation of NOAC after AIS is highly heterogeneous in Sweden. Our aim is to establish the efficacy and safety of early vs delayed initiation of NOAC in patients with AIS and AF in a register-based randomized controlled trial (RRCT)
Method: The TIMING study is an investigator led, open-label, prospective, multicenter, non-inferiority, randomized controlled study. The Swedish Stroke Register will be used for enrolment, randomization and follow-up of 3000 patients, randomized 1:1, within 72 hours from stroke onset to early ($\leq$4 days) or delayed ($\geq$5–10 days) start of NOAC.
Results: The protocol of the study is available at www.clinicaltrials.gov (NCT02961348). The study is funded by the Swedish Medical Research Council, and will start enrolment of patients during 2017. The primary outcome is the composite of recurrent ischemic stroke, symptomatic intracerebral hemorrhage, or all-cause mortality within 90 days after randomization.
Conclusion: TIMING is the world's 1st RRCT in the stroke field. By the inclusion of a randomization module in the Swedish Stroke Register, the advantages of a prospective randomized study can be combined with the strengths of a national clinical quality register. The concept of RRCT may, beyond the simplified enrolment and follow-up of study patients, also facilitate implementation of clinical trial results to routine practice.

AS30-030

ONGOING TRIALS

ASSOCIATION OF DUAL TRANSCRANIAL ELECTRICAL STIMULATION (TDCS) TO UPPER LIMB ROBOTIC THERAPY IN PATIENTS WITH CHRONIC STROKE

M. Paolucci[1], G. Morone[2], F. Capone[1], G. Musumeci[1], F. Gallinelli[3], E. Mammucari[3], M. Iosa[2], D. Morelli[2], S. Paolucci[2] and V. Di Lazzaro[1]
[1]Campus Bio-Medico University, Neurology, Roma, Italy
[2]IRCCS Fondazione Santa Lucia, Neurorehabilitation, Rome, Italy
[3]University of Rome Tor Vergata, School of Physiotherapy, Rome, Italy

Background and Aims: Interhemispheric balance (i.e. mutual inhibition of cerebral hemispheres) is impaired after stroke.
The study aims to evaluate whether rebalancing interhemispheric inhibition with dual transcranial direct current stimulation (tDCS) (excitatory over lesioned side and inhibitory over healthy side), might enhance response to a robotic treatment.
Method: The study is designed as a double-blind RCT with masked allocation to groups, observing CONSORT guidelines; an intention-to-treat analysis will be conducted.
Patients with first stroke in chronic phase, with paralysis of upper limb, are considered eligible. Recruited patients are randomized into a treatment group, subjected to real dual tDCS (anodic over lesioned side and cathodic over the healthy) of 1–2 mA of intensity for 20 minutes, and into a control group, subjected to sham tDCS with same duration. Real or sham tDCS are administered just before each rehabilitation session (one per day for 10 consecutive days) with ArmeoPower® exoskeleton.
Patients undergo to clinical, kinematic and neurophysiological evaluations before, immediately at the end of the treatment, 1 and 3 months later.
Primary endpoint is to evaluate differences in Fugl-Meyer Assessment - Upper Extremity (FMA-UE) scale.
Secondary endpoints are: i) reduction of the difference in laterality indices of recorded neurophysiological parameters; ii) improvement kinematic parameters recorded by ArmeoPower®.
Results: Will be enrolled 40 subjects per group. Sample size estimation was based on literature data referring to improvement of Fugl-Meyer with robotic therapy.

Conclusion: Registration on ClinicalTrial.gov is ongoing (ID FSLCBM01). We will present data based on the intermediate analysis at one year from the start of enrollment (approximately 20 patients).

AS30-031

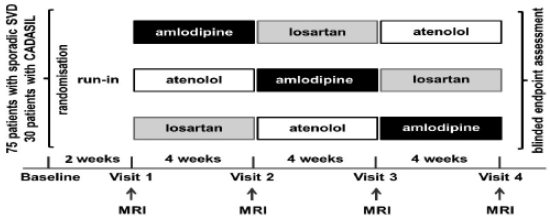
ONGOING TRIALS

EFFECTS OF AMLODIPINE AND OTHER BLOOD PRESSURE LOWERING AGENTS ON MICROVASCULAR FUNCTION IN SMALL VESSEL DISEASES (TREAT-SVDS)

A. Kopczak[1], G. Blair[2], J. Staals[3], D. Kerkhofs[3], A. Webb[4], L. Onkenhout[5], M. Duering[1], P. Rothwell[4], J. Wardlaw[2], G.J. Biessels[5], R. van Oostenbrugge[3], M and Dichgans[1] ; on behalf of the SVDs@target group[1]

[1]Institute for Stroke and Dementia Research, Klinikum der Universität München, Munich, Germany
[2]University of Edinburgh, Neuroimaging Sciences and Brain Research Imaging Centre, Edinburgh, United Kingdom
[3]Maastricht University Medical Centre +, Department of Neurology, Maastricht, The Netherlands
[4]Centre for the Prevention of Stroke and Dementia, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom
[5]Brain Center Rudolf Magnus, Department of Neurology and Neurosurgery, Utrecht, The Netherlands

Background and Aims: Cerebral small vessel disease (SVD) is a major cause of stroke and dementia. High blood pressure (BP) and BP variability (BPv) are prominent risk factors for stroke. Ca^{2+} channel blockers (CCBs) are more efficient than other antihypertensive-drug classes in reducing BPv and stroke risk. We set out to test the hypothesis that the CCB amlodipine has a beneficial effect on microvascular function in symptomatic patients with SVD when compared to either the AT1 receptor blocker losartan or the ß-blocker atenolol.
Method: 105 patients with symptomatic SVD will be enrolled at five European sites. This phase IIIb clinical trial is designed as a prospective randomised open-label 3 sequence crossover trial with blinded endpoint assessment (PROBE-design).



Primary outcome is the cerebrovascular reactivity as determined by BOLD MRI brain scan response to a 6% hypercapnic challenge at the end of the 2 week run-in phase and after 4 weeks of monotherapy while still on medication (see figure). Secondary outcomes include mean systolic BP and BPv assessed by daily telemetric BP monitoring throughout the trial.
Results: -
Conclusion: TREAT-SVDs will provide novel insights into the effects of different BP lowering agents on microvascular function in SVDs.
Funding: EU Horizon2020 (grant agreement No 666881, SVDs@target)

AS30-033

ONGOING TRIALS

ONGOING SECONDARY STROKE PREVENTION STUDY OF DABIGATRAN VERSUS ACETYLSALICYCLIC ACID IN PATIENTS WITH EMBOLIC STROKE OF UNDERTERMINED SOURCE (RE-SPECT ESUS): RATIONALE, DESIGN AND BASELINE DATA

H.C. Diener[1], D. Easton[2], M. Brueckmann[3], L. Cronin[4], C. Grauer[5], D. Cotton[6], C. Granger[7] and R. Sacco[8]

[1]University Hospital Essen, Department of Neurology and Stroke Center, Essen, Germany
[2]University of California–San Francisco, Department of Neurology, San Francisco, USA
[3]Boehringer Ingelheim GmbH & Co. KG, Medicine TA Cardiology, Ingelheim am Rhein, Germany
[4]Boehringer Ingelheim Canada Ltd/Lte, Cardiovascular Therapeutic Area, Burlington, Canada
[5]Boehringer Ingelheim Pharma GmbH & Co. KG, Clinical Operations, Biberach, Germany
[6]Boehringer Ingelheim Pharmaceuticals Inc., Biometrics & Data Management, Ridgefield, USA
[7]Duke Clinical Research Institute, Cardiology faculty at Duke Clinical Research Institute, Durham, USA
[8]University of Miami, Department of Neurology, Miami, USA

Background and Aims: Embolic strokes of undetermined source (ESUS) are non-lacunar infarcts, without relevant arterial stenoses, or cardiac sources with an indication for antithrombotic therapy.
Method: RE-SPECT ESUS, an international, phase III, double-blind, randomized trial comparing dabigatran etexilate 150 mg (or 110 mg twice daily in patients aged ≥75 years or with renal dysfunction) with acetylsalicylic acid 100 mg once daily for secondary stroke prevention in patients with ESUS, began in December 2014. Eligibility criteria include: ESUS diagnosed within 3 months of randomization (6 months in selected patients), modified Rankin Score ≤ 3 and age ≥ 60 years or 18–59 years with ≥one stroke risk factor. The event driven trial is powered to detect superiority (~6000 patients; observation period 0.5–3 years); primary efficacy outcome: time to first recurrent stroke; main safety outcome: time to first major haemorrhage.
Results: By December 12, 2016, 3002 patients had been randomized. Baseline characteristics (table): approximately two thirds male; median time from stroke to study entry 43 days; duration of cardiac monitoring before inclusion: 0–19 hours, 20–47 hours, 48–72 hours and >72 hours in 0.7%, 83.2.%, 5.5%, and 9.7% of patients, respectively (information unavailable in 0.9%).

Table: Baseline characteristics (for subjects enrolled as of 01 December 2016)

Total number of patients, (%)	2922 (100)
Male gender, n (%)	1837 (63)
CHA_2DS_2-VASc score, mean (SD)	4.3 (1.3)
TIA or stroke prior to index event, n (%)	521 (18)
Coronary artery disease, n (%)	247 (8)
LV dysfunction/congestive heart failure, n (%)	39 (1)
Diabetes mellitus, n (%)	648 (22)
History of hypertension, n (%)	2157 (74)
Patent foramen ovale, n (%)	385 (13)

LV, left ventricular; SD, standard deviation; TIA, transient ischaemic attack.

Conclusion: Results will guide physicians to use the most effective antithrombotic treatment for patients with ESUS.

AS30-034

ONGOING TRIALS

ZOOM@SVDS: ZOOMING IN AT MICROVASCULAR MALFUNCTION IN SMALL VESSEL DISEASE WITH 7T MRI

L. Onkenhout[1], A. Kopczak[2], M. Duering[2], M. Dichgans[2], G.J. Biessels[1] and . on behalf of the SVDs@target group[1]
[1]Brain Center Rudolf Magnus- University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands
[2]Institute for Stroke and Dementia Research, Klinikum der Universität München- Ludwig-Maximilians-University, Munich, Germany

Background and Aims: Cerebral small vessel diseases (SVDs) are is a major cause of stroke and dementia. Yet, there is no targeted treatment. High field strength imaging with 7T MRI offers novel possibilities of examining microvascular function in SVDs. Zoom@SVDs is part of a coordinated programme, SVDs@target, to elucidate key mechanisms of SVDs. Our primary objective is to assess which aspects of microvascular function – assessed with 7TMRI - are affected in patients with symptomatic sporadic SVDs (n = 60) and patients with the inherited SVD CADASIL (n = 15), relative to age and sex matched controls (n = 45). Our secondary objectives are to establish how microvascular function relates to other markers of SVD-related brain injury on 3T MRI and cognition.
Method: This is an observational case-control study with two years follow-up.
Results: Main study parameters/endpoints: Measures of microvascular function at 7T MRI that will be compared between patients and controls include: high resolution vascular reactivity in different cortical layers and in the white matter, and mean blood flow velocity and pulsatility index of the cerebral perforating arteries. Cognitive assessment and 3T MRI are performed at baseline and after two years and related to microvascular function at baseline.
Conclusion: Zoom@SVDs will characterize SVDs in terms of microvascular function, thus providing an entirely novel perspective on this condition.
Funding: EU Horizon2020 (grant agreement No 666881, SVDs@target)

AS30-035

ONGOING TRIALS

THE GERMAN STROKE REGISTRY ENDOVASCULAR TREATMENT – AN ACADEMIC, INDEPENDENT, PROSPECTIVE, MULTICENTRE, OBSERVATIONAL REGISTRY

F. Dorn[1] and G. Thomalla[2]
[1]Klinikum der Universität München- Campus Großhadern, Neuroradiology, München, Germany
[2]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany

Background and Aims: Randomized controlled trials have demonstrated effectiveness of endovascular treatment of acute stroke, but it remains to be demonstrated that these results can be reproduced in routine care. Moreover, thrombectomy trials have randomized highly selected patients leaving a number of important clinical questions unanswered, e.g. efficacy and safety of endovascular stroke treatment in the late time window or unknown time of symptom onset stroke, in large ischemic core (low ASPECTS), or in distal vessel occlusion. Registry data of endovascular treatment in routine care may help answer these questions.
Method: The German Stroke Registry (GSR) Endovascular Treatment is an academic, independent, prospective, multicentre, observational registry study. Consecutive patients treated with endovascular stroke treatment will be enrolled in German stroke centers. Patients receive regular care and data will be collected as part of clinical routine. Baseline clinical and procedural information as well clinical follow-up information during in-hospital stay, and up to 90 days of stroke onset are collected. Data collected include demographics, NIHSS on admission, pre-treatment ASPECTS, information on timing and success of interventional treatment, procedural complications, intracranial hemorrhage, and functional outcome.
Results: The registry was established in June 2015. As of 10 January 2017, 712 patients have been included in 14 active sites. The number of participating sites is increasing continuously. First analysis of baseline data will be presented at the conference.
Conclusion: The German Stroke Registry Endovascular Treatment will provide valuable insights into practices, safety, and effectiveness of endovascular treatment in routine care of acute ischemic stroke.

AS30-036

ONGOING TRIALS

MULTICENTRE RANDOMISED TRIAL OF ACUTE STROKE TREATMENT IN THE AMBULANCE WITH A NITROGLYCERINE PATCH (MR ASAP)

S.A. van den Berg[1], N.D. Kruyt[2], J.S.P. van den Berg[3], K. Caminada[4], J. Hofmeijer[5], H. Kerkhoff[6], F.E. de Leeuw[7], H.B. van der Worp[8] and P.J. Nederkoorn[1]
[1]Academic Medical Center, Neurology, Amsterdam, The Netherlands
[2]Leiden University Medical Center, Neurology, Leiden, The Netherlands
[3]Isala Klinieken, Neurology, Zwolle, The Netherlands
[4]RAV IJsselland, Emergency Medicine, Zwolle, The Netherlands
[5]Rijnstate Ziekenhuis, Neurology, Arnhem, The Netherlands
[6]Albert Schweitzer Ziekenhuis, Neurology, Dordrecht, The Netherlands
[7]Radboudumc, Neurology, Nijmegen, The Netherlands
[8]University Medical Center Utrecht, Neurology & Neurosurgery, Utrecht, The Netherlands

Background and Aims: Recent studies have suggested that administration of glyceryl trinitrate (GTN) via a transdermal patch in the first hours after stroke onset increases the chance of a favourable outcome, possibly through an increase in intracranial collateral blood flow and a reduction in blood pressure.
The aim of this trial is to investigate the effect of transdermal GTN, started within 3 hours of stroke onset in the prehospital setting, on functional outcome at 90 days in patients with acute ischaemic stroke or intracerebral haemorrhage.
Method: Phase III multicentre prospective randomised open-label blinded end point (PROBE) trial. Stroke patients with a systolic blood pressure $\geq$140 mmHg and onset of symptoms within 3 hours will be included. A total of 1400 patients will be randomly assigned in the ambulance. The intervention group will receive a transdermal GTN patch 5 mg/day during one day plus standard care. The patch will be applied in the prehospital setting and continued during hospital admission. The control group will receive standard stroke care.
The primary outcome is functional outcome assessed with the modified Rankin Scale at 90 days, analysed with ordinal logistic regression. Predefined subgroup analyses will be performed for intra-arterial treatment and for intravenous thrombolysis.
Results: Expected enrolment 1st patient July 2017.

Conclusion: We will assess whether transdermal GTN administered within 3 hours of symptom onset in the prehospital setting will improve outcome in patients with acute stroke.

AS30-037

ONGOING TRIALS

ALTEPLASE-TENECTEPLASE TRIAL EVALUATION FOR STROKE THROMBOLYSIS (ATTEST 2)

A. Murray[1], K. Muir[1], I. Ford[1], J. Wardlaw[2] and G. Ford[3]
[1]University of Glasgow, Glasgow, United Kingdom
[2]University of Edinburgh, Edinburgh, United Kingdom
[3]Oxford University Hospitals NHS Trust, Oxford, United Kingdom

Background and Aims: Intravenous (IV) thrombolysis with alteplase, the only medical treatment currently approved for acute ischaemic stroke, significantly increases the probability of excellent recovery. Data from small randomised trials suggest that the modified tissue plasminogen activator tenecteplase is potentially superior to IV alteplase, with respect to both safety and efficacy in stroke, in addition to having simpler administration. More data are required to establish the true risk-benefit profile compared with alteplase.
Method: ATTEST-2 will establish whether tenecteplase is superior to alteplase by undertaking a prospective randomised open blinded endpoint (PROBE) trial in patients eligible for IV thrombolysis based on non-contrast CT imaging. 60 UK centres will recruit 1870 patients.
All regulatory approvals are in place. The ATTEST-2 study has been adopted onto the NIHR Clinical Research Network Portfolio. The study opened to recruitment in Dec 2016 at Queen Elizabeth University Hospital, Glasgow. Additional UK sites will be initiated from Feb 2017.
Results: Primary outcome is the distribution of modified Rankin Scale (mRS) outcomes at day 90, determined by the Rankin Focused Assessment method, analysed by ordinal distribution ("shift") analysis of the of scores in intervention and control groups.
Conclusion: An agent with superior risk:benefit ratio to alteplase would potentially extend thrombolytic treatment to a greater proportion of patients than at present and reduce the need for mechanical thrombectomy. This trial will contribute to the optimisation of reperfusion strategies.

AS30-039

ONGOING TRIALS

PRACTISE TRIAL: PENUMBRA AND RECANALISATION ACUTE COMPUTED TOMOGRAPHY IN ISCHAEMIC STROKE EVALUATION

S. El Tawil[1], A. Murray[2], J. Wardlaw[3], L. Kalra[4], I. Ford[5], T.R. Robinson[6], E. Warburton[7], J. Freeman[8] and K. Muir[2]
[1]University of Glasgow, Glasgow, United Kingdom
[2]University of Glasgow, Institute of Neuroscience and Psychology, Glasgow, United Kingdom
[3]University of Edinburgh, Division of Neuroimaging Sciences, Edinburgh, United Kingdom
[4]King's College London, Institute of Psychiatry- Psychology and Neurosciences, London, United Kingdom
[5]University of Glasgow, Robertson Centre for Biostatistics, Glasgow, United Kingdom
[6]University of Leicester, Department of Cardiovascular Sciences- Ageing and Stroke Medicine Group, Leicester, United Kingdom
[7]University of Cambridge, Department of Clinical Neurosciences, Cambridge, United Kingdom
[8]None, None, None, United Kingdom

Background and Aims: The use of multimodal brain imaging, including CTP and CTA provides valuable information on tissue viability and vascular anatomy that may be helpful in patient stratification for revascularisation therapy.
However, it is currently unknown whether benefits from potentially improved patient selection outweigh the disadvantages of additional resource utilisation, radiation and contrast exposure, and treatment delay associated with the use of additional multimodal CT imaging. This study aims to evaluate the effect of additional CT imaging on the number of acute stroke patients treated with IV rtPA and their outcomes.
Method: PRACTISE is a prospective, multicentre randomised controlled trial (RCT).
Patients with acute ischaemic stroke, $\geq$18 years, and clinically eligible for IV rtPA treatment are randomised in a 1:1 ratio to control (NCCT alone) or multimodal CT (CT + CTA + CTP). The primary endpoint is the proportion treated with rtPA. Secondary endpoints evaluate times to decision making, comparison of different image processing software and clinical outcomes at 3 months. Randomisation of up to 400 patients is planned.
Results: By January 2017, nine sites were open for recruitment in the UK with 115 patients recruited. The mean age of patients is 68.5 years, and the median NIHSS is 8.
Conclusion: Understanding the role of CTA and CTP in thrombolysis decision would guide their use in clinical practise. If additional diagnostic testing identifies a subgroup of patients that are more or less likely to respond to treatment and hence influences treatment decisions favourably, then these could be adopted as standard practice.

AS30-040

ONGOING TRIALS

METHAMPHETAMINE-INDUCED INTRACEREBRAL HEMORRHAGE AMONG YOUNG FILIPINO ADULTS AT A TERTIARY HOSPITAL IN THE PHILIPPINES

P. Olarte[1], J. Navarro[2], K.J. Lara[1] and S. Abantas-Diamla[1]
[1]Jose R Reyes Memorial Medical Center, Neurology, Manila, Philippines
[2]Jose R Reyes Memorial Medical Center- St. Luke's Medical Center-University of Santo Tomas Hospital, Neurology, Manila, Philippines

Background and Aims: Strokes occurring in adults aged less than 45 years have incidence rates from 8.7 to 21.02. Intracerebral hemorrhages range between 3.7% and 38.5%. In the Philippines, stroke has a prevalence of 0.9%, with intracerebral hemorrhages (ICH) comprising 30% of affected individuals.
Stroke may be associated to the presence of traditional risk factors, such as diabetes mellitus, hypertension, and obesity in the said groups, but may also be secondary to use of illicit drugs. Amphetamine and methamphetamine have strong sympathicomimetic activity, manifested by angiospasms of peripheral blood vessels and increased heart rate.
This study will attempt to compare the clinical features and outcome of methamphetamine-induced intracerebral hemorrhage (MIICH) against primary hypertensive intracerebral hemorrhage (PICH) among persons aged 45 years and below who had first-ever ICH.
Method: This is a cross-sectional descriptive study which will include patients 45 years old or younger, with intracerebral hemorrhage by neuroimaging, without concomitant vascular risk factors such as hypertension, diabetes mellitus, hypercholesterolemia and etc, admitted to have taken methamphetamine in the past 2 weeks or with urine screening positive for methamphetamine.

Age and sex matched patients with PICH will be compared with MIICH. They should have no history of MAP intake and negative urine MAP.
The following data will be collected from both groups (MIICH and PICH): 1.location of the intracerebral hemorrhage, 2.the size of hematoma, 3.ICH score, 4.NIHSS score, 5. In hospital mortality rates and 6. Modified Rankin Scale at 3 months.
Results: -ongoing-
Conclusion: -ongoing-

AS30-041

ONGOING TRIALS

A MULTICENTRE, RANDOMIZED, DOUBLE-BLIND, PLACEBO-CONTROLLED TRIAL TO TEST EFFICACY AND SAFETY OF MRI-BASED THROMBOLYSIS IN WAKE-UP STROKE (WAKE-UP)

G. Thomalla[1], J.B. Fiebach[2], S. Pedraza[3], R. Lemmens[4], N. Nighoghossian[5], F. Boutitie[6], K. Muir[7], M. Ebinger[2], C.Z. Siemonsen[8], J. Puig[3], B. Cheng[9], M. Endres[2], I. Ford[10], J. Fiehler[11] and C. Gerloff[9]
[1]Germany
[2]Charité Universitätsmedizin Berlin, Neurologie, Berlin, Germany
[3]Institut d'Investgació Biomèdica de Girona IDIBGI, Radiology, Girona, Spain
[4]University Hospitals Leuven, Neurology, Leuven, Belgium
[5]Hospices Civils de Lyon, Neurology, Lyon, France
[6]Hospices Civils de Lyon, Service de Biostatistique, Lyon, France
[7]University of Glasgow, Institute of Neuroscience & Psychology, Glasgow, United Kingdom
[8]Aarhus University hospital, Neurology, Aarhus, Denmark
[9]University Medical Center Hamburg-Eppendorf, Neurology, Hamburg, Germany
[10]University of Glasgow, Robertson Centre of Biostatistics, Glasgow, United Kingdom
[11]University Medical Center Hamburg-Eppendorf, Neuroradiology, Hamburg, Germany

Background and Aims: MRI with a mismatch between the acute ischemic lesion visible on diffusion weighted imaging (DWI) but not on fluid-attenuated inversion recovery (FLAIR) imaging was suggested to identify patients $\leq$4.5 h from symptom onset. WAKE-UP (Efficacy and safety of MRI-based thrombolysis in wake-up stroke: a randomised, double-blind, placebo-controlled trial) aims to test the efficacy and safety of MRI-guided thrombolysis with rtPA in ischemic stroke patients with unknown time of symptom onset.
Method: WAKE-UP is an investigator initiated, European, multicentre, randomized, double-blind, placebo-controlled clinical trial. Patients with unknown time of symptom onset will be studied by MRI. Patients with DWI-FLAIR-mismatch will be randomised to either treatment with rtPA or placebo. The primary efficacy endpoint will be favourable outcome as defined by modified Rankin Scale 0–1 at day 90. The primary safety outcome measures will be mortality and death or dependency as defined by modified Rankin Scale 4–6 at 90 days. WAKE-UP is registered with the EU Clinical Trials Register (EudraCT No. 2011–005906-32) and ClinicalTrials.gov (ClinicalTrials.gov Identifier NCT01525290).
Results: The trial has started in October 2012 and is currently recruiting patients in 8 European countries. Third safety analysis has been performed after 300 patients had completed the trial. No safety concerns have been raised as of yet. An update on the number of active sites and enrollment status will be given.
Conclusion: WAKE-UP is an innovative clinical trial applying novel MRI criteria to identify stroke patients with unknown time of symptom onset likely to benefit from thrombolysis based on the estimation of lesion age.

AS30-042

ONGOING TRIALS

A REDUCTION IN TIME WITH ELECTRONIC MONITORING IN STROKE (ARTEMIS): A RANDOMIZED CONTROLLED TRIAL

G. Koster[1]
[1]Leiden University Medical Center, department of Neurology, LEIDEN, The Netherlands

Background and Aims: For intravenous thrombolysis (IVT) and intra-arterial thrombectomy (IAT) time is the most crucial factor limiting efficacy. The time between the moment the dispatch office is alarmed and initiation of reperfusion therapy, the *'total system delay'* (TSD), depends greatly on logistics and collaboration between caregivers involved in this trajectory. A promising method to reduce TSD is to provide real-time visual feedback to caregivers.
Method: The 'A Reduction in Time with Electronic Monitoring In Stroke' (ARTEMIS) trial is a randomized open end-point trial conducted within three Emergency Medical Services (EMS) regions. All patients considered eligible for IVT/IAT by the dispatch office will receive a Bluetooth wristband enabling electronic tracking. Real-time visual feedback will be provided to caregivers by showing actual treatment delays through premounted handhelds in the ambulance and tablets in hospitals en route to IVT/IAT. Randomization of feedback will be per patient. By including 150 IAT- and 450 IVT-patients we will be able to demonstrate a 20-minute reduction on TSD to IAT and a 10-minute reduction on TSD to IVT. Secondary outcomes comprise proportion IVT/IAT treated patients, clinical outcome after three months, and cost-effectiveness. Predefined subgroup analyses will be performed for IAT patients with- or without prior IVT. To adjust for EMS region and location of treatment we will use linear regression analysis.
Results: Expected enrolment first patient June 2017.
Conclusion: We will assess whether providing caregivers with real-time visual feedback on actual treatment delays will reduce TSD to IAT/IVT.

AS30-044

ONGOING TRIALS

DAWN. DWI OR CTP ASSESSMENT WITH CLINICAL MISMATCH IN THE TRIAGE OF WAKE UP AND LATE PRESENTING STROKES UNDERGOING NEUROINTERVENTION

T. Jovin[1] and R. Nogueira[2]
[1]UPMC, Neurology, Pittsburgh, USA
[2]Emory University School of Medicine, Neurology, Atlanta, USA

Background and Aims: We aim to evaluate whether Trevo thrombectomy leads to superior clinical outcomes at 90 days as compared to medical management alone.
Method: Design: Multi-center, prospective, randomized, controlled, blinded-endpoint, phase II/III (feasibility/pivotal) trial of thrombectomy for wake-up and late presenting AIS that follows an adaptive design based on Bayesian predictive probabilities allowing population enrichment.
Population Studied and Intervention: Subjects presenting 6–24 hours from TLSW with CTA or MRA proven occlusion of the intracranial ICA or MCA-M1 are randomized in a 1:1 ratio to embolectomy vs. medical therapy. Selection is based on clinical imaging mismatch (CIM) and age: 0-$<$21 cc core, NIHSS $\geq$ 10 and age $\geq$ 80; 0- $<$ 31 cc core, NIHSS $\geq$ 10 and age $<$ 80 years old; 31 cc to $<$51 cc core, NIHSS $\geq$ 20 and age $<$ 80. Core is measured with RAPID software on DWI MRI or CT Perfusion. The maximum sample size is 500.

Outcome Measures & Analysis: Primary endpoint: average weighted 90-day mRS. Secondary endpoints: good outcome at 90 days, "early response" at day 5–7, all-cause mortality, median final infarct size, revascularization at 24 hours, sICH.
Results: Trial Status: Enrollment started in September 2014. As of January 2017, a total of 190 subjects have been randomized across 23 centers globally. First efficacy analysis expected when once 200 subjects are enrolled.
Conclusion: This study will help to answer the question of whether the treatment window for endovascular therapy can be expanded in properly selected patients.

AS30-046

ONGOING TRIALS

TENECTEPLASE IN WAKE-UP ISCHAEMIC STROKE TRIAL

M.B. Roaldsen[1], M.H. Søyland[2], M. Jusufovic[3], E.B. Mathiesen[1], A. Tveiten[2], H. Christensen[4], H.K. Iversen[5], J. Petersson[6], E. Lundström[7], J. Putaala[8], J. Kõrv[9], D. Jatuzis[10], D. Werring[11], T. Robinson[12], G.M. Marchis[13], S. Engelter[13], P. Kelly[14] and E. Berge[15]
[1]University of Tromsø- The Arctic University of Norway, Department of Clinical Medicine, Tromsø, Norway
[2]Hospital of Southern Norway, Department of Neurology, Kristiansand, Norway
[3]Oslo University Hospital, Department of Neurology, Oslo, Norway
[4]Bispebjerg Hospital, Department of Neurology, Copenhagen, Denmark
[5]Rigshospitalet, Department of Neurology, Copenhagen, Denmark
[6]Skåne University Hospital, Department of Neurology, Malmö, Sweden
[7]Karolinska Institutet, Department of Clinical Neuroscience, Stockholm, Sweden
[8]Helsinki University Hospital, Department of Neurology, Helsinki, Finland
[9]Tartu University Hospital, Department of Neurology and Neurosurgery, Tartu, Estonia
[10]Vilnius University, Department of Neurology and Neurosurgery-Center for Neurology, Vilnius, Lithuania
[11]UCL Institute of Neurology, UCL Stroke Research Center, London, United Kingdom
[12]University of Leicester, Department of Cardiovascular Sciences, Leicester, United Kingdom
[13]University Hospital of Basel, Department of Neurology, Basel, Switzerland
[14]The Mater University Hospital, Department of Neurology, Dublin, Ireland
[15]Oslo University Hospital, Department of Internal Medicine, Oslo, Norway

Background and Aims: Patients with wake-up stroke have traditionally been considered ineligible for intravenous thrombolytic treatment. Tenecteplase has pharmacological advantages over alteplase, and can be given as a bolus. We are performing a pragmatic, CT-based, randomised-controlled, open trial of tenecteplase for patients with wake-up stroke; the Tenecteplase in Wake-up Ischaemic Stroke Trial (TWIST).
Method: Patients with wake-up stroke <4.5 hours and without evidence of large infarct or proximal artery occlusion will be randomised to tenecteplase 0.25 mg/kg plus standard care or standard care alone. Plain brain CT and CT angiography will be done before randomisation and repeated on day 2. CT perfusion will be done at selected centres. Follow-up will be done at discharge (or day 7) and by telephone at 3 months.
The primary effect variable is functional outcome at 3 months, measured by the modified Rankin Scale.
Results: The target is to include 500 patients from centres in Norway, Sweden, Denmark, Finland, Estonia, Lithuania, UK, Ireland and Switzerland. Start of patient inclusion: January 2017. Planned study period: two years. Study questions to be answered:
1. Can thrombolytic treatment with tenecteplase within 4.5 hours of wake-up improve functional outcome at 3 months?
2. Can findings on CT angiography or CT perfusion identify patients who benefit from such treatment, compared to patients without such findings?
Conclusion: TWIST will show whether patients with wake-up stroke benefit from treatment with tenecteplase within 4.5 hours of awakening, and whether multi-modal CT can be used for selection of patients.

AS30-047

ONGOING TRIALS

RIVAROXABAN FOR SECONDARY PREVENTION IN PATIENTS WITH EMBOLIC STROKES OF UNDETERMINED SOURCE: DESIGN OF THE NAVIGATE ESUS RANDOMIZED TRIAL

X. Jin[1], C. Figueroa[2], H. Chen[3], E. Pudov[4], Y. Yang[5], W. Brola[6], W. Lang[7], R. Bazan[8], T. Tatlisumak[9], C. Molina[10], G. Povedano[11], J. Ferrari[12], A. Firstenfeld[13], T. Kleinig[14], A. Sabet[15], M. Friedrich[16], C. Pater[17], H. Mundl[18], A. Shoamanesh[19] and S. Connolly[20]
[1]Taizhou Hospital of Zhejiang Province, Neurology, Linhai, China
[2]Alta Salud, Neurology, Los Angeles, Chile
[3]General Hospital of Shen-Yang Military Region, Neurology, Shen-Yang, China
[4]City Clinical Hospital №5, Neurology, Nizhny Novgorod, Russia
[5]The First Hospital of Jilin University, Neurology, Changchun, China
[6]Szpital Specjalistyczny im. Św. Łukasza, Neurology, Końskie, Poland
[7]St John of God Hospital, Neurology, Vienna, Austria
[8]Faculdade de Medicina de botucatu – UNESP, Neurology, Botucatu, Brazil
[9]Helsinki University Central Hospital, Neurology, Helsinki, Finland
[10]Hospital Universitari Vall dHebron, Neurology, Barcelona, Spain
[11]Complejo Médico de la PFA Churruca Visca, Neurology, Buenos Aires, Argentina
[12]Hospital Interzonal General de Agudos Eva Perón, Neurology, San Martin, Argentina
[13]Instituto Cardiológico Banfield, Neurology, Banfield, Argentina
[14]Lyell McEwin Hospital, Neurology, Adelaide, Australia
[15]Gold Coast University Hospital, Neurology, Queensland, Australia
[16]Instituto de Medicina Vascular - Hospital Mãe de Deus, Neurology, Porto Alegre, Brazil
[17]Bayer Vital, Cardiovascular and Coagulation, Leverkusen, Germany
[18]Bayer AG, Pharmaceuticals Development- TA Cardiovascular, Wuppertal, Germany
[19]McMaster University/Population Health Research Institute, Medicine Neurology, Hamilton, Canada
[20]McMaster University/Population Health Research Institute, Medicine Cardiology, Hamilton, Canada

Background and Aims: Cryptogenic strokes comprise up to 20% of ischemic strokes. The stroke recurrence rate is substantial with antiplatelet therapy, which is widely used for secondary prevention. The construct of embolic strokes of undetermined source (ESUS) defines a cohort of stroke patients that may respond better to anticoagulation than antiplatelet therapy for secondary stroke prevention.
Main hypothesis: In patients with recent ESUS, rivaroxaban 15 mg once daily will reduce the risk of recurrent stroke (both ischemic and hemorrhagic) and systemic embolism (primary efficacy outcome) compared with aspirin 100 mg once daily.
Method: International, double-blinded, randomized phase III trial comparing rivaroxaban 15 mg once daily with aspirin100mg once daily in

patients with recent ESUS. The planned sample size of 7000 participants will be recruited from approximately 480 sites in 31 countries between 2014 and 2017 and followed for a mean of about two years until at least 450 primary efficacy outcome events have occurred. The study will have 90% power to detect a 30% reduction in the primary outcome by rivaroxaban vs. aspirin.

Results: Participants aged ≥50 years with recent (enrolled between seven days and six months) non-lacunar ischemic stroke visualized on neuroimaging in the absence of relevant extracranial arterial occlusion/stenosis >50%, history/evidence of atrial fibrillation after at least 20 hours of cardiac monitoring, intracardiac thrombus on echocardiography, or other identified stroke etiology are eligible.

Conclusion: NAVIGATE ESUS is likely to be a landmark clinical trial impacting clinical management of large numbers of patients with cryptogenic ischemic stroke attributed to embolism (Clinicaltrials.gov.NCT02313909).

AS30-048

ONGOING TRIALS

COLCHICINE FOR PREVENTION OF VASCULAR INFLAMMATION IN NON-CARDIOEMBOLIC STROKE (CONVINCE)

S. Coveney[1], S. Murphy[2], C. Lynch[3], K. Tobin[3], M. Kiely-Donnelly[3], R. Lemmens[4], D. Williams[5], M. O'Donnell[6], J. Forbes[7], L. Daly[8], C. Price[9], G. Tsivgoulis[10], F. Purroy[11], P. Sandercock[12], C. Walsh[13] and P.J. Kelly[14]

[1]University College Dublin HRB/Mater Misercordiae University Hospital, Stroke Clinical Trials Network Ireland, Dublin, Ireland
[2]Mater Misercordiae University Hospital, Stroke Medicine, Dublin, Ireland
[3]University College Dublin, Stroke Clinical Trials Network Ireland, Dublin, Ireland
[4]UZ Leuven, Stroke Medicine, Leuven, Belgium
[5]RCSI/Beaumont University Hospital, Medicine for the Older Person, Dublin, Ireland
[6]NUI Galway, Translational Medicine, Galway, Ireland
[7]University Of Limerick, Health Economics, Limerick, Ireland
[8]University College Dublin, CSTAR, Dublin, Ireland
[9]Newcastle University, Stroke Medicine, Newcastle, United Kingdom
[10]University of Athens, Stroke Medicine, Athens, Greece
[11]Hospital U. Arnau de Vilanova, Stroke Medicine, Barcelona, Spain
[12]University of Edinburgh, Stroke Medicine, Edinburgh, United Kingdom
[13]University of Limerick, Statistics, Limerick, Ireland
[14]HRB Stroke Clinical Trials Network- UDC/Mater Misercordiae University Hospital, Department of Neurology/Stroke Medicine, Dubline, Ireland

Background and Aims: Stroke is a leading cause of death globally. Despite recent advances in secondary prevention, significant residual risk remains. A recent meta-analysis found a recurrent stroke risk of 11.1% at 1 year and 26.4% at 5 years. Vascular inflammation is likely involved in modulating recurrent vascular event risk. To date howver, no trial has focused on stroke patients in this context.

Method: CONVINCE is a prospective open-label blinded endpoint assessment (PROBE) clinical trial of low-dose colchicine for secondary prevention after stroke or high risk transient TIA. This is the first Irish investigator initiated randomized trial undertaken by the Stroke Clinical Trials Network Ireland. The first patient was enrolled in December 2016. Initially 5 centers in Ireland will begin enrolling followed by collaborating centers in the UK, Spain, Belgium and Greece. Further trial expansion in Ireland and Europe will follow, aiming to achieve a trial enrollment of 2,623patients.

Enrollees will be >40 years with ischemic stroke or high risk TIA, with onset between 72 hours and 28 days, where the event mechanism is probably other than cardio-embolism or other specified cause. The trial will compare low dose colchicine 0.5 mg OD plus usual care-vs-usual care.

Primary end-point will be time to independently adjudicated non-fatal recurrent ischemic stroke, myocardial infarction, cardiac arrest, unstable angina or vascular death.

Results: Interim results will be presented

Conclusion: It is hoped that a robust and dynamic Stroke Clinical Trials Network will become established and lead to the successful completion of this and other important randomized controlled trials in Ireland

AS30-049

ONGOING TRIALS

PENUMBRAL RESCUE BY NORMOBARIC OXYGEN ADMINISTRATION IN PATIENTS WITH ACUTE ISCHEMIC STROKE AND TARGET MISMATCH PROFILE (PROOF)

S. Poli[1], J.C. Baron[2], R. Lemmens[3], P. Michel[4], R. Mikulik[5], C. Molina[6], D. Strbian[7], T. Tatlisumak[8], G. Turc[2], J. Fiehler[9], H. Graessner[10], J. Hüsing[11], J. Montaner[12], G. Randall[13], S. Siemonsen[9], M. Dichgans[14], A. Singhal[15], R. Veltkamp[16] and F. Härtig[1]

[1]Tuebingen University Hospital, Department of Neurology & Stroke- and Hertie Institute for Clinical Brain Research, Tuebingen, Germany
[2]University Paris Descartes, INSERM U894/Centre for Neurosciences and Psychiatry- and Department of Neurology- Centre Hospitalier St. Anne, Paris, France
[3]KU Leuven - University of Leuven, Department of Neurosciences-Experimental Neurology- University Hospitals Leuven- Department of Neurology, Leuven, Germany
[4]Centre Hospitalier Universitaire Vaudois CHUV and University of Lausanne, Stroke Center- Neurology Service, Lausanne, Switzerland
[5]St. Anne's University Hospital, Comprehensive Stroke Center-Neurology Department, Brno, Czech Republic
[6]Vall d'Hebron University Hospital, Stroke Unit, Barcelona, Spain
[7]Helsinki University Central Hospital, Department of Neurology, Helsinki, Finland
[8]University of Gothenburg, Sahlgrenska University Hospital, Gothenburg, Sweden
[9]University Medical Center Hamburg-Eppendorf, Eppdata and Neuroradiology, Hamburg, Germany
[10]Tuebingen University Hospital, Rare Disease Centre Tuebingen and Institute of Medical Genetics and Applied Genomics, Tuebingen, Germany
[11]University Hospital Heidelberg, Center for Clinical Trials Heidelberg, Heidelberg, Germany
[12]Fundacio Hospital Universitari Vall d'Hebron, Institut de Recerca VHIR, Barcelona, Spain
[13]Stroke Alliance For Europe, SAFE, London, United Kingdom
[14]Klinikum der Universität München- Ludwig-Maximilians-University Munich, Institute for Stroke and Dementia Research, Munich, Germany
[15]Harvard Medical School, Massachusetts General Hospital, Boston, USA
[16]Imperial College London, Stroke Medicine, London, United Kingdom

Background and Aims: Despite effective reperfusion therapies, outcome following ischemic stroke (IS) often remains poor. Shortly after IS onset, the already necrotic area is surrounded by the severely hypoperfused but still viable penumbra. Sustaining the latter may widen treatment time windows and improve outcomes. As tissue damage in IS is primarily mediated by hypoxia, increasing penumbral oxygen (O2) supply seems a logical approach. Normobaric hyperoxygenation (NBHO) increased penumbral O2 and attenuated brain injury when initiated early in

animal models of transient vessel occlusion. PROOF will adapt these insights in a clinical trial.

Method: Multi-center, randomized phase-II proof-of-concept trial studying NBHO adjunct to standard IS treatment; adaptive patient sample size of 180 to 460 depending on interim analysis. Eligibility: Patients with an acute proximal vessel occlusion in the anterior circulation and target mismatch profile on imaging. Study treatment must be initiated prior to recanalization therapy and within three hours after IS onset. NBHO is achieved by administration of high-flow O2 via non-rebreather facemask or FiO2 of 1.0 during mechanical ventilation. NBHO will be stopped after successful mechanical thrombectomy or applied for a maximum of six hours in case of not-attempted thrombectomy or insufficient reperfusion. Controls will receive standard O2 supplementation whenever required. Primary Endpoint: Infarct growth from baseline to 24 hours; key secondary endpoint: Δ24 h-NIHSS.

Results: n/a

Conclusion: PROOF is the first clinical trial to incorporate two cornerstones of effective experimental NBHO: early initiation and fast reperfusion. If proven beneficial, phase-III trials may be undertaken. Considering its low cost, NBHO may impact stroke care worldwide.

AS30-050

ONGOING TRIALS

EXTENDING THE TIME FOR THOMBOLYSIS IN EMERGENCY NEUROLOGICAL DEFICITS (EXTEND) – CLINICAL CHARACTERISTICS AMONG AUSTRALASIAN AND TAIWANESE PATIENTS

H. Ma[1], B. Campbell[2], M. Parsons[3], C. Levi[3], L. Churilov[4], A. Meretoja[2], C. Hsu[5], S. Davis[2] and G. Donna[6]

[1]Monash Health, Neurology, Clayton, Australia
[2]Royal Melbourne Hospital, Neurology, Melbourne, Australia
[3]University of Newcastle, Medicine, Newcastle, Australia
[4]Florey Neuroscience and Mental Health Research Institutes, Statistics, Melbourne, Australia
[5]China Medical University Hospital, Medicine, Taichung, Taiwan R.O.C.
[6]Florey Neuroscience and Mental Health Research Institutes, Neurology, Melbourne, Australia

Background and Aims: EXTEND is an ongoing randomised, double-blind, placebo-controlled Phase III trial of intravenous alteplase vs. placebo among patients with ischemic stroke 4.5–9 hours from stroke onset or wake-up-stroke (WUS). There is uncertainty about clinical characteristic differences between patients from Australasia and Taiwan in these extended time windows.

Objective: To determine the clinical characteristics among EXTEND randomised patients for Australasia and Taiwan.

Method: Patients with ischemic stroke within 4.5–9 hours from stroke onset and WUS patients (time of WUS onset defined as the midpoint between time to sleep and awakening with the stroke symptoms) are eligible for enrolment. Patients must fulfil the advanced imagining criteria to ensure the presence of ischemic penumbra.

Results: 165 patients (140 from Australasia, 25 from Taiwan) have been randomised to date. The median height of Australasian and Taiwanese patients were 165.0 cm (157.8, 175.0 cm) and 164 cm (158,169 $p = 0.38$), and weight 80 kg (76.0,85.3 kg) and 63 kg (55.6, 70.5 kg $p = 0.002$) respectively. For the Australasian and Taiwanese cohort the median age were 77yo (66, 82) and 73 (61, 78 $p = 0.04$), the percentage of atrial fibrillation was 40% and 24% ($p = 0.22$), hypertension 72% and 56% ($p = 0.14$), history of transient ischemic attack 17.4% and 8.0% ($p = 0.14$), hyperlipidemia 50.7% and 24% ($p = 0.15$), diabetes 15.9% and 32% ($p = 0.01$).

Conclusion: Within the EXTEND cohort, Taiwanese patients are younger, have lower body weight and higher rate of diabetes.

AS30-051

ONGOING TRIALS

ATRIAL FIBRILLATION IN CRYPTOGENIC STROKE - THE NORDIC ATRIAL FIBRILLATION AND STROKE STUDY (NOR-FIB)

A.T. Lambert[1], B. Ratajczek-Tretel[1], D. Russell[2], B. Halvorsen[3], E.C. Sandset[4], H. Næss[5], H. Tobro[6], T. Idicula[7], T.C. Truelsen[8], K.L. Ægidius[9], C. Kruuse[10], H. Ihle-Hansen[11], G. Hagberg[12], R. Salvesen[13], C. Jonassen[14], W. Ganima[15] and A.H. Aamodt[2]

[1]Østfold Hospital Trust, Neurology, Kalnes, Norway
[2]Oslo University Hospital Rikshospitalet, Neurology, Oslo, Norway
[3]Oslo University Hospital- University of Oslo, Research Institute of Internal Medicine- Institute of Clinical Medicine-, Oslo, Norway
[4]Oslo University Hospital, Neurology, Oslo, Norway
[5]Haukeland University Hospital, Neurology, Bergen, Norway
[6]Telemark Hospital, Neurology, Skien, Norway
[7]Vestfold Hospital, Neurology, Tønsberg, Norway
[8]Rigshospitalet University Hospital, Neurology, Copenhagen, Denmark
[9]Bispebjerg University Hospital, Neurology, Copenhagen, Denmark
[10]Herlev University Hospital, Neurology, Copenhagen, Denmark
[11]Vestre Viken Hospital Trust- Bærum Hospital, Internal Medicine, Bærum, Norway
[12]Vestre Viken Trust- Bærum Hospital, Internal Medicine, Bærum, Norway
[13]Nordlandssykehuset, Neurology, Bodø, Norway
[14]Østfold Hospital Trust, The Laboratory Centre, Kalnes, Norway
[15]Østfold Hospital Trust, Research Centre, Kalnes, Norway

Background and Aims: Data from real-life studies and randomized controlled trials have shown a detection rate of paroxysmal atrial fibrillation (AF) of 10–20% in patients with cryptogenic stroke using insertable continuous cardiac monitoring for 6 months. More studies are needed to identify factors which can be used to select the patients where the possibility of detecting AF with prolonged rhythm monitoring is highest, to evaluate the best duration of rhythm monitoring and to determine the optimal definition of short-term AF that warrants intervention.

The aims of the NOR-FIB Study:

1. To assess the incidence of AF detection using insertable cardiac monitoring in patients with cryptogenic stroke/TIA.
2. To assess biomarkers that can be used to identify patients with cryptogenic stroke/TIA patients where AF is more likely to be detected by prolonged ECG monitoring.

Method: This study is an ongoing prospective multi-center observational study on patients with cryptogenic stroke/TIA who will be observed with insertable cardiac monitoring (Reveal LINQ®), biomarkers and clinical follow-up for 12 months.

Results: The results from the pilot study and the preliminary results of the main study will be presented.

Conclusion: This study will increase our knowledge regarding the occurrence of AF in patients with cryptogenic stroke and TIA. The study will provide information on biomarkers that may be used to select patients with cryptogenic stroke or TIA for long-term cardiac rhythm monitoring as well as information on the significance of short-term AF and optimal duration of cardiac rhythm monitoring.

AS30-052

ONGOING TRIALS

LONGITUDINAL STUDY OF YOUNG PATIENTS WITH EMBOLIC STROKE OF UNDETERMINED SOURCE (ESUS)

K. Perera[1] and R. Hart[1]
[1]McMaster University, Medicine Neurology, Hamilton, Canada

Background and Aims: There is persuasive evidence that most cryptogenic strokes (i.e. of unknown cause) are thromboembolic. Accordingly these strokes are now described as Embolic Stroke of Undetermined Source (ESUS) a new clinical construct that was recently introduced, and is the basis for two ongoing large randomized clinical trials. Even though these trials are likely to provide us with valuable information on older ESUS patients there will be a gap in the knowledge of the Young-ESUS (<50years) patients due to the respective trial designs.
We seek to determine the clinical characteristics of Young-ESUS patients and to determine the rates of stroke recurrence, death and hospital in this Young-ESUS registry project.
Method: Data will be collected from 500–1000 Young-ESUS patients from 100 stroke research centers from different global regions. Patients will be followed prospectively every 6months up to 18months via telephone to determine outcomes.
Results: We aim to describe characteristics of Young-ESUS patients including antithrombotic therapy used and rates of recurrent stroke and death and predictors of these factors and to determine rates of new onset AF in this cohort.
Conclusion: Following the completion and publication of ESUS related trials, clinical interest in the ESUS construct will increase exponentially. ESUS would become part of daily management of stroke patients. By available estimates 15–20% ESUS patients will be <50years and not included in these trials. There will be intense clinical interest in knowing how Young-ESUS patients compare to older ESUS cohorts. The Young-ESUS registry will provide unique insights that would likely influence clinical practice and even guidelines.

AS30-053

ONGOING TRIALS

THE EFFECTIVENESS OF UPPER LIMB TRAINING WITH ROBOTIC GLOVE FOR STROKE SURVIVORS WITH MODERATE TO SEVERE UPPER LIMB DISABILITY: PRELIMINARY RESULTS

J. Petioky[1], L. Bissolotti[2], K. Hoidekrová[1], P. Zuccher[2], D. Migliarini[2], P. Gaffurini[2] and M. Zatloukalova[1]
[1]Rehabilitation Centre Kladruby, Rehabilitation, Kladruby, Czech Republic
[2]Rehabilitation Service- Teresa Camplani Foundation - Domus Salutis Clinic, LARIN: Laboratory of Neuromuscular Rehabilitation and Adapted Physical Activity, Brescia, Italy

Background and Aims: Recovery of upper limb function after stroke is still one of the major heats for clinicians involved in the rehabilitation process. The acute to subacute phase after stroke is the optimal time window to promote the recovery. The current study concerns an approach to address this shortcoming, through evaluation of the Gloreha Idrogenet® (GI), a robotic device that enables intensive and repetitive practice of hand and fingers by stroke survivors with moderate to severe upper limb impairment.
Method: Participants are adult stroke survivors (>18 years) with a primary diagnosis of first-ever unilateral stroke (ischaemic, haemorrhagic, subarachnoid haemorrhage) less than four months previously, confirmed radiographically or clinically. Participants will receive at least 20 sessions lasting 30minutes of robotic therapy through (GI), and at least 60 minutes of usual physiotherapy for five days per week for four weeks
Results: Motor Assessment Scale items 7 (hand movements) (0.8 ± 1.2 vs 2.2 ± 2.5, $p < 0.05$) and 8 (advanced hand activities) (0.3 ± 1.6 vs 1.5 ± 2.0, $p < 0.05$) has been performed to monitor for any carryover improvement in hand function at the post intervention time period and at follow up (4 weeks). The Box and Block showed a significant improvement after the intervention (1.2 ± 5.3 vs 8.0 ± 10.9, $p < 0.05$). According to Motricity Index we registered an improvement in pinch (10.2 ± 11.3 vs 16.7 ± 10.1, $p < 0.05$) and elbow flexion (13.2 ± 8.5 vs 17.4 ± 8.5, $p < 0.05$).
Conclusion: Gloreha Idrogenet® has been easily introduced in the clinical setting during subacute rehabilitation phase of post-stroke patients. The robotic device contributed to maintain under control spasticity and promoted hand and fingers motor recovery.

AS30-054

ONGOING TRIALS

DIAGNOSTIC VALUE OF VIDEOOCULOGRAPHY-BASED HINTS PLUS EXAM IN ACUTE VESTIBULAR SYNDROME: AN ONGOING STUDY

C. Tischer[1], L.P. Pallesen[1], V. Puetz[1], J. Barlinn[1], S. Timo[1] and K. Barlinn[1]
[1]Universitätsklinikum C.G. Carus Dresden, Neurology, Dresden, Germany

Background and Aims: The HINTS plus examination (horizontal head impulse test, assessment of nystagmus, skew deviation and hearing loss) has been recently introduced as beside test to rule out vertebrobasilar stroke in patients at increased cerebrovascular risk presenting with acute vestibular syndrome (AVS). We aimed to define the diagnostic value of HINTS plus in unselected AVS patients and to assess its diagnostic accuracy with and without videooculography.
Method: We performed an interim analysis of an ongoing prospective study in consecutive patients with AVS presenting to our neurology emergency department. HINTS plus examination was independently undertaken by neurologists using conventional and videooculography-based head impulse test in a randomized sequence. Caloric vestibular testing and brain magnetic resonance imaging were performed to identify peripheral or central causes of AVS. We projected a total sample of 62 patients to detect a difference in diagnostic accuracy between videooculography-based and conventional HINTS plus.
Results: We present data from 11 patients (73% men, 66 ± 14 years, median NIHSS 0). Median elapsed times between onset of AVS and MRI was 1 (range, 3) day. An indication of centrally mediated AVS was found in 9 patients using conventional and in 10 patients using videooculography based HINTS plus. Only in 1 patient a central lesion (acute pontine infarction) plausibly accounting for AVS was found on MRI with pathological findings in both HINTS plus approaches.
Conclusion: Our preliminary analysis indicates a low association between abnormal HINTS plus findings and causative MRI lesions independently of whether videooculography was employed. However, all limitations of an interim analysis apply.

AS15-002

PATHOPHYSIOLOGY OF STROKE

ANTIPHOSPHOLIPID ANTIBODIES; A RISK FACTOR FOR STROKE IN YOUNG

M. Zaletel[1], N. Gašperšič[2], A. Ambrožič[2], J. Kobal[1] and B. Žvan[1]
[1]University Clinical centre Ljubljana, depatment of Vascular neurology, Ljubljana, Slovenia
[2]University Clinical centre Ljubljana, depatment of Reumatology, Ljubljana, Slovenia

Background and Aims: BACKGROUND: Testing for antiphospholipid antibodies could be an important part in determining the cause of a cerebrovascular event (CVE). Primary was to determine the frequency of patients experiencing a CVE and fulfilling the laboratory criterion for an antiphospholipid syndrome (APS) or probable APS (being persistently positive for antiphospholipid antibodies, not yet included in APS criteria). The second was to investigate whether the persistent presence of antiphospholipid antibodies represented a risk factor for a CVE. We also focused on the efficacy of the selected treatment strategy in the first year after the CVE.
Method: METHODS: Eighty-nine patients with an acute CVE were prospectively followed for one year. In the comparative group, there were 25 patients with migraine and 20 patients with Huntington's disease. At least two sera from each were tested for lupus anticoagulants, anti-cardiolipin, anti-β2 glycoprotein I, anti-phosphatidylserine/prothrombin and anti-annexinV antibodies.
Results: RESULTS: 20/89 (22%) of CVE patients fulfilled criteria for APS (17/20 for definitive and 3 for probable APS). The cause of the CVE could be subsequently explained as APS in 16% of the patients with the formerly unexplained CVE. There was a significant association between the persistently present antiphospholipid antibodies and the CVE (OR 4.62). Being treated mainly with acetyl salicylic acid, no statistically significant difference was found in the CVE recurrence rate between APS-CVE and non-APS-CVE patients.
Conclusion: CONCLUSIONS: Antiphospholipid antibodies represent an independent risk factor for CVE. For the first year after the CVE, antiplatelet therapy seems to be sufficient in secondary CVE thromboprophylaxis in most APS patients.

AS15-005

PATHOPHYSIOLOGY OF STROKE

THE EXPRESSION OF BRAIN DAMAGE BIOCHEMICAL MARKERS IN POST-STROKE HYPERGLYCEMIA. THE GLIAS-2 STUDY

B. Fuentes[1], M. Gutiérrez Fernández[1], L. Otero-Ortega[1], M. Alonso de Leciñana[1], B.E. Sanz-Cuesta[1], R. Madero-Jarabo[2], P. Martínez-Sánchez[1], R. Delgado-Mederos[3], J. Gállego-Cullere[4], M. Martínez-Zabaleta[5], M. Freijo[6], J.C. Portilla[7], A.C. Gil-Núñez[8] and E. Díez-Tejedor[1]
[1]University Hospital La Paz, Neurology, Madrid, Spain
[2]University Hospital La Paz, Biostatistics, Madrid, Spain
[3]Santa Creu I Sant Pau Hospital, Neurology, Barcelona, Spain
[4]Navarra General Hospital, Neurology, Pamplona, Spain
[5]Donostia Hospital, Neurology, San Sebastián, Spain
[6]Basurto Hospital, Neurology, Bilbao, Spain
[7]San Pedro de Alcántara Hospital, Neurology, Cáceres, Spain
[8]Gregorio Marañón University Hospital, Neurology, Madrid, Spain

Background and Aims: To investigate the expression of several brain damage biomarkers that could be associated with hyperglycaemia in patients with acute ischemic stroke.
Method: Secondary analysis of the GLIAS-2 study selecting those patients participating in the biomarkers substudy. We collected blood samples within the first 24 h from stroke onset and at 72–96 h analysing the levels of IL6, IL4, IL10, TNF-a, PAI-1, VCAM-1, ICAM-1, MMP9 and Anexin V, comparing them according to the development of glucose levels $\geq$155 mg/dL and to the administration and response to corrective treatment: (1) untreated and maximum glucose levels $<$155 mg/dL; (2) treated and good responders (glucose levels persistently $<$155 mg/dL); (3) treated and non-responders (any glucose value $\geq$155 mg/dL during the 24 h after the start of corrective treatment); and (4) untreated with any glucose value $\geq$155 mg/dL.
Results: 174 patients; 79 (45,9%) with glucose levels $\geq$155 mg/dl. They had more frequently prior diagnosis of DM and of metabolic syndrome and had a higher mortality (14.7% vs. 5.5%; $P < 0.05$). No significant differences were found in the expression of any of the biomarkers analysed at the first 24 hours neither than at 72–96 h in the comparison with patients with glucose levels $<$155 mg/dl neither than according to the administration and response to corrective treatment.
Conclusion: No differences in the expression of any of the analysed biomarkers addressing inflammation, prothrombosis, blood-brain barrier damage, endothelial dysfunction, and neuronal death was found to be related to poststroke hyperglycaemia neither than to the response to corrective treatment.

AS15-006

PATHOPHYSIOLOGY OF STROKE

WIP1 PHOSPHATASE PLAYS A CRITICAL NEUROPROTECTIVE ROLE IN BRAIN INJURY INDUCED BY LPS COMBINED WITH HYPOXIA

L. Zhu[1]
[1]Beijing Institute of Basic Medical Sciences, Department of Cognitive Science, Beijing, China

Background and Aims: WIP1 (wild-type p53-induced phosphatase 1) has been shown to suppress NF-κB signaling via dephosphorylating the p65 subunit of NF-κB, and NF-κB is well-known as a crucial regulator of inflammation. The hypoxic environment often aggravates the severity of inflammation and induces brain injury as a consequence. However, the pathological roles of WIP1 in inflammation occurring during hypoxia and the subsequent brain injury were unknown.
Method: Here, we established a mouse model by using LPS plus hypoxia to mimic hypoxic inflammation-induced brain injury of injury and WIP1 deficiency mouse were used
Results: Our results showed that WIP1 deletion leads to augmented IL-6, TNF-α, and IL-1β release in the peripheral circulation as well as in brain tissues after LPS plus hypoxia, In addition, the anti-inflammatory cytokine IL-10 level in brain is comparable in WT and WIP1-KO mice after acute hypoxia plus LPS (Lipopolysaccharide). We also noted that, unlike in the brain tissue, the level of IL-10 in WIP1-KO mouse serum was significantly higher than in the WT after acute hypoxia plus LPS. Here, we found that WIP1 deficiency augmented the release of inflammatory cytokines in the peripheral circulation and brain tissue, increased the numbers of activated microglia/macrophages in the brain, aggravated cerebral histological lesions, and exacerbated the impairment of motor and cognitive abilities.
Conclusion: Collectively, these results provide the first *in vivo* evidence that WIP1 play a critical neuro-protection against hypoxic inflammation-induced brain injury.

AS15-008

PATHOPHYSIOLOGY OF STROKE

HIGH TORTUOSITY OF INTRACRANIAL ARTERY MAY BE ASSOCIATED WITH HIGH PREVALENCE OF INTRACRANIAL ATHEROSCLEROSIS IN ASIAN PATIENTS

B. Kim[1] and J. Kim[2]
[1]Kyung Hee University, Neurology, SEOUL, Republic of Korea
[2]Asan Medical Cener, Neurology, Seoul, Republic of Korea

Background and Aims: Intracranial atherosclerosis is more frequently observed in Asian ischemic stroke patients. As the location of atherosclerosis is influenced by the geography of the cerebral arteries, we have aimed to compare the tortuosity of intracranial artery between Asians and Caucasian subjects.
Method: Non-Korean subjects who visited a health promotion center were screened. Among them Caucasian subjects who underwent time-of-flight magnetic resonance angiography (TOF-MRA) was included. Age and sex matched Korean subjects who underwent TOF-MRA most closely to the matched foreign subject were included. The tortuosity and average curvature (arc/chord ratio) of middle cerebral and basilar arteries were automatically measured in a 3-dimensional method. Clinical factors, average curvature and tortuosity were compared between Korean and Caucasian subjects.
Results: Fifth-five Caucasian subjects and age- and sex matched 55 Korean subjects were compared. The mean age of enrolled subjects was 60.6 years-old, and 27 subjects (49%) were male. There was no difference in terms of risk factors between Korean and Caucasian subjects. Average curvature was higher in Korean subjects than that of Caucasian subjects (0.89 ± 0.22 vs. 0.80 ± 0.21, respectively; $p = 0.042$). Furthermore, the tortuosity of BA was higher in Korean subject than that of Caucasians (1.14 ± 0.12 vs. 1.10 ± 0.08, respectively; $p = 0.028$). There was no significant difference in the geometrical properties of middle cerebral arteries between Korean and Caucasian subjects. High average curvature was independently associated with Asian subjects (OR = 7.303; $p = 0.037$).
Conclusion: High tortuosity of intracranial arteries may be associated with the high prevalence if intracranial atherosclerosis in Asians

AS15-010

PATHOPHYSIOLOGY OF STROKE

VARIANT DISTRIBUTIONS OF VASA VASORUM AMONG INTRACRANIAL ARTERIES AND EFFECTS ON ATHEROSCLEROSIS MORPHOLOGY: A POSTMORTEM STUDY

L. ZHENG[1], W.J. Yang[1], M. Fisher[2], C.B. Niu[3], H.L. Zhao[4], H.K. Ng[5], K.S. Wong[6] and X.Y. Chen[6]
[1]Chinese University of Hong Kong, Department of Medicine and Therapeutics, Shatin-, Hong Kong S.A.R.
[2]University of California Irvine, Departments of Neurology and Pathology & Laboratory Medicine, Irvine, USA
[3]China-Japan Union Hospital Affiliated to Jilin University, Department of Pathology, Jilin, China
[4]Guilin Medical University, Center for Diabetic Systems Medicine, Guilin, China
[5]Chinese University of Hong Kong, Department of Anatomical and Cellular Pathology, Shatin-, Hong Kong S.A.R.
[6]Chinese University of Hong Kong, Department of Medicine and Therapeutics, Shatin, Hong Kong S.A.R.

Background and Aims: Vasa vasorum (VV), which constitutes a network of microvasculature, plays a nutritive and drainable role in vessel walls of arteries. There have been conflicting data about the existence of vasa vasorum within brain vasculature. Based on a series of cerebral artery specimens, we aimed to describe the distribution features of vasa vasorum among intracranial arteries, including middle cerebral arteries (MCAs), basilar arteries (BAs) and vertebral arteries (VAs) and potential effects of vasa vasorum on atherosclerosis morphology.
Method: MCA, BA, VA samples were obtained from consecutively recruited 32 autopsy cases aged 45 years or above. Routine and immunostaining were performed to identify the existence of vasa vasorum and to describe the morphology and components of intracranial atherosclerotic lesions.
Results: Among 96 intracranial cerebral arteries, vasa vasorum was detected most prevalently at vertebral arteries (96.875%), followed by basilar arteries (43.75%) and middle cerebral arteries (25%). Compared those without vasa vasorum, cerebral arteries had higher thickness of tunica adventitia (0.096 vs. 0.050, $p < 0.001$) and higher rate of concentric plaques (66.04% vs. 41.86%, $p < 0.05$).

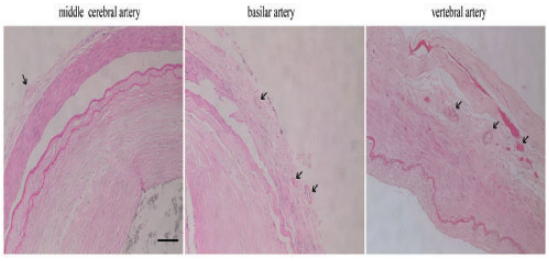


Table 1 Comparisons of plaque morphology and presence of vasa vasorum among middle cerebral artery, vertebral artery and basilar artery groups.

	Middle cerebral arteries (n=32)	Basilar arteries (n=32)	Vertebral arteries (n=32)	P*	P**	P ***
Plaque load	2.017±1.752	1.858±2.058	2.089±1.868	0.738	0.881	0.628
Area stenosis	31.532±21.871	29.285±18.693	29.221±23.252	**0.038**	0.666	0.098
Adventitia thickness	0.048±0.028	0.064±0.024	0.099±0.061	0.310	**0.000**	**0.001**
Adventitia thickness/Artery radius	0.031±0.018	0.038±0.017	0.058±0.032	0.300	**0.000**	**0.001**
Presence of vasa vasorum	8(25%)	14(43.75%)	31(96.875%)	0.188	**0.000**	**0.000**

Remarks: *MCA vs. BA, **MCA vs. VA, ***VA vs. BA.

Table 2 Plaque histological differences between arteries with and without vasa vasorum.

	Arteries with vasa vasorum (n=53)	Arteries without vasa vasorum (n=43)	P value
Plaque load	2.205±1.950	1.722±1.775	0.208
Area stenosis	28.272±21.995	25.461±21.456	0.531
Adventitia thickness	0.096±0.081	0.050±0.025	**0.000**
Adventitia thickness/Artery radius	0.055±0.037	0.032±0.017	**0.000**
Distribution			**0.023**
eccentric	18(33.96%)	25(58.14%)	
concentric	35(66.04%)	18(41.86%)	
Intraplaque hemorrhage	7(13.21%)	4(9.30%)	0.749
Neovasculature	7(13.21%)	5(11.62%)	1.000
Thromboembolı	10(18.87%)	5(11.62%)	0.404
Macrophages	14(26.42%)	7(16.28%)	0.322
Calcification	21(39.62%)	12(27.91%)	0.282

Conclusion: Histology evidence from human cerebral artery specimens indicates that vasa vasorum occurs more frequently in posterior cerebral arteries, especially vertebral arteries. The existence of vaso vasorum may benefit the formation of concentric atherosclerotic lesions.

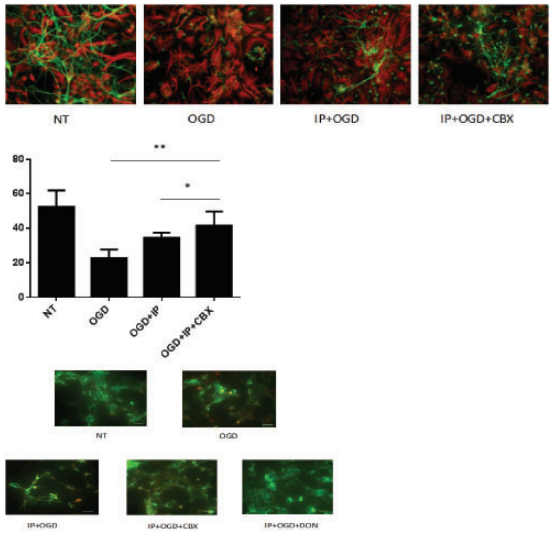
AS15-013

PATHOPHYSIOLOGY OF STROKE

EFFECTS OF HYPOXIA PRECONDITIONING COMBINED WITH GAP JUNCTION BLOCKING ON THE SURVIVAL OF NEURONS IN CO-CULTURE SYSTEM

D. Ma[1], L. Feng[1], F. Deng[1], J. Feng[1] and J. Miao[1]
[1]Jilin University, Neurology, changchun, China

Background and Aims: The previous work of us confirmed that ischemic preconditioning on the rat model of tMCAO could significantly improve the prognosis of cerebral ischemia reperfusion and the inhibition of gap junctional intercellular communication could obviously reduce the infarct area. But the mechanism is not completely clear. This study aimed to observe the survival of neuron in the coculture of astrocytes and neurons, after pretreated with carbenoxolone (CBX) under the oxygen glucose deprivation (OGD)/reintroduction culture conditions. We try to explore the mechanism of neuronal protective effect of ischemic preconditioning after intervention of gap junction in vitro.
Method: Primary asroctye-neuronal cultures were prepared from the cortices of Wistar rats embryos. Carbenoxolone was administrated on set of oxygen glucose deprivation (OGD) 12 h/reintroduction 6 h. Live cell staining for ROS was also performed in astrocytes ROS sensor CellROX™ Deep Red reagent (red) and the astrocyte cell surface marker anti-GLAST(green) with a deconvolution fluorescent microscopy. Images of coculture systerm were analyzed with a deconvolution fluorescent microscope system.
Results: After OGD 12 h/reintroduction 6 h, hypoxic preconditioning has protective effects on nerve cell number and morphology; carbenoxolone significantly strengthen the protective effects (Figure 1). Carbenoxolone hypoxic preconditioning strengthen the protective effect of hypoxic preconditioning, mainly by the method of reducing astrocytes glutamate induced ROS production decline (Figure 2). After the intervention of glutamate, the prduction of ROS was significantly reduced, and the protective effect was significantly increased (Figure 3).



Conclusion: Carbenoxolone intervented gap junction can enhance hypoxic preconditioning protective effect, which by means of blockaged of astrocytes produce glutamate and reduced ROS.

AS15-017

PATHOPHYSIOLOGY OF STROKE

CEREBRAL BLOOD FLOW RESPONSE TO HEAD-OF-BED MANIPULATION AFTER STROKE: A METHOD FOR THE ASSESSMENT OF CEREBRAL AUTOREGULATION?

R. Delgado-Mederos[1], C. Gregori-Pla[2], G. Cotta[2], P. Camps-Renom[1], A. Martínez-Domeño[1], L. Prats-Sánchez[1], D. Guisado[1], T. Durduran[2] and J. Martí-Fábregas[1]
[1]Hospital Santa Creu i Sant Pau, Neurology, BARCELONA, Spain
[2]ICFO-Institut de Ciències Fotòniques- The Barcelona Institute of Science and Technology, Medical Optics, Castelldefels, Spain

Background and Aims: Cerebral blood flow (CBF) response to head-of-bed (HOB) manipulation is variably altered in stroke patients and has been associated with functional outcome. It has been hypothesized that HOB induced response may be a surrogate of cerebral autoregulation. We explored whether CBF response to HOB angle changes is related to vasomotor reactivity by using diffuse correlation spectroscopy (DCS) and transcranial Doppler (TCD).
Method: We prospectively recruited patients with unilateral or bilateral carotid steno-occlusive disease and healthy volunteers. Simultaneous measurement of bilateral frontal CBF with DCS and CBF velocities (CBFV) on both middle cerebral arteries with TCD were performed during HOB changes (0° to 30°), breath-holding and acetazolamide test in each patient. We calculated the percentage of CBF and CBFV change after HOB and acetazolamide tests and the breath-holding index (BHI).
Results: We studied 12 patients (age 66 ± 7y, 83% men) and 5 healthy volunteers (age 28 ± 3y, 60% men). Carotid lesion was classified as normal (n = 16), 50–69% (n = 2), >70% (n = 12) or occlusion (n = 4). HOB elevation resulted in a mean CBF decrease of 15% (IQ -7%- -19%) and mean CBFV decrease of 3% (IQ-7%-1%). A paradoxical response (CBF increase after HOB elevation) occurred in 4 (23%) participants. HOB response was not associated with the presence of a carotid occlusive lesion or the vasomotor reactivity status. Only BHI on both DCS ($p = 0.04$) and TCD ($p = 0.02$) were related to the severity of the stenosis.
Conclusion: CBF response to HOB changes is not related to vasomotor reactivity as measured with breath holding and acetazolamide test.

AS15-020

PATHOPHYSIOLOGY OF STROKE

MIGRAINE IS NOT ASSOCIATED WITH EXCESS CEREBROVASCULAR ATHEROSCLEROSIS IN PATIENTS WITH ISCHEMIC STROKE

H.J.A. van Os[1], I.A. Mulder[1], I. van der Schaaf[2], L.J. Kappelle[3], B.K. Velthuis[2], A. Broersen[4], G.M. Terwindt[1], W. Schonewille[5], M.C. Visser[6], M.D. Ferrari[1], A. Algra[1], M.A.A. van Walderveen[4] and M.J.H. Wermer[1]
[1]LUMC, Neurology, Leiden, The Netherlands
[2]UMCU, Radiology, Utrecht, The Netherlands
[3]UMCU, Neurology, Utrecht, The Netherlands
[4]LUMC, Radiology, Leiden, The Netherlands
[5]St. Antoniusziekenhuis, Neurology, Nieuwegein, The Netherlands
[6]VUMC, Neurology, Amsterdam, The Netherlands

Background and Aims: Migraine is a well-established risk factor for ischemic stroke, but migraine is also related to other vascular diseases. This study aims to investigate the association between migraine and cerebrovascular atherosclerosis in patients with acute ischemic stroke.
Method: We retrieved data on patients with ischemic stroke from the Dutch acute stroke study. Migraine history was assessed with a migraine

screener and confirmed by telephone interview based on the ICHD criteria. We assessed intra- and extracranial atherosclerotic changes and quantified intracranial internal carotid artery (ICA) calcifications as measure of atherosclerotic burden on non-contrast CT and CT-angiography. We calculated risk ratios (RR) with adjustments for possible confounders (aRR) with multivariable Poisson regression analyses.
Results: We included 656 patients, aged 18 to 99 years, of whom 53 had a history of migraine (29 with aura). Patients with migraine did not have more frequent atherosclerotic changes in intracranial (51% versus 74%; aRR: 0.82; 95%CI: 0.64–1.05) or extracranial vessels (62% versus 79%; aRR: 0.93; 95%CI: 0.77–1.12) than patients without migraine and had comparable ICA calcification volumes (largest versus medium and smallest volume tertile, 23% versus 35%, aRR: 0.93; 95%CI: 0.57–1.52).
Conclusion: Migraine is not associated with excess atherosclerosis in large vessels in patients with acute ischemic stroke. Our findings suggest that the biological mechanisms by which migraine results in ischemic stroke are not related to macrovascular cerebral atherosclerosis.

AS15-022

PATHOPHYSIOLOGY OF STROKE

FETAL-TYPE POSTERIOR CEREBRAL ARTERY: PREVALENCE AND ASSOCIATION WITH ISCHEMIC STROKE IN THE POSTERIOR CEREBRAL ARTERY VS. MIDDLE CEREBRAL AND ANTERIOR CEREBRAL ARTERY TERRITORIES

P. Frid[1]
[1]Lund University, Department of Clinical Sciences, Malmö, Sweden

Background and Aims: A fetal-type posterior cerebral artery (FPCA) is a normal anatomic variant with the posterior cerebral artery (PCA) arising as a branch from the anterior cerebral circulation. Its reported prevalence varies (11–46%), and its potential role in the pathophysiology of ischemic stroke has not been fully elucidated.
Aim: We aimed to determine the prevalence of ipsilateral FPCA in patients with acute ischemic stroke and its association to ischemic stroke in the PCA vs. MCA/ACA vascular territory.
Methods: We reviewed acute ischemic stroke cases from seven sites within the Stroke in Genetics Network (SiGN) image database. A total of 697 ischemic stroke cases had MRI (DWI and MRA) data. A senior neuroradiologist blinded to clinical data and initial radiology assessment assessed all MRI data. Only cases with verified acute infarction (s) on MRI-DWI sequences with MRA-TOF of intracranial vessels available were included in this analysis. We excluded those with infratentorial infarcts or infarcts in more than one vascular territory.
Results: Of the 680 cases with available MRAs and acute ischemic DWI lesions, there were 59 (9%) cases with unilateral, isolated PCA infarct (s). FPCA was observed in 205 cases (29%): 144 (20%) unilateral and 61 (9%) bilateral. The proportion of ischemic stroke did not differ in the presence of ipsilateral FPCA between the anterior (19%) and PCA territory (19%) ($p = 0{,}986$) (Table 1).
Conclusion: In this study, ipsilateral FPCA was not associated with an increased the risk of ischemic stroke in the ipsilateral PCA territory compared to the ipsilateral MCA/ACA territory.

Table 1.

		PCA Lesion	MCA/ACA Lesion	Total
Ipsilateral FPCA	No, n (%)	48 (81)	360 (81)	408 (81)
	Yes, n (%)	11 (19)	82 (19)	93 (19)
Total		59 (100)	442	501

AS15-023

PATHOPHYSIOLOGY OF STROKE

NEUTROPHIL TO LYMPHOCYTE RATIO AND LEUKOCYTE SUBTYPE COUNTS IN ACUTE STROKE ARE PREDICTIVE OF OUTCOME INDEPENDENTLY OF INFECTIONS

A. Semerano[1], **D. Strambo**[2], **G. Martino**[1], **G. Comi**[2], **L. Roveri**[2] **and M. Bacigaluppi**[1]
[1]San Raffaele Scientific Institute, Division of neuroscience - INSPE - Institute of Experimental Neurology- Neuroimmunology Unit, Milan, Italy
[2]San Raffaele Scientific Institute, Department of Neurology, Milan, Italy

Background and Aims: Brain ischemia directly triggers, mainly through the autonomic nervous system, a strong systemic inflammation. Peripheral blood counts have therefore been studied as potential predictors of stroke outcome. However changes in leukocyte counts might be related to infections that often precede, trigger or follow shortly stroke onset, and are often responsible for a worse outcome. Previous studies did not consider infections as potential confounders as well as did not evaluate systematically all leukocyte subpopulations.
We aimed to determine whether leukocyte subtype counts after ischemic stroke are associated with functional outcome and hemorrhagic complications independently from the occurrence of infections.
Method: Blood samples of patients with acute ischemic stroke were collected within 48 h from symptom onset. Patients with pre-existing recent infections were excluded. Data about early post-stroke infections, NIH Stroke Scale (NIHSS) at admission and at discharge, intracerebral bleedings, functional outcome at 3 months (measured by modified Rankin Scale [mRS]) were analysed.
Results: Independently of infections, lymphocyte and eosinophil counts as well as eosinophil to leukocyte ratio (EoLeu-R) were positively associated, while the neutrophil to lymphocyte ratio (NL-R) was negatively associated with 3-month good outcome (Fig.1-A). High neutrophil counts and NL-R but low lymphocyte, eosinophil counts and EoLeu-R were independently associated to death within 3 months and also to discharge-NIHSS (Fig.1-B and Tab. 1). Patients developing parenchymal hemorrhagic transformation (PH) had higher neutrophil counts as well as NL-R (Fig.1-C).

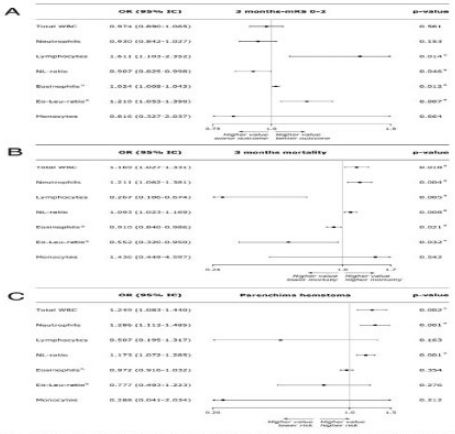


Figure 1. Adjusted association of leukocyte subtype counts/ratios with outcome measures.
(A) 3-month Functional Outcome, (B) 3-month Mortality and (C) Parenchymal Hematoma (Multivariate). Statistics: Logistic Regression analysis. Data were adjusted for parameters resulted to be associated in the univariate analysis with p≤0.1. * Significant (p≤0.05). ° OR is intended for 0.01-point increase of Eosinophil count and EoLeu-R.

Table 1. Adjusted association of leukocyte subtype counts/ratios with NIHSS at discharge.

	NIHSS discharge		
	Beta	95%CI	p
WBC	0.158	0.284 – 0.658	0.000[a]
Neutrophil	0.217	0.465 – 0.860	0.000[a]
Lymphocyte	-0.131	(-2.373) – (-0.855)	0.000[a]
NL-R	0.271	0.405 – 0.636	0.000[a]
Monocyte	0.037	(-0.713) – 2.973	0.229
Eosinophil[b]	-0.082	(-0.740) – (-0.011)	0.009[a]
EoLeu-R[b]	-0.086	(-0.573) – (-0.089)	0.007[a]

Statistics: Linear Regression analysis. Data were adjusted for parameters resulted to be associated with discharge NIHSS on the previous univariate analysis (Table 2 and Table e1) with p<0.10. [a] Significant (p<0.05). [b] Beta is intended for 0.01-point increase of Eosinophil count and EoLeu-R.

Conclusion: Leukocyte subtype counts and ratios represent predictors of outcome independently of infections. The mechanisms underlying early peripheral immunological shifts after stroke still need to be investigated.

AS15-025

PATHOPHYSIOLOGY OF STROKE

REVISITING STROKES INVOLVING THE DISTRIBUTION OF THE ANTERIOR CHOROIDAL ARTERY

P. Claffey[1], D. Bradley[2] and J.A. Harbison[1]
[1]St. James Hospital, Stroke/Medicine for the Elderly, Dublin 8, Ireland
[2]St. James Hospital, Department of Neurology and Stroke, Dublin 8, Ireland

Background and Aims: There is inconsistency in published literature about the neuroanatomical distribution, clinical manifestations and aetiology of infarction of the anterior choroidal artery (AChA).
Method: We examined 10 consecutive subjects with probable isolated AChA distribution stroke confirmed on MRI. We compared clinical features found against Foix's characteristic syndrome of contralateral hemiplegia, hemihypoaesthesia and homonymous hemianopia.
Results: Six subjects were female and six had left hemispheric infarction. Subjects were younger than an unselected stroke register derived group (300 subjects) with cerebral infarct (mean 58.7 vs.70.2 years p = 0.03, t-test). Eight initially presented with hemiplegia, 7 with sensory loss but none with visual field deficit. Nine were identified with dyspraxia of motor and/or speech function during assessment. At discharge median modified Rankin score was 1.5 (range 0–3). Upper limb weakness was the most predominant persistent neurological finding (n = 7). This was characteristically more severe distally (mean MRC score 2.8 vs.3.5 p = 0.2 paired t-test). Aetiologically, 6 were cardioembolic and 4 were cryptogenic. On MRI review, only one AChA infarct involved the ipsilateral uncus and hippocampal region; the rest involved the region of the posterior internal capsule extending in an inverted cone shape into the white matter adjacent to the cella media, an area also commonly affected by M1 distribution Middle Cerebral Artery distribution infarction.
Conclusion: In this series, hemiplegia and hemihypoaesthesia were found in the majority of subjects; hemianopia appears infrequent. Distal upper limb weakness and dyspraxia were the commonest long term sequela. Infarction size may be related to the degree of collateralisation with the M1 territory.

AS15-027

PATHOPHYSIOLOGY OF STROKE

INTRINSIC COAGULATION ANTIGEN AND ACTIVATION LEVELS IN ISCHEMIC STROKE PATIENTS WITH HEADACHE

H.J.A. van Os[1], M.J.H. Wermer[1], F.R. Rosendaal[2], A. Algra[3] and B.S. Siegerink[4]
[1]LUMC, Neurology, Leiden, The Netherlands
[2]LUMC, Epidemiology, Leiden, The Netherlands
[3]UMCU, Epidemiology, Leiden, The Netherlands
[4]Charité, Center for Stroke Research, Berlin, Germany

Background and Aims: Hypercoagulable states in migraine patients may play a role in the pathophysiology underlying the association between migraine and stroke. We aimed to investigate this possible connection.
Method: We included participants from the RATIO study, a Dutch population-based case-control study of young women (age < 50) with ischemic stroke and healthy controls. We constructed a migraine proxy variable based on headache history and treatment. Intrinsic coagulation proteins were measured through both antigen levels (FXII, FXI, prekallikrein, HMWK) and protein activation, determined by measuring activated

Table (AS15-027)

Intrinsic coagulation parameter	>P75*	Headache	Controls, n(%)	Cases, n(%)	OR (95%CI)	OR* (95%CI)
KAL-C1-INH	-	-	360 (60%)	43 (38%)	1(ref)	1(ref)
	+	-	142 (24%)	32 (28%)	1.89(1.15-3.10)	1.83(1.10-3.05)
	-	+	82 (14%)	27 (24%)	2.76(1.61-4.72)	2.63(1.51-4.59)
	+	+	14 (2%)	11 (10%)	6.58(2.81-15.40)	6.22(2.56-15.14)

*Intrinsic coagulation parameter >75th percentile
**Adjusted: matching variables, age, hypercholesterolemia, alcohol use, smoking

protein complex with C1esterase-inhibitor (FXIIa-C1-INH, FXIa-C1-INH, Kallikrein-C1-INH) or antitrypsin-inhibitor (FXIa-AT-INH). We performed an interaction analysis assessing the increase in stroke risk associated with high levels of intrinsic coagulation and headache history.
Results: We included 114 cases and 612 controls. In total, 194 (18%) patients had a history of headache suspect for migraine. The combination of headache and elevated intrinsic antigen and activation (all but FXII and FXIa-AT-INH) led to a higher stroke risk than expected based on the risk factors independently. The most pronounced effects were observed for Kallikrein-C1-INH (Table).
Conclusion: Headache and elevated intrinsic coagulation parameters may biologically interact increasing risk for ischemic stroke. Within the headache group, migraine may be mainly responsible for these findings.

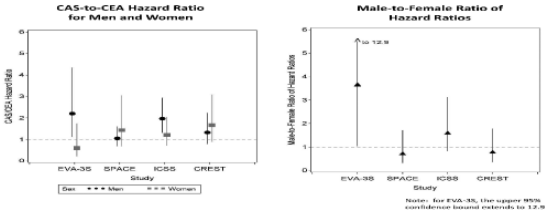
AS04-012

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ABSENCE OF CONSISTENT DIFFERENCES IN OUTCOMES BY SEX IN EVA-3S, SPACE, ICSS AND CREST

V. Howard[1], G. Howard[2], A. Algra[3], J. Becquemin[4], L. Bonati[5], R. Bulbulia[6], D. Calvet[7], H.H. Eckstein[8], G. Fraedrich[9], J. Gregson[10], A. Halliday[11], J. Hendrikse[12], O. Jansen[13], G. Roubin[14], M. Brown[15], J.L. Mas[7], P. Ringleb[16] and T. Brott[17]
[1]University of Alabama at Birmingham, Epidemiology, Birmingham, USA
[2]University of Alabama at Birmingham, Biostatistics, Birmingham, USA
[3]University Medical Center Urecht, Neurology and Neurosurgery, Utrecht, Netherlands Antilles
[4]University of Paris, Vascular Surgery, Creteil, France
[5]University Hospital Basel, Neurology and Stroke Center, Basel, Switzerland
[6]Oxford University, Clinical Trial Service Unit and Epidemiological Studies Unit, Oxford, United Kingdom
[7]Hopital Sainte-Anne- Universite Paris-Descartes, Neurology, Paris, France
[8]Klinikum rechts der Isar der Technischen Universitat Munchen, Vascular and Endovascular Surgery/Vascular Center, Munich, Germany
[9]Medical University of Innsbruck, Vascular Surgery, Innsbruck, Austria
[10]London School for Hygiene and Tropical Medicine, Statistics, London, United Kingdom
[11]John Radcliffe Hospital, Nuffield Department of Surgical Sciences, Oxford, United Kingdom
[12]University Medical Center Urecht, Radiology, Utrecht, Netherlands Antilles
[13]Clinic for Radiology and Neuroradiology- UKSH Campus Kiel, Radiology and Neuroradiology, Kiel, Germany
[14]Cardiovacular Associates of the Southeast, Cardiovascular Disease Cardiology, Birmingham, USA
[15]UCL Institute of Neurology- University College London, Brain Repair and Rehabilitation, London, United Kingdom
[16]University of Heidelberg Medical School, Neurology, Heidelberg, Germany
[17]Mayo Clinic, Neurology, Jacksonville, USA

Background and Aims: CREST reported a higher carotid artery stenting (CAS) to carotid endarterectomy (CEA) risk ratio in the peri-procedural period for women relative to men. This analysis included both asymptomatic and symptomatic patients, and employed the outcome any stroke, death or MI. The sample size was not sufficient for precise estimates of the sex difference for the outcome stroke or death in symptomatic patients.
Method: Data from the Carotid Stenosis Trialists' Collaboration included outcomes from symptomatic patients participating in the four major trials assessing CAS-to-CEA efficacy (EVA-3S, SPACE, ICSS and CREST), with 3,317 men and 1,437 women. The primary analysis employed proportional hazards analysis to assess sex differences in the CAS-to-CEA risk ratio for any stroke or death during a 120-day peri-procedural period or ipsilateral stroke thereafter.
Results:



Over an average follow-up of 3.3 years, 433 events occurred. For each trial, the sex-specific CAS-to-CEA hazard ratio is shown below in the left panel, with the male-to-female ratio of these hazard ratios in the right panel. There was significant evidence of heterogeneity ($p = 0.10$, *a priori* criterion for significance) between studies in the sex difference of the hazard ratios, with EVA-3S and ICSS having higher CAS-to-CEA risk in men, but SPACE and CREST having lower CAS-to-CEA risk in men.
Conclusion: The sex differences in the CAS-to-CEA risk ratios were not consistent across these trials. Thus, in symptomatic patients, the patient's sex should not be used to guide the choice of revascularization procedure.

AS05-005

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

CLINICAL SIGNIFICANCE OF PLATELTE REACTIVITY MONITERING IN ACUTE ATHEROTHROMBOTIC STROKE: THE PRAISE STUDY

H. Yamagami[1], K. Fukuma[2], K. Kamiyama[3], Y. Enomoto[4], E. Furui[2], Y. Manabe[5], M. Ezura[6], K. Toyoda[7], T. Miyata[7] and K. Nagatsuka[8]
[1]National Cerebral and Cardiovascular Center, Stroke Care Unit, Suita, Japan
[2]Konan Hospital, Stroke Neurology, Sendai, Japan
[3]Nakamura Memorial Hospital, Neurosurgery, Sapporo, Japan
[4]Gifu University Graduate School of Medicine, Neurosurgery, Gifu, Japan
[5]National Hospital Organization Okayama Medical Center, Neurology, Okayama, Japan
[6]Sendai Medical Center, Neurosurgery, Sendai, Japan
[7]National Cerebral and Cardiovascular Center, Cerebrovascular Medicine, Suita, Japan
[8]National Cerebral and Cardiovascular Center, Neurology, Suita, Japan

Background and Aims: The impact of platelet reactivity on clinical outcome in acute ischemic stroke patients has not been established.
Method: In this multicenter observational study, patients with acute atherothrombotic stroke or transient ischemic attack within 7 days after the onset and treated with antiplatelet therapy including clopidogrel were enrolled. Platelet reactivity, P2Y12 reaction unit (PRU), was measured with Verify Now system at 24 and 72 hours after the initiation of antiplatelet therapy. The primary outcomes were evaluated as a composite of neurological deterioration (NIHSS ≥ 4 points) within 30 days and recurrent ischemic stroke within 90 days.
Results: Among 239 patients enrolled at 16 hospitals in Japan, 227 with sufficient data were analyzed (age 72 ± 11 years, 158 men). The primary outcomes were developed in 38 patients (16.7%), including 14

deterioration and 24 recurrence. Baseline glucose level (mean 146 vs 130 mg/dL), NIHSS score (median 3.5 vs 2), and PRU at 24 h(mean 245 vs 219) were higher in patients with the primary outcomes than those without (all $P < 0.1$). PRU at 72 h was not significantly different (mean 219 vs 204). In a Cox proportional hazards model, higher glucose levels (HR 1.06/10 mg/dL, 95%CI 1.00–1.12, $P = 0.046$) and PRU at 24 h (HR 1.06/10units, 1.00–1.11, $P = 0.033$) were the predictive factors of the primary outcomes. With receiver operating characteristic analysis, optimal cut-off value of PRU at 24 h was 254 (AUC 0.59).

Conclusion: High on-treatment platelet reactivity at 24 hours after the initiation of clopidogrel was the predictor of neurological deterioration or recurrent stroke in acute atherothrombotic stroke.

AS05-013

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TRENDS IN THE PRESCRIPTION OF NOVEL ORAL ANTICOAGULANTS IN UK PRIMARY CARE

S. Loo[1,2], S. Dell'Aniello[1], L. Huiart[3] and C. Renoux[1,2,4]
[1]Lady Davis Institute for Medical Research- Jewish General Hospital, Centre for clinical epidemiology, Montreal, Canada
[2]McGill University, Epidemiology- Biostatistics- and Occupational Health, Montreal, Canada
[3]Centre Hospitalier Universitaire de la Réunion, Centre d'investigation clinique, Saint-Denis, Reunion
[4]McGill University, Neurology and Neurosurgery, Montreal, Canada

Background and Aims: Novel oral anticoagulants (NOAC) are recent alternatives to vitamin-K antagonists (VKA) for the prevention of thromboembolic events. In the UK, it is not clear how NOAC have been adopted and prescribed in primary care since first introduced in 2008.

Method: Using the UK's Clinical Practice Research Datalink, the rates of new users of NOAC and of VKA were estimated from 2009 to 2015 using Poisson regression. Patient characteristics associated with the initiation of NOAC compared with VKA were identified using multivariate logistic regression.

Results: The overall rate of oral anticoagulant initiation increased by 58% from 2009 to 2015 (rate ratio (RR) 1.58; 95% CI 1.23–2.03). Whereas the rate of new VKA users decreased by 31% (RR 0.69; 95% CI 0.52–0.93), the rate of new NOAC users increased, particularly from 2012 onwards, with a 17-fold increase from 2012 to 2015 (RR 17.68; 95% CI 12.16–25.71). NOAC accounted for 56.5% of all oral anticoagulant prescriptions in 2015, with rivaroxaban prescribed most frequently, followed by apixaban, and dabigatran. The most notable temporal changes in prescription pattern occurred among patients aged 75 and older. As compared with new VKA users, new users of NOAC were less likely to have cardiovascular conditions, and more likely to have a history of ischemic stroke.

Conclusion: In the UK, the rate of NOAC initiation has increased dramatically since 2009, and NOAC have now surpassed VKA as the oral anticoagulant of choice. This is presumably due to NOAC's better safety profile and ease of use.

AS05-015

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

RELEVANCE OF NEUROIMAGING ABNORMALITIES AND LONG-TERM STROKE RECURRENCE

Y. Lee[1] and K.W. Nam[1]
[1]SNU-SMG Boramae Medical Center, Neurology, Seoul, Republic of Korea

Background and Aims: Previous studies have revealed that the predictors for short- and long-term stroke recurrence are different. We designed a comprehensive stroke risk (CSR) model, composed of demographic, clinical, and radiological findings, to predict long-term stroke recurrences.

Method: Consecutive patients with first-ever ischemic stroke within 7 days of symptom onset were recruited. Univariate and multivariate Cox regression analysis was used to evaluate the association between 2-year recurrence and demographic, clinical, and neuroradiological factors. CSR score was calculated by adding the integer value of independent predictors that was derived from the β-coefficient in the multivariate analysis. To qualify the model, we analyzed the receiver operating characteristics (ROC) curve. We assessed internal validation with bootstrap methods, and external validation with another independent cohort.

Results: A total of 958 patients were enrolled, and 63 patients had recurrent ischemic strokes during the follow-up periods. The rate of stroke recurrence was 7.0% at 2 years. In the multivariate analysis, multiple stage lesions, isolated cortical lesions on diffusion-weighted imaging, severe white matter hyperintensities, multiple lacunar infarctions, and relevant arterial stenosis were independently associated with stroke recurrence. The CSR model showed good discrimination (area under the curve [AUC] = 0.80 [0.72–0.88]), which was consistent with internal validation (AUC = 0.74 [0.64–0.84]) and external validation (AUC = 0.85 [0.76–0.93]).

Conclusion: Abnormal neuroimaging findings, rather than cardiovascular risk factors, are predictive of long-term stroke recurrence. Causative mechanism of stroke and underlying hostile brain milieu seem to be associated with long-term stroke recurrence.

AS05-016

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

THERAPEUTIC OUTCOMES POST-APPLICATION OF A COMPUTERISED ANTITHROMBOTIC RISK ASSESSMENT TOOL (CARAT) FOR THERAPEUTIC DECISION-MAKING IN A COHORT OF AUSTRALIAN PATIENTS WITH ATRIAL FIBRILLATION

B. Bajorek[1], P. Magin[2], S. Hilmer[3] and I. Krass[4]
[1]University of Technology Sydney, Graduate School of Health, Sydney, Australia
[2]University of Newcastle, Faculty of Medicine and Public Health, Newcastle, Australia
[3]Royal North Shore Hospital, Department of Clinical Pharmacology, Sydney, Australia
[4]University of Sydney, Faculty of Pharmacy, Sydney, Australia

Background and Aims: CARAT may assist clinicians prescribing of antithrombotics for stroke prevention in people with atrial fibrillation. This follow-up study determined the impact of CARAT-led decision-

making on therapeutic outcomes: treatment changes, thromboembolism (stroke), haemorrhage, and side-effects.
Method: Patients (≥65 years) from a cluster-randomised controlled trial of CARAT-based decision-making were followed-up at 1, 6 and 12-months post-review of their antithrombotic therapy. The trial was conducted in rural and urban general practice settings (New South Wales, Australia).
Results: From 393 trial patients, 391 (1-month), 385 (6-months) and 373 (12-months) were reviewed. Treatment changes: there were no significant differences in antithrombotic use on follow-up at each time-point: 385 (98.5%), 378 (98.1%), and 364 (97.6%) patients used therapy, respectively. Warfarin use declined minimally, from 79.6% (1-month) to 78.0% (12-months), with a minor increase in dabigatran (11.2% to 12.3%) and aspirin (6.1% to 6.7%) use. Adverse clinical outcomes: only 1 stroke reported during follow-up, and 3 TIAs (all in warfarin-users). Bleeding/bruising was reported in 9 (1-month), 10 (6-months), and 11 patients (12-months). Other side-effects (e.g., gastrointestinal) were reported in up to 10 patients at each follow-up. Among those with bleeds/bruises/side-effects (n = 59), only 23 (38.9%) had treatment changes (19 were warfarin-users); 16 involved dose-adjustments (reduced warfarin), 5 involved prescribing alternatives (e.g., alternative anticoagulant), and 2 were downgrades to inferior therapy (e.g., from anticoagulant to antiplatelet or nothing).
Conclusion: CARAT can assist clinicians' decision-making to optimise outcomes. Few adverse clinical outcomes were observed, however, management of these may need attention given that less than half of the events resulted in treatment adjustments.

AS05-007

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

TWENTY-YEAR TRENDS IN TIME TO HOSPITAL ADMISSION, ACUTE MANAGEMENT AND FUNCTIONAL OUTCOME AFTER ISCHEMIC STROKE IN CHU UCL NAMUR, 1992–2013

S. Fastré[1], K. de Fays[1], F. London[1], Y. Vandermeeren[1] and P. Laloux[1]
[1]CHU UCL Namur- site Mont-Godinne, Neurology, Mont-Godinne, Belgium

Background and Aims: Last decades have been challenging years in the field of ischemic stroke, with improved acute care and public education for swift identification of stroke. The aim of this study was to assess whether education campaigns had resulted in (1) reduced onset-to-admission time, (2) increased iv-thrombolysis rate and (3) improved outcome in our setting (i.e. a secondary academic stroke center in a semi-rural area).
Method: All ischemic stroke and transient ischemic attacks hospitalized in our stroke unit were prospectively collected in a stroke database. We extracted 3 cohorts of patients according to the time of admission: C1, 1992–1993 (n = 208); C2, 2002–2003 (n = 438); C3, 2012–2013 (n = 386). We compared the 3 periods for the onset-to-admission time, the use of iv-thrombolysis (except for C1 as Actilyse® was not available in Belgium before 2003), and the modified Rankin scale (mRS) at discharge from neurology department.
Results: The amount of patients admitted within the 6 hours from stroke onset was 71 (34.1%) in C1, 188 (42.9%) in C2, and 185 (47.9%) in C3. The thrombolysis rate increased from 1.4% in C2 to 11.4% in C3. At discharge from hospital, functional independence (mRS ≤ 2) was reached by 98 patients (47.1%) in C1, 338 (77.2%) in C2 and 273 (70.7%) in C3.
Conclusion: In our semi-rural setting, prevention campaigns and optimization in the management of acute ischemic stroke have (1) reduced the delay to reach the hospital, (2) increased the thrombolysis rate and (3) improved the functional outcome.

AS05-008

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ITINERANT BUS FOR DETECTION OF VASCULAR RISK FACTORS AND CAROTID ATHEROSCLEROSIS IN THE GENERAL POPULATION: CHARACTERISTICS OF 549 SUBJECTS SCREENED IN THE SUBURB OF PARIS

J. SERVAN[1], M. BLANCHERE[2], J.F. SPIELER[3], G. MUTLU[1], L. BERTON[4], F. WOIMANT[5], O. HEINZLEF[2] and F. PICO[1]
[1]Hôpital Mignot, Neurology, Le Chesnay, France
[2]Hôpital de Poissy-Saint Germain en Laye, Neurology, Poissy, France
[3]Hôpital Bichat, Neurology, Paris, France
[4]Hôpital Mignot, Emergency, Le Chesnay, France
[5]ARS Ile de France, Neurology, Paris, France

Background and Aims: In the Paris area with 12 million inhabitants, more than 20,000 people are victims of stroke and/or TIA every year. Access to information and prevention of stroke remain difficult in some urban and peri-urban areas of the suburbs.
Method: With the support of the Regional Health Authority, patients association and the departmental council of the Yvelines, we have set up an information and screening campaign by itinerant bus on stroke, its warning signs and detection of vascular risk factors. The bus have been parked for one day in in downtown of ten cities with poor health facilities in the Yvelines department (10 miles away from Paris, 1.5 million habitants).
Results: We were able to collect demographic and anamnestic data of 549 persons from the general population (age, sex, home address, profession, medical follow-up, vascular risk factors, personal and family health history, quality of life, treatment) and proposed systematic screening of risk factors such as body mass index, arterial pressure, cardiac arrhythmia, blood glucose and total cholesterol test strip and carotid atherosclerotic plaque. For some people, we recommended to consult the family doctor and to carry out additional exams (cervical arterial Doppler ultrasound, ECG Holter record . . ..).
Conclusion: The detailed results of this campaign with the profile of 549 screened subjects will be presented and compared to French cohort studies based on healthy volunteers randomly selected by electoral list.

AS05-012

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

ASPIRIN HIGH ON TREATMENT PLATELET REACTIVITY (HOTPR) PREVALENCE IN ACUTE ISCHEMIC STROKE PATIENTS

C. Rath[1] and T. Wienecke[1]
[1]Zealand University Hospital- University of Copenhagen, Neurology, Roskilde, Denmark

Background and Aims: High dose (150–300 mg) acetylsalicylic acid (ASA) reduces the risk of recurrent stroke in the acute stroke phase. Patients who experience normal ex vivo platelet aggregation despite antiplatelet treatment are called "non-responders" or patients who have high on treatment platelet reactivity (HOTPR). The prevalence of

patients with ex vivo HOTPR when treated with Aspirin range widely (7% -27.7%).
We aim to determine the prevalence of acute ischemic stroke patients with reduced ex vivo platelet inhibition measured with VerifyNow when treated with Aspirin in therapeutic doses in the acute stroke phase.
Method: 285 acute ischemic stroke or transitoric ischemic attack (TIA) patients with no prior treatment of Aspirin admitted in our stroke unit were treated with 300 mg oral Aspirin. Blood sampling was done 4–24 hours after Aspirin intake and analyzed using the VerifyNow Aspirin Assay. An ARU > 550 was considered HOTPR as recommended by the manufacturer. Concomitant therapy and time from ASA-intake to blood sampling was recorded.
Results: We found 14.7% of the patients to have HOTPR. There was no difference in HOTPR frequency regarding gender, age, smokers/non-smokers, Diabetes Mellitus/non-diabetic. Concomitant therapy with PPI, NSAID, corticosteroids or antidepressants did not have any significant effect on HOTPR status. The time from bolus intake to blood sampling or from blood sampling to analysis did not have any significant effect on HOTPR status.
Conclusion: In an aspirin naïve treatment compliant ischemic stroke/TIA population 14.7% shows HOTPR. HOTR patients might have an increased risk of recurrent stroke given lack of Aspirin efficacy.

AS05-017

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

CARDIOVASCULAR HEALTH IN A LARGE COHORT OF TYROLIAN ADOLESCENTS

M. Knoflach[1], A. Schmid[2], M. Bohl[1], K. Stock[2], J. Marxer[2], C. Hochmayr[2], G. Nina[2], J. Letzner[2], R. Geiger[3] and U. Kiechl-Kohlenderfer[2]
[1]Medical University of Innsbruck, Department of Neurology, Innsbruck, Austria
[2]Medical University of Innsbruck, Department of Pediatrics- Pediatrics II Neonatology, Innsbruck, Austria
[3]Hospital of Bruneck, Department of Pediatrics, Bruneck, Italy

Background and Aims: Atherosclerosis is a slowly progressive disease that starts in early life, yet cardiovascular health and prevalence of cardiovascular risk conditions in the youth is ill-defined. The ongoing EVA (Early Vascular Ageing) study aims to evaluate cardiovascular risk factors in 15 to 16 year old inhabitants of North-, East- and South Tyrol in order to tailor preventive strategies to this age group.
Method: Volunteers were recruited in Tyrolian schools and companies. Seven ideal cardiovascular health metrics for children were defined as suggested by the American Heart Association: never consumed tobacco, body mass index (BMI) $<85^{th}$ percentile of the age specific distribution, physical activity >60 min per day, >3 heathy diet components, total cholesterol < 170 mg/dL, blood pressure $<90^{th}$ percentile, fasting glucose <100 mg/dL.
Results: Up-to-date 1264 boys (46%) and girls (54%) with a mean age of 16 years were enrolled. Of all participants 6.6% had 0–2, 15.8% had 3, 27.9% had 4, 32.1% had 5 and 17.7% had 6–7 of the cardiovascular health metrics in the ideal range. Ideal metrics for blood pressure, cholesterol, BMI and fasting glucose were present in 70.0%, 70.1%, 81.9%, respectively. Only 69,4% met the criteria regarding a favourable profile for smoking. Physical activity and ideal diet were showed lowest scores with 43.7% and 9.9%.
Conclusion: Cardiovascular health in the young must be improved by strategies to promote lifestyle factors like healthy diet, physical activity and smoking cessation.

AS05-018

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

EFFICIENCY AND SAFETY OF LEFT ATRIAL APPENDAGE CLOSURE

S. Martínez Peralta[1], M.D. Calabria Gallego[1], I. Cruz González[2], J.C. Rama Merchan[2], L.J. Collado[2], V.A. Vera Monge[1], M. Álvarez Álvarez[1], B.S. Pérez Pérez[3], B. Martínez Peralta[4] and L. López Mesonero[1]
[1]Complejo Asistencial Universitario de Salamanca, Neurology, Salamanca, Spain
[2]Complejo Asistencial Universitario de Salamanca, Cardiology, Salamanca, Spain
[3]Complejo Asistencial de Zamora, Comunity Medicine, Zamora, Spain
[4]Universidad de Zaragoza, University, Zaragoza, Spain

Background and Aims: Left atrial appendage closure in an alternative of stroke prevention for patients with atrial fibrilation and contraindication for anticoagulation. We analyze the characteristics, complications and follow-up of a serie of patients who required the procedure.
Method: We indicated left atrial appendage closure and followed consecutive cases of patients who presented acute ischemic or hemorragic strokes and contraindication for anticoagulation in our centre between July 2009 and December 2016.
Results: The procedure was performed in 81 patients, 40 male and 41 female; all the patients had non valvular arrhytmia, in 55 (68%) it was permanent atrial fibrilation, in 21 (26%) paroxistic atrial fibrilation and in 5 (6%) it was an atrial flutter. Most of them had concomitant conditions like arterial hypertension in 72 (89%) cases, and mellitus diabetes in 31 (38%). In 51 (63%) patients the stroke had been hemorragic and in 30 (37%) ischemic. In 5 (6%) cases periprocedural complications were reported, with no influence in the final prognosis: 2 cases of cardiac tamponade that were treated succesfully, 1 case of transient ischemic attack, 1 case of right coronary artery air embolism and 1 case of device embolism. During our follow-up, with a median of 23 months, 8 (9.9%) of patients died and in all cases it was not related to the procedure. There were no reports of new strokes.
Conclusion: Left atrial appendage closure can be an efficient and safe alternative for secondary stroke prevention in patients with non valvular atrial fibrillation.

AS05-019

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

IS PRICE MAJOR FACTOR WHEN CONSIDERING NOACS FOR SECONDARY STROKE PREVENTION?

K. Jurjāns[1], E. Miglane[2], B. Lurina[3], O. Kalejs[3], Z. Priede[2] and A. Millers[2]
[1]Riga, Latvia
[2]P. Stradins Clinical university hospital, Neurology, Riga, Latvia
[3]P. Stradins Clinical university hospital, Cardiology, Riga, Latvia

Background and Aims: Use of oral anticoagulants (OAC's) is a cornerstone of primary and secondary stroke prevention. But the choice of any specific OAC remains up to debate.
Method: In a retrospective study we evaluated the choice of OAC's in secondary stroke prophylaxis in patients with non-valvular atrial fibrillation discharged from P. Stradins Clinical university hospital, Department of Neurology since 2014 up to 2016 and we also compared the change in price of the available OAC's (apixaban, dabigatran, rivaroxaban and

warfarin) in the same time period. The data of medication prices was provided by respective pharmaceutical companies.

Results:

OAC's prescribed

Year	Number of patients	Warfarin	Dabigatran	Apixaban	Rivaroxaban
2014	260	49,1%	20,5%	6,2%	24,2%
2015	266	34,6%	5,6%	0,0%	59,8%
2016	229	23,6%	14,8%	0,0%	61,6%

OAC's price in Latvia (EURO)

	Warfarin	Dabigatran	Apixaban	Rivaroxaban
2014	3.56	90.00	99.00	96.00
2015	3.56	72.00	99.00	61.00
2016	3.56	63.00	99.00	61.00

Conclusion: Unfortunately, the price is a dominant factor when considering Novel Oral Anticoagulants (NOACs). The lowering of the price for NOAC's increases its prescription amount accordingly. But it is evident that the use of NOACs is gradually increasing compared to warfarin.

AS05-022

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

DISCHARGE PRESCRIPTIONS AND OPTIMISATION OF CARDIOVASCULAR RISK FACTORS IN PATIENTS FOLLOWING A CAROTID ENDARTERECTOMY: AUDIT OF PRACTICE

H. Smyth[1,2], E. O'Connell[1], H. Jones[1], C. Terry[1], S. Coveney[1,2], C. McCarthy[1,2], M. Marnane[1], P. Kelly[1] and S. Murphy[1]
[1]Mater Misericordiae University Hospital, Stroke, Dublin, Ireland
[2]University College Dublin, Medicine, Dublin, Ireland

Background and Aims: Carotid Endarterectomy (CEA) is effective in preventing ischaemic strokes in patients with symptomatic stenosis. To reduce the risk of stroke recurrence, medical therapy with antiplatelet drug therapy, statin and optimisation of cardiovascular (CV) risk factors are key.
We aimed to review secondary preventive cardiovascular medication prescription and lifestyle advice given following a stroke and CEA at discharge
Method: A retrospective audit was performed for patients discharged following CEA in an Irish University Hospital from 2009–2015. The following data was obtained: antiplatelet therapy, statin utilisation, smoking status with referral to smoking cessation clinic, HbA1c at time of surgery and blood pressure (BP) on discharge.
Results: 173 patients were identified. 94.2%(n = 164) were prescribed an antiplatelet agent on discharge and 94.2% were prescribed a statin. 49.2% of current smokers were not referred to the smoking cessation clinic. 34.2%(n = 13) of diabetic patients did not have a Hba1C around the time of surgery and 65.9% did have not a BP documented on discharge summaries.
Conclusion: High rates of anti-platelet and statin therapy were found in our CEA patients. Discharge BP was poorly recorded suggesting less of a focus on this important risk factor. Referral of known smokers to the Smoking Cessation Service and investigations of CV risk factors were sub-optimal. Hospitalisation following a stroke and CEA represents a unique opportunity to optimise secondary prevention. Further work is required to see if redesigning discharge letters with prompts for guideline-based medical therapies and a checklist of cardiovascular stroke work up would benefit patients in the long term.

AS05-023

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

A COMPARISON OF NATIONAL GUIDELINES FOR SECONDARY PREVENTION OF ISCHAEMIC STROKE

S. Chowienczyk[1], Q. Nguyen[1], D. Pindus[2], E. Kreit[2], J. Mant[2] and R. Mullis[2]
[1]University of Cambridge, School of Clinical Medicine, Cambridge, United Kingdom
[2]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: National guidelines for secondary prevention of ischaemic stroke are developed independently, and could therefore offer different recommendations based on the guideline body's interpretation of evidence and local economic or contextual factors. To compare recommendations on the use of statins, antiplatelet drugs and antihypertensive drugs from national guidelines on the secondary prevention of ischaemic stroke.
Method: A grey literature search for national clinical guidelines on secondary prevention of ischaemic stroke. A systematic comparison of guideline recommendations with regard to indication, choice of drug and outcome targets.
Results: Guidelines from National Institute for Health and Care Excellence (NICE), Royal College of Physicians (RCP), Scottish Intercollegiate Guidelines Network, American Heart Association, National Stroke Foundation and Canadian Stroke Best Practice Recommendations were identified. All guidelines recommend antiplatelet therapy and statins, but differ with regard to choice of antiplatelet drug and lipid targets. More substantial variation exists within the recommendations for anti-hypertensive therapy, with no agreement on the threshold to initiate treatment, choice of drug and target blood pressure. Only NICE and RCP recommend selection of antihypertensive drugs according to age and ethnicity.
Conclusion: The differences in the guidelines highlight the need for further research, and suggest that in some instances, individual guidelines are more didactic than is warranted. Where evidence is equivocal, patient preference could be prioritised in the selection process.

AS05-028

PREVENTION – EXCLUDING CLINICAL TRIAL RESULTS

EMBOLIC STROKES OF UNDETERMINED SOURCE (ESUS): INCIDENCE, RISK PROFILES AND OUTCOME

S. Lorenzano[1], I. Berto[1], L. Durastanti[1], M.T. Di Mascio[1], A. Mancini[1], S. Fausti[1], A. Pieroni[1], A. Falcou[1], M. De Michele[1], A. Anzini[1] and D. Toni[1]
[1]Sapienza University of Rome, Department of Neurology and Psychiatry-Unità di Trattamento Neurovascolare- Policlinico Umberto I Hospital, Rome, Italy

Background and Aims: Recent evidences suggest that most cryptogenic strokes has thromboembolic origin and represents approximately one third of ischemic strokes (IS), particularly in young adults. Aim of the study was to evaluate the incidence, clinical characteristics and short- and long-term outcome of ESUS.
Method: A retrospective analysis on consecutive patients admitted at our Emergency Department Stroke Unit was performed.

Results: Among 443 patients with IS, 135(30%) were classified as ESUS(61.5% males). Mean (SD) age was significantly lower than that of non-ESUS patients (63.1 [14.1] vs. 68.6 [14.2]). ESUS were of moderate severity (median baseline NIHSS, 4) and 85% of patients achieved a favorable outcome (mRS 0–2) at 3 months. Only one death occurred during the admission. The most prevalent risk factors were arterial hypertension (68.9%), dyslipidemia (54.8), smoking (24%), diabetes (20%), coronary heart disease (13.5%). Most patients were discharged home (76.7%) with antiplatelet therapy (92.5%) (only 3% with anticoagulants). In the long-term follow-up, admission for non-specified cardiovascular events was significantly less frequent in ESUS patients (14.8% vs. 28.3%; OR 0.4, 95%CI 0.26–0.75, $p = 0.0028$). All-type stroke and IS recurrence were less likely to occur in ESUS patients (11% vs. 15.6% and 9.6% vs. 13%, respectively). Thirty-day and long-term mortality were less frequent in ESUS patients (3% vs.7.7%; OR 0.36, 95%CI 0.12–1.06, $p = 0.064$ and 5.2% vs.20.4%; OR 0.21, 95%CI 0.094–0.477, $p < 0.001$, respectively).
Conclusion: In our cohort, approximately one third of IS patients were classified as ESUS. Compared with non-ESUS patients, most patients were younger, had a milder stroke, lower risk of long-term mortality and a trend towards a lower frequency of stroke recurrence.

AS28-002

RARE CAUSES, STROKE IN THE YOUNG

ACUTE ISCHEMIC STROKE IN YOUNG ADULTS: DO THE RISK FACTORS DIFFER FROM THE ADULTS PATIENT?

J. Suwanno[1], J. Suwanno[2], K. Angkoon[3] and K. Ratborirak[4]
[1]Walailak University, School of Nursing, Thasala, Thailand
[2]Hat Yai Hospital, Stroke Care Unit, Songkhla, Thailand
[3]Hat Yai Hospital, Division of Nursing, Songkhla, Thailand
[4]Hat Yai Hospital, Internal Medicine, Songkhla, Thailand

Background and Aims: It is not well established whether the risk factors in young adults differ from the adults (age > 45 years) in developing country as Thailand. The purpose of this study was to compare the likely risk factors of acute ischemic stroke in young adults and adults patients.
Method: We analyzed from the stroke registry of a public, tertiary care, and teaching hospital, located in the Southern Thailand. During October 2011 to February 2016, there were 3135 patients with a final diagnosis of acute ischemic stroke, aged 16–101 years (63.67 ± 14.19), and 323 young adults (10.3%). Data analyzed using Chi-square and odds ratio [OR] (95% confidential interval [CI]).
Results: Compared to the adults, young adults had lower risk factors of diabetes (16.4 vs 24.8% [OR 0.594, 95%CI 0.437–0.807], $p = 0.001$), hypertension (38.1 vs 61.5% [OR 0.385, 95%CI 0.303–0.487], $p = 0.000$), dyslipidemia (14.2 vs 26.4% [OR 0.462, 95%CI 0.333–0.638], $p = 0.000$), and previous history of stroke. (7.4 vs 11.2% [OR 0.636, 95%CI 0.413–0.979], $p = 0.038$). They had higher risk factors of smoking (56.0 vs 48.4% [OR 1.357, 95%CI 1.076–0.1.711], $p = 0.010$), and alcohol used (55.7 vs 33.7% [OR 2.082, 95%CI 1.652–2.630], $p = 0.000$). Both of the groups had not differ in sex ($p = 0.098$), and atrial fibrillation (1.9 vs 2.6% [OR 0.710, 95%CI 0.306–1.645], $p = 0.422$).
Conclusion: Risk factors of young adults and adults with acute ischemic stroke were difference. Primary and secondary stroke prevention in young adults should be more considered in modification smoking and alcohol consumption. Improving blood pressure control, diabetes, and dyslipidemia would be considered as similar to the adults patient.

AS28-003

RARE CAUSES, STROKE IN THE YOUNG

CLINICAL CHARACTERISTICS AND OPTIMAL TREATMENT OF VERTEBRAL ARTERY DISSECTION

C. Arakawa[1], T. Adachi[1] and H. Hoshino[1]
[1]Tokyo Saiseikai Central Hospital, Neurology, Tokyo, Japan

Background and Aims: To investigate the clinical characteristics and optimal treatment of vertebral artery (VA) dissection
Method: We examined 38 Japanese patients who underwent VA dissection (30 males, 8 females; mean age, 46.4 years) and who were admitted to our stroke center from January 2006 to November 2016. They fulfilled the diagnostic imaging criteria for cerebral artery dissection.
Results: There were 37 dissection sites in the intracranial VA and 1 in the extracranial VA. Two patients had head trauma, 1 had chiropractic manipulation, 1 had parturition, and the other patients had no clear trigger events. Nineteen patients with cerebral infarctions (CIs) and 10 with subarachnoid hemorrhages (SAHs) presented. One patient had SAH accompanied with CI. Seven patients complained of only headache. Among the 19 patients who developed only CI, antithrombotic agents were not administered in 11, whereas edaravone was administered in 5. Among the 8 patients whom antithrombotic agents were administered, heparin, aspirin, and argatroban were administered in 5, 1, and 2 patients, respectively. ADL at discharge was modified Rankin Scale (mRS) of 0–2 in 17 patients and mRS of 3–6 in 2. mRS of 0–2 was observed at discharge in all 5 patients who were administered with edaravone. Among the 10 patients who developed only SAH, ADL at discharge was mRS of 0–2 and 3–6 was seen in 5 patients each.
Conclusion: VA dissection more frequently occurred in the intracranial VA. Patients who developed CI showed good recovery even if antithrombotic agents were not administered. Edaravone may improve the prognosis of VA dissection.

AS28-004

RARE CAUSES, STROKE IN THE YOUNG

BASELINE CHARACTERISTICS IN THE GORE REDUCE TRIAL OF PFO CLOSURE VS. MEDICAL THERAPY COMPARED WITH PRIOR TRIALS

S. Kasner[1], L. Sondergaard[2], L. Thomassen[3] and J. Rhodes[4]
[1]University of Pennsylvania, Neurology, Philadelphia, USA
[2]Rigshospitalet, Cardiology, Copenhagen, Denmark
[3]Haukeland University Hospital, Neurology, Bergen, Norway
[4]Nicklaus Children's Hospital, Cardiology, Miami, USA

Background and Aims: The REDUCE Study aims to demonstrate that PFO closure with the GORE® HELEX® Septal Occluder or GORE® CARDIOFORM Septal Occluder plus antiplatelet medical management safely and effectively reduces the risk of recurrent stroke when compared to antiplatelet medical management alone in patients with PFO and cryptogenic stroke. This analysis sought to characterize the study population and compare it to prior PFO closure trials.
Method: This multinational randomized clinical trial enrolled 664 subjects with PFO and cryptogenic stroke. Subjects will be followed a minimum of 2 years for the primary endpoint, and up to 5 years for secondary endpoints. We summarize key baseline clinical, radiographic, and echocardiographic characteristics of the REDUCE subjects and compare them to subjects in CLOSURE-1, RESPECT, and PC-Trials. We also calculated the group-level Risk of Paradoxical Embolism (RoPE) scores for each trial.

Results: Nearly all subjects in the REDUCE trial (Table 1) have radiographically confirmed cryptogenic strokes and the majority have moderate-to-large PFOs. The proportion with common vascular risk factors is relatively low compared to prior trials. The group-average RoPE score in REDUCE is high, suggesting that PFO was the likely cause of the stroke in this population.

Table 1. Baseline characteristics of PFO closure trial subjects

	REDUCE (n=664)	CLOSURE-1 (n=909)	RESPECT (n=980)	PC-Trial (n=414)
Age, yr	45.2 ± 9.4	45.5 ± 9.3	45.4 ± 9.8	44.5 ± 10.2
Male sex	60.1%	51.8%	54.7%	49.8%
Medical history				
Diabetes mellitus	4.2%	7.8%	7.4%	2.7%
Hypertension	25.5%	31.0%	31.4%	25.8%
Current smoker	13.3%	15.2%	13.3%	23.9%
Prior stroke/TIA	12.8%	12.5%	18.6%	37.4%
Imaging confirmation of stroke as qualifying event	98.6%	71.8%	91.6%	79.2%
Cortical/superficial infarction	*	37.0%	72.1%	*
RoPE Score (group-level)	7.2	6.7	7	6.8
Treated with antiplatelet agents only (in medical arm)	97.3%	84.7%	88.0%	80.0%
PFO size				
Small/Grade 1	15.3%	47.1%	22.7%	34.4%
Moderate/Grade 2	49.5%	52.9%	26.4%	43.9%
Large/Grade 3	32.7%		48.8%	21.7%
Atrial septal aneurysm	20.6%	35.6%	35.6%	23.7%

*Assumed to be similar to RESPECT since not reported in PC and currently under evaluation in REDUCE.

Conclusion: The Gore REDUCE trial has successfully enrolled a population of subjects with confirmed cerebral infarctions that were highly attributable to their PFO. These features of the Gore REDUCE trial suggest that it is optimally poised to determine the role of PFO closure compared to antiplatelet therapy for the prevention of recurrent stroke.

AS28-010

RARE CAUSES, STROKE IN THE YOUNG

CLINICAL PRESENTATION OF INTERNAL CAROTID ARTERY DISSECTION IN A SERIES OF 37 PATIENTS

I. Divjak[1], Z. Zivanovic[1], N. Popovic[1] and P. Slankamenac[1]
[1]Clinical Center of Vojvodina, Clinic of Neurology, NOVI SAD, Serbia

Background and Aims: Cervical artery dissection is defined by the existence of a hematoma in the arterial wall. Internal artery dissection (ICAD) is an important cause of stroke among young and middle-aged patients. The aim was to analyze the spectrum of clinical presentation in 37 ICAD patients.
Method: Thirty-seven patients with ICAD, 33 with unilateral and 4 with bilateral, aged 28–59 years (mean 44.3) were evaluated over the last 15 years. The ICAD diagnosis was established in all cases using MRI, MRA and duplex sonography.
Results: Facial and neck pain and Horner's syndrome were the only presenting symptoms in 8 patients; headache and visual disturbances in 2; headache and tinnitus in 1; facial pain, Horner's syndrome and contralateral sensorimotor deficit in 7; headache and contralateral sensorimotor deficit in 7; contralateral sensorimotor deficit in 12. ICAD was triggered by mild trauma in 9 patients (1 while unloading sacks of corn, 3 following sudden head turning, 2 during sports activity, 1 during sexual intercourse, 1 during roller-coaster ride, and 1 in car accident), and spontaneous in 28. MRI revealed infarction in 26 patients, while in the 8 patients presenting with facial and neck pain and Horner's syndrome, 2 patients with headache and visual disturbances, and 1 with headache and tinnitus, MRI did not show evidence of infarction. Good outcome (mRS 0–2) was seen in 32 patients (86.5%).
Conclusion: The clinical presentation of ICAD is variable and can be similar to other stroke etiologies. ICAD is not always associated with brain infarction.

AS28-014

RARE CAUSES, STROKE IN THE YOUNG

MAY-THURNER SYNDROME - ANALYSIS OF GROUP OF PATIENTS

G. Krastev[1], M. Mako[1], Z. Ševková[1], M. Cabúková[1], J. Cisár[1], I. Zajičková[1], L. Mokošová[1] and E. Kabátová[1]
[1]Faculty Hospital Trnava, Neurology, Trnava, Slovak Republic

Background and Aims: May-Thurner syndrome or iliocaval compression syndrome occurs secondary to compression of the left iliac vein by the overriding right iliac artery. The patogenesis is unclear. In certain cases deep vein thrombosis develops, which increases the risk of pulmonal artery embolization as well as ischaemic stroke in young patients with PFO (patent foramen ovale) as a result of paradoxical embolization. In 40–60 % of cryptogenic stroke in patients under 55 years with May Thurner syndrome associated with PFO, the stroke etiology is embolic.
Method: We analysed group of 300 patients younger than 55 years with PFO associated with cryptogenic ischemic stroke for the presence of May-Thurner syndrome. We compared presence of May-Thurner syndrome in group of patients with and without presence of PFO. We were looking for the rate of patients who underwent closure of PFO and the effectivness of the procedure. We also analysed risk of stroke reccurence depending on closure of PFO and secondary prevention. We tried to find out measure of sensitivity of TCD emboldetection comparing to transesophageal echocardiography.
Results: May-Thurner syndrome is a rare cause of cryptogenic stroke associated with patent foramen ovale and should be considered and also treated in young patients under 55 years.
Conclusion: Closure of PFO decreases risk of stroke reccurence. TCD emboldetection seems to be sensitive process of PFO detection and also monitoring of effectiveness of PFO closure.

AS28-015

RARE CAUSES, STROKE IN THE YOUNG

EFFECTIVENESS OF BURR-HOLE SURGERY FOR REVASCULARIZATION IN MOYAMOYA ANGIOPATHY

P. Brandicourt[1], L. calviere[2], I. Catalaa[3], S. Boetto[1], C. Michelozzi[3], C. Cognard[3], V. Larrue[2], F. Bonneville[3] and J.C. Sol[1]
[1]University Hospital Toulouse, Neurosurgery, Toulouse, France
[2]University Hospital Toulouse, Neurology, Toulouse, France
[3]University Hospital Toulouse, Neuroradiology, Toulouse, France

Background and Aims: Burr-hole surgery is increasingly used to treat Moyamoya angiopathy (MMA), because this technic allows revascularization of large frontal areas. We assessed the clinical and radiological data following burr-hole surgery as the only revascularization technic in patients with MMA.
Method: Retrospective study of 21 consecutive patients (11 women, 2 children, mean age ± SD 39.4 ± 14.1 years) with MMA treated by burr-hole surgery in a tertiary hospital. Perioperative complications and long-term risk of stroke/transient ischemic attack (TIA) were reviewed. Development of transdural anastomoses was assessed on digital subtracted angiography. The percentage of hypoperfused parenchyma was compared before and after surgery on MR perfusion using Tmax maps.
Results: A total of 39 hemispheres received a median of 7 (6–9) burr holes. Perioperative cerebral infarction occurred in 3 (14.2%) patients. At 6 months, 1/21 patient (4.7 %) had presented TIA recurrences. During a median follow-up time of 26.8 (IQR 21.9–59.1) months, 3 strokes and 1 TIA occurred in 3 patients (10.2%/hemispheres). The 2-year survival

probability free of stroke/TIA was 85.1 % (Kaplan Meier). Development of collaterals was observed in 83 % of hemispheres through a median number of 2 (0–6) burr holes. The volume of hypoperfused (Tmax > 2 s) and severely hypoperfused (Tmax > 6 s) parenchyma significantly decreased after surgery ($p = 0.039$ and $p = 0.008$, respectively).
Conclusion: In a population mainly composed of adults, burr-hole surgery improved brain perfusion and seemed to prevent long-term ischemic events, but, like other revascularization procedures, was associated with the risk of perioperative stroke.

AS28-016

RARE CAUSES, STROKE IN THE YOUNG

WHOLE EXOME SEQUENCING OF YOUNG PATIENTS WITH FAMILIAL AGGREGATION OF STROKE IN LUND STROKE REGISTER

A. Ilinca[1], S. Sofie[2], P. Paul[2], S. Maria[2], K. Ulf[2] and L. Arne G[1]
[1]Lund University- Skåne University Hospital, Department of Clinical Sciences Lund- Neurology, Lund, Sweden
[2]Lund University and Regional Laboratories- Region Skåne, Department of Clinical Genetics, Lund, Sweden

Background and Aims: We previously reported that familial clustering occurs in 13% of young-onset stroke probands in Lund Stroke Register (LSR). From 4,467 probands, twenty probands aged <55 years with familial aggregation of stroke were selected for whole exome sequencing (WES).
Method: WES was performed with an amplicon-based library using Ion AmpliSeq Exome RDY panel.
Based on Online Mendelian Inheritance in Man and reports in the literature, we compiled a list of 156 genes known or suspected to cause monogenic ischemic stroke, of which 11 are in the mitochondrial genome.
We filtered the WES results for variants within the exons of the 145 non-mitochondrial genes.
Variants with a minor allele frequency of >1% in publically available databases were eliminated.
The clinical phenotype of the proband and affected family members were compared with clinical characteristics associated with reported pathogenic variants in the 145 genes.
The mutation's location (intronic, exonic, splice variants), the type (synonymous, missense, frameshift) and possible previous reports in clinically similar disease were evaluated.
Results: A mean of 16 variants in the 145 genes (range 7–22) per proband were identified. Between 66% and 100% were heterozygous variants. For 2 probands we detected a previously reported pathogenic mutation. A mean of 3 (range 0–7) novel mutations per proband were considered compatible with the individual proband's and family's clinical stroke type.
Conclusion: WES of young stroke patients with positive family history may reveal a monogenic cause of the disease. Co-segregation of the identified novel mutations with stroke in the selected families will now be analysed.

AS28-017

RARE CAUSES, STROKE IN THE YOUNG

TUMEFACTIVE MULTIPLE SCLEROSIS : A DIAGNOSTIC CHALLENGE

A. Khan[1], K. Javaid[1], S.A. Bhatti[2] and S. Babar[2]
[1]Manor hospital- WALSALL, STROKE/GERIATRIC MEDICINE, Walsall, United Kingdom
[2]Manor Hospital Walsall, Stroke/Geriatric Medicine, WALSALL, United Kingdom

Background and Aims: Tumefactive multiple sclerosis is rare and difficult to diagnose as it mimics tumours clinically and radiologically. We present an interesting case which presented initially as Stroke and later was diagnosed as Tumefactive multiple sclerosis.
Method: 23 year old healthy female presented with sudden onset of right sided numbness and weakness. Stroke team review revealed right hemiparesis with NIHSS Score of 6 and so was appropriately Thrombolysed. Post thrombolysis patient clinically did not improve and MRI DWI was not typical of acute infarction. She was discussed at Neuroradiology MDT and further CT and MRI contrast scans revealed possible Inflammatory/Neoplastic process. CSF showed Wbc of 4 being 100% Lymphocytes with positive IgG Oligoclonal bands. She was transferred to Specialist Neurology unit where she received intravenous Steroids. She improved remarkably and was discharged to Neuro rehabilitation unit.
Results: Tumefactive multiple sclerosis makes up 1–2/1000 Multiple sclerosis cases with female preponderance with median age of 37 years. Tumefactive multiple sclerosis are demyelinating plaques of greater than 2 cm radiologically. Clinically patients often mimic variety of diseases including Ischemic stroke and Intra cranial pathologies. Diagnosis is based upon MRI and CSF results.
Patients are usually treated with high dose Intravenous Steroids. Plasmapheresis and Cyclophosphamide are reserved in non responsive cases.
Conclusion: Tumefactive multiple sclerosis is a rare variant of Multiple sclerosis, presenting with features similar to a brain tumour.
Two thirds of patients presenting with Tumefactive variant subsequently develop Multiple sclerosis.
Diagnosis is usually on MRI and CSF examination.
High dose intravenous steroids are the first line treatment.

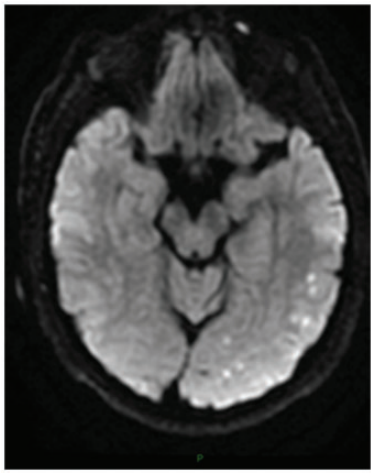
AS28-018

RARE CAUSES, STROKE IN THE YOUNG

STROKE AFTER FACIAL AND PENILE HYALURONIC ACID ADMINISTRATION

P. Reiner[1], T. Morvan[1], M. Mazighi[1] and H. Chabriat[1]
[1]Hôpital Lariboisière- APHP, Neurology, PARIS, France

Background and Aims: Hyaluronic acid injection (HAI) is a common esthetic treatment that is not usually considered as a potential cause of stroke. Recurrent retinal ischemic lesions and multiple territorial cerebral infarcts were observed after the use of such a treatment.
Method: Case Report: A 42 year-old patient was admitted twice in our stroke unit after two episodes of transient monocular visual loss. MRI howed, each time, multifocal and distal small hyperintensities on diffusion weighted images.



Results: The extended work-up was negative except for the presence of a patent foramen ovale. The potential source of the multiple cerebral ischemic lesions at the retinal and cerebral level was undetermined until the patient detailed several days after his second admission that he recently used HAI in the facial skin for esthetic reason but also in the glans for penile augmentation, each time, few hours preceding the occurrence of the neurological events.

Conclusion: Hyaluronic acid is a popular treatment used for rejuvenation. Obstruction of ophthalmic artery branches or within the anterior circulation has been reported following HAI at facial level but not in the posterior circulation. Retrograde embolic mechanism through orbital branch of ophtalmic artery is usually suspected. In the present case, paradoxal embolism in presence of PFO after HAI is presumably responsible for strokes in a young adults after facial but also penile HAI.

AS28-019

RARE CAUSES, STROKE IN THE YOUNG

RETURN TO PAID EMPLOYMENT AFTER ISCHEMIC STROKE IN YOUNG ADULTS - A RETROSPECTIVE FOLLOW-UP STUDY

K. Aarnio[1], J. Rodriguez-Pardo[2], B. Siegerink[3], J. Hardt[4], S. Järvenpää[5], E. Poutiainen[6], M. Kaste[7], T. Tatlisumak[8] and J. Putaala[9]

[1]Helsinki University Central Hospital, Helsinki, Finland
[2]La Paz University Hospital, Department of Neurology, Madrid, Spain
[3]Charite Universitätsmedicin, Center for Stroke Research, Berlin, Germany
[4]Charité Universitätsmedizin, Center for Stroke Research Berlin CSB, Berlin, Germany
[5]University of Tampere, Faculty of Medicine, Tampere, Finland
[6]University of Helsinki, Clinical Neurosciences- Neurology, Helsinki, Finland
[7]Helsinki University Hospital, Clinical Neurosciences- Neurology- University of Helsinki and Department of Neurology- Helsinki University Hospital, Helsinki, Finland
[8]Institute of Neurosciences and Physiology, Institute of Neurosciences and Physiology- Sahlgrenska Academy- University of Gothenburg & Department of Neurology- Sahlgrenska University Hospital and Clinical Neurosciences- Neurology- University of Helsinki and Department of Neurology- Helsinki University Hospital- Finland, Gothenburg, Sweden
[9]Helsinki University Hospital, Clinical Neurosciences- Neurology- University of Helsinki and Department of Neurology- Helsinki University Hospital- Finland, Helsinki, Finland

Background and Aims: Return to vocational activities is one of the most important outcomes of stroke at younger ages. We investigated the proportion of patients not returning to work (NRTW) and factors associated with NRTW at one year after ischemic stroke in young adults.

Method: Patients from Helsinki Young Stroke Registry with a first-ever ischemic stroke 1994–2007 and at paid employment within one year before stroke, were included. Data on periods of payment and sick leaves came from the Finnish Centre for Pensions and Social Insurance Institution of Finland until 2012.

Results: A total of 769 patients were at paid employment within one year before stroke, of whom 289 (37.6%) had not returned to work one year later. In a multivariate binary logistic regression model adjusted for age, sex, smoking, type 2 diabetes, heavy drinking, and NIH Stroke Scale score at admission, NRTW was significantly associated with blue-collar worker status (OR 2.65 versus upper white-collar workers; 95%CI 1.36–5.15), large-artery atherosclerosis (OR 2.97 versus undetermined causes; 95%CI 1.32–6.66) or rare causes underlying the stroke (OR 1.91 versus undetermined causes; 95%CI 1.04–3.52), large anterior stroke (OR 2.43; 95% CI 1.23–4.78), and symptoms at discharge: mild (OR 2.09 versus no paresis; 95%CI 1.23–3.57) or moderate to severe limb paresis (OR 5.95; 95%CI 2.79–12.69), moderate to severe aphasia (OR 2.46 versus no aphasia; 95%CI 1.07–5.63), and moderate to severe visual field deficit (OR 2.27 versus no deficit; 95%CI 1.09–4.73).

Conclusion: NRTW is a frequent outcome after ischemic stroke. Clinical variables available during acute hospitalization may allow determination of NRTW.

AS28-021

RARE CAUSES, STROKE IN THE YOUNG

BILATERAL INTERNAL CAROTID ARTERY DISSECTION CAUSING ACUTE STROKE IN A YOUNG PATIENT WITH RHEUMATOID ARTHRITIS: AN UNCOMMON PHENOMENON RAISING QUESTIONS OF AETIOLOGY AND PATHOGENESIS

S. Saber[1], H. Garrett[1] and V. Nadarajan[1]
[1]Royal Free Hospital, Medicine, London, United Kingdom

Background and Aims: Spontaneous bilateral internal carotid dissection is a rare phenomenon. It is an important cause of stroke in younger patients and is imperative to consider the diagnosis in patients presenting with unexplained neurological symptoms. It's aetiology is not well understood, thought to be multifactorial.

Method: 29 year old gentleman presented with frontal headache , horner's syndrome and spontaneously resolving episode of paraesthesia of his left arm and leg. These occurred at the end of respiratory tract infection he had for six weeks associated with significant cough .

Past medical history included complex rheumatoid arthritis (RA) associated with a prior episode of vasculitis mediated tibial nerve palsy .

His RA was refractory to steroids and rituximab and required regular toclizumab for symptom control. Immunosuppression resulted in recurrent respiratory and urinary tract infections.

He was initially treated for migraine but symptoms didn't improve. Neuroimaging revealed acute ischaemic infarcts in left internal capsule with bilateral internal carotid dissection.

He was managed with dual anti platelet therapy and acute immunosuppression due to concern regarding an underlying vasculitis process.FDG PET demonstrated no active vasculitis and his symptoms resolved on follow up.

Results: These event were keeping with arterial dissection, his prolonged cough is possible trigger . Understanding of this disease remains limited, it is thought an arteriopathy could predispose to spontaneous dissection.

Conclusion: Internal carotid artery dissection is an important cause of stroke in younger patients and should part of differential diagnosis when assessing neurological symptoms in a young patient. Repetitive trauma is known to be trigger and this case demonstrates cough as plausible source.

AS28-022

RARE CAUSES, STROKE IN THE YOUNG

STROKE IN FAMILIAL MEDITERRANEAN FEVER

M.A. TOPCUOGLU[1], E.M. ARSAVA[1], U. KALYONCU[2], R. GOCMEN[3], K. OGUZ[3] and A. TUNCER[1]
[1]HACETTEPE UNIVERSITY, NEUROLOGY, ANKARA, Turkey
[2]HACETTEPE UNIVERSITY, RHEUMATOLOGY, ANKARA, Turkey
[3]HACETTEPE UNIVERSITY, RADIOLOGY, ANKARA, Turkey

Background and Aims: Occurrence of neurovascular complications in familial Mediterranean fever [FMF] is not widely known.
Method: 19 acute neurovascular events occurring in 14 patients (mean age 40 ± 13 years; 6 male) hospitalized over the last 10 years were analyzed. Clinical features, MRI topography, vascular status and stroke etiology were determined.
Results: There was 1 patient with lobar (parietal) hematoma; 1 with TIA (no DWI lesion) and 17 with acute ischemic stroke. Of these 17 episodes of ischemic stroke, stroke etiology was determined in 4 (2 cardioembolism, 1 vertebral artery stenosis and 1 bilateral ICA dissection); and remained cryptogenic (called as "FMF-associated stroke") in 13. Atherosclerosis risk factors were observed in 31% of FMF-associated stroke. Four patients had multiple (2 each) DWI lesions. Midbrain paramedian region was involved in 5 (30%) (all isolated); thalamus in 30% (paramedian 2, lateral 2, polar 1); basal ganglia and deep white in 24% (posterior striate 1, splenium 1,internal capsule in 1; caudate in 1); and occipital, lateral medullar and cerebellar in 1 each. Stroke occurred from 2 to 40 years after diagnosis of FMF; and 6 patients had active disease during stroke. Aspirin was used alone for secondary stroke prevention in all except one, in whom it was combined with heparin. During a median follow-up of 11.5 months, recurrence was noted in 15% of patients.
Conclusion: Previously unknown and easily recognizable phenotypic characteristics of "cryptogenic" strokes occurring in FMF, "FMF-associated stroke", were herein described. Our observations suggest an underlying disease-specific small vessel thrombotic arteriopathy affecting midline diencephalic and upper rhombencephalic regions.

AS28-023

RARE CAUSES, STROKE IN THE YOUNG

CHARACTERISTIC FEATURES OF SNEDDON'S SYNDROME ASSOCIATED CEREBROVASCULAR DISEASE

E. YILMAZ[1], E.M. ARSAVA[1], K. OGUZ[2], R. GOCMEN[2], A. ARAT[2] and M.A. TOPCUOGLU[1]
[1]HACETTEPE UNIVERSITY, NEUROLOGY, ANKARA, Turkey
[2]HACETTEPE UNIVERSITY, RADIOLOGY, ANKARA, Turkey

Background and Aims: Sneddon's syndrome is a multisystem non-inflammatory progressive distal cerebrocutaneous arteriopathy. Multimodal magnetic resonance imaging features of the syndrome were not well studied.
Method: 10 Sneddon's syndrome (age range 34–50 years; 9 female) cases diagnosed during the last 10 years were included. The relationship between MRI lesion patterns (acute and chronic infarct topography and number, periventricular/subcortical white matter disease burden, basal ganglia/centrum semiovale perivascular space scores, cerebral atrophy scores) and contrast angiography-based arteriopathy grade (defined as "pseudoangiomatosis score") were determined.
Results: The median interval from the onset of symptoms (stroke in 6, seizure in 4) to diagnosis of Sneddon's syndrome was 9.9 years. Acute infarction was seen in 37.5%. The pseudoangiomatosis score (mean 4.5) was correlated with cortical infarct number (mean 3.3) but not with small vessel disease pathology type and burden. Multiple cerebellar cortical infarcts were found in 90%, cortical atrophy in 90% and hydrocephalus in 30%. Small deep infarct was detected in 10%, enlarged perivascular spaces in 20% and cerebral microbleeds in 10%.
Conclusion: Constellation of multiple cortical and cerebellar infarcts along with cerebral atrophy and angiographic pseudoangiomatosis appearance is "highly specific" for Sneddon's syndrome when seen in a young female. Familiarity for these properties allows avoidance of potentially perilous diagnostic (brain biopsy) and therapeutic (immunosuppression) interventions in Sneddon's syndrome.

AS28-025

RARE CAUSES, STROKE IN THE YOUNG

IRON DEFICIENCY ANAEMIA – A POSSIBLE CAUSE OF ISCHEMIC STROKE IN YOUNGER ADULTS?

K. Matz[1], C. Ruzin[2], Y. Teuschl[1] and M. Brainin[1]
[1]Danube University Krems, Clinical Neurosciences and Preventive Medicine, Krems, Austria
[2]University Clinic Tulln, Neurology, Tulln, Austria

Background and Aims: Iron deficiency anaemia (IDA) is an occasionally reported cause of stroke in pediatric patients. However, its pathogenetic role in adult patients has not been scientifically followed so far.
Method: We performed a retrospective review of hospital case records of patients younger than 56 years treated for ischemic stroke or TIA. Digital case records from 01/2010 to 11/2016 of 485 patients were scanned for co-morbidity with IDA or chronic microcytic hypochromic anaemia (CMHA).
Results: 21 of 485 (4.3%) stroke patients with suspected IDA were identified. 10 had confirmed IDA with low serum iron markers. One patient had thalassemia combined with low serum iron values and CMHA (IDA+), five patients had CMHA without iron values available, five patients had chronic microcytosis without anaemia and no available iron values (CMHA-). 16 (71%) were female, 11 (52.3%) had embolic stroke of unknown source (ESUS), six small vessel lacunar stroke (SVD), three larger artery atherothrombotic stroke (LVD), one cardioembolic stroke (CE) and one had venous infarction due to sinus venous thrombosis (SVT). Among 11 patients with IDA/IDA+, eight strokes (67%) were classified as ESUS, one as SVD, one as LVD, one as SVT. In ESUS patients patent foramen ovale was present in two cases, other prothrombotic factors were found in four (antiphospholipid antibodies, neoplasm, oral contraception, APC resistance).
Conclusion: IDA is rare in younger aged middle European stroke patients. In most cases stroke is classified as ESUS, with or without additional prothrombotic factors, leaving a possible pathogenetic or predisposing role of IDA for embolic stroke.

AS28-028

RARE CAUSES, STROKE IN THE YOUNG

TIME COURSE FROM LOCAL SYMPTOM ONSET TO ISCHEMIC STROKE IN SPONTANEOUS CERVICAL ARTERY DISSECTION

L. Mayer[1], T. Toell[1], C. Boehme[1], J. Willeit[1], S. Kiechl[1], E.R. Gizewski[2], G. Ratzinger[3], K. Berek[4] and M. Knoflach[1]
[1]Medizinische Universitaet Innsbruck, Neurology, Innsbruck, Austria
[2]Medizinische Universitaet Innsbruck, Neuroradiology, Innsbruck, Austria
[3]Medizinische Universitaet Innsbruck, Dermatology, Innsbruck, Austria
[4]BKH Kufstein, Neurology, Kufstein, Austria

Background and Aims: Spontaneous cervical artery dissection (sCAD) is a frequent cause of stroke in the young. Local symptoms especially pain and Horner's syndrome typically present before stroke occurs. The time interval between onset of local symptoms and ischemic stroke (IS) is assumed to range from hours to weeks but systematic evaluations are scarce.
Method: In the ReSect-study all patients with a sCAD treated at the Innsbruck University Hospital since 2000 (n = 260) were invited to attend a standardized follow-up examination. So far, 147 of the 260 patients have been enrolled. Through detailed history taking at the study visit and retrospective chart review we evaluated the time course of local symptoms in relation to stroke onset. sCAD was diagnosed by MRI in a majority of patients.
Results: A total of 167 ReSect patients presented with IS and 111 had prior local symptoms. The time interval in between was 5.0 days at a median (IQR 11) with a range from 0 to 90 days. Time intervals were almost identical for anterior circulation and posterior circulation dissections (median of 5.5 and 5.0 days). Men had earlier IS presentation than women (median of 4.5 and 6.0 days). None of our patients experienced cranial nerve palsy before stroke onset.
Conclusion: IS due to sCAD is typically predated by local symptom especially pain and could potentially be prevented by proper early diagnosis.

AS28-029

RARE CAUSES, STROKE IN THE YOUNG

CLINICAL FEATURES, DIAGNOSIS, AND SURGICAL TREATMENT OF MOYAMOYA DISEASE - AN UPDATE

S. Kuroda[1]
[1]Japan

Background and Aims: Moyamoya disease is an uncommon cerebrovascular disease that is characterized by progressive occlusion of terminal portion of the internal carotid artery and its main branches within the circle of Willis. This occlusion results in the formation of a fine vascular network (moyamoya vessels) at the base of the brain. In this session, the authors review recent knowledge on moyamoya disease.
Method: The author reviewed recent (2010–2016) articles on moyamoya disease through PubMed.
Results: Recent investigations have revealed that RNF213 gene on chromosome 17 is a susceptibility gene for moyamoya disease. Most pediatric patients with moyamoya disease develop transient ischemic attack (TIA) or cerebral infarction, whereas about half of adult patients develop hemorrhagic stroke and another half develop TIA or cerebral infarction. In moyamoya disease, specific shrinkage can be observed in the involved arteries, which may be a pathognomonic finding for moyamoya disease. Surgical revascularization is known to improve cerebral hemodynamics and significantly reduce the recurrence of TIA and ischemic stroke. Surgical procedures include direct and indirect bypass. Superficial temporal artery to middle cerebral artery (STA-MCA) anastomosis is the main procedure of direct bypass for moyamoya disease. Intraoperative indocyanine green (ICG) videoangiography is quite useful to confirm the patency of bypass graft during surgery. Recently, Japan Adult Moyamoya (JAM) Trial Group has showed that direct or combined bypass can significantly reduce the recurrence of hemorrhagic stroke especially in patients with "posterior" hemorrhage.
Conclusion: Based on recent knowledge on moyamoya disease, the author discusses future perspective for basic and clinical researches.

AS28-031

RARE CAUSES, STROKE IN THE YOUNG

IMAGING OF A RARE CAUSE OF RECURRENT STROKE IN A YOUNG PATIENT: CAROTID WEBS

H. Smyth[1,2], D. Byrne[1], C. McCarthy[1,2], E. Kavanagh[1], M. Marnane[1], P. Kelly[1] and S. Murphy[1]
[1]Mater Misericordiae University Hospital, Stroke, Dublin, Ireland
[2]University College Dublin, Medicine, Dublin, Ireland

Background and Aims: Carotid webs are considered a form of fibromuscular dysplasia, possibly developmental in origin, with non-inflammatory and non-atherosclerotic features and a characteristic appearance on CT angiography (CTA). Choi et Al described them as a thin intraluminal filling defect along the posterior wall of the carotid bulb in oblique sagittal reformats and a septum on axial CTA.
Here we summarise a case of recurrent ischaemic stroke secondary to carotid webs with characteristic images.
Method: Case: A 39-year-old Middle Eastern man presented with sudden onset dense right hemiparesis, facial droop and aphasia. He was treated with thrombolysis and thrombectomy. He previously suffered an ischaemic left middle cerebral infarct 15 months previously at another hospital and was discharged on clopidogrel and atorvastatin. MRI confirmed a new extensive left MCA infarct. On CTA, a 0.8 cm focus, previously reported as 'soft plaque', arose from the posterior wall of the origin of the left internal carotid artery (ICA), unchanged from prior stroke, with typical imaging characteristics of a carotid web (Figure1). A similar asymptomatic abnormality was seen in the right ICA. Extensive investigations did not disclose any other cause for this man's recurrent stroke.
Results:

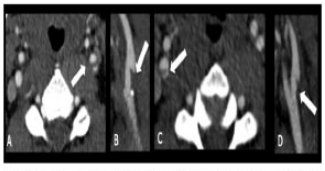


Figure 1. Bilateral carotid webs. CTA images of a 39-year-old male patient who presented with an acute left MI occlusion with a background history of a prior left MCA infarct. A and B: Axial and sagittal CTA images demonstrate a carotid web arising from the posterior wall of the proximal left internal carotid artery. C and D: Axial and sagittal CTA images demonstrate a carotid web arising from the posterior wall of the proximal right internal carotid artery.

Figure 1
Conclusion: Heightened awareness of carotid webs and their imaging features is needed to avoid overlooking this important cause of recurrent stroke. There is lack of consensus on most appropriate treatment, ranging from conservative treatment of asymptomatic cases to surgical intervention. Anti-thrombotic therapy is justified given the high risk of recurrent stroke.

AS28-032

RARE CAUSES, STROKE IN THE YOUNG

DE NOVO MUTATIONS IN CBL CAUSING EARLY-ONSET PEDIATRIC MOYAMOYA ANGIOPATHY

E. Tournier-Lasserve[1], S. Guey[2], L. Grangeon[3], F. Brunelle[4], J. Amiel[5], S. Lyonnet[6], B. Desnous[7], C. Bellesme[8], D. Hervé[9], J.C. Schwitalla[10], M. Kraemer[11] and M. Kossorotoff[12]
[1]France
[2]INSERM, U1161, Paris, France
[3]INSERM, U1161 Genetics, Paris, France
[4]AP-HP CHU Necker, Radiology, Paris, France
[5]AP-HP CHU NECKER, Genetics, Paris, France
[6]AP_HP CHU NECKER, Genetics, Paris, France
[7]AP-HP CHU Robert Debré, Neurpediatrics, Paris, France
[8]AP-HP CHU Kremlin Bicêtre, Neuropeditrics, Kremlin Bicêtre, France
[9]AP-HP Hôpital Lariboisière, Neurology, Paris, France
[10]Afried Krupp Hospital, Neurology, Essen, Germany
[11]Alfried Krupp Hospital, Neurology, Essen, Germany
[12]AP-HP CHU Necker, Neuropediatrics, Paris, France

Background and Aims: Moyamoya angiopathy (MMA) is characterized by a progressive stenosis of the terminal part of the internal carotid arteries and the development of abnormal collateral deep vessels. Its pathophysiology is unknown. MMA can be the sole manifestation of the disease (moyamoya disease) or be associated with various conditions (moyamoya syndrome) including some Mendelian diseases. We aimed to investigate the genetic basis of moyamoya using a whole exome sequencing (WES) approach conducted in sporadic cases without any overt symptom suggestive of a known Mendelian moyamoya syndrome.
Method: A WES was performed in four unrelated early-onset moya-moya sporadic cases and their parents (trios). Exome data were analyzed under dominant de novo and recessive hypotheses. A panel of 17 additional early onset moyamoya sporadic cases was available for mutation recurrence analysis.
Results: We identified two germline de novo mutations in *CBL* in two out of the four trio probands, two females presenting with an infancy-onset severe MMA. Both mutations were predicted to alter the ubiquitin ligase activity of the CBL protein that acts as a negative regulator of the RAS pathway. These two germline *CBL* mutations have previously been described in association with a developmental Noonan-like syndrome and susceptibility to Juvenile Myelomonocytic Leukemia (JMML). Notably, the two mutated girls never developed JMML and presented only subtle signs of RASopathy that did not lead to evoke this diagnosis during follow-up.
Conclusion: These data suggest that *CBL* gene screening should be considered in early-onset moyamoya, even in the absence of obvious signs of RASopathy.

AS28-033

RARE CAUSES, STROKE IN THE YOUNG

PHACE SYNDROME – A POLYMORPHIC CLINICAL ENTITY NOT ALWAYS BENIGN, CASE SERIES

C. Félix[1], H. Nzwalo[1], J.P. Vieira[2], S. Duarte[2] and E. Calado[2]
[1]Centro Hospitalar do Algarve, Serviço de Neurologia, Faro, Portugal
[2]Centro Hospitalar Lisboa Central, Hospital Dona Estefânia - Serviço de Neuropediatria, Lisboa, Portugal

Background and Aims: *P*osterior fossa malformations, *H*emangioma, *A*rterial anomalies, *C*ardiac defects, *E*ye anomalies *S*yndrome (PHACES) is rare but should be considered in any newborn with a large segmental facial hemangioma.
Method: Single center case-series description.
Results: Four cases were identified during 17 years. Table 1 describes demographics, clinical manifestations, treatment and evolution.

Sex	Age	Age at diagnosis	Posterior fossa malformations	Hemangioma: Side, Treatment, Evolution	Arterial anomalies (Side:findings)	Complications
Male	18years	1month	- Meningioangiomatosis - Left cerebellar cystic lesion - Left cerebellar hemisphere/cerebral pedinculus: hypoplasic	Left, Corticoid, Regression	Bilateral: - Left Internal Carotid Artery, Left Posterior Cerebral Artery: displasic-dilatation -Right Internal Carotid Artery: reduced caliber	- Mesencephalic hemorrhage at 2months - right hemiparesis, left hemicorea - Epilepsy(symptomatic)
Female	7years	4years	None	Left, Propanolol, Regression	Left: - Internal Carotid Artery, Left Middle Cerebral Artery (M1): Hypoplasic -Collateral moya-moya type circulation	None
Male	7years	4years	None	Right, Propanolol, Regression	Bilateral: - Right Carotid Artery: agenesis - Right Posterior Cerebral Artery and Posterior Communicating Artery: ectasia - Left Internal Carotid Artery and Left Vertebral Artery: ectasia	None
Female	11years	10years	Arnold-Chiari malformation type1	Left, Triamcinolone, Regression	Bilateral: - Aortic-cross: Aneurismatic-dilatation - Left Carotid Artery: reduced caliber -Left Internal Carotid Artery: stenosic, displasic - Left Vertebral Artery, Right Vertebral Artery: dilatation	None

Table1

Table1
Conclusion: Our case-series reflects the multiple presentations of PHACES. Revascularization is the main difficult decision during follow up. This was not considered due to the absence of progressive stenosis or asymptomatic ischemia. Multidisciplinary follow-up, including seriated angiographic studies, must be assured to monitor an eventual progression of the disease.

AS28-038

RARE CAUSES, STROKE IN THE YOUNG

NEUROSYPHILIS AND INTRACRANIAL ARTERIAL DOLICHOECTASIA: A TREATABLE CAUSE OF INFLAMMATORY VASCULOPATHY

D. Reges[1], V. Gagliardi[1], C. Rouanet[1], E. Rocha[1], R. Valiente[1] and G. Silva[1]
[1]Universidade Federal de São Paulo, Neurology, São Paulo, Brazil

Background and Aims: Intracranial arterial dolichoectasia is defined as an abnormal increase in the length and diameter of at least one intracranial artery. It was originally associated with some conditions, such as atherosclerosis and systemic hypertension, but is also related to metabolic, genetic and infectious causes.
Method: We describe a rare case of stroke secondary to neurosyphilis and intracranial arterial dolichoectasia.
Results: A 60-year-old white male presented with acute ischemic stroke of the left prefrontal cortex and reported having systemic hypertension and a previous ischemic stroke. Echocardiography, carotid and vertebral Doppler ultrasonography, and electrocardiogram were normal. Magnetic Resonance Angiography (MRA) showed important dolichoectasia of both carotids, vertebral and basilar arteries, with a fusiform aneurysm in middle cerebral artery (M1). Cerebral angiography confirmed this fusiform aneurysm, with a diameter of 11x10 mm (Figure 1). The patient further developed dementia and neurosyphilis was diagnosed based on serologic and cerebrospinal fluid results.
Conclusion: Syphilis is a known cause of vasculitis, although intracranial dolichoectasia and aneurysms are a rare complication of this disease and

few cases have been reported yet. Because the diagnostic tests for Shyphilis are cheap and largely available, we suggest that evaluation for this disease should be included in the investigation of patients with marked intracranial dolichoectasia.

AS28-039

RARE CAUSES, STROKE IN THE YOUNG

A RARE CASE OF CONCURRENT SPINAL AND POSTERIOR CIRCULATION STROKE

B. BHASKARAN[1], A. SAULAT[1] and S. HOPE[1]
[1]South Devon Healthcare NHS Foundation Trust, Stroke Medicine, Torquay, United Kingdom

Background and Aims: Introduction: Patients presenting with concurrent posterior circulation and spinal infarcts can be a diagnostic challenge and is a rare possibility. We present the case of an ischemic stroke in a young Caucasian farmer.
Method: Case: 50 year old male presented with sudden onset pain over right neck radiating to both arms. He had weakness in his right hand along with pins and needles in both arms. Three weeks earlier he had pressure sensation behind right eye and neck with associated vertigo. His examination showed weakness of right upper and lower limbs with grade 4 power, decreased sensation in right arm and ataxia on gait examination. His CT brain scan was normal and subsequent CT angiogram showed no vascular abnormality. Clinical diagnosis was posterior circulation stroke. An MRI of head and cervical spine along with MRA showed right cerebellar ischemic stroke and patchy signal change in the cervical cord confined to anterior spinal artery territory at C3 & C4 level consistent with an ischemic infarct. There was also evidence of high signal in the right vertebral artery likely to represent a dissection.
Results: Findings of cerebellar and cervical spine infarcts together with a history of neck pain pointed to the diagnosis of a right vertebral artery dissection resulting in emboli to right cerebellum and cervical spine.
Conclusion: It is well known that cervical arterial dissection is a common cause of stroke in young especially with neck pain and as this case shows this can be rarely associated with spinal infarcts.

AS28-040

RARE CAUSES, STROKE IN THE YOUNG

FOCAL CEREBRAL ARTERIOPATHY: A WELL-CHARACTERIZED CAUSE OF STROKE IN PEDIATRIC AGE

A. De Alboniga-chindurza[1], A. De Felipe[1], S. Garcia-madrona[1], C. Anciones[1], F. Acebron[1], S. Sainz De La Maza[1], C. Matute[1], R. Vera[1], A. Cruz[1] and J. Masjuan[1]
[1]Hospital Ramon Y Cajal, Neurology, Madrid, Spain

Background and Aims: Focal cerebral arteriopathy is an uncommon cause of stroke in pediatric age. This idiopathic clinical syndrome consists of unilateral intracranial arteriopathy involving distal carotid artery and proximal segments of middle and anterior cerebral artery. We present our clinical experience in the management of this entity.
Method: We present 3 cases of girls with ages between 10 and 16 years old, admitted to our center with the diagnosis of acute ischemic stroke between 2013 and 2016. Complementary tests including angiography and their evolution, were consistent with the diagnosis of focal cerebral arteriopathy.
Results: At initial evaluation their National Institute of Health Stroke Scale (NIHSS) score was 16 or greater. One patient received intravenous thrombolysis treatment, the other two were beyond the time window. Another patient underwent endovascular treatment 8 hours from stroke onset. In all cases, the angiographic studies showed supraclinoid carotid and ipsilateral proximal middle cerebral artery involvement, which consisted of focal stenosis. Radiological worsening at 6 months was observed in one patient, without clinical relevance. All patients had characteristic lenticulostriate infarction demonstrated on MRI. A complete etiological study was performed, with no additional findings. None presented new ischemic events and all showed a trend for clinical improvement.
Conclusion: Focal cerebral arteriopathy is a typical pediatric disease with a characteristic vascular involvement pattern. It has an overall good prognosis, although it is necessary to consider the possibility of radiological worsening.

AS28-042

RARE CAUSES, STROKE IN THE YOUNG

IMPROVING AWARENESS AND SKILLS IN THE EARLY DIAGNOSIS OF CEREBRAL VENOUS THROMBOSIS

V.M. Vedana[1], A.P. Dutra[2], L.P. Conzatti[1], P.C. Gasperin[1], L.C.P. Marrone[1], W.A. Martins[3], R.D.A. Cristovam[1], G. Tomasi[1], M.E. Zandona[1], B.C.D. Portal[1], J.C. da Costa[1] and A.R. Massaro[1]
[1]BraIns- Pontifícia Universidade Católica do Rio Grande do Sul, Neurology, Porto Alegre, Brazil
[2]BraIns- Pontificia Universidade Católica do Rio Grande do Sul, Neurology, São Paulo, Brazil
[3]BraIns- Pontifícia universidde Católica do Rio Grande do Sul, Neurology, Porto Alegre, Brazil

Background and Aims: Current diagnosis of cerebral venous thrombosis (CVT) is limited because early signs and symptoms are usually nonspecific and can be missed. Our study explores changes in knowledge and skills for the early diagnosis of CVT at the same neurological center during a 10- year interval.
Method: All consecutive patients with diagnosis of CVT were analyzed in a single university hospital from 1996 to 2006. The cohort was divided in two sub-cohorts: the early cohort (EC) - 1996–2000 and the late cohort (LC) - 2001–2006. Demographic, clinical and neuroimaging features and outcome (modified Rankin Scale: mRS) were compared between the groups (EC vs. LC).
Results: There were 111 patients evaluated during 10 years. Demographic features did not differ. The percentage of women using oral contraceptive was higher in the LC (80.4%) compared to the EC (60.6%) ($p = 0.046$). Time interval between the onset of symptoms and diagnosis of CVT has been reduced throughout the time (Spearman correlation coefficient $r = -0.440$, $p < 0.001$). Median time to diagnose CVT decreased from 15 (EC) to 5 days (LC). Headache was the main presenting symptom of CVT (EC = 91.5% x LC = 100%; $p = 0.01$). Deep venous thrombosis (EC = 48.9% x LC = 14.1%; $p < 0.001$) were more common in the EC. All the 6 deaths occurred in the EC ($p = 0.012$)
Conclusion: Raising awareness of CVT signs and symptoms may increase early recognition of less severe patients and improve outcome.

AS28-043

RARE CAUSES, STROKE IN THE YOUNG

"Multiple sclerosis and brain vascular events: is a relapse another cause of stroke chameleons?"

D.M. Ana[1], S. Pérez-Sánchez[1], R. De Torres Chacón[1], M.A. Gamero García[1], G. Navarro Mascarell[1], D. Páramo Camino[1], G. Izquierdo Ayuso[1] and J. Montaner[1]
[1]Hospital Universitario Virgen Macarena, Neurology, Sevilla, Spain

Background and Aims: There is an insufficient knowledge about the relationship between stroke and multiple sclerosis (MS). An early diagnosis of stroke instead of a MS relapse could allow the possible use of the hyperacute treatments.
Method: We collected data from 1,000 MS patientsduring last two years and reviewed the neurovascular related hospitalizations. Brain neuroimaging, carotid and cardiac studies were obtained. NIHSS and Rankin scores were recorded. Clinical description of each episode is given.
Results: Among seven hospitalizations in the Stroke Unit we detected 4 strokes, 2 other vascular events and one patient with stroke mimic due to a real MS relapse. The medium age was 45 years old. The medium NIHSS at discharge was 5 and mRS changed from 2 before stroke to 3 at third month after the event. Vascular risk factors were detected in 50% of patients although only one was receivingpreventive antiplatelets. Three cases of lacunar stroke were registred and the remaining infarct was due to left carotid stenosis. Despite the acute focal neurological signs all were oriented as MS relapses at the emergency department and no patient received acute reperfusion treatments due to delayed diagnosis. The 2 remaining cases were: a brain venous thrombosis with an underlying arteriovenous malformation and a posterior reversible encephalopathy syndrome.
Conclusion: Stroke chameleons may result in patients not receiving appropriate care. MS relapses may be among those chameleons. A multimodal TC for an early diagnosis of stroke to manage the hyperacute treatment of stroke and preventive antiplatelets should be evaluated in these patients.

AS28-044

RARE CAUSES, STROKE IN THE YOUNG

CLINICAL RESULTS ACCORDING TO STROKE ETIOLOGY IN PATIENTS UNDER 50 YEARS WITH ISCHEMIC STROKE

S. Canbaz Kabay[1], M. Cetiner[1], H.E. Aydın[2] and O. Temel[1]
[1]Dumlupinar University Faculty of Medicine- Kutahya- Turkey., Department of Neurology, KÜTAHYA, Turkey
[2]Dumlupınar University Faculty of Medicine, Department of Neurosurgery, KÜTAHYA, Turkey

Background and Aims: The incidence of stroke has increased in people under 50 years of age, in recent years. The common causes in this age group are cardioembolism, arterial dissection and atherosclerosis. The aim of this study is to determine the distribution of stroke etiologic subtypes, risk factors, and short/long-term clinical outcomes according to stroke etiology under 50 years of age with ischemic stroke.
Method: We retrospectively reviewed the records of 50 ischemic stroke patients aged under 50 years who were admitted to our neurology clinic between 2012–2016. Patients were grouped according to the etiological classification of TOAST(Trial of Stroke-Org10172 in Acute Stroke Treatment). National health institute stroke scale (NIHSS) and modified Rankin scale (mRS) scores after 3rd months were evaluated during hospitalization and at the discharge. All patients underwent CranialCT/MR imaging, transthoracal/transesophageal echocardiography, ECG, carotid/vertebral ColorDoppler/US, cerebral angiography (if needed), detailed cardiac examinations with routine-blood tests and vasculitis panel.
Results: Twenty-six(52%) of the patients were male and 24(48%) were female and the mean age was 40.88 ± 7.09(17–50). In the total patient population, large arterial atherosclerosis was detected in 9 patients (18%), cardioembolic stroke in 16 patients (32%), lacunar infarction in 4 patients (8%),stroke due to other causes in 11 patients (22%) and undetermined stroke in 10 patients. Among these groups, NIHSS scores at the time of hospital admission and discharge and also mRS scores at the 3rd month between groups were compared but no statistical significance was found.
Conclusion: According to our results, among young ischemic stroke causes, cardioembolism was the main risk. Stroke severity and the short-and-long term prognosis showed no difference.

AS28-045

RARE CAUSES, STROKE IN THE YOUNG

BRAIN MAGNETIC RESONANCE ANGIOGRAPHY IN PATIENTS WITH TRANSIENT GLOBAL AMNESIA

L. Guarnieri[1], R. Miranda[1], N. Keila[1], R. Morgulis[1] and G. Silva[1]
[1]Hospital Israelita Albert Einstein, Programa Integrado de Neurologia, São Paulo, Brazil

Background and Aims: Transient global amnesia (TGA) is a well-described condition. It manifests with a paroxysmal and transient loss of memory. The underlying cause of TGA is still unknown however, venous congestion and arterial thromboembolic events have been questioned. Our objective was therefore to describe the findings of intracranial and extracranial vessel evaluation in patients with TGA.
Method: We evaluated all consecutive patients admitted with TGA to a tertiary hospital from January 2010 to July 2016. A clinical neurologist evaluated and confirmed the diagnosis in all patients. Medical records and neuroimaging data were retrospectively reviewed. Significant intracranial or extracranial arterial stenosis was defined as a more than 50% stenosis or vessel occlusion present on magnetic resonance angiography (MRA). All neuroimaging exams were evaluated by two board certified neuroradiologists.
Results: A total of 33 patients (mean age 61.30 +/- 10.1, 66.7% males) were evaluated. The most common vascular risk factor was hypertension (60.6%), followed by dyslipidemia (30.3%), diabetes (30.3%) and atrial fibrillation (3%). Eleven patients (33%) presented focal hippocampal signal hyperintensities on the DWI sequence. None of the patients had significant intracranial or extracranial arterial stenosis or occlusions detected by MRA. Other neuroimaging findings included a possible fibromuscular dysplasia (3.3%), one patient with a basilar artery megadolichoectasia (3.3%) and two patients with capillary telangiectasias (6%).
Conclusion: In conclusion, intracranial and extracranial arterial stenoses or occlusion were not present in this series of patients with acutely admitted with TGA. Our results do not support an ischemic arterial etiology of TGA. Other pathophysiologic mechanisms need to be further explored.

AS28-047

RARE CAUSES, STROKE IN THE YOUNG

CASE REPORT: STROKE SECONDARY TO OTITIS MEDIA

G. Ahmed[1] and J. Mc Manus[2]
[1]University Hospital Limerick, Internal medicine, limerick, Ireland
[2]universityn hospital limerick, geriatric medicine, limerick, Ireland

Background and Aims: A 16-year-old male presented with mild left upper limb weakness, right parietal headache, bilateral papilloedema and a GCS of 13/15. There was no fever, rash, seizures, meningial signs or hemodynamic instability. Past medical and family histories were unremarkable. Otoscopy showed right-sided otitis media.
MethodResultsFull blood count, prothrombin time, partial thromboplastin time, renal, and liver profiles were normal. D-Dimer was 1.25 (normal range <0.5). ANA/ANCA, anti-phospholipid and syphilitic screen were negative. Protein C and S were normal. A brain computed tomography scan showed no acute abnormality. An MRI-brain scan with contrast showed right-sided mastoditis and a non-occlusive thrombus in

right transverse and sigmoid sinuses [figure 1]. A diagnosis of a stroke secondary to cerebral venous thrombosis as a complication of otitis media was made. Warfarin in addition to a two-week course of Ceftiazedime and Vancomycin were given. Symptomatic and motor improvement was evident within 48 hours of therapy. At three months follow-up, normal motor examination was noted. A three months follow-up MRI-brain scan showed marked decrease in thrombus size [figure 2]. Warfarin therapy continued for a total of six months.

Conclusion: Stroke secondary to dural sinus thrombosis is uncommon and accounts for 5 % of cases especially in young individuals 1. Otitis media with mastodidtis is linked and rarely reported 2. Given the diversity in presentation, the diagnosis depends on a high degree of clinical suspicion and radiological evaluation 3. Motor weakness has been reported in 37 percent of patients 4. Antithrombotic treatment is safe and leads to favourable functional outcomes 5.

AS10-001

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

THE BENEFITS OF INTER-PROFESSIONAL TRAINING FOR STROKE REHABILITATION

J. Birns[1], H. Haran[1], M. Patel[2] and A. Bhalla[1]
[1]Guys and St Thomas' NHS Foundation Trust, Ageing & Health, London, United Kingdom
[2]University Hospital Lewisham, Elderly Medicine, London, United Kingdom

Background and Aims: Delivering high quality stroke rehabilitation is dependent on a coordinated multidisciplinary team approach but education for members of such teams has traditionally been unidisciplinary, with interprofessional training lacking.

Method: A multidisciplinary working party of stroke clinicians and educationalists formulated a blended, multi-modal, inter-professional stroke rehabilitation training programme. Using previously validated assessment tools, a mixed-methods evaluation of interprofessional learning modalities was used to analyse data from participants before and after training. This included both quantitative analysis from pre- and post-course questionnaires and thematic analysis of free-text responses about the course's educational value and learning experience.

Results: 83 individuals (28% nurses; 17% occupational therapists; 15% dieticians; 13% physiotherapists; 8% doctors; 5% speech and language therapists; 15% not from health care backgrounds e.g. social worker, volunteer) completed the training. 82% of participants reported the inter-professional opportunity being the reason for involvement and 64% reported the multi-professional approach to provide a more effective method of education. Mean rating for the benefit of the course was 89%. Mean increase in confidence level for the topics taught was 11% (range: 5–18%) with management of continence, cognition and pain being the most commonly reported subjects for learning. 94% of attendees reported learning in areas that had potential for improving practice.

Conclusion: There is an appetite among stroke health care professionals for inter-disciplinary education. This course received favourable feedback and attendees reported improved confidence in all domains taught with an emphasis on experiential learning opportunities. The challenge is to develop a standardised programme that may be delivered across multiple sites.

AS10-002

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

PERIVENTRICULAR WHITE MATTER LESIONS AS A PROGNOSTIC FACTOR OF SWALLOWING FUNCTION IN OLDER PATIENTS WITH MILD STROKE

H.I. Moon[1], J.S. Nam[1], M.J. Leem[1], K.H. Kim[1], H.J. Lee[2] and Y. Lee[3]
[1]Bundang Jesaeng General Hospital, Department of Rehabilitation Medicine, Seong-nam si- Gyounggi-do, Republic of Korea
[2]National Rehabilitation Center, Department of Rehabilitation Medicine, Seoul, Republic of Korea
[3]H+ Yang-ji Hospital, Department of Rehabilitation Medicine, Seoul, Republic of Korea

Background and Aims: Older patients with stroke have poor functional prognosis compared to younger patients. Patients with stroke who have severe white matter (WM) lesions have been reported to have poor functional prognosis such as cognitive dysfunction, increased propensity for falling, and gait and balance problems. The aim of this study was to determine whether WM lesions exert negative effects on swallowing function in older patients with mild stroke.

Method: We conducted a retrospective analysis of 63 patients aged >65 years who had a National Institutes of Health Stroke Scale score ≤ 5 and who underwent videofluoroscopic swallowing examination after their first stroke.

Results: Linear regression analysis showed that oral transit time tended to increase as Fazekas grade increased ($p = 0.003$). In addition, inadequate mastication was related to the presence of lesions in the left hemisphere ($p = 0.039$). The presence of penetration could also be predicted by Fazekas grade ($p = 0.015$).

Conclusion: Our findings suggest that WM lesions observed in brain magnetic resonance imaging scans can impact swallowing problems in older patients with mild stroke, regardless of initial stroke severity or other factors associated with lesion location. Accordingly, our data indicate that WM lesions are a predictive factor by which patients can be stratified into favorable or unfavorable outcomes with respect to dysphagia.

AS10-003

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

UPRIGHT MOTOR CONTROL TEST: INTERRATER RELIABILITY, RETEST RELIABILITY, AND CONCURRENT VALIDITY IN ADULTS WITH SUBACUTE STROKE

M.A. Gelisanga[1] and E.J. Gorgon[2]
[1]Philippine General Hospital, Rehabilitation Medicine, Manila, Philippines
[2]University of the Philippines Manila, Physical Therapy, Manila, Philippines

Background and Aims: The Knee Extension and Knee Flexion subtests of the Upright Motor Control Test (UMCT-KE and UMCT-KF, respectively) have been purported to assess total voluntary control of the hemiplegic lower limb in the standing position. However, little is known about the UMCT's measurement properties. This study examined interrater and retest reliability, and concurrent validity with the Motricity Index (MI) of the UMCT-KE and UMCT-KF in adults with subacute stroke.

Method: A methodological study design was applied. Participants were conveniently sampled from a government-run general hospital in Manila,

Philippines. Fifty adults with subacute stroke (mean, SD age = 51, 12 years; mean, SD time post-stroke = 68, 48 days) participated. Three physical therapists independently administered the UMCT-KE and UMCT-KF to patients at baseline and after two days. A fourth rater administered the MI Leg subscale on the second testing session. Measurements were conducted under similar testing conditions.

Results: On both testing occasions, excellent interrater reliability was estimated for both the UMCT-KE (ICC range = 0.821–0.848) and UMCT-KF (ICC range = 0.818–0.779). Retest reliability was consistently excellent across raters for both subtests (ICC range = 0.834–0.964). UMCT-KE and UMCT-KF scores correlated strongly with MI Leg scores ($\rho = 0.747$ and 0.775, respectively) and moderately with MI knee extension scores ($\rho = 0.633$ and 0.669, respectively).

Conclusion: The UMCT-KE and UMCT-KF are reliable and valid tests for measuring lower limb strength in adults with subacute stroke. Strong correlations with MI Leg scores support previous literature that UMCT knee subtest scores represent total voluntary limb control. The UMCT knee subtests are clinically relevant tests that should be used in subacute stroke rehabilitation.

AS10-005

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

IN THE DRIVER'S SEAT: A RETURN-TO-DRIVING AFTER STROKE E-LEARNING MODULE

J. Frith[1], C. James[2], I. Hubbard[3] and H. Warren-Forward[2]
[1]Newcastle, Australia
[2]University of Newcastle- Australia, School of Health Sciences, Newcastle, Australia
[3]University of Newcastle- Australia, School of Medicine and Public Health, Newcastle, Australia

Background and Aims: In Australia, 60,000 people experience a stroke each year. Stroke can impact the motor, cognitive and visuoperceptual skills required to safely operate a car. Stroke survivors have a four-week driving restriction and those with TIA a two-week restriction. Less than 50% of stroke survivors receive advice on return-to-driving. This paper introduces an e-learning module on returning to driving after stroke. This is an Australian-first initiative aimed to bridge the practice-evidence gap that exists in the management of driving after stroke and TIA.

Method: A 30-minute e-learning module was developed based on Australian return-to-driving guidelines. The e-learning module included development, pilot and implementation phases. A pre- and post-module knowledge test was used to assess the success of the e-module in achieving its learning objectives. During the implementation phase, an additional survey was included to assess any behaviour change resulting from completion of the module.

Results: In the first four months, 204 learners completed the module, with 68% (n = 139) scoring 100% in the post-module knowledge test. The most common errors were questions around commercial licensing standards. In the implementation phase, 12 learners completed the additional behaviour-change survey and these were predominately occupational therapists (75%, n = 9). An additional 400 learners have completed the module since this time.

Conclusion: The e-module is the first of its kind in Australia and could be adopted by other countries with similar return-to-driving guidelines. Ongoing promotion of the e-learning module is required, particularly with the variety of health professionals involved in stroke care.

AS10-006

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

DECANNULATION AND FUNCTIONAL OUTCOME AFTER TRACHEOSTOMY IN PATIENTS WITH SEVERE STROKE (DECAST): A PROPSECTIVE OBERVATIONAL STUDY

H. Schneider[1], F. Hertel[2], M. Kuhn[3], M. Ragaller[4], B. Gottschlich[4], A. Trabitzsch[5], M. Dengl[6], M. Neudert[7], H. Reichmann[1] and S. Wöpking[1]
[1]University Hospital- TU Dresden, Department of Neurology, Dresden, Germany
[2]TU Dresden, Faculty of Medicine, Dresden, Germany
[3]TU Dresden, Institute for Medical Informatics and Biometry-, Dresden, Germany
[4]University Hospital- TU Dresden, Department of Anesthesiology and Intensive Care Therapy, Dresden, Germany
[5]University Hospital- TU Dresden, Surgery Center, Dresden, Germany
[6]University Hospital- TU Dresden, Department of Neurosurgery, Dresden, Germany
[7]University Hospital- TU Dresden, Department of Otorhinolaryngology, Dresden, Germany

Background and Aims: Tracheostomy is performed in ventilated stroke patients affected by persisting severe dysphagia, reduced level of consciousness or prolonged mechanical ventilation. We aimed to determine the frequency and predictors of successful decannulation and long-term functional outcome in tracheotomized stroke patients.

Method: A prospective single-centre observational study was conducted recruiting ventilated patients with ischemic stroke, intracerebral hemorrhage and subarachnoid hemorrhage. Follow-up visits were performed at hospital discharge, 3 months and 12 months. Univariate and multivariate competing risks analyses were performed to identify predictors of decannulation.

Results: We included 53 ventilated stroke patients subject to tracheostomy. At one year after tracheostomy 35.8% of the patients were decannulated (median time to decannulation 74 [IQR: 58–117] days), 24.5% were permanently cannulated and 39.6% of the patients died without prior removal of the cannula. Independent predictors for decannulation in our cohort were patient age (HR 0.95 [0.924–0.979] per one year increase, $p < 0.0007$), supratentorial stroke (HR 6.13 [1.28–29.41] compared to infratentorial, $p = 0.024$) and absence of sepsis (HR 4.44 [1.72–11.46], $p = 0.0021$). Decannulated patients, compared to surviving patients without cannula removal, had an improved functional outcome after one year (median mRS 4 vs. mRS 5, median Barthel index 35 vs. 5).

Conclusion: Decannulation can be achieved in 59.4% of stroke patients surviving the first 12 months after tracheostomy and is associated with better functional outcome compared to patients without decannulation. Early estimation of the probability of successful decannulation, using factors like patient age, stroke lesion level and presence of sepsis, might guide clinicians in selecting stroke patients for tracheostomy.

AS10-007

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

FACTORS ASSOCIATED WITH PHYSIOTHERAPY PROVISION TO HOSPITALISED STROKE PATIENTS- ANALYSIS OF SSNAP DATABASE

M. McGlinchey[1], L. Paley[2], A. Rudd[1,3] and A. Hoffman[2]
[1]Guy's and St Thomas' NHS Foundation Trust, Stroke Unit, London, United Kingdom
[2]Royal College of Physicians, Clinical Effectiveness and Evaluation Unit, London, United Kingdom
[3]King's College London, Primary Care & Public Health Sciences, London, United Kingdom

Background and Aims: There is strong evidence that physiotherapy can optimise functional outcomes post-stroke. However, it is unclear how different patient factors influence its provision. If this evidence was available, physiotherapy sessions could be tailored to optimise functional recovery and minimise disability. The aim of this descriptive study was to investigate factors associated with physiotherapy provision to hospitalised stroke patients using a large national stroke patient register.
Method: Data analysed were for stroke patients admitted to hospital in England, Wales and Northern Ireland between April 2013 and March 2015 recorded on the Sentinel Stroke National Audit Programme national stroke register (SSNAP). Associations between different patient factors, amount of physiotherapy and applicability for physiotherapy were measured. Median hospital length of stay was also compared for each patient factor.
Results: 146,667 patients were included in the analyses. 81% of patients were functionally independent prior to their stroke and 74% of patients had a very mild or mild stroke. Findings suggested that more intense physiotherapy provision was associated with younger age, being male, less pre-morbid disability and stroke severity, having an infarction and being thrombolysed, fewer medical complications, surviving $\geq$30 days post-stroke, and being discharged with early supported discharge rehabilitation ($p < 0.001$). With the exception of the last two factors (time of mortality and discharge rehabilitation support), these factors were associated with shorter median hospital length of stay ($p < 0.001$).
Conclusion: A number of identified patient factors have been identified that influence physiotherapy provision to stroke patients. Awareness of these factors is important when tailoring physiotherapy sessions.

AS10-008

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTORS OF BALANCE RECOVERY AND GAIT VELOCITY CHANGE AFTER REHABILITATION IN STROKE PATIENTS

H.I. Moon[1], H. Lee[2], Y. Lee[3] and J.H. Lee[4]
[1]Bundang Jesaeng General Hospital, Department of Rehabilitation Medicine, Seong-nam si- Gyounggi-do, Republic of Korea
[2]National Rehabilitation Center, Department of Rehabilitation Medicine, Seoul, Republic of Korea
[3]H+ Yang-ji Hospital, Department of Rehabilitation Medicine, Seoul, Republic of Korea
[4]Korea Su Medical Clinic, Department of Rehabilitation Medicine, Seoul, Republic of Korea

Background and Aims: Impaired gait function after stroke contributes strongly to overall disability. However, the response to rehabilitation varies between individuals. The aim of the study is to identify predictors of gait velocity change.
Method: We reviewed 82 patients with stroke. The patients were divided into 2 groups according to gait ability post rehabilitation and we analyzed the differences of the characteristics such as demographic factors, lesion factors and initial balance function. 10 m walk velocity and Berg balance scale (BBS), functional ambulation category (FAC) was assessed at baseline and post rehabilitation. Linear regression analyses were performed to examine the predictors of response to rehabilitation. Lesion location and volume were measured on brain magnetic resonance images. We generated statistic maps of lesion related to gait velocity change using voxel-based lesion symptom mapping (VLSM).
Results: The group of patients who regained independent ambulation function showed the smaller lesion size, shorter duration from stroke onset, higher initial balance function. In regression model, gait velocity changes were predicted with initial BBS and duration post onset. Absolute BBS changes were also correlated with duration post onset and relative BBS changes were predicted with lesion volume. Using VLSM, lesion location associated with gait velocity change were insula, internal capsule and adjacent white matter.
Conclusion: Initial balance function and lesion volume as well as interval between stroke onset and therapy might affects on the balance recovery and gait velocity change. And gait velocity change after rehabilitation was affected by damage to insula and internal capsule.

AS10-010

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

DEPRESSIVE SYMPTOMS IN PATIENTS WITH POST-STROKE PAIN SYNDROMES

T.S. Mishchenko[1], O.V. Dmytriyeva[1] and O.Y. Kutikov[1]
[1]"Institute of Neurology- Psychiatry and Narcology of the NAMS of Ukraine" SI, Department of Brain Vascular Pathology, Kharkiv, Ukraine

Background and Aims: In post-stroke pain syndromes (PSPS), impairments of higher functions and mental health problems (asthenic, depressive-hypochondriac) are occurred frequently. These mental health problems stipulate a slowed-down restoration of patients' everyday life and social skills in the sufficient muscle strength. Sometimes patients with "pure sensory stroke" and pains due to emotional impairments are disabled more than patients with sensomotor impairments.
Method: In prospective study 69 post-stroke patients including 35 patients with PSPS were assessed with the Hamilton Depression Rating Scale (HAM-D).
Results: There are differences between patients with PSPS and patients without PSPS as concerns prevalence of the stages of depression: mild depression – 40.0% vs. 58.82%; moderate depression – 54.29% vs. 38.32%; severe depression – 5.71% vs. 2.94% of cases. In the structure of depressive symptoms in patients without PSPS, who mostly were critical regarding their conditions, somatic-autonomous symptoms, a feeling of a groundless worrying, sadness, and hopelessness predominated. For depressive symptoms in patients with PSPS along with psychoautonomous and somatic symptoms were characteristic a decreased ability to work and concentration, anhedonia, anepithymia, feelings of hopelessness, personal worthlessness, anxiety about the future, daily mood fluctuations.
Conclusion: A combination of chronic pain and depressive disorders in the post-stroke period results in formation of specific conditions based on "vicious circle", where pain and depression potentiate one another.

AS10-011

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

PREVALENCE OF DIFFERENT TYPES OF POST-STROKE PAIN

V.M. Mishchenko[1], K.V. Kharina[1] and I.M. Nikishkova[1]
[1]"Institute of Neurology- Psychiatry and Narcology of the NAMS of Ukraine" SI, Department of Brain Vascular Pathology, Kharkiv, Ukraine

Background and Aims: The post-stroke pain syndrome (PSPS) is one of complications of stroke. Among patients after stroke 30–40% develop PSPS. Due to significant stroke prevalence (up to 500 cases per 100,000 persons), an absolute number of patients with PSPS is high enough. Usually even a mild of moderate pain is a serious burden for patients as PSPS deteriorates their quality of life and can result in self-injuries or even suicides.
Method: In a retrospective study of 435 patients and a prospective study of 54 patients with PSPS, a prevalence of different PSPS types was evaluated using the Leeds Assessment of Neuropathic Symptoms and Signs (LANSS), Pain Visual Analogue Scale, Pain DETECT and DN-4 questionnaires.
Results: Among the patients examine 4 types of chronic PSPS were defined: central one (6.62–12.96%); PSPS associated with arthralgia (predominantly in shoulder joint) and the muscle-skeletal system (58.72–72.22%); headache (11.11–20.53%); and pain spasticity (14.14–50.00%). A patient can have several chronic PSPS types simultaneously; the most often this is a combination of arthralgia and pain spasticity, and headache. In 79.63% of patients PSPS was formed during first 3 months after stroke. Predictors of post-stroke pain were female gender, and a presence of comorbid pathology (diabetes mellitus, ischemic heart disease, atherosclerotic cardiosclerosis, and hyperlipidemia).
Conclusion: Thus, the most prevalent PSPS type was pain which was associated with damage of the locomotive system and formed during first 3 months after stroke. These data as well as the defined PSPS predictors should be taken into account in management of post-stroke patients.

AS10-014

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

GUSS TEST AS A DYSPHAGIA SCREENING TOOL AND ITS IMPACT ON THE FREQUENCY OF RESPIRATORY INFECTIONS IN PATIENTS WITH ISCHEMIC STROKE

M. Lopes[1], E. Freitas[2], J. Pinho[1], M. Oliveira[3], E. Dantas[4], N. Azevedo[4], P. Rodrigues[4] and C. Ferreira[1]
[1]Hospital de Braga, Neurology Department, Braga, Portugal
[2]Hospital Santa Luzia- Unidade Local de Saúde do Alto Minho, Neurology Department, Viana do Castelo, Portugal
[3]Hospital de Braga, Physical Medicine and Rehabilitation Department, Braga, Portugal
[4]Hospital de Braga, Intermediate Neurocritical Care Unit, Braga, Portugal

Background and Aims: Prevalence of dysphagia in acute stroke patients has been reported in up to two thirds of patients and is associated with a higher risk of respiratory infections and worse outcomes. Use of early dysphagia screening tests was associated with a lower risk of respiratory infection, however, the severity of dysphagia was not assessed. Our aim was to evaluate the impact of Gugging Swallowing Screen (GUSS), on the frequency of respiratory infections, mortality and functional outcome of ischemic stroke patients.
Method: Retrospective study of acute ischemic stroke patients admitted to the Stroke Unit between February/2014-October/2016, admitted before (non-GUSS group) and after (GUSS group) the systematic use of GUSS. Dysphagia in non-GUSS group was systematically tested with the water swallowing test. We compared baseline and stroke characteristics, respiratory infection occurrence and 3-month outcome.
Results: 302 patients with ischemic stroke were included (GUSS group- $= 127$). Mean age was 67.5 years and mean admission NIHSS was 12. There were no significant differences in baseline and stroke characteristics, intravenous thrombolysis or use of nasogastric tube between the two groups. Respiratory infection occurrence was similar between the two groups (25.7 vs 25.2%, $p = 0.919$) as well as the length of stay and 3-month outcome. GUSS score was an independent predictor of respiratory infection when adjusted for variables of interest (OR $= 0.83$, IC 95% $= 0.76$–0.90, $p < 0.001$).
Conclusion: Systematic use of GUSS did not reduce frequency of respiratory infection when compared to the water swallowing test. The severity of dysphagia measured by GUSS was an independent predictor of respiratory infection.

AS10-016

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

FEAR OF FALLING ACUTE AFTER STROKE: A PART OF THE FALL STUDY IN GOTHENBURG

A. Larén[1], A. Odqvist[1], P.O. Hansson[2] and C.U. Persson[1]
[1]Institute of Neuroscience and Physiology, Department of Rehabilitation Medicine- Sahlgrenska Academy- University of Gothenburg, Gothenburg, Sweden
[2]Institute of Medicine, Department of Molecular and Clinical Medicine-Sahlgrenska Academy- University of Gothenburg, Gothenburg, Sweden

Background and Aims: Fear of falling may negatively affect daily life in people with chronic stroke, but little is known about its prevalence and association to clinical variables acute after stroke. Therefore, the purpose was to describe the prevalence of fear of falling and related factors in the acute phase after stroke, 0–4 days after admission to a stroke unit.
Method: The study population consisted of those 462 consecutive patients with acute stroke included in The Fall study in Gothenburg (FallsGOT), who were able to answer the question regarding fear of falling: *"Are you afraid of falling?"* (Yes/No). To analyse any association between fear of falling and clinical variables during inpatient rehabilitation, a multivariable stepwise logistic regression was used.
Results: Among women 141 of 226 (60%) reported fear of falling compared to 96 of 236 men (41%), $p < 0.0001$. In women who fell during hospitalisation, 21 of 24 (88%) reported fear of falling. Corresponding figures among men was 22 of 34 (65%). The interaction between gender, fear of falling related to falls was non-significant. In the multivariable regression analysis, good postural control (odds ratio [OR] = 0.89, 95% confidence interval [CI] = 0.86–0.92, $p < 0.0001$), female gender (OR = 2.32, 95% CI = 1.50–3.59, p 0.0002) and the use of walking aids (OR = 4.10, 95% CI = 2.63–6.38, $p < 0.0001$) were statistical significant associated with fear of falling acute after stroke.
Conclusion: Fear of falling is common among patients in the acute phase after stroke. Impaired postural control, being female and using walking aids increase the probability for fear of falling acute after a stroke.

AS10-017

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

HOW DO THERAPISTS SELECT REHABILITATION INTERVENTIONS? SELECTED FINDINGS FROM REACT, AN ETHNOGRAPHIC CASE STUDY SERIES IN EIGHT ENGLISH STROKE UNITS

L.J. Burton[1] and D.J. Clarke[1]
[1]Academic Unit of Elderly Care and Rehabilitation, University of Leeds, Leeds, United Kingdom

Background and Aims: A key feature of stroke unit care involves evidence-based interventions delivered by physiotherapists (PT), occupational therapists (OT) and speech and language therapists (SLT). We aimed to explore the content of post-stroke therapy as part of a wider study exploring therapy provision.
Method: Non-participant observations in eight in-patient stroke units. Content was classified using a previously developed schedule. Decision-making around intervention content was explored in semi-structured interviews with staff, analysed using the Framework approach.
Results: 197 staff and 77 patients were observed across 433 sessions; 130 staff were interviewed. PT activity (165 sessions) primarily focused on mobility (64%), balance (62%), incorporating mobilisation (40%) and selective movements (45%). OT sessions (n = 136) were more varied, showing some overlap with physiotherapy in upper limb activity (41%) and mobility (28%), but with additional focus on personal (33%) and domestic (25%) activities and cognition (24%). SLT sessions (n = 51) were more discrete, focussing on assessment of communication (43%) and swallowing (24%). OTs and PTs reported drawing on their prior clinical experience, and comparison of patients' previous levels of function with findings from continuous assessment, to select appropriate interventions. Few described accessing evidence on the effectiveness of interventions; barriers to evidence-based practice included lack of resources. Many SLTs felt their role was assessment-focused in the hospital setting with intensive communication intervention more suited to longer-term rehabilitation.
Conclusion: Analysis of therapy session content confirmed some overlap between OT and PT with a separate and distinct role for SLT. Interviews revealed that intervention selection was more reliant on clinical reasoning than research evidence.

AS10-018

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

BRIDGING THE RURAL- URBAN DIVIDE; SUCCESSFUL IMPLEMENTATION OF EARLY SUPPORTED DISCHARGE MODEL AFTER STROKE IN THE WEST OF IRELAND

M. Costello[1], C. Breen[1], M. Chawke[1], C. McMahon[1], C. Judge[1], K. Donlon[1], T. Walsh[1] and M. O'Donnell[1]
[1]Galway University Hospital, Geriatric and Stroke Medicine, Galway, Ireland

Background and Aims: Early Supported Discharge (ESD) services after stroke aim to accelerate discharge home, by providing intensive rehabilitation to avoid a prolonged in-patient stay. Although recommended in international clinical guidelines, evidence to date supports domiciliary-based rehabilitation in urban areas only. In response to the high numbers of rural dwellers within our catchment area, an alternative ESD service model was developed, combining domiciliary and out-patient rehabilitation.
Method: 81 patients participated in ESD during 2014–2016. A retrospective audit was completed comparing urban and rural participants comparing demographics, length of programme time and functional outcome.
Results: 50 patients were within the urban catchment, 10 living alone compared to 31 within in the rural catchment with 2 living alone. The total group had a median age of 71 years (+/-18). 59 patients were discharged directly from the acute hospital while 22 were discharged from the rehabilitation unit. The median number of bed days saved was 10 (+/- 9)
The Functional Independence Measure (FIM) was available for 37 patients. The average improvement in FIM score was 8.7 between patients pre and post-ESD ($p < 0.001$). We found no significant difference between the urban and rural groups at baseline, at discharge or for overall gains.
Conclusion: Rural dwellers in our ESD service had equivalent functional outcomes to those within the traditional ESD population demonstrating that this model is both effective and feasible to deliver. Our findings suggest that further exploration of this service model should be considered in other centers with a similar catchment profile.

AS10-020

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

HOW IS THE INITIAL EXERCISE PRESCRIPTION DETERMINED IN STROKE STUDIES?

L. Johnson[1,2,3], S. Kramer[1,3], T. Kaffenberger[1,3] and J. Bernhardt[1,3]
[1]The Florey Institute of Neuroscience and Mental Health, Stroke Division, Melbourne, Australia
[2]Australian Catholic University, Faculty of Health Sciences, Melbourne, Australia
[3]The Florey Institute of Neuroscience and Mental Health, Centre of Research Excellence in Stroke Rehabilitation and Brain Recovery, Melbourne, Australia

Background and Aims: A recent Cochrane review which assessed the effectiveness of fitness training after stroke found cardiorespiratory fitness (CRF) training improved fitness levels and walking ability. However, it remains unclear what the most effective prescription of physical fitness training is after stroke. We aimed to describe the methods used to determine initial exercise training prescription in the studies included in the review.
Method: Two reviewers independently screened studies included in the Cochrane review titled "Physical fitness training for stroke patients" for eligibility using the following criteria: 1) included participants <3 months' post-stroke; 2) tested CRF, strength, task-specific exercises or a combination of the three. Studies were excluded if they only included task-specific upper limb exercises. Two reviewers independently extracted data including patient characteristics, rationale for, and details of, the initial exercise prescription parameters (frequency, intensity, time and type).
Results: We screened 54 studies and included 17 in this review (median sample size = 37, median days' post-stroke = 34). These included CRF (n = 5), strength (n = 4) task-specific (n = 1) and combined (n = 7) interventions. Ten studies were identified as pilot studies, one study reported all four exercise prescription parameters, and in 10 studies, no parameters were reported. A pre-intervention exercise capacity test was performed in one CRF study, one strength study and three combined intervention studies.
Conclusion: The reporting of early post-stroke exercise training interventions is poor. Intervention rationale, initial exercise prescription and the methods used to determine this prescription need to be reported more clearly for research to be replicated and translated into clinical practice.

AS10-021

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

MOTOR LEARNING IN ACUTE STROKE

Y. Vandermeeren[1,2,3], M. Yeganeh Doost[1,2,3], A. Riga[1,2,3], B. Bihin[4], P. Laloux[1,3] and M. Baguma[1,5]
[1]Université catholique de Louvain UCL- CHU UCL Namur, Neurology, Yvoir, Belgium
[2]Université catholique de Louvain UCL, Louvain Bionics, Louvain-la-Neuve, Belgium
[3]Université catholique de Louvain UCL- Institute of NeuroScience IoNS, NEUR division, Brussels, Belgium
[4]Université catholique de Louvain UCL- CHU UCL Namur, Scientific Support Unit USS, Yvoir, Belgium
[5]Université Catholique de Bukavu UCB- Faculty of medicine, Department of internal medicine, Bukavu, Democratic Republic of the Congo

Background and Aims: The most dynamical recovery is consistently observed during the (sub-)acute stroke phase. Beyond a cascade of metabolic and genetic events, part of this spontaneous recovery is driven by brain plasticity. It is currently unknown whether, during the (sub-)acute phase, stroke patients are able to acquire "new" motor skills with the paretic upper limb. This question is crucial for neurorehabilitation. The aim of this study was to quantify the amount of motor skill learning and retention that hemiparetic stroke patients could achieve during the (sub-)acute phase.
Method: Over 364 consecutively screened patients, 14 hemiparetic patients were included between day 1 and day 7 post-stroke (4 ± 3). They completed a 3-consecutive-days (D1-D3) motor skill learning protocol, moving a cursor in a circuit through a computer mouse controlled by the paretic hand, with a speed/accuracy trade-off (SAT). A Learning Index (LI) was computed, reflecting a normalised % change of SAT compared to baseline performance.
Results: Except one patient whose LI worsened, all others learned from D1 to D3, to various degrees. Overall (n = 14), from D1-D3 the LI improved of $90{,}7\% \pm 80{,}8$ (mean ± SD) [median: 61%, min: -6%, max: 297%], compared to baseline. This improvement was similar that observed in a group of young healthy individuals (n = 30; $73{,}8\% \pm 48{,}1$ [65.7%, 13.4%, 228.7%]).
Conclusion: Although preliminary, these results are encouraging: during the (sub-)acute stroke phase, most of the stroke patients (13 over 14) were able to learn and retain from day to day a new motor skill engaging the paretic upper limb.

AS10-022

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

EMBEDDING MEASURES OF THERAPY FIDELITY IN "COMPARE": A RANDOMISED CONTROLLED TRIAL OF COMPLEX BEHAVIOURAL INTERVENTIONS FOR POST-STROKE APHASIA

M. Rose[1], A. Foster[1], D. Copland[2], L. Nickels[3], L. Togher[4], M. Meinzer[2], T. Rai[5], M. Hurley[1] and E. Godecke[6]
[1]La Trobe University, Allied Health, Melbourne, Australia
[2]The University of Queensland, Health Sciences, Brisbane, Australia
[3]Macquarie University, Cognitive Science, Sydney, Australia
[4]The University of Sydney, Faculty of Health Sciences, Sydney, Australia
[5]University of Technology Sydney, Mathematical Sciences, Sydney, Australia
[6]Edith Cowan University, Medical and Health Sciences, Perth, Australia

Background and Aims: Treatment fidelity refers to the methodological approaches used to examine and increase the reliability and validity of behavioural interventions. Assessments of treatment fidelity allow for greater confidence in research results, improved statistical power, and facilitation of research implementation. Despite being widely acknowledged as an essential measure of research quality, particularly for trials including complex interventions as are typical for post-stroke aphasia, only 14% of aphasia treatment studies have explicitly reported on treatment fidelity.
Method: The COMPARE Clinical Trial is a 3-arm randomised controlled trial (n = 216) which aims to determine whether two novel, intensive and contrasting treatments for chronic post-stroke aphasia – multi-modal aphasia treatment (M-MAT) and constraint induced aphasia therapy (CIAT) – are superior to non-standardised aphasia therapy (usual care) and to define participant characteristics that determine the comparative

responsiveness to M-MAT and CIAT. This research is valuable as to date there are few well-designed, large-scale trials that directly compare aphasia interventions. Importantly the design and implementation of a comprehensive integrity monitoring plan within COMPARE establishes a standard for future aphasia treatment studies.
Results: An overview of and rationale for COMPARE's comprehensive therapy integrity plan will be provided, including the tools and measurement being used. Issues in implementation of the plan will be highlighted. Treatment fidelity results to date will be summarised.
Conclusion: The mechanisms by which therapy fidelity monitoring within clinical trials of complex behavioural interventions can facilitate the implementation of evidence-supported practices in typical clinical settings will be discussed. Strengths and limitations of current fidelity monitoring practices will be highlighted.

AS10-024

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

INCREASED MUSCLE TONE SEVEN YEARS AFTER AN ISCHEMIC STROKE: RESULTS FROM THE SAHLGRENSKA ACADEMY STUDY ON ISCHEMIC STROKE (SAHLSIS)

C.U. Persson[1], L. Holmegaard[2], P. Redfors[2], C. Jern[3], C. Blomstrand[4] and K. Jood[2]
[1]Institute of Neuroscience and Physiology, Department of Rehabilitation Medicine- Sahlgrenska Academy- University of Gothenburg, Gothenburg, Sweden
[2]Institute of Neuroscience and Physiology, Department of Clinical Science- Sahlgrenska Academy- University of Gothenburg, Gothenburg, Sweden
[3]Institute of Biomedicine, Department of Clinical Pathology and Genetics - Sahlgrenska Academy - University of Gothenburg, Gothenburg, Sweden
[4]Institute of Neuroscience and Physiology, Department of Clinical Neuroscience- Sahlgrenska Academy- University of Gothenburg and Stroke Centre West, Gothenburg, Sweden

Background and Aims: Increased muscle tone and contractures are important for motor function, but knowledge about prevalence late after stroke is limited. Here, we investigated the prevalence of increased muscle tone and its baseline predictors, and assessed the prevalence of spasticity in a classical meaning, seven years after ischemic stroke in young and middle-aged adults.
Method: Consecutive patients with acute ischemic stroke <70 years of age ($n=411$) were recruited at hospital admission. Those 358 who remained alive were invited to a follow-up seven years after stroke onset. Increased muscle tone was assessed using the Modified Ashworth Scale (MAS), defined as a MAS score ≥ 2. Classical spasticity was defined as velocity dependent increase in muscle tone according to Lance, and assessed through a standardized neurological examination. A multivariable stepwise logistic regression analysis was used to calculate odds ratios for baseline variables associated to increased muscle tone.
Results: Increased muscle tone was recognized in 99 (34%) of the 288 participants. The upper limbs were affected in 94 (33%) and the lower limbs in 72 (25%). Classical spasticity was found in 51 (17%) and 26 (9%) had contractures. In the multivariable analysis, the Scandinavian Stroke Scale total score at baseline predicted increased muscle tone (odds ratio 0.91; confidence interval 0.89–0.93, $p < 0.001$).
Conclusion: Seven years after ischemic stroke, one third showed increased muscle tone, half of whom displayed classical spasticity, and one forth contractures. Increased muscle tone is predicted by the severity of neurological deficits acute after stroke.

AS10-025

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

CD200FC PROMOTES NEUROGENESIS AND FUNCTIONAL RECOVERY BY MODULATING MICROGLIAL INFLAMMATORY RESPONSES AFTER STROKE

H. Liao[1], X. Tao[1], H. Sun[1] and S. Chen[1]
[1]China Pharmaceutical University, Jiangsu Key laboratory of Drug Screening, Nanjing, China

Background and Aims: Neurogenesis play an important role on the functional recovery after ischemic stroke. Microglia are important cellular components in the neurogenic niche and could affect neurogenesis after stroke. The CD200/CD200R signaling has been reported to suppress microglial inflammatory responses. Thus, we explored the effects of CD200 fusion protein (CD200Fc), which acts as agonist of CD200R expressed on the microglia, on the adult neurogenesis and functional recovery in a rat transient middle cerebral artery occlusion (tMCAO) model.
Method: Rats were subjected to tMCAO. Subgroups were treated with CD200Fc intracerebroventricularly after stroke. After behaviors tests in rats were finished, brain sample were isolated for immunostaining and PCR.
Results: The results showed that sensory, motor and cognition function were improved obviously in the CD200Fc infusion group after stroke. Then we found that CD200Fc increased remarkably neural progenitor cells proliferation and neuronal differentiation in the ipsilateral SVZ, particularly, further enhanced recruitment of new neuroblasts (DCX+/BrdU+ cells) to the striatum and increased the number of newborn neuroblasts and new neurons (NeuN+/BrdU+ cells) in the peri-infarct brain region after tMCAO. Similarly, neurogenesis in SGZ was significantly enhanced after CD200Fc delivery. CD200Fc attenuated markedly the large number of microglia clustering, suppressed the microglia activation, decreased the expression of IL-1β and TNF-α mRNA and increased IL-4 and BDNF and NGF mRNA expression around the peri-infarct brain region after tMCAO.
Conclusion: In sum, our results suggest that CD200Fc could promote adult rat neurogenesis in SVZ and SGZ and neurological functional restoration by modulating microglia inflammation response and improving neural progenitor cells niche after stroke.

AS10-026

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

OVERVIEW OF THE STROKECOG STUDY: MODELLING AND MODIFYING THE CONSEQUENCES OF STROKE-RELATED COGNITIVE IMPAIRMENT THROUGH INTERVENTION

N.A. Merriman[1], E. Sexton[1], N.A. Donnelly[2], N. Pender[3], F. Horgan[4], D. Williams[5], M.A. Wren[2], K.E. Bennett[1] and A. Hickey[1]
[1]Royal College of Surgeons in Ireland, Division of Population Health Sciences, Dublin, Ireland
[2]Economic and Social Research Institute, Social Research, Dublin, Ireland
[3]Beaumont Hospital, Psychology, Dublin, Ireland
[4]Royal College of Surgeons in Ireland, Physiotherapy, Dublin, Ireland
[5]Royal College of Surgeons in Ireland and Beaumont Hospital, Geriatric and Stroke Medicine, Dublin, Ireland

Background and Aims: Cognitive impairment (CI) is a pervasive outcome of ischaemic stroke, reported in over half of patients six months post-stroke [1]. However, cognitive rehabilitation has received considerably less research attention than physical rehabilitation [2]. The aim of the StrokeCog study is to 1) model the progression, costs and outcomes of post-stroke CI, 2) develop and pilot-test a post-stroke cognitive intervention, and 3) evaluate the cost-effectiveness of alternative hypothetical interventions.
Method: Data will be collected on the epidemiology and costs of post-stroke CI using literature review, secondary data analysis and patient-level surveys, and analysed using regression and survival analysis. The pilot intervention design will be informed by systematic review of existing interventions and a qualitative study with patients, caregivers and healthcare professionals, and will be tested using a pilot feasibility randomised controlled trial (RCT). Decision-analytic modelling will be applied to findings from the RCT, and epidemiological and economic analyses, to evaluate the potential cost-effectiveness of hypothetical interventions.
Results: An epidemiological modelling platform and meta-dataset will be produced and available for evaluation of alternative treatment strategies for post-stroke CI at the study's conclusion. Evidence for the feasibility, effectiveness and cost-effectiveness of a pilot intervention for post-stroke CI will be generated.
Conclusion: The research findings will support the planning of cost-effective treatment strategies addressing post-stroke CI in hospital and community settings in Ireland.

1. Mellon L, Brewer L, Hall P, Horgan F, Williams D, Hickey A. PMID: 25879880
2. Brainin M, Tuomilehto J, Heiss W-D, Bornstein NM, Bath PMW, Teuschl Y, et al. PMID: 25492161

AS10-027

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

AN ASSESSMENT OF MELDONIUN THERAPY EFFECT ON CILIARY NEUROTROPHIC FACTOR LEVEL IN PATIENTS WITH POST STROKE APHASIA

V. Shishkova[1]
[1]Moscow centre of speech patology and neurorehabilitation, healh, Moscow, Russia

Background and Aims: An important role in the maintenance and regulation of the functional integrity of the nervous system playing neurotrophic factors. including ciliary neurotrophic factor. It is found that the mechanism of neuronal cell death largely depends of deficiency of neurotrophic effects. Meldonium may have an impact on the level of ciliary neurotrophic factor (CNF)and improves outcomes for stroke rehabilitation. We studied out an open randomized controlled study to explore the changes in the rate of speech recovery and CNF concentrations in patients with left-hemisphere stroke who received meldonium 120 day (1000 mg/day)
Method: A study included 60 inpatients of the Center of Speech Pathology and Neurorehabilitation. Neuropsychological examination was performed at baseline and after the treatment was completed. We determined aphasia type and quantitatively assessed speech in scores which reflected the severity of speech impairment. CNF serum concentrations were measured.
Results: Clinical efficacy of Meldonium (1000 mg/day, during 120 days) used in addition to standard neurorehabilitation measures in patients with post stroke aphasia of different severity was demonstrated. This treatment was most effective in patients with very marked and marked speech impairment that was confirmed by the maximal possible improvement of speech during the first course of neurorehabilitation measures. A significant increase in CNF concentrations was an additional evidence of this improvement.
Conclusion: The use of Meldonium in the complex treatment of patients with post stroke aphasia of different severity improves the prognosis of their rehabilitation.

AS10-028

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

LONG TERM CONSEQUENCES AND STRATEGIES AFTER SUBARACHNOID HEMORRHAGE – A QUALITATIVE STUDY

H.C. Persson[1], **K. Törnbom**[1], **K. Sunnerhagen S**[1] **and M. Törnbom**[1]
[1]Neuroscience and Physiology, Clinical Neuroscience and Rehabilitation, Gothenburg, Sweden

Background and Aims: After a subarachnoid hemorrhage (SAH) remaining impairments is common and may impact the person's life. There is a lack of knowledge regarding experienced long-term consequences. The purpose with the study was to explore experiences of long-term consequences six years after SAH and strategies used to cope with everyday life.
Method: An explorative interview study with a qualitative design was conducted. Individual interviews with open ended questions using an interview guide were performed with sixteen participants (mean age 63, 8 men, 8 women) six years post a SAH. Data was analyzed according to a descriptive thematic analysis, and themes were discovered inductively.
Results: Six years post SAH, participants described cognitive problems, such as impaired memory, mental fatigue, difficulties to concentrate, and lack of initiative. Strategies used to handle problems were; to receive support from family, societal institutions or technical support, but also unmet needs were described. Some participants experienced consequences in their work situation. Although most participants had accepted consequences after SAH, they felt that life was no longer the same and missed lost abilities. Some participants described that they hid symptoms in front of employers and friends, and tried to continue doing tasks in the same manner as prior the SAH. If this was not possible some refrained from doing things.
Conclusion: Several long-term consequences were reported that had impact in daily live post SAH, and different strategies were used to cope with these problems. Lack of awareness regarding consequences of SAH were reported and stressed the importance of follow-up.

AS10-029

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

LESION LOCATION AND EXTENT OF ISCHEMIC CHANGES IN POST-STROKE SPASTICITY IN PATIENTS WITH FIRST DOCUMENTED ANTERIOR CIRCULATION STROKE

O. Volny[1,2], **M. Justanova**[1], **P. Cimflova**[3], **L. Kasickova**[4], **I. Svobodova**[5], **J. Muzik**[5] **and M. Bares**[1]
[1]St. Annés University Hospital and Faculty of Medicine- Masaryk University, Department of Neurology, Brno, Czech Republic
[2]International Clinical Research Centre, Stroke Research Program- St. Annés University Hospital, Brno, Czech Republic

[3]St. Annés University Hospital and Faculty of Medicine- Masaryk University, Department of Medical Imaging, Brno, Czech Republic
[4]Faculty of Medicine- University Ostrava, Department of Neurology, Ostrava, Czech Republic
[5]Masaryk University, Institute of Biostatistics and Analyses, Brno, Czech Republic

Background and Aims: We seek to explore the role of extent and location of acute ischemia in development of superior limb spasticity.
Method: This is a single-centre prospective study of first documented anterior circulation ischemic stroke with permanent neurological deficit lasting >7 days (from March/2014 to September/2016). We evaluated: acute ischemic changes using ASPECTS on control 24 h-CT/24 h-MRI; additionally we focused on: precentral, postcentral gyrus, posterior limb of internal capsule (PLIC), thalamus, premotor cortex and supplementary motor area (SMA). Superior limb flexor spasticity was evaluated by using modified Ashworth scale (MAS) at day 7–10 and 6 months after by a well-trained neurologist.
Results: Seventy-six patients (mean age 72 years, 45% females; 30% treated with IV-tPA, 6,5% mechanical thrombectomy) fullfiled study inclusion criteria. Forty-nine (64%) patients have developed early flexor spasticity defined as MAS > 1 (at day 7–10), in 44 (58%) patients the spasticity was present at 6 months. There was no differences between the patients who developed spasticity and who did not in: admission stroke severity [NIHSS 5 (IQR 4–8) vs. 6 (IQR 4–10)] and vascular risk factors (hypertension, diabetes mellitus, dyslipidemia, atrial fibrillation, coronary artery disease). There was no difference in 24 h-ASPECTS [9 (IQR 8–10) vs. 9 (IQR 7–10)]. No differences were found between the groups with and without spasticity if particular regions of ASPECTS (M1, M2, M3, M4, M5, M6, Lentiform, Insula, Caudate, Internal Capsule) and precentral/postcentral gyrus, premotor cortex, SMA, PLIC, thalamus were studied in association with spasticity.
Conclusion: We did not find any MCA region significantly associated with development of superior limb spasticity.

AS10-030

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

SYSTOLIC BLOOD PRESSURE AND THE RISK OF FALLING AFTER ACUTE STROKE - A PART OF THE FALL STUDY OF GOTHENBURG (FALLSGOT)

S. Kjellberg[1], P.O. Hansson[1], B. Lernfelt[1] and C.U. Persson[2]
[1]Institute of Medicine Sahlgrenska Academy- University of Gothenburg, Department of Molecular and clinical medicine, Gothenburg, Sweden
[2]Institute of Neuroscience and Physiology Sahlgrenska Academy-University of Gothenburg, Department of Rehabilitation Medicine, Gothenburg, Sweden

Background and Aims: The objectives were to study the systolic blood pressure (SBP) in patients with acute stroke the first week and to analyze to what extent blood pressure was associated to the risk of falling during the first 10 days after stroke onset.
Method: Systolic blood pressure, antihypertensive treatment and falls were studied in 421 consecutive patients with acute stroke during hospitalization. Univariable and multivariable cox proportional hazard model was used to predict the risk of falling associated to SBP.
Results: During the first four days following stroke onset, mean systolic blood pressure decreased from 159 to 145 mmHg. The SBP was significantly higher among patients with intracerebral haemorrhage compared to patients with cerebral infarction during the first 3 days. New or intensified antihypertensive treatment was prescribed to 172 patients (41%), without any difference in the SBP decrease compared to patients with no or unchanged antihypertensive treatment. Low SBP at admission to hospital was significantly associated with the risk of falling during the first 10 days after stroke onset in univariable Cox proportional hazard model (HR by 5 mm higher SBP: 0.94, 95%CI: 0.88–0.99, $p = 0.033$), but not in a multivariable analysis adjusted for sex, age, postural control and comorbidity.
Conclusion: The SBP was higher among patients with intracerebral haemorrhage compared to patients with cerebral infarction, and decreased significantly in both groups during the first days. Low SBP at admission was associated with a higher risk of falling during the first 10 days of hospital stay in a univariable but not in a multivariable analysis.

AS10-033

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

ANXIETY DISORDERS ARE COMMON IN MINOR STROKE AND TRANSIENT ISCHAEMIC ATTACK: FREQUENCY OF ANXIETY TYPES, PREDICTORS, AND ASSOCIATION WITH FUNCTION, QUALITY OF LIFE AND PARTICIPATION

H.Y.Y. Chun[1], A. Carson[1], M. Dennis[1], G. Mead[1] and W. Whiteley[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Anxiety after stroke can be persistent, debilitating and reduce quality of life. We aimed to report the frequency and predictors of anxiety disorders at 3 months after stroke and transient ischaemic attack (TIA).
Method: We recruited participants with minor stroke and TIA consecutively from acute stroke unit and TIA clinics from 9/9/2015 to 28/6/2016. Participants underwent semi-structured clinical interview for Diagnostic Statistical Manual disorders at 3 months.
Results: At 3 months post-stroke/TIA, 38/175 (22%) patients had an anxiety disorder. Of these, 18/38 (47%) had phobic disorder only, 13/38 (34%) had both phobic disorder and generalized anxiety disorder (GAD), and 7/38 (18%) had GAD only. Post-traumatic Stress Disorder was present in 11/175 (6%). 15/38 (39%) anxious patients had no anxiety or depression before their stroke. Patients were more likely to be anxious at 3 months post stroke if they were younger [adjusted OR per decade: 0.64 (95%CI: 0.45–0.91), $p = 0.013$] or had a history of anxiety or depression [adjusted OR: 4.38 (95%CI: 1.94–9.89), $p < 0.0005$)]. Patients with anxiety were more dependent on modified Rankin (mRS3–5 OR: 4.93 (95%CI: 2.14–11.35), $p = 0.0002$), had a poorer quality of life (per 1 point EuroQoL Visual Analog Scale, OR: 0.96 (95%CI: 0.94–0.98), $p < 0.00005$), and were more restricted in work and social activities (per 1 point increase on Work and Social Adjustment Scale, OR: 1.17 (95%CI: 1.12–1.23), $p < 0.00005$)].
Conclusion: Anxiety is common after minor stroke and TIA. Over a third of anxious patients were new cases. Anxiety was associated with more disability and a poorer quality of life at 3 months.

AS10-034

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

THE ACCURACY OF 7-ITEM GENERALIZED ANXIETY DISORDER QUESTIONNAIRE AND THE FEAR QUESTIONNAIRE IN DETECTING CLINICALLY DIAGNOSED GENERALIZED ANXIETY DISORDER AND PHOBIC DISORDER IN STROKE

H.Y.Y. Chun[1], M. Dennis[1], G. Mead[1], W. Whiteley[1] and A. Carson[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Generalized anxiety disorder (GAD) and phobic disorders are common post-stroke. They require different treatment approaches so distinguishing them is important. We report accuracy of methods to identify both disorders.
Method: We recruited participants with minor stroke and transient ischaemic attack (TIA) from 1/12/14 to 28/6/2016. Participants underwent semi-structured clinical interview for anxiety disorders (SCID) by a trained clinician within 2 weeks of a self-completed test questionnaire. The interviewer was blinded to the test questionnaire results and confirmed diagnoses with a neuropsychaitrist. We tested the diagnostic performance of the 7-item Generalized Anxiety Disorder Questionnaire (GAD-7) at a pre-defined threshold of 9/10, and the Fear Questionnaire (FQ) agoraphobic subscale (using a threshold developed in this dataset) against SCID diagnosis as the reference standard.
Results: We analysed 180 paired questionnaire and interview data. For the diagnosis of GAD, GAD-7 (threshold 9/10) had a sensitivity of 81% (95%CI 58%-94%) and specificity of 91% (95%CI: 87%-95%). For detecting 'any phobic disorder', GAD-7 (threshold 9/10) had a sensitivity of 55% (95%CI: 38%-71%) and specificity of 93% (95%CI: 88%-97%). The FQ agoraphobic subscale (threshold 6/7) detected 'any phobic disorder' with a sensitivity of 87% (95%CI: 72%-96%) and a specificity of 78% (95%CI: 71%-94%).
Conclusion: We have demonstrated the sensitivities and specificities of GAD-7 and the FQ agoraphobic subscale in detecting clinical GAD and phobic disorder in a minor stroke and TIA sample. GAD-7 may be used to identify GAD but not phobic disorder. The FQ agoraphobic subscale requires further external validation.

AS10-039

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

BUDGET IMPACT OF POST-STROKE DYSPHAGIA: DATABASE ANALYSES OF HOSPITAL DISCHARGES IN FRANCE AND SWITZERLAND

N. Muehlemann[1], B. Saitta[2], B. Jouaneton[2], L. de Léotoing[2], M. Arnold[3] and G. Kaegi[4]
[1]Nestle Health Science, Medical Devices, Vevey, Switzerland
[2]HEVA, HEVA, Lyon, France
[3]University Hospital of Berne, Department of Neurology, Berne, Switzerland
[4]Kantonsspital St. Gallen, Department of Neurology, St. Gallen, Switzerland

Background and Aims: Oropharyngeal dysphagia is prevalent in hospitalized post-stroke patients and is associated with increased mortality and comorbidities. The aim of our analysis was to evaluate the impact of dysphagia on Length of Hospital Stay (LOS) and costs. The hospital perspective was used to assess costs.
Method: Hospital discharge databases comparing hospital stays for stroke associated with dysphagia vs stroke without dysphagia in France and Switzerland were analyzed. The French Medical Information System Program (PMSI) database analysis focused on 62'297 stays for stroke in public sector. 6'037 hospital stays for stroke were analyzed from Swiss OFS (Office fédéral de la statistique: Statistique des coûts par cas 2012) database. Diagnosis codes and listing of procedures were used to identify dysphagia in stroke patients.
Results: Patients with post-stroke dysphagia accounted for 8.4% of stroke hospital stays in Switzerland, which is consistent with recently reported prevalence of dysphagia at hospital discharge (Arnold *et al*, 2016). The French database analysis identified 4.2% stays with post-stroke dysphagia. We hypothesize that the difference between the Swiss and French datasets may be explained by the limitations of the analysis based on diagnosis and procedure coding. Post-stroke dysphagic patients stayed longer at hospitals (LOS of 23.7 vs. 11.8 days in France and LOS of 14.9 vs. 8.9 days in Switzerland) as compared to post-stroke patients without dysphagia. Post-stroke dysphagia was associated with €3'000 and CHF14'000 cost increase in France and Switzerland respectively.
Conclusion: Post-stroke dysphagia is associated with increase of length of hospital stay and higher hospital costs.

AS10-040

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

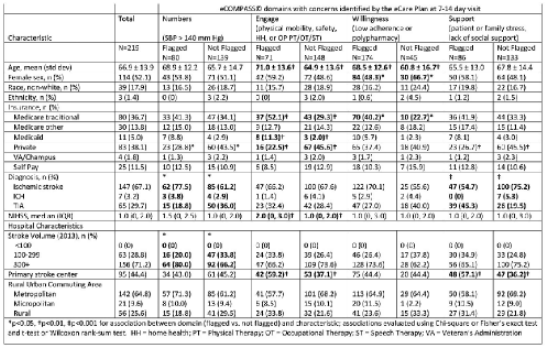
IDENTIFYING ACTIONABLE POST-ACUTE STROKE CONCERNS: THE COMPREHENSIVE POST-ACUTE STROKE SERVICES (ECOMPASS©) CARE PLAN

P. Duncan[1], C. Bushnell[2], R. Abbott[1], S. Rushing[3], J. Stafford[3], B. Lutz[4], S. Jones[5], J. Prvu-Bettger[6] and R. D'Agostino[3]
[1]Wake Forest Baptist Health, Neurology, Winston Salem, USA
[2]USA
[3]Wake Forest Baptist Health, Public Health Sciences, Winston Salem, USA
[4]University of North Carolina at Wilmington, Nursing, Wilmington, USA
[5]University of North Carolina at Chapel Hill, Epidemiology, Chapel Hill, USA
[6]Duke University, Orthopedic Surgery, Durham, USA

Background and Aims: A comprehensive model of post-acute stroke care that systematically identifies necessary services, develops patient-centric Care Plans, and facilitates appropriate referrals is being tested in a cluster-randomized trial in North Carolina, USA. Our aim was to compare patients identified with concerns vs not by eCOMPASS domain.
Method: COMPASS includes enrollment at discharge, a 2-day call, and clinic visit within 14 days. An advanced practice provider and nurse perform standardized assessments (goals for care, physical, social and medical function, health literacy, medication management) that use proprietary algorithms to immediately generate provider reports and electronic care plans (eCOMPASS©) with recommendations for prevention, referrals to rehab/community resources, and support. eCOMPASS© domains include Numbers, Engage, Willingness, and Support toward finding the way forward after stroke.
Results: The post-acute needs for the first 219 patients with eCare Plans were identified. At the 7–14 day visit, 36.5% had systolic BP > 140 mmHg, 32.4% were referred for rehabilitation, 39.2% for support services, and 79.4% for medication management. There were significant differences in patients who were or were not flagged for services by age, gender,

insurance type, NIHSS, and primary stroke center status, but not race/ethnicity, or geography (Table).

Conclusion: Comprehensive assessments at the point of care identified a substantial number of patient/caregiver needs within each of domain of COMPASS. The trial will determine whether this model improves outcome after stroke.



Characteristic	Total	eCOMPASS© domains with concerns identified by the eCare Plan at 2-14 day visit: Numbers (SBP > 140 mm Hg)		Engage (physical mobility, safety, HH, or OP PT/OT/ST)		Willingness (low adherence or polypharmacy)		Support (patient or family stress, lack of social support)	
	N=215	Flagged N=80	Not Flagged N=135	Flagged N=71	Not Flagged N=144	Flagged N=176	Not Flagged N=45	Flagged N=86	Not Flagged N=133
Age, mean (std dev)	66.9 ± 13.9	68.9 ± 12.3	65.7 ± 14.7	**71.8 ± 13.6†**	**64.9 ± 13.6†**	**68.5 ± 12.6†**	**60.8 ± 16.7†**	65.5 ± 13.0	67.8 ± 14.4
Female sex, n (%)	114 (52.1)	48 (58.8)	71 (51.1)	47 (59.2)	72 (48.6)	**86 (48.8)***	**30 (66.7)***	50 (58.1)	64 (48.1)
Race, non-white, n (%)	39 (17.9)	13 (16.5)	26 (18.7)	11 (15.7)	28 (18.9)	28 (16.2)	11 (24.4)	17 (19.8)	22 (16.7)
Ethnicity, n (%)	3 (1.4)	0 (0)	3 (2.2)	2 (0)	3 (2.0)	3 (0.6)	2 (4.5)	1 (1.2)	2 (1.5)
Insurance, n (%)									
Medicare traditional	80 (36.7)	33 (41.3)	47 (34.1)	**37 (52.1)†**	**43 (29.3)†**	**70 (40.2)***	**10 (22.7)***	36 (41.9)	44 (33.3)
Medicare other	30 (13.8)	12 (15.0)	18 (13.0)	9 (12.7)	21 (14.3)	22 (12.6)	8 (18.2)	15 (17.4)	15 (11.4)
Medicaid	11 (5.0)	7 (8.8)	4 (2.9)	**8 (11.3)†**	**3 (2.0)†**	10 (5.7†)	1 (2.3)	7 (8.1)	4 (3.0)
Private	85 (38.1)	26 (28.8)*	60 (43.5)*	**16 (22.5)†**	**67 (45.6)†**	65 (37.4)	16 (40.9)	23 (26.7)*	62 (45.5)*
VA/Champus	4 (1.8)	1 (1.3)	3 (2.2)	1 (1.4)	3 (2.0)	3 (1.7)	1 (2.3)	1 (1.2)	3 (2.3)
Self Pay	25 (11.5)	10 (12.5)	15 (10.9)	5 (8.5)	15 (12.0)	18 (10.3)	7 (15.9)	11 (13.8)	14 (10.6)
Diagnosis, n (%)		*	*					†	†
Ischemic stroke	147 (67.1)	**62 (77.5)**	**85 (61.2)**	47 (66.2)	100 (67.6)	122 (70.1)	25 (55.6)	**47 (54.7)**	**100 (75.2)**
ICH	7 (3.2)	**3 (3.8)**	**4 (2.9)**	1 (1.4)	6 (4.1)	5 (2.9)	2 (4.4)	**0 (0)**	**7 (5.3)**
TIA	65 (29.7)	**15 (18.8)**	**50 (36.0)**	23 (32.4)	42 (28.4)	47 (27.0)	18 (40.0)	**39 (45.3)**	**26 (19.5)**
NIHSS, median (IQR)	1.0 (0, 2.0)	1.5 (0, 2.5)	1.0 (0, 2.0)	**2.0 (0, 5.0)†**	**1.0 (0, 2.0)†**	1.0 (0, 3.0)	1.0 (0, 2.0)	1.0 (0, 2.0)	1.0 (0, 2.0)
Hospital Characteristics									
Stroke volume (2013), n (%)		*	*						
<100	0 (0)	**0 (0)**	**0 (0)**	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
100-299	63 (28.8)	**16 (20.0)**	**47 (33.8)**	24 (33.8)	39 (26.4)	46 (26.4)	17 (37.8)	30 (34.9)	33 (24.8)
300+	156 (71.2)	**64 (80.0)**	**92 (66.2)**	47 (66.2)	109 (73.6)	128 (73.6)	28 (62.2)	56 (65.1)	100 (75.2)
Primary stroke center	95 (44.4)	34 (43.0)	61 (45.2)	**42 (59.2)†**	**53 (37.1)†**	75 (44.6)	20 (44.4)	**48 (57.1)†**	**47 (36.2)†**
Rural Urban Commuting Area:									
Metropolitan	142 (64.8)	57 (71.3)	85 (61.2)	41 (57.7)	101 (68.3)	113 (64.9)	29 (64.4)	59 (68.1)	83 (63.8)
Micropolitan	21 (9.6)	8 (10.0)	13 (9.4)	5 (8.5)	15 (10.1)	20 (11.5)	1 (2.2)	9 (10.5)	12 (9.0)
Rural	56 (25.6)	15 (18.8)	41 (29.5)	24 (33.8)	32 (21.6)	41 (23.6)	15 (33.3)	27 (31.4)	29 (23.8)

*p<0.05, †p<0.01, ‡p<0.001 for association between domain (flagged vs. not flagged) and characteristic; associations evaluated using Chi-square or Fisher's exact test and t-test or Wilcoxon rank-sum test. HH = home health; PT = Physical Therapy; OT = Occupational Therapy; ST = Speech Therapy; VA = Veteran's Administration

AS10-041

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

VEER STUDY: VOLUNTEERS ENGAGED TO ENHANCE REINTEGRATION

M. Nelson[1]
[1]Bridgepoint Collaboratory for Research and Innovation, Toronto, Canada

Background and Aims: The increasing medical and social complexity of patients has an impact on the post hospital, community reintegration experience. Although literature exists on care transitions and patient navigation, research on the engagement of volunteers in supporting patient transitions is limited. While it is recognized that the voluntary sector can play an important role in supporting care transitions, very little is known regarding what specific roles volunteers undertake, the services delivered, nor how capacity for volunteers to support patient care transition is built.

This study explored the variety of ways volunteer-supported transition programs have been used to support patients in their transition from the hospital to home both in Canada and England.

Method: A comparative case study of 'exemplar' volunteer-supported patient care transition programs in Canada and England was implemented. Each program was examined as an individual case, with Canada and England then representing a composite case. Comparisons between cases and then national aggregates were conducted.

Results: Five transition support programs were studied. Each program was developed to address constituent requirements, and reduce service duplication and disruption. Key services provided included psychosocial support, assistance with Instrumental Activities of Daily Living, and transportation services. Participant and program benefits included decreased social isolation, decreased hospital readmissions and improved patient safety as well as appropriate service utilization.

Conclusion: The voluntary sector plays an important role in supporting patients in the transition from hospital to home. Benefits of volunteer provided services include improve patient experiences and outcomes, while reducing health care expenditures due to unnecessary readmissions and service utilization.

AS10-042

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

FACTORS AFFECTING RECOVERY OF MOTOR FUNCTION DURING SUBACUTE PHASE AFTER FIRST-EVER STROKE: THE KOSCO STUDY

J.H. Kim[1,2], M.K. Sohn[3], J. Lee[4], D. Kim[5], S.G. Lee[6], Y.I. Shin[7], G.J. Oh[8], Y.S. Lee[9], M. Joo[10], E. Han[11], J. Han[12], W. Chang[1] and Y.H. Kim[1,2]
[1]Heart Vascular Stroke Institute- Samsung Medical Center-Sungkyunkwan University School of Medicine, Physical and Rehabilitation Medicine- Center for Prevention and Rehabilitation, Seoul, Republic of Korea
[2]Sungkyunkwan University, Health Science and Technology- SAIHST, Seoul, Republic of Korea
[3]Chungnam National University, Rehabilitation Medicine- School of Medicine, Daejeon, Republic of Korea
[4]Konkuk University School of Medicine and Konkuk University Medical Center, Rehabilitation Medicine, Seoul, Republic of Korea
[5]Yonsei University College of Medicine, Research Institute of Rehabilitation Medicine, Seoul, Republic of Korea
[6]Chonnam National University Medical School, Physical and Rehabilitation Medicine, Gwangju, Republic of Korea
[7]Pusan National University School of Medicine- Pusan National University Yangsan Hospital, Rehabilitation Medicine, Yangsan, Republic of Korea
[8]Wonkwang University School of Medicine, Preventive Medicine, Iksan, Republic of Korea
[9]Kyungpook National University School of Medicine- Kyungpook National University Hospital, Rehabilitation Medicine, Daegu, Republic of Korea
[10]Wonkwang University School of Medicine, Rehabilitation Medicine, Iksan, Republic of Korea
[11]Jeju National University Hospital- Jeju National University- School of Medicine, Rehabilitation Medicine, Jeju, Republic of Korea
[12]Pusan National University Yangsan Hospital, 11Research And Statistical Support- Research Institute of Convergence for Biomedical Science and Technology, Yangsan, Republic of Korea

Background and Aims: The purpose of the present study is to analyze the factors influencing on motor recovery at 3 months after first-ever stroke and to provide useful information for establishing comprehensive and systematic care for stroke patients.

Method: This study is an interim analysis of the Korean Stroke Cohort for Functioning and Rehabilitation (KOSCO) designed as a 10-year longitudinal follow-up study of first-ever stroke patients. All patients admitted to the representative hospitals in 9-distinct-areas of Korea with first-ever stroke. Out of 7,858 participants, 5,815 patients completed survey and face-to-face functional assessments at 3 months. Multiple regression analysis was performed to analyze the influencing factors on motor functional recovery until 3 months.

Results: Among 5,815 participants, 79.4% suffered from ischemic stroke. The mean age was 64.6 ± 13.2 year-old, and male to female ratio was 1.37:1. At 3 months, 52.2% of stroke survivors needed assistance in their activities of daily living. Significant factors influencing on motor function at 3 months were age, medical history of hypertension, functional level before stroke, functional status at 7 days, duration of hospitalization, and intensive subacute rehabilitation treatment ($p < 0.05$).

Conclusion: These results indicate that the systematic stroke care during subacute phase is helpful to improve functional independence and motor recovery at 3 months after onset in first-ever stroke patients

(Supported by the Research Program funded by the Korea Centers for Disease Control and Prevention (2016-E33003-00)).

AS10-043

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

USE OF ANTIDEPRESSANT TREATMENT IN POST-STROKE DEPRESSION: A LOOSE FIT? RESULTS FROM THE BERLIN PSD STUDY

K. Werheid[1], S. Ladwig[1], M. Volz[1] and M. . Hackett Prof[2]
[1]Humboldt University, Department of Psychology, Berlin, Germany
[2]The George Institute for Global Health, University of Sydney, Sydney, Australia

Background and Aims: Post-stroke depression (PSD) occurs in 30% of stroke survivors and limits rehabilitation outcome. Current guidelines recommend carefully monitored antidepressant medication (ADT) in moderate to severe PSD. In the Berlin PSD study, depressive disorders and ADT status were assessed thrice within one year after stroke.
Method: Depression according to DSM-5 criteria and ADT were assessed in 303 participants one, six, and twelve months after stroke. At each measurement occasion, patients were assigned to one of four subgroups (PSD yes/no, ADT yes/no). Longitudinal transitions were visualized by a Sankey chart. ADT frequency in patients with major compared to minor depression, and ADT persistence in previously depressed patients were analysed.
Results: After 1, 6 and 12 months, 36.7%, 31.1% and 25,5% of patients fulfilled DSM-5 criteria for depression. About 60% of these patients did not receive ADT, but 15% of the non-depressed patients received ADT. ADT frequency in patients with major and minor depression at follow-up did not differ. Two thirds of the non-depressed patients with ADT had not previously fulfilled the depression criteria.
Conclusion: Confirming previous research, depression occurred in one in three stroke survivors. Among these, one in three receives ADT, irrespective of severity. In contrast, one in six patients without clinically relevant depressive disorder receives ADT, two thirds of them in the absence of earlier PSD. In conclusion, treatment of depression, could be more closely tied to current research evidence.

AS10-044

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

ACCEPTABILITY AND FEASIBILITY OF LOWER LIMB ACCELEROMETRY VS CUED (PROMPTED) RECALL TO ASSESS COMMUNITY-BASED WALKING IN STROKE SURVIVORS

A.J. Wright[1], I. Wellwood[2], C.J. McKevitt[3], F. Hamidi[1], D.P. French[4] and C.D.A. Wolfe[3]
[1]King's College London, Division of Health and Social Care Research-Faculty of Life Sciences and Medicine-, London, United Kingdom
[2]University of Cambridge, Department of Public Health and Primary Care- Cambridge Institute of Public Health, Cambridge, United Kingdom
[3]King's College London, Division of Health and Social Care Research-Faculty of Life Sciences and Medicine. NIHR Biomedical Research Centre at King's College London and Guy's & St. Thomas' NHS Trust-, London, United Kingdom
[4]University of Manchester, School of Psychological Sciences-, Manchester, United Kingdom

Background and Aims: Evaluating walking interventions for stroke survivors requires valid measurement of walking. Two potential methods are accelerometry and cued (prompted) recall. This study examined data completeness and acceptability of both.
Method: A feasibility study of a walking intervention for stroke survivors collected lower limb accelerometer and cued recall data for five days at two time-points (t1 and t2).
Analyses:
- Proportion of participants wearing accelerometers for three/five days.
- Reasons for incomplete accelerometry.
- Proportion of participants with complete recall data for three/five days.
Results: At t1, 33% completed five days accelerometry while 60% completed ≥3 days. Four participants refused to wear the accelerometer. One removed it due to discomfort. Others experienced difficulty keeping it attached during daily activities. At t2, 7/14 participants began accelerometry. Of those refusing, four also refused at t1, one previously experienced discomfort and two had difficulties keeping the device attached. Cued recall data were more complete than accelerometry. Nevertheless, a notable minority had difficulties fully recalling their walking.
Proportion of complete data for accelerometry and cued recall

Time	Days measured	Accelerometry		Cued recall	
		n/N	%	n/N	%
t1	5	5/15	33	5/10*	50
	3	9/15	60	8/10	80
t2	5	6/14	43	7/13	54
	3	6/14	43	10/13	77

* Lower denominator as cued recall was introduced during t1.

* Lower denominator as cued recall was introduced during t1.
Conclusion: Objectively measuring walking via accelerometry is scientifically desirable, but was not acceptable to all participants. Cued recall appears more acceptable, but was impacted by memory difficulties. Less burdensome objective measures or enhanced cued recall protocols are required.

AS10-045

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

RESUMING VALUED ACTIVITIES AFTER STROKE; THE IMPACT OF THE SOCIAL NETWORK

S. Jellema[1], E. Steultjens[1], R. van der Sande[2] and R. Nijhuis-van der Sanden[3]
[1]HAN University of Applied Sciences, Institute of Health Studies, Nijmegen, The Netherlands
[2]HAN University of Applied Sciences, Faculty of Health and Social Studies, Nijmegen, The Netherlands
[3]Radboud university medical center- Radboud Institute for Health Sciences, Scientific Institute for Quality of Healthcare, Nijmegen, The Netherlands

Background and Aims: Stroke patients need support from their social network to resume their valued activities, such as their social and leisure activities. However, it is unclear how precisely social network members can facilitate or hinder stroke patients in resuming these activities.
Method: We asked 41 social professionals working with stroke patients in everyday settings, such as patients' homes or workplaces, to memorise and describe in detail cases in which a patient was facilitated respectively hindered by their family, friends, acquaintances or colleagues in resuming a valued activity. Descriptive content analysis was done on all the cases provided, revealing the main social network influences that, according to

these professionals, facilitated or hindered stroke patients' reengagement in their valued activities.

Results: Analysis of all case-descriptions showed that reengagement was facilitated if social network members were nearby, respectful and interested, invited patients to participate in community activities and outings and helped patients to overcome personal hesitations and practical problems. Reengagement was hindered if others were overprotective or too demanding, took over activities unnecessarily and prevented patients from becoming engaged in wider social networks or seeking professional help. Being facilitated seemed to help patients to develop their self-confidence and sense of identity, whereas being hindered resulted in inactivity, social isolation and less wellbeing.

Conclusion: Other people can facilitate or hinder stroke patients' reengagement in valued activities, which indirectly affects patients' wellbeing. Rehabilitation professionals should be aware of this and teach social network members how to support patients in resuming their valued activities post stroke.

AS10-046

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

USE OF THE HUMAN ACTIVITY PROFILE FOR ESTIMATING FITNESS IN POST-STROKE INDIVIDUALS

A.P.C. Loureiro[1], T. Gjøvaag[2], H. Ihle-Hansen[3], L.C. Guarita-Souza[4] and B. Langhammer[5,6]

[1]Pontifícia Universidade Católica do Paraná -PUCPR, Physiotherapy Department, Curitiba, Brazil

[2]Faculty of Health Science- Oslo and Akershus University College of Applied Sciences, Department of Occupational Therapy and Prosthetics and Orthotics- and Department of Physical Therapy, Oslo, Norway

[3]Vestre Viken- Baerum Hospital, Department of Internal Medicine and Department of Medical Research, Baerum, Norway

[4]Pontifícia Universidade Católica do Paraná -PUCPR, School of Medicine, Curitiba, Brazil

[5]Faculty of Health Science- Oslo and Akershus University College of Applied Sciences, Physiotherapy Department, Oslo, Norway

[6]Sunnaas Rehabilitation Hospital, Physiotherapy Department, Nesoddtangen, Norway

Background and Aims: In addition to sensory-motor deficits, post-stroke individuals may experience fatigue, which can lead to a reduction in physical activity and/or physical fitness. The Human Activity Profile (HAP) is a questionnaire used to evaluate the level of physical activity in healthy individuals and in those with various clinical dysfunctions, including stroke. HAP presents 94 items covering the majority of everyday activities, listed in order according to increasing energy expenditure. The present study aimed to investigate the association between levels of physical activity as measured with the self-reported HAP (using the Adjusted Activity Score) and endurance capacity in stroke survivors.

Method: Twenty-four post-stroke individuals in the sub-acute phase, with a mean age of 72 ± 11 years and BMI of 26.02 ± 2.79 Kg/m^2 were invited to answer the HAP questionnaire and carried out a sub-maximal test on a treadmill using the Eng protocol for the indirect determination of oxygen consumption ($VO_{2\ peak}$).

Results: Self reports of physical activity according to the HAP classification revealed that 58.3% of the individuals were inactive, 29.1% moderately active and 12.5% active. The mean values obtained for the $VO_{2\ peak}$ were 15.8 ± 5, 18.5 ± 4 and 23.4 ± 6 mL/Kg/min for the inactive, moderately active and active groups, respectively, and there was a significant association between HAP and the $VO_{2\ peak}$ ($r = 0.65$: $p < 0.01$).

Conclusion: The association between the HAP score X $VO_{2\ peak}$ indicates that HAP could contribute as a screening tool also for physical activity level in post-stroke individuals and thus aid in their stratification for directing to appropriate cardio-respiratory rehabilitation.

AS10-048

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

IMPROVING COMMUNICATION BETWEEN GENERALISTS AND SPECIALISTS FOR PATIENT BENEFIT: INSIGHTS FROM FOCUS GROUPS ON LONG-TERM CARE AFTER STROKE

D. Pindus[1], R. Mullis[1], C. Moore[1], E. Kreit[1], L. Lim[1] and J. Mant[1]

[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: Cooperation between generalist and specialist healthcare professionals (HCPs) improves patient satisfaction. Personal professional relationships between generalists and specialists can facilitate collaboration and consultation, thus improve continuity of care. Little is known about how communication between specialist and generalist HCPs affects long-term care after stroke. The aim of this study was to explore how such communication facilitates and/or impedes post-stroke care and how it could be improved.

Method: A qualitative study design was adopted. Six focus groups with self-identified generalists (GPs, practice nurses, PNs; $n = 15$) and specialists (consultants, nurses and allied HCPs, $n = 33$) involved in stroke care were conducted across East of England and East Midlands. Sampling criteria included roles (specialist versus generalists), practice setting (acute and community) and years of professional experience. Data were tape recorded, transcribed verbatim and analysed using a Framework method.

Results: The lack of direct contact between specialists and generalists, inadequate information in discharge letters, and complexity and fragmentation of community services were listed as key barriers to more seamless patient care. Direct (telephone or electronic) and timely contact between a GP and a stroke consultant were highlighted as facilitators. Importantly, participants felt that personal professional relationships across teams and care settings would improve continuity of care, facilitate care transition and long-term care planning.

Conclusion: Developing personal professional relationships between generalist and specialist HCPs could enhance the quality and efficiency of long-term care after stroke. Such improved relationships may facilitate integration across primary and secondary care and thus more effective use of healthcare resources.

AS10-049

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

CHANGING CARE NEEDS OF STROKE SURVIVORS IN PRIMARY CARE

C. Moore[1], D. Pindus[1], R. Mullis[1], L. Kreit[1], L. Lim[1] and J. Mant[1]

[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: Research has focussed on improving access to acute stroke services rather than considering the role of primary care in stroke management. Stroke survivors report feeling abandoned and lack information about stroke and its consequences; their longer-term care needs are often not adequately addressed.

The study aim was to explore changing care needs across stroke survivors' trajectories and identify how these needs could be addressed by primary care.
Method: 22 stroke survivors (3 months-22 years post-stroke) were recruited from five GP practices in the East of England and participated in audio and video- recorded semi-structured qualitative interviews. Verbatim data was transcribed and analysed using a Framework approach.
Results: Care needs were characterised at three different phases of post-stroke recovery; (1) the stroke crisis phase, (2) the post-discharge phase, (3) the longer-term care phase. Key unmet needs identified across all phases of recovery included health service and information needs. Psychological needs (anxiety and feelings of abandonment) were most apparent at the post-discharge phase while the importance of meeting physical needs were identified in the longer-term phase by some survivors. It is notable that some survivors who had physical health needs in the longer-term phase viewed their changed health needs in the context of their other co-morbidities and by making comparisons with other stroke survivors.
Conclusion: Changing care needs of stroke survivors were identified across the recovery trajectory. These findings will inform a new model of primary care which includes an annual structured person-centred review of patient needs and a practice-based single point of contact.

AS10-050

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

FACTORS INFLUENCING RE-REFERRAL DECISIONS TO SPECIALIST CARE IN STROKE SURVIVORS: INSIGHTS FROM FOCUS GROUPS ON LONG-TERM CARE AFTER STROKE

L. Lim[1], D. Pindus[1], C. Moore[1], E. Kreit[1], R. Mullis[1] and J. Mant[1]
[1]University of Cambridge, Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: Primary care is often the first point of contact with the health service for a person with stroke who has a new or chronic need. In the UK there is a lack of guidance regarding when patients should be referred to specialist care. The aim of this study was to explore indications for re-referral and management in primary care.
Method: 6 focus groups were conducted, comprising 33 stroke specialists (consultants, nurses, and allied healthcare professionals) and 15 generalists (GPs and nurses). Participants were purposively selected to reflect a wide variety of roles, settings and experience. The focus groups were structured to ensure that the same questions were discussed in each. The data was audio-recorded, transcribed verbatim and analysed using a Framework approach.
Results: A number of factors affecting the decision to refer were identified. Patients with specific needs, clearly defined problems with a clear pathway, complex and high risk cases were more likely to be referred. "Soft" problems, patients in whom no change was expected and where routine medical management was required tended to be managed in primary care. Awareness, availability and timing of local services and patient persistence influenced referral.
Conclusion: There is a lack of clarity about when to re-refer to specialist care and when the patient should be managed in primary care; many factors contribute to the judgement of individual clinicians. Specific stroke re-referral guidelines for generalists may aid consistency of decision making. This study will inform the development of a new primary care model for people with stroke.

AS10-051

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

PSYCHOMETRIC EVALUATION OF THE SIGNS OF DEPRESSION SCALE IN STROKE PATIENTS WITH COMMUNICATIVE IMPAIRMENT

J. de, M. Man-van Ginkel[1], T. van Dijk[2], M. Hafsteinsdóttir[1] and Schuurmans[1]
[1]University Medical Center Utrecht, Julius Center for Health Science and Primary Care, Utrecht, The Netherlands
[2]University of Applied Sciences, Faculty of Health Care, Utrecht, The Netherlands

Background and Aims: The identification of depression in communicative impaired patients after stroke is hampered since generally screening instruments for depressive symptoms depend on the patient's ability to communicate. Although the Signs of Depression Scale (SODS) is developed for the identification of depressive symptoms in patients with impaired communication, prior studies show inconclusive evidence for the psychometric properties in patients with communicative impairments. Therefore, our objectives were to establish 1) the diagnostic value of the SODS in a Likert scale format, and 2) whether the Likert scale improves the diagnostic value compared to the original dichotomous SODS.
Method: In our cross-sectional multicentre study in one general and one university hospital 116 consecutive hospitalized stroke patients participated, including 53 patients with communicative impairment. Depression was diagnosed with the Composite International Diagnostic Interview (CIDI) administered to the patients' relatives and in non-communicative impaired patients.
Results: For both instruments the discriminatory power was best at a cut-off score of $\geq$2, with comparable diagnostic accuracy.(SODS-Likert: sensitivity 0.74, 95% CI: 0.54–0.94; specificity 0.36, 95% CI: 0.20–0.53; SODS: sensitivity 0.74, 95% CI: 0.49–0.91, specificity 0.40, 95% CI: 0.23–0.58). The internal consistency of the SODS-Likert was good ($\alpha = 0.69$) and slightly higher than that of the SODS ($\alpha = 0.57$). The inter-rater reliability of the SODS-Likert and the SODS was moderate to good (ICC 0.66; $p = 0.00$, ICC $= 0.80$, $p = 0.00$, respectively). The clinical utility was rated good.
Conclusion: The psychometric properties of the SODS are sufficient for the initial mood assessment of stroke patients with communicative impairment, though the Likert scale did not improve the diagnostic value.

AS10-052

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

THE STROKE IMPACT SCALE VERSION 3.0 IN JAPANESE

M. Ochi[1], S. Satoru[1] and H. Kenji[2]
[1]University of Occupational and Environmental Health, Rehabilitation medicine, Kitakyushu, Japan
[2]Moji Medical Center, Rehabilitation medicine, Kitakyushu, Japan

Background and Aims: We assessed the reliability and validity of the Japanese version of the Stroke Impact Scale (SIS) version 3.0 in stroke survivors.
Method: Chronic stroke patients were evaluated by the Brunnstrom stage, Functional ambulation classification, and Functional independence measure. Health-related quality of life was evaluated with the short form 8 and SIS version 3.0.

Results: Thirty two stroke survivors were assessed (mean age, 60.0 years; 21 male). The internal consistency of SIS and SIS domains were satisfactory. Concerning the stability of the SIS version 3.0, the weighted Kappa values ranged from 0.52 to 0.93. Regarding convergent validity, a significant correlation (Spearman's correlation coefficient, $P < 0.05$) was found between the SIS composite physical domain and Brunnstrom stage (0.49–0.53) and Short form 8 physical summary score (0.82).
Conclusion: The Japanese version of SIS version 3.0 has satisfactory psychometric properties and can be used in stroke survivors to assess health-related quality of life.

AS10-053

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

INTER-RATER VARIABILITY BETWEEN OTORHINOLARYNGOLOGIST AND NEUROLOGIST IN EVALUATION OF ASPIRATION DETECTED BY FLEXIBLE VIDEONASOPHARYNGOENDOSCOPY

D. Vaclavik[1], B. Gwardova[2], G. Solna[3], O. Pavlik[4], L. Stanikova[5] and K. Pavel[5]
[1]Hospital Ostrava Vitkovice, Neurology, Ostrava, Czech Republic
[2]1 Agel Research and Training Institute- Ostrava Vitkovice Hospital-Czech Republic, Neurology, Ostrava, Czech Republic
[3]1 Agel Research and Training Institute- Ostrava Vitkovice Hospital-, Neurology, Ostrava, Czech Republic
[4]1 Agel Research and Training Institute- Ostrava Vitkovice Hospital, Neurology, Ostrava, Czech Republic
[5]University Hospital Ostrava, Otorhinolaryngological, Ostrava, Czech Republic

Background and Aims: Dysphagia belongs to serious complication of stroke. Bronchopneumonia due to aspiration is a main risk. There is noticeable difference among its incidence in dysphagia-screening-performing and non-performing centres. Swallowing test is considered to be the right tool in dysphagia screening. However videofluoroscopy (VFS) and videopharyngonasoendoscopy (FEES) help to detect aspiration accurately. Bed-side performing is the FEES advantage. Otorhinolaryngologist has competence to perform this method in the Czech Republic. The objective of research was to determine correspondence in FEES scroring among ORL and neurologist/speech therapist.
Method: Prospective study. 20 subjects presenting acute stroke and positive GUSS (Gugging Swallowing Screen) were performed by FEES. 2 neurologists and speech therapeutist were trained by otorhinolaryngologist for that purpose. Demographic items, history, severity of stroke and dysphagia were assesed. Rosenbek penetration-aspiration scale (PAS) was applied for aspiration scoring by neurologist; subsequently was videorecord assessed by otorhinolaryngologist. The inter-rater agreement in evaluation was compared by PAS (yes 6–8 or no 1–5), assessed by using the Kappa index and was considered as "poor" if $\kappa < 0.4$, "moderate" 0.41–0.60, " strong" 0.61–0.80 and " very strong" > 0.81.
Results: During 18 months, 20 patients were enrolled, 50 % male, average age 71,30 % hypertonics, 35 % diabetics, entry NIHSS 8, GUSS 13. The average PAS 4,45 at neurologist on contrary to 4,35 at otohinolaryngologist. The total agreement in evaluation was 85%, Kappa index 0,7(strong), ($p = 0{,}0008$) 95% IS: (0.389 - 1.000).
Conclusion: The ability of trained neurologist in FEES performing and correct interpretation seems like valuable tool for patients with neurogenic dysphagia.

AS10-054

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

IDENTIFYING THE LONG-TERM NEEDS OF CARERS OF STROKE SURVIVORS LIVING IN THE COMMUNITY TO INFORM A NEW PRIMARY CARE MODEL

C. Moore[1], D. Pindus[1], R. Mullis[1], L. Kreit[1], L. Lim[1] and J. Mant[1]
[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: Informal carers are significant in the process of rehabilitation and to the long-term outcomes for stroke survivors, yet their longer-term needs are not being adequately addressed. Presently no formal primary care based model of care exists to support the informal carers of stroke survivors.
The aim of the study was to identify how the needs of stroke survivor carers are met by primary care.
Method: 14 carers identified by stroke survivors were recruited to the Improving Primary Care After Stroke (IPCAS) interview study from five GP practices in the East of England and participated in audio and video-recorded semi-structured qualitative interviews. Verbatim data was transcribed and analysed using a Framework approach.
Results: Carer experiences of primary care and unmet need were identified. The GP practice was considered first point of contact for carers, particularly in relation to seeking stroke specific information. The blurring of boundaries between the perception of carers' own unmet needs and those related to the stroke survivors' own needs was notable. Many carers felt unprepared for their caregiving role and struggled to cope with perceived role reversal. A key unmet need was psychological need; carers were anxious and lacked reassurance about their caregiving role.
Conclusion: The findings add to our understanding of the experiences of stroke carers and will inform a new model of primary care which includes an annual structured person-centred review of patient needs and a practice-based single point of contact for stroke survivors. A GP practice-based intervention will provide opportunities for carers' needs to be identified and addressed.

AS10-055

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

EVIDENCE FOR A WINDOW OF ENHANCED NEUROPLASTICITY FOLLOWING ISCHAEMIC STROKE

D. Austin[1], B. Hordacre[2], R. Greenwood[1], M. Ridding[2] and J. Rothwell[1]
[1]UCL Institute of Neurology, Sobell Department of Motor Neuroscience, London, United Kingdom
[2]University of Adelaide, Robinson Research Institute, Adelaide, Australia

Background and Aims: Recovery in motor function after stroke appears to asymptote after 2–3 months, whilst animal stroke models demonstrate a transient bihemispheric increase in dendritic sprouting and synaptogenesis over the first 10–14 days. It remains unclear whether this early period of maximal recovery in humans corresponds to a period of enhanced neuroplasticity. We present data to support such a phenomenon in human stroke patients, using transcranial magnetic stimulation (TMS).
Method: Data were collected at two centres, examining either ipsilesional (Adelaide) or contralesional cerebral hemispheres (London) following acute ischaemic stroke. 19 patients (average age 63yrs) attended for recordings from the contralesional hemisphere at weeks 2, 4 and 6.

15 patients (average 68yrs) attended for recordings from the ipsilesional hemisphere at weeks 1, 2, 3, 4 and 8. All patients had made a good functional recovery with FMUL > 58 or ARAT > 55 by week 4.
Subjects received TMS in a spaced continuous theta burst protocol to primary motor cortex, with subsequent change in motor evoked potentials (MEPs) recorded over 30 minutes as a measure of neuroplasticity. Averaged normalised MEPs were analysed for each group in a two-way rmANOVA with factors TIME and WEEK.
Results: In the ipsilesional hemisphere, there was a significant effect of WEEK ($p = .04$), with largest neuroplastic effect between weeks 2 and 4. In the contralesional hemisphere there was also a significant effect of WEEK ($p = 0.03$), with largest neuroplastic effect at weeks 2 and 4.
Conclusion: These data represent the first neurophysiological evidence in humans for enhanced neuroplasticity early (c. 2–4 weeks) post-stroke.

AS10-056

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

CLINICAL PRACTICE GUIDELINES FOR STROKE REHABILITATION AND LONG-TERM MANAGEMENT: SIMILARITIES AND DIFFERENCES IN RECOMMENDATIONS FOR MOOD, APHASIA AND COGNITIVE DEFICITS

E. Kreit[1], D. Pindus[1], R. Mullis[1], S. Chowienczyk[2] and J. Mant[1]
[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom
[2]University of Cambridge, School of Clinical Medicine, Cambridge, United Kingdom

Background and Aims: Intervention literature for long-term rehabilitation after stroke focuses on physical outcomes while the majority of stroke survivors also report emotional, cognitive and speech and language problems. As clinical guidelines for long-term stroke rehabilitation set priorities for stroke management, they influence how these are addressed. The aim of this review is to compare psychological and pharmacological treatment recommendations for long-term management of these problems after stroke.
Method: A systematic grey literature search for current national clinical guidelines using custom Google searches (until July 2016) across Western English-speaking countries was performed. Guideline quality was assessed with the validated AGREE II tool.
Results: Guidelines from 6 countries with comparable healthcare systems were identified: National Institute for Health and Care Excellence (NICE), Stroke Foundation of New Zealand (SFNZ), Scottish Intercollegiate Guidelines Network (SIGN), American Heart Association (AHA), National Stroke Foundation (NSF) and Canadian Stroke Best Practice Recommendations (CSBPR). NICE, SIGN, AHA and CSBPR focused specifically on long- term rehabilitation. For aphasia all guidelines recommend referral to Speech and Language Therapy, but they vary with regard to pharmacotherapy. Guidelines vary in recommended referrals and treatment for cognitive deficits. SFNZ, NICE and NSF recommend psychotherapy for post-stroke depression while pharmacotherapy is recommended by SIGN.
Conclusion: Insufficient evidence on effectiveness of interventions to address psychological outcomes after stroke contributes to inconsistencies and lack of specificity in recommendations. This may reduce both compliance with and impact of the guidelines. There should be a greater emphasis in stroke research on these aspects of long-term management.

AS10-057

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

ADAPTIVE-TRAINING MOBILE-GAMING FOR STROKE HEMIPARESIS

R. Lotay[1], M. Mace[1], P. Rinne[1], S. Gupta[2], E. Burdet[1] and P. Bentley[2]
[1]Imperial College London, Bioengineering, London, United Kingdom
[2]Imperial College London, Medicine, London, United Kingdom

Background and Aims: Our group have developed a hand-grip controller (*gripAble*) that enables a majority of hemiparetic stroke patients to engage meaningfully with training software on a PC-tablet (Rinne et al, 2016, Plos One). Since physiotherapy effectiveness depends not only upon intensity, but also upon exercise scheduling (e.g. ordering type and difficulty), we explored whether Adaptive task scheduling of *gripAble* exercises improve learning rate more than a Fixed, block pattern of training.
Method: 11 healthy volunteers and 6 hemiplegic stroke patients were asked to perform a visuomotor tracking exercise using shoulder, wrist or finger movements. Movement type, target pattern and speed varied over the course of 6 training sessions (3 days), in either an Adaptive or Fixed pattern, whilst ensuring intensity remained constant. Adaption is implemented into gripAble software using a learning-optimisation algorithm (Challenge-Point Framework). Performance is measured as Root-Mean Square (RMS) Error between cursor and target.
Results:

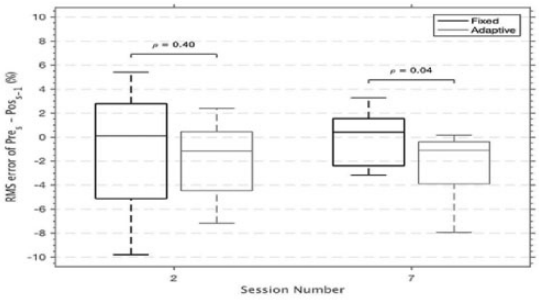


Figure 1: The plot shows performance in Sessions 2 and 7 (final test), relative to subjects own baseline, comparing subjects who trained using a Fixed versus Adaptive Task schedule.
Subjects who received Adaptive scheduling performed better, relative to baseline (less RMS Error), than those given Fixed scheduling, specifically in the final session ($p < 0.05$).
Conclusion: This indicates that a motor-learning optimisation learning algorithm can be implemented into rehabilitation gaming technologies, and this can influence learning efficiency.

AS10-060

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

VIRTUAL REALITY FOR POST-STROKE UPPER LIMB REHABILITATION: THE EUROPEAN LEMAN REGISTRY

V. Arnao[1], V. Caso[2], J. Dowson[3], F. Müller[4], S. Ghoussayni[5] and K. Kerman[5]
[1]University of Perugia, PERUGIA, Italy
[2]University of Perugia, Stroke Unit and Division of Internal and Cardiovascular- Medicine, PERUGIA, Italy

[3]University of Glasgow, Institute of Cardiovascular and Medical Sciences- Queen Elizabeth University Hospital- Glasgow, Glasgow, United Kingdom
[4]Schön Klinik Bad Aibling, Neurology- Physical Therapy- Rehabilitation Head Physician, Bad Aibling, Germany
[5]MindMaze SA, MindMaze SA, Lousanne, Switzerland

Background and Aims: Virtual reality (VR) is a new treatment approach in stroke rehabilitation. MindMotion systems (e.g. MindMotionPRO (MMPRO), MindMaze SA, Switzerland) use integrated, computer-based programs to simulate life-like objects and tasks for upper extremities. Patients can independently practice from the comfort of their bed, within a hospital environment. Interactive features and real-time feedback help to motivate patients and increase therapy time and intensity. Although studies have shown VR to be effective in stroke rehabilitation, further supporting real-world data is required.
Aims: To establish a stroke rehabilitation web registry to benchmark the real-world clinical performance of MindMotion systems by capturing information on patient characteristics, system usage, rehabilitation results and their interrelationship.
Method: Participants will use MMPRO as part of routine clinical care. Data capture after patient consent will be achieved using: 1) data entry into a web registry (Electronic Case Report Form, with appropriate ethical and data governance clearances); 2) use of hospital patient data and data captured directly from MMPRO itself (system usage). Collected data will include: patient population (medical history); baseline characteristics (level of impairment, motor function (including MAL, WMFT), short form of SIS, neuropsychological evaluation, optional imaging); session usage data (transferred from MindMotion devices, e.g. usage duration) and therapist time; outcome data collected after last session (baseline measures and reasons for ending rehabilitation with MindMotion, resource utilization, semi-structured questionnaire-based interviews for patients and therapists). The registry will be launched in May 2017.
Results: Conclusion
The web registry results are expected to increase real-world data on VR in stroke rehabilitation.

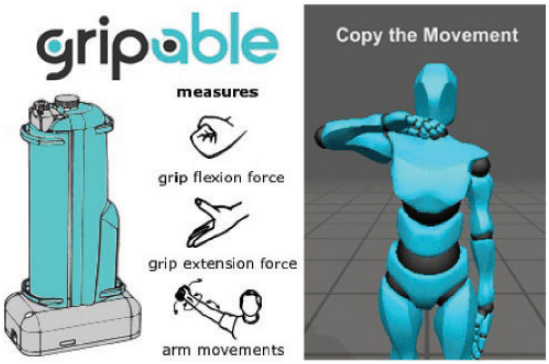
AS10-063

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

AUTOMATED MOTOR ASSESSMENT IN STROKE

M. Pucek[1], R. Lotay[2], M. Mace[2], P. Rinne[1], Y. Maheswaran[1], E. Burdet[2] and P. Bentley[1]
[1]Imperial College London, Brain Sciences, London, United Kingdom
[2]Imperial College London, Human Robotics Group- Bioengineering Dept, London, United Kingdom

Background and Aims: Automation of physical examination promises to provide accurate and reliable assessment of stroke patients, in hospital and at home. We adapted a novel arm-training device (gripAble), so that it could measure and feedback cardinal upper and lower arm movements, on a PC-tablet. Here we report the first clinical validation results, focusing particularly on shoulder abduction – finger extension (SAFE) - a well-recognized functional marker of prognosis.
Method: We developed gripAble functionality so as to sense finger flexion/extension, and shoulder abduction/adduction. Shoulder movement estimation also utilized 'Myo' armband sensors. A 3D avatar tablet-software was designed to show subjects which movements to perform, and to feedback their actual movements. We tested this system on 5 hemiplegic stroke patients and 5 healthy controls; and compared software measures with joint angles, and clinician-judged MRC power.
Results: Shoulder and elbow joint angles (0/45/90 degs) were accurately recorded by the gripAble-Myo system. GripAble-derived angular measures correlated with MRC scores for finger flexion/extension ($R = 0.7$, $p < 0.03$), but not shoulder abduction/adduction.
Conclusion: We demonstrate that a low-cost, wireless system of gripAble plus arm-sensors can measure important aspects of the upper-limb motor examination. Ongoing research is exploring more advanced motor parameters, e.g. acceleration, and somatosensory assessment - that are additional gripAble capabilities.



AS10-064

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

LONG-TERM HEADACHE AFTER ISCHEMIC STROKE - A PROSPECTIVE STUDY

M. Carvalho Dias[1], T. Guerreiro[2], L. Caeiro[3], J. Ferro[4] and A. Verdelho[4]
[1]Santa Maria Hospital- CHLN, Neurology Department- Department of Neurosciences and Mental Health, Lisboa, Portugal
[2]University of Lisbon, Faculty of Medicine, Lisbon, Portugal
[3]Santa Maria Hospital- CHLN, Department of Neurosciences and Mental Health, Lisbon, Portugal
[4]Santa Maria Hospital- CHLN, Neurology Department- Department of Neurosciences and Mental Health- Faculty of Medicine- University of Lisbon, Lisbon, Portugal

Background and Aims: Headache in the chronic stage after stroke is poorly described. Our aim was to study prospectively the frequency and characteristics of long-term headache in patients with ischemic stroke.
Method: We included acute ischemic stroke patients admitted to our Stroke Unit over 17 months. All patients were evaluated in the acute phase and at follow-up using a validated headache questionnaire that allows classification according to the International Headache Society. The same questionnaire was used for history of headache prior to stroke. We registered demographic data, vascular risk factors, stroke severity at admission, treatment (including IV-tPA), lesion location (CT/MRI), and functional status. Follow-up assessments additionally included depressive symptoms.
Results: One hundred and two patients were included (mean 63.9 years-old, 39.2% women), 52.9% had headache prior to stroke. Eighty nine patients underwent follow-up evaluation (16 months average follow-up time), 7 patients died and 6 were lost to follow-up. 44.1% presented long-term headache, 33.3 % of them had previous headache, 22.2% had new onset headache and 35.6% stopped complaining of previous headache. Tension-type headache was the most frequent long-term type of headache (22.5%). Using logistic regression analysis, previous headache (OR = 3.92; 95% CI[1.54 – 10.03]) and female gender (OR = 3.34; 95% CI[1.27–8.80]) were independently associated with long-term headache.

IV-tPA treatment, depression, stroke severity and location, functional status were not associated with long term headache.
Conclusion: Long-term headache after ischemic stroke occurs in more than half of the patients and is more frequent in patients with previous headache and female gender. Stroke characteristics are not determinants of long term headache.

AS10-066

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

INTEGRATING THE PHARMACIST ROLE IN THE STROKE MULTIDISCIPLINARY TEAM ENABLES EARLIER DISCHARGE AND EARLIER INDEPENDENCE WITH MEDICINES

M. Braga[1], M. Christie[1], H. Barnes[2], F. Watson[2], C. Williams[3], L. Smith[1], A. Flynn[2] and D. Wood[2]
[1]Sheffield Teaching Hospitals NHS Foundation Trust, Beech Hill Rehabilitation Unit - IC beds and Community Stroke Service, Sheffield, United Kingdom
[2]Sheffield Teaching Hospitals NHS Foundation Trust, Pharmacy, Sheffield, United Kingdom
[3]Sheffield Teaching Hospitals NHS Foundation Trust, Community Stroke Service, Sheffield, United Kingdom

Background and Aims: Stroke rehabilitation aims to improve the physical and cognitive functions to optimise an individual's independence.
Medicines management requires a significant level of cognition and functioning but is not addressed until near the discharge day when organising a care package. This can result in delayed discharges and unnecessary requests for care calls to administer medication.
This study aimed to explore how pharmacy teams can facilitate earlier discharges and simplify care packages.
Method: The study involved 52 patients from presentation of stroke until discharge from the stroke service. The intervention group consisted of 29 patients – all of whom had their medicines reviewed by pharmacy at each stage of the pathway. The control group (23 patients) had minimal pharmacy input. Rehabilitation progress was reviewed weekly by the multidisciplinary team (MDT) to identify the appropriate time to support the patient to be independent with their medicines.
Identifying potential for self-medication in the intervention group was reviewed by pharmacy within the MDT, whereas in the control group it was not prioritised.
Results: Of the patients followed up by the pharmacy team, 34.5% regained full independence compared to 30% in the control group. Only 27.6% required four care calls compared to 52.2% in the control group
Conclusion: Working together with the MDT resulted in a 25% reduction of care packages requiring four daily calls to administer medication. Overall, the number of care calls requiring medication administration was reduced representing greater independence for patients and
simplification of care packages requiring support with medication thus promoting earlier discharges

AS10-068

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

EFFECTIVENESS OF FACIAL NMES FOR DYSARTRIA AND ORAL PHASE DYSPHAGIA REHABILITATION

M. Ciyiltepe[1], Ü. Karazeybek[2] and M.N. Tıras[2]
[1]Eskisehir, Turkey
[2]Anadolu University, Health Sciences Faculty- Speech language Therapy Department, Eskisehir, Turkey

Background and Aims: The purpose of this study is to determine if facial stimulation with NMES adds an effective means of improvement for both dysartria and oral phase dysphagia. Multiple measures will take place to determine the efficacy of this intervention.
Method: 30 patients with TBI/CVA included; they had problems with: 1 bilabial and plosive sounds (flask dysartria), 2. dysphagia (bolus transfer A-P), poor saliva management with severe drooling. NMES was applied 3 times a week for 4 weeks in addition to facial taping and oral-motor exercise regime. Results were compared before and after. There were two separate groups for control: 1. Healthy Subjects 2. Patients with dysartria and dysphagia due to naso-pharyngeal cancer management (surgery o tumor removal in adjunct to chemo-radiation) who received only taping and exercise regime but no NMES.
Measures were taken before-after for pressure p the lips and the palate, acouistic values (jitter, shimmer, noise-harmony ratio, APQ, and PPQ), goniometric measures.
Results: There were significant changes in all the parameters measured, mostly with goniometric measures ($z = -4.405$; $p = 0.000$), lip pressure ($z = -3.345$; $p = 0.000$). other measures also had significant changes both speech intelligibility (improved from 45% to 90%) and bolus consistency has improved from nectar liquids to pureed solids to thin liquids to mechanical soft-regular solids.
Conclusion: NMES is an effective means of intervention. Patients indicated no discomfort and that the initial improvement of their voice quality has added better feeling of selves for their quality of their life.

AS10-069

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

EFFECTIVENESS OF INPATIENT REHABILITATION IN STROKE PATIENTS IS NOT DIMINISHED IN OLDER PATIENTS

H. Smyth[1], C.S. Leong[1], I. Noone[2], M.K. Meagher[2], M. Crowe[2], T. Cassidy[2], L. Cogan[1], D. O'Shea[2] and M.T. Cooney[2]
[1]St. Vincent's University Hospital, Royal Hospital Donnybrook, Dublin, Ireland
[2]St. Vincent's University Hospital, Dept of Medicine for the Elderly, Dublin, Ireland

Background and Aims: The benefits of rehabilitation post stroke are widely accepted. We aimed to examine whether the benefits differ based on age.
Method: All patients admitted to a specialist inpatient rehabilitation hospital post stroke between 2010–2016 were included. Patients were assessed for rehabilitation potential prior to transfer. Patients all received a individualised comprehensive interdisciplinary rehabilitation programme. Admission and discharge Barthel score was recorded. We analysed the change in Barthel post rehabilitation programme and length of stay by age group.

Results: 185 patients were included, 10 of these were excluded because they developed medical conditions requiring prolonged readmission to acute hospital. Patients (47% men, mean age 77.8, 83% ischaemic strokes) were generally independent previously (81% modified Rankin 0–1). Mean increase in Barthel did not differ across the agegroups, as shown in the table (shows mean and standard deviation). Additionally, there was no significant difference in length of stay. 81% of patients discharged home.

	Number	Admission Barthel	Discharge Barthel	Change in Barthel*	Length of stay (days)*
Under 65 years	13	13.8 (6.1)	16.1 (4.9)	2.3 (2.1)	78 (70)
65 -75 years	51	13.9 (4.9)	16.2 (4.2)	2.3 (2.7)	97 (111)
75-85 years	76	13.2 (4.3)	16.1 (3.8)	2.9 (2.3)	69 (57)
Over 85 years	35	11.0 (4.2)	13.3 (5.0)	2.3 (2.9)	89 (67)

*p for trend across age groups non-significant**Conclusion:** The absence of several functional domains, particularly communication, from Barthel score may lead to underestimation the benefits of rehabilitation. We have demonstrated that rehabilitation can be as effective in older people as in younger people.

AS10-070

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

MANAGEMENT AND OUTCOME OF VISUAL FIELD DEFECTS IN OCCIPITAL ISCHEMIC STROKE (NOR-OCCIP) – A MULTI-CENTER PROSPECTIVE STUDY

K.M. Sand[1], L. Thomassen[2], A.R. Taraldsen[3], G. Wilhelmsen[4], A. Midelfart[5], E. Rødahl[6], H. Næss[7], T. Idicula[8], M. Kurz[9], K. Kurz[10], H.K. Tandstad[11], G.T. Hegreberg[12], K. Lundberg[13], B. Dalslåen[13], B. Indredavik[14] and J.M. Hoff[7]

[1]Flekkefjord Hospital, Department of Internal Medicine, Flekkefjord, Norway
[2]University of Bergen, Department of Neurology, Bergen, Norway
[3]Stavanger University Hospital, Dept. of Ophthalmology, Stavanger, Norway
[4]Bergen University College, Department of Special Needs Education, Bergen, Norway
[5]Norwegian University of Science and Technology, Dept. of Ophthalmology, Trondheim, Norway
[6]University of Bergen, Department of Ophthalmology, Bergen, Norway
[7]Haukeland University Hospital, Dept. of Neurology, Bergen, Norway
[8]Norwegian University of Science and Technology, Dept. of Neurology, Trondheim, Norway
[9]Stavanger University Hospital, Dept. of Neurology, Stavanger, Norway
[10]Stavanger University Hospital, Dept. of Radiology, Stavanger, Norway
[11]Statped Vest, Dept. of Special Needs Education, Bergen, Norway
[12]Stavanger Municipality, Lassa Rehabilitation Center, Stavanger, Norway
[13]Trondheim Municipality, Special Needs Education, Trondheim, Norway
[14]Norwegian University of Science and Technology, Dept. of Internal Medicine, Trondheim, Norway

Background and Aims: Visual field defects (VFD) after stroke are common and causes reduced post stroke function as well as health related quality of life (HR-QoL). Visual rehabilitation has shown promise in improving post-stroke function and HR-QoL for patients with VFD. Still, VFD is poorly studied and randomised studies on the effect of visual rehabilitation are scarce.
Method: Patients admitted to Haukeland University Hospital, Trondheim University Hospital or Stavanger University Hospital with occipital ischemic stroke were included if able to consent and comply. Patients were examined with a general eye exam as well as autoperimetry by ophthalmologist within two weeks and again after six months. Neurological function was mapped with NIHSS in the acute phase and mRS after three months. Visual function was mapped by vision teacher after four weeks and six months. Vision Related QoL was assessed by VFQ-25 after four weeks and six months. Cerebral MRI scans were provided for all patients in the acute phase and after 6 months. Patients were randomised to training with vision teacher with individually adapted training program.
Results: A total of 76 patients with occipital ischemic stroke were included, 24 were lost to follow-up. VFD was present in 49/76 (64.5%) patients of which 15/49 (30.6%) were randomised to training with vision teacher.
Conclusion: NOR-OCCIP is a multi-center prospective study aiming at mapping outcome in patients with VFD after occipital ischemic stroke. VFD was found in 49 of 76 included patients of which 15 were randomised to training with vision teacher.

AS10-071

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

ICF-READER - A SOFTWARE FOR REHABILITATION MANAGEMENT

A. Shmonin[1,2], M. Maltseva[3], V. Nikiforov[4], V. Kasatkina[5] and E. Melnikova[1]

[1]First Saint-Petersburg I.P. Pavlov State Medical University, Department of neurology- Department of physical methods of treatment and sports medicine, St. Petersburg, Russia
[2]V.A. Almazov Federal Heart- Blood and Endocrinology center, Laboratory of microcirculation and heart metabolism, St. Petersburg, Russia
[3]I.M. Pavlov First Saint Petersburg State Medical University, Department of psychology and pedagogy, Saint-Petersburg, Russia
[4]First Saint-Petersburg I.P. Pavlov State Medical University, IT-department, St. Petersburg, Russia
[5]First Saint-Petersburg I.P. Pavlov State Medical University, Department of neurology, St. Petersburg, Russia

Background and Aims: International Classification of Functioning (ICF) is key instrument for work with multidisciplinary team (MDT) and management of rehabilitation process in all rehabilitation fields. Stroke rehabilitation cannot providing without rehabilitation diagnosis in ICF category. Our aim: to make software for management of rehabilitation process based on rehabilitation diagnosis in ICF category.
Method: The software was tested for large clinical trial "Development Of MEdical rehabilitation in Russia (DOME)" (ClinicalTrials.gov Identifier: NCT02793934). The program "ICF-reader" can help to generate rehabilitation diagnosis from the personal data of the patient, scales and medical history. The program «ICF-reader» has some options for simple ICF assessment: domains list for different specialists (neurologist, psychologist, nurse, occupational therapist and others), ICF core set for different diagnosis (stroke, MI, pneumonia, urology infection) and clinical situation (coma, surgeon operation, health people and others). ICF-reader help planning of rehabilitation based on the ICF diagnosis. The program accumulates and analysis of all the data about patient who get rehabilitation after stroke. We analyzed time of MDT work with or whithout "ICF-reader". We assesed how many patient problem MDT finded with or whithout "ICF-reader".
Results: We assessed 156 patients with stroke in trial DOME. ICF assessment and MDT meeting of the patient with stroke using «ICF-reader» takes to significant lower time then traditional MDT meeting without rehabilitation diagnosis and «ICF-reader» ($p < 0,01$). MDT

work with «ICF-reader» helps find more patient's hidden problems ($p < 0{,}01$).
Conclusion: The software "ICF-reader" helps find more patient's hidden problems and reduces the time to work with rehabilitation diagnosis.

AS10-072

REHABILITATION AND RECOVERY – EXCLUDING CLINICAL TRIAL RESULTS

SHOULDER PAIN AFTER RECENT STROKE (SPARS): AN OBSERVATIONAL STUDY OF HEMIPLEGIC SHOULDER PAIN WITHIN 72 HOURS AND AFTER 2 MONTH FOLLOW-UP (NCT 02574000)

M. Nadler[1], M. Pauls[1], G. Cluckie[1], B. Moynihan[1] and A. Pereira[1]
[1]ST GEORGE's UNIVERSITY OF LONDON, Dept. Neurology, LONDON, United Kingdom

Background and Aims: Hemiplegic shoulder pain (HSP) was thought to typically present around 2–3 months. We previously reported that 23% of patients actually had HSP within 72 hours of stroke (Nadler *et al.* 2015). Here we studied HSP in a fresh cohort within 72 hours and at 2 months post-stroke.
Method: With ethical approval, all patients admitted to the hyper-acute stroke unit over 4 months were screened. Those with confirmed new stroke and intact cognition were assessed using a standardised shoulder pain questionnaire (ShoulderQ), examination for MRC grade muscle power and subluxation. Follow-up was performed in clinic or via telephone.
Results: 154 consecutive stroke patients were recruited at 1.9 ± 1.1 days (mean $\pm$ SD). 121/144 survivors (85%) agreed follow-up at 66 ± 17 days. Within 72 hours, 42/121 (35%) reported HSP: 18 (15%) with new HSP following stroke and 24 (20%) affecting pre-existing shoulder pain. At follow-up, 15/18 and 17/24 respectively had continuing pain. 22 patients developed pain making 45% affected by HSP. Initial Pain Visual Analogue Scores (3x10cm-maximum 30 cm) were lower for patients whose pain resolved (8.7 ± 5.8 cm *vs* 12.8 ± 8.1 cm, $p = 0.021$, Mann Whitney U). Pain at 2 months was associated with weakness (MRC ≤ 3, $p < 0.00001$, Chi Sq) and subluxation ($p = 0.032$, Chi Sq).
Conclusion: There was a bimodal distribution with 35% having HSP within 72 hours of stroke (76% lasting 2 months) and 10% developing later HSP. HSP being present at 2 months was significantly associated with arm muscle weakness and/or subluxation and this may be reflected in higher initial VAS scores. Early targeted intervention may be feasible.

AS16-001

RISK FACTORS FOR STROKE

INCREASED PULSE WAVE VELOCITY IN PATIENTS WITH ACUTE LACUNAR INFARCTION DOUBLED THE RISK OF FUTURE ISCHEMIC STROKE

N. Saji[1,2,3], K. Murotani[4], H. Shimizu[3], T. Uehara[3], Y. Kita[3], K. Toba[1] and T. Sakurai[1]
[1]National Center for Geriatrics and Gerontology, Center for Comprehensive Care and Research on Memory Disorders, Obu, Japan
[2]Kawasaki Medical School, Department of Stroke Medicine, Kurashiki, Japan
[3]Hyogo Brain and Heart Center at Himeji, Department of Neurology, Himeji, Japan
[4]Aichi Medical University, Division of Biostatistics- Center for Clinical Research, Nagakute, Japan

Background and Aims: The aim of this study was to determine whether pulse wave velocity (PWV), a marker of vascular endothelial impairment and arteriosclerosis, predicts future ischemic stroke in patients who developed acute lacunar infarction.
Method: Patients with a first-ever ischemic stroke due to acute lacunar infarction were enrolled. An oscillometric device (Form PWV/ABI®; Omron Colin Co., Ltd., Tokyo, Japan) was used to measure brachial-ankle PWV 1 week after stroke onset. Patients were followed for at least 5 years. The main endpoint of the study was recurrent ischemic stroke. Event-free survival was analyzed using Kaplan-Meier plots and log-rank tests. The risk of recurrent ischemic stroke was estimated using the Cox proportional hazards model.
Results: Of the 156 patients (61% male, mean age: 69.2 ± 11.3 years) assessed in this study, 29 developed recurrent ischemic stroke. The median brachial-ankle PWV value was 20.4 m/s. Patients with high PWV values had a greater risk of recurrent ischemic stroke than patients with low PWV values (28% *vs.* 15%, $P = 0.08$). Kaplan-Meier curve analysis showed that patients with high PWV values had a less favorable (i.e., free of recurrent ischemic stroke) survival time ($P = 0.015$). A multivariate Cox proportional-hazards model identified high PWV as an independent predictor of recurrent ischemic stroke after adjusting for age, sex, and blood pressure (hazard ratio 2.35, 95% confidence interval, 1.02–5.70, $P = 0.044$).
Conclusion: In patients with acute lacunar infarction, a high PWV predicts a two-fold greater risk of future ischemic stroke, independent of patient age, sex, and blood pressure levels.

AS16-006

RISK FACTORS FOR STROKE

INFLUENCE OF STATINS ON LDL- AND HDL-CHOLESTEROL AND PLASMA FATTY ACIDS IN NEAR AND OLD ELDERLY JAPANESE STROKE PATIENTS

T. Mori[1], Y. Tanno[1], S. Kasakura[1], K. Yosioka[1] and N. Nakai[1]
[1]Shonan Kamakura General Hospital, Stroke Treatment, Kamakura, Japan

Background and Aims: Stroke sometimes occurs in near and old elderly (noE) patients who are treated with statins. The aim of our retrospective study was to investigate what influences statins had on plasma levels of LDL-C, HDL-C, triglyceride (TG) and some fatty acids (FA) in noE stroke patients at the onset of stroke.
Method: We included in our analysis Japanese stroke patients aged between 50 and 74 years admitted to our institution between Sep 2015 and Aug 2016 within 24 hours of stroke onset who took blood examination for LDL-C, HDL-C, TG and FAs such as palmitic acid (PaA), stearic acid (StA), oleic acid (OlA), linoleic acid (LiA), dihomo-gamma-linolenic acid (DHLA), arachidonic acid (AA), eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). We compared plasma lipid levels in patients taking statins (group S) with patients not taking statins (group NS).
Results: One hundred forty-seven patients matched our criteria. Average age was 68 years. On arrival to the hospital, 30 patients took statins (group S) and 117 didn't (group NS). In group S and NS, LDL-C was 84.6 and 130.1 mg/dl ($p < 0.0001$), HDL-C was 50.5 and 60.3 mg/dl ($p < 0.01$), TG was 196.8 and 135.7 mg/dl ($p < 0.05$). There was no difference in plasma levels of any FAs except LiA (722.5 vs. 880.1 μg/mL, ($p < 0.001$)). There were no differences in plasma levels of FAs in both groups, since both patients had same dietary composition.

Conclusion: Plasma levels of LDL-C, HDL-C and LiA were lower in group S, however there were no differences in PaA, StA, OlA, DHLA, AA, EPA or DHA in both groups.

AS16-009

RISK FACTORS FOR STROKE

BREATH HOLDING TEST IN PATIENTS WITH OBSTRUCTIVE SLEEP APNEA

O. Gunel[1], G. Tekgol Uzuner[1] and N. Uzuner[1]
[1]Eskisehir Osmangazi University, Neurology, Eskisehir, Turkey

Background and Aims: Because of the endothelial dysfunction which has been considered in patients with obstructive sleep apnea syndrome (OSAS), it is an important risk factor for stroke. Therefore, we investigated cerebral vascular reactivity (CVR) using breath holding test in subjects with OSAS with transcranial Doppler (TCD) and followed them nine months afterward.
Method: Doppler data were obtained by 91 patients who have moderate to severe OSAS, and compared with 19 healthy subjects matched for age and risk factors. Blood flow velocities were recorded during 30 seconds of normal breathing and 15 seconds breath holding. The CVR was calculated as a ratio of the difference of cerebral flow velocities during breath holding.
Results: There are no significant differences between patients and controls when considering risk factors. Since there is no significant side difference, the Doppler data of the left and right sides were pooled both in patients and controls. Thus, 182 vessels in patients and 38 vessels in controls were analyzed. OSAS patients showed significantly lower reactivity to breath holding than controls (38.7% vs. 47.3%; $p = 0.013$). However, neither patients nor controls have any stroke during the nine months follow-up period.
Conclusion: Our data showed the reduced vasodilator response to the breath-holding in the OSAS patients. Although we have not encountered any stroke in our subjects during the follow-up period, the lower CVR may be used as a predictor test to estimate the having a future stroke in these patients. However, we need larger sample size and probably longer follow-up period to clarify this issue.

AS16-014

RISK FACTORS FOR STROKE

FACTORS ASSOCIATED WITH MORTALITY AMONG HAITIAN PATIENTS MANAGED FOR STROKE AT A HOSPITAL IN PORT-AU-PRINCE, HAITI

L.G. Alexis[1], A. Elie[2], R.M. Laferrière[1] and J.J. Bernard[1]
[1]Université Notre Dame d'Haiti - Faculté de Médecine et des Sciences de la Santé, Research Departement, Port-au-Prince, Haiti
[2]Université Notre Dame d'Haiti - Faculté de Médecine et des Sciences de la Santé, Neurology Departement, Port-au-Prince, Haiti

Background and Aims: Stroke was the third leading cause of death in Haiti in 2010 (CDC, 2013). The aims of this study are to describe the epidemiology of stroke and determine the factors associated with mortality
Method: This is a cross-sectional study based on the chart review of patients admitted to the emergency department of St Luke Family Hospital in Port-au-Prince, Haiti from February 2013 to January 2014. Variables such as age, gender, cardiovascular risk factors, medical history, type of stroke, vital signs and outcome were collected. Association with mortality was evaluated with Mantel-Haenszel Chi-square test.
Results: Of the 442 registered cases of stroke, 173 were selected. The mean age of the population was 65,9 years-old [36–89] and the sex ratio 0.57. Hypertension (95.4%), diabetes mellitus (28.3%), smoking (13,9%), alcohol abuse (8.1%), dyslipidemia (7%) and personal history of stroke (12,7%) were the main risk factors. 55,5% of the patients had ischemic stroke and 42,2 % of them hemorrhagic stroke. The mortality rate was 43,4%, and the factors associated with death were: a systolic blood pressure > 220 mm Hg (Odds ratio (OR) = 6.23; P = 0.002), a diastolic blood pressure > 120 mm Hg (OR = 5.22; P = 0,00009), a temperature ≥37,5 °C (OR = 5,46; P = 0.000008), an oxygen saturation <95% OR = 2.96; P = 0.008), a Glasgow Coma Scale ≤ 8 (OR = 16,96; P = 0.000000) and dyslipidemia (OR = 7,38; P = 0,004)

Table 1 : Baseline characteristics of the patients admitted for stroke at St Luke family hospital (N=173)

Variables	Modalities	Frequency/Proportion	95% CI
Age	< 40 years	2 (1,2%)	0% – 2.7%
	40– 49 years	18 (10,4%)	5.9% – 15.0%
	50– 59 years	31 (17,9%)	12.2% - 23.6%
	60 69 years	51 (29,5%)	22.7% - 36.3%
	70– 79 years	47 (27,2%)	20.5% - 33.8%
	≥ 80 years	24 (13,9%)	8.7% - 19.0%
Gender	Female	110 (63,6%)	56.4% - 70.8%
	Male	63 (36,4%)	29.2% – 43.6%
Type of stroke	Ischemic	96 (55,5%)	48.1% - 62.9%
	Hemorragic	73 (42,2%)	34.8%- 49.6%
	Not mentioned	4 (2,3%)	0.1% - 4.6%
Habits	Tobacco	24 (13,9%)	8.7% - 19.0%
	Alcohol abuse	14 (8,1%)	4.0%- 12.2%
Medical history	Hypertension	165 (95,4%)	92.2% - 98.5%
	Diabetes mellitus	49 (28,3%)	21.6% - 35.0%
	Dyslipidemia	12 (6,9%)	3.2% - 10.7%
	History of stroke	22 (12,7%)	7.8% - 17.7%
	None	7 (4%)	1.1% - 7.0%
Stage of hypertension (HTN)	Pre-HTN	10 (5,8%)	2.3% - 9.3%
	Stage 1	27 (15,6%)	10.2% - 21.0%
	Stage 2	42 (24,3%)	17.9% - 30.7%
	Stage 3	81 (46,8)	39.4% - 54.3%
	No HTN	11 (6,4%)	2.7% - 10.0%
	Unknown	2 (1,2%)	0% - 2.7%

Table 2: Factors associated with mortality among patients admitted for stroke at St Luke family hospital

Variables	N	Odds ratio	95% CI	χ^2	P value
Age (> 65 years vs < 65 years)	173	1,14	0,62 – 2,09	0,18	0,67
Gender (M vs F)	173	1,19	0,64 – 2,21	0,29	0,59
Type of stroke (hemorragic vs ischemic)	169	1,81	0,97 3,36	3,55	**0,06**
Previous stroke (Yes vs No)	173	1,36	0,55 3,33	0,45	0,50
Systolic blood pressure (> 220 vs ≤ 220)	171	6,23	1,69 – 22,98	9,3	**0,002**
Diastolic blood pressure (> 120 vs ≤ 120)	171	5,22	1,81 – 15,02	10,92	**0,0009**
Temperature (<37,5 vs ≥ 37,5)	169	5,16	2,19 – 11,98	19,88	**0,000008**
Oxygen saturation (< 95% vs >95%)	123	2,96	1,31 – 6,67	7,08	**0,008**
Glycemia (< 180 vs > 180)	61	0,94	0,34 2,61	0,012	0,91
Comorbidities (≥2 vs 1)	166	1,7	0,88 – 3,26	2,54	0,11
Hypertension (yes vs no)	173	1,29	0,3 – 5,58	0,12	0,73
Known hypertension (yes vs no)	173	0,56	0,26 – 1,2	2,27	0,13
Stage of Hypertension (stage 3 vs stages 1 and 2)	150	1,46	0,76 – 2,81	1,29	0,26
Diabetes mellitus (yes vs no)	173	1,37	0,7 – 2,67	0,88	0,35
Known diabetes mellitus (yes vs no)	173	1,37	0,6 – 3,2	0,85	0,16
Dyslipidemia (yes vs no)	173	7,38	1,57 34,81	8,34	**0,004**
Smoking (yes vs no)	173	1,12	0,47 2,67	0,07	0,79
Alcohol abuse (yes vs no)	173	0,98	0,32 – 2,95	0,0015	0,97
Glasgow coma scale(≤ 8 vs >8)	87	16,96	5,86 – 49,03	31,85	**0,000002**

Conclusion: These findings confirm the guidelines for the management of stroke, that need to be correctly applied at St Luke hospital to decrease mortality. Dyslipidemia must be actively diagnosed and managed among the Haitian population.

AS16-015

RISK FACTORS FOR STROKE

THE FREQUENCY OF ISCHEMIC STROKE IN MYOTONIC DYSTROPHY TYPE 1 PATIENTS

K. Yoshida[1], Y. Aburakawa[1], Y. Suzuki[1], K. Kuroda[1] and T. Kimura[1]
[1]Asahikawa Medical Center, Neurology, Asahikawa, Japan

Background and Aims: Myotonic dystrophy patients have many cardiac abnormalities, especially myocardial conduction disorder. However, a

few studies reported cerebral infarction of myotonic dystrophy patients and no study with computed tomography or magnetic resonance imaging. We investigated how many both symptomatic and asymptomatic ischemic strokes occurred in myotonic dystrophy patients.
Method: We used with medical records of Asahikawa medical center. We retrospective investigated sex, age, follow-up duration, CTG repeat, neuroradiological image, electrocardiogram, medical history and treatment with medical records.
Results: One hundred eight patients diagnosed myotonic dystrophy type 1. Seventy-two patients (30 male, mean age 54.8, SD 10.7.) were performed computed tomography or magnetic resonance imaging. Four patients had symptomatic and six patients had asymptomatic ischemic stroke. Seventeen patients had hyperlipidemia, thirteen had diabetes mellitus. In an electrocardiogram, two had atrial flutter, three had atrial fibrillation, twenty-eight had atrioventricular block (I in 27 patients; III in one patient.). All of the ischemic stroke correlated with atrial fibrillation (spearman test, $r = 0.589$, $P < 0.001$).
Conclusion: The ischemic stroke in myotonic dystrophy type 1 patients correlates with atrial fibrillation. An electrocardiogram is important in myotonic dystrophy type 1.

AS16-016

RISK FACTORS FOR STROKE

RESPONSE TO STROKE SYMPTOMS DOES DIABETES MAKE THE DIFFERENCE OR DO WE NEED TO IMPROVE DIABETES EDUCATION?

J. Silva Fernández[1], R. García Ruiz[2], R.M. García Ruiz[3], E. Botia Paniagua[2], J. Abellán Alemán[4], I. Rueda Medina[2], B. Espejo Martínez[2], B. Miguel Martín[2], A.M. González Maner[2], A. Santos Pinto[2] and C. González Pereira[5]
[1]Hospital General La Mancha Centro, Endocrinology, Alcázar de San Juan, Spain
[2]Hospital General La Mancha Centro, Neurology, Alcázar de San Juan, Spain
[3]Hospital de Denia, Internal Medicine - Nursery, Denia, Spain
[4]Universidad Católica de Murcia UCAM, Cátedra de Riesgo Vascular, Guadalupe - Murcia, Spain
[5]Hospital Universitario Central de Asturias, Intensive Care Unit - Nursery, Oviedo, Spain

Background and Aims: Diabetes is a well-known vascular risk factor, more than doubling the risk of stroke with implications in mortality and dependecy. The success of reperfusion therapies is time-dependent, with most delays being patient-related. We investigated the response to stroke in diabetic patients (DM) as compared to non-diabetic patients (non-DM).
Method: Consecutive patients with acute stroke or transient ischemic attack were prospectively included. Sociodemographic and clinical data, time from stroke onset to decision to seek medical attention (Decision delay (DD)) and to hospital arrival (Prehospital Delay (PD)) and first medical contact (FMC) were obtained. Decision to call the 112 Emergency Services (112-ES) within the first 15 min was considered the correct decision. Descriptive and bivariate analysis were performed.
Results: 382 patients were included. 138 (36,1%) were diabetic. DD was <15 min in 41 (29,7%) DM vs 57 (23,4%) non-DM patients ($p = 0,17$). FMC was 112-ES in 20 (14,5%) DM vs 50 (20,5%) non-DM patients ($p = 0,14$), and a correct decision was made in 13 (9,4%) DM vs 32 (13,1%) non-DM patients ($p = 0,28$). PD was <60 min in 14 (10,1%) DM vs 29 (11,9%) non-DM patients. No significant differences were found after adjustment for potential confounders.
Conclusion: Despite carrying a greater load of risk factors and a higher risk of stroke, diabetic patients didn't respond to stroke symptoms better than non-DM patients. Even more, although not significant, the use of the 112-ES was quite lower in DM. We propose to systematically include information on stroke risk, symptoms, consequences and how to respond to stroke into diabetes education.

AS16-020

RISK FACTORS FOR STROKE

BLOOD PRESSURE AND RISK OF SUBARACHNOID HAEMORRHAGE IN CHINA

I. McGurgan[1], R. Clarke[2], Z. Chen[2] and S. Lewington[2]
[1]University of Oxford, Nuffield Department of Clinical Neurosciences, Oxford, United Kingdom
[2]University of Oxford, Nuffield Department of Population Health, Oxford, United Kingdom

Background and Aims: Elevated blood pressure (BP) is one of the chief determinants of stroke, but the relevance of moderate differences in usual levels of BP for subarachnoid haemorrhage (SAH) in China has not been previously studied.
Method: After excluding individuals with prior cardiovascular disease in the China Kadoorie Biobank study of 0.5 million participants, data on systolic (SBP) and diastolic BP (DBP) were related to incident SAH over a 7 year mean follow-up. Cox regression models were used to relate differences in usual BP with SAH after adjustment for confounding and correction for regression dilution. Repeat BP measurements in 5% samples at 3 and 8 year resurveys were used to obtain regression dilution ratios.
Results: There were 542 incident SAH events during 3.5 million person-years at risk, resulting in an age- and sex- standardised annual incidence rate of 16/100,000. Regression dilution ratios for the mean time to event (4 years) were 0.64 for SBP and 0.62 for DBP. SAH was linearly related with usual levels of both SBP and DBP. 20 mmHg higher SBP was associated with a hazard ratio (HR) for SAH of 1.67 (95%CI: 1.49–1.88) and 10 mmHg higher DBP was associated with a HR of 1.65 (95%CI: 1.47–1.86). The strength of the association was greater in those participants younger than 55 years versus those older, but no effect modification was demonstrated by levels of other established risk factors.
Conclusion: Incidence rates of SAH and strength of associations with usual levels of BP in China were comparable with equivalent estimates from Western populations.

AS16-021

RISK FACTORS FOR STROKE

INTERARM BLOOD PRESSURE DIFFERENCE IN A STROKE POPULATION

E. Gaynor[1], L. Brewer[2], L. Mellon[3], E. Dolan[4], A. Hickey[5] and D. Williams[6]
[1]Royal College of Surgeons Ireland, Stroke and Geriatrics, Dublin, Ireland
[2]Beaumont Hospital Dublin, Department of Stroke and Geriatric Medicine, Dublin, Ireland
[3]Royal College of Surgeons Ireland, Department of Psychology, Dublin, Ireland
[4]Connolly Hospital, Department of Geriatric Medicine, Dublin, Ireland
[5]Royal College of Surgeons Ireland, Division of Population Health Science, Dublin, Ireland
[6]Royal College of Surgeons Ireland- Beaumont Hospital, Stroke and Geriatrics, Dublin, Ireland

Background and Aims: Background: Increased interarm systolic blood pressure (IASBP) difference of >15 mmHg is associated with increased cardiovascular risk and all-cause mortality[Clark, C.E., et al., Lancet, 2012].

Aim: To determine the prevalence of interarm systolic and diastolic blood pressure difference in a stroke population.
Method: Methods: Data on interarm blood pressure differences was extracted from the ASPIRE-S (Action on Secondary Prevention Interventions and Rehabilitation in Stroke) cohort.
Results: Results: 238 (M:F, 139:99, mean age 68.4yrs, range 22–95yrs) of 256 patients followed up at 6 months post stroke had suitable BP readings from both arms. The mean systolic BP(SBP) from the right arm was 148.7(range 92–207; SD 22.09) and mean SBP from the left arm was 146 (range 83–208; SD 21.89). The results of interarm blood pressure differences are shown in table 1.

Table 1: Interarm SBP and DBP differences

	≥10mmHg		≥15mmHg		≥20mmHg	
Systolic Blood Pressure	40.3%	n=96	20.6%	n=49	11.3%	n=37
Diastolic Blood Pressure	19.3%	n=46	10.1%.	n=24	5.9%	n=14

A history of hypertension, diabetes, smoking, obesity and excess alcohol intake and stroke subtype was not statistically associated with an increased risk of IASBP difference across all ranges. History of carotid stenosis was associated with an increased IASBP difference of >20 mmHg ($P = 0.04$).
Conclusion: Conclusion: We report a prevalence of IASBP difference of >15 mmHg of 20.6% in this post stroke population. This important measure of cardiovascular disease was associated with the presence of carotid artery disease and therefore may act as an important measure of large artery disease.

AS16-023

RISK FACTORS FOR STROKE

INTRACRANIAL ARTERIAL CALCIFICATION PREDICTS LONG-TERM STROKE AND OTHER CARDIOVASCULAR EVENTS IN CHINESE ADULTS

X.H. Wu[1], L. Wang[1], T.W.H. Leung[1], J.X. Zhong[2], W.C.W. Chu[3], K.S. Wong[1], A. Jill[3] and X.Y. Chen[1]
[1]Chinese University of Hong Kong, Department of Medicine and Therapeutics, Hong Kong, Hong Kong S.A.R.
[2]Guangdong Province Traditional Medicine Hospital, The Cerebrovascular Disease Center, Guangzhou, China
[3]Chinese University of Hong Kong, Department of Imaging and Interventional Radiology, Hong Kong, Hong Kong S.A.R.

Background and Aims: Intracranial arterial calcification (IAC) is frequently observed on brain computed tomography (CT) and associated with atherosclerotic arteries. However, data on the association between IAC severity and vascular events are inconclusive.
Method: This hospital-based cohort study, recruiting consecutive patients referred for unenhanced brain CT imaging for any kinds of reasons in a regional hospital, aimed to related IAC to the incidence of ischemic stroke, other cardiovascular events and related mortality. In this study, quantitative IAC volume and IAC Agatston score were evaluated on unenhanced brain CT, using a semi-automatic custom-made system. Regular follow-up was performed through January 2005 and till July 2016.
Results: A total of 407 patients were recruited (mean age, 64 years; 205 males). During follow-up (median, 8.1 years), 35 patients developed ischemic stroke, 27 patients developed myocardial infarction, and 54 patients died of cardiovascular causes. In Cox proportional hazard model adjusted for established vascular risk factors, higher IAC Agatston score was associated with higher risks for non-cardioembolic stroke (HR per 1-SD increment, 1.747; 95% CI, 1.162–2.626), myocardial infarction (HR per 1-SD increment, 3.195; 95% CI, 1.891–5.396) and cardiovascular mortality (HR per 1-SD increment, 1.698; 95% CI, 1.107–2.605). Higher IAC volume (HR per 1-SD increment, 1.632; 95% CI, 1.026–2.596) also accounted for higher risk of cardiovascular mortality.
Conclusion: IAC value evaluated by quantitative measurements predict non-cardioembolic stroke, myocardial infarction and cardiovascular death in hospital patients referred for brain CT scanning. Further studies are warranted to evaluate the clinical implications of measuring IAC in vascular risk prediction.

AS16-024

RISK FACTORS FOR STROKE

PREVALENCE OF RIGHT-TO-LEFT CARDIAC SHUNT IN THE GREEK POPULATION AND IN PATIENTS WITH ESUS: PRELIMINARY RESULTS OF A TCD STUDY

I. Koutroulou[1], T. Karapanayiotides[1], G. Tsivgoulis[2], D. Karacostas[1] and N. Grigoriadis[1]
[1]Aristotle University Of Thessaloniki, 2Nd Department Of Neurology, Thessaloniki, Greece
[2]Attikon Hospital- University Of Athens, 2Nd Department Of Neurology, Athens, Greece

Background and Aims: The value of Patent Foramen Ovale (PFO) as a possible risk factor for embolic strokes of undetermined source (ESUS) is largely associated with the PFO prevalence in the general population. Depending on the diagnostic procedure, PFO prevalence in nonselected populations varies widely between 9%-35%. Hitherto, PFO prevalence in the Greek population remains unknown. We aim to define the prevalence of PFO using transcranial Doppler (TCD) in a national multicenter study.
Method: Right-to-left cardiac shunt (RLS) was detected according to the international consensus criteria (Jauss et al, Cerebrovasc Dis 2000) in healthy subjects (H, $n = 80$) and patients with ESUS ($n = 30$), ≤55 years old. In particular, each subject underwent unilateral TCD recording (Nicolet Sonaratek, Natus) with a 2-MHz probe installed on a special headframe (Nikolet, Natus) after infusion of agitated saline, at rest (R) and after a controlled (>5 sec, >20 cm H_2O) Valsalva maneuver (VM). We characterized RLS as large (>20 microbubbles or curtain), moderate ($10 < x \leq 20$) and minimal (≤10). Statistical comparisons were performed using the Fisher's exact test.
Results: RLS was detected in almost 50% of both H [$n = 40/80$, large = 17.5% (14/80), moderate = 21,25% (17/80)] and ESUS [$n = 16/30$, large = 43%(13/30), moderate = 10% (3/30)]. Large RLS were more often in the ESUS goup ($p < 0.012$, two-sided).
Conclusion: Our preliminary data suggest that the prevalence of PFO in Greece is quite higher than expected, based on observations from other populations. Despite the 50% chance of having RLS across the board, patients with ESUS have large RLS more than twice as often as the general population.

AS16-025

RISK FACTORS FOR STROKE

BLOOD PRESSURE VARIABILITY AND OUTCOMES IN SECONDARY PREVENTION FOR NON-VALVULAR ATRIAL FIBRILLATION: THE SAMURAI-NVAF STUDY

S. Matsubara[1,2], M. Koga[3], S. Sato[1], K. Kario[4], K. Kamiyama[5], Y. Okada[6], S. Okuda[7], K. Kimura[8], K. Nishiyama[9], Y. Nagakane[10], T. Terasaki[11], D. Ando[1], M. Shiozawa[1], S. Yoshimura[1], S. Arihiro[3], H. Yamagami[3], Y. Ando[2] and K. Toyoda[1]

[1]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Suita, Japan
[2]Graduate School of Medical Sciences, Department of Neurology, Kumamoto, Japan
[3]National Cerebral and Cardiovascular Center, Division of Stroke Care Unit, Suita, Japan
[4]Jichi Medical University School of Medicine, Division of Neurology, Shimotsuke, Japan
[5]Nakamura Memorial Hospital, Department of Neurosurgery, Sapporo, Japan
[6]NHO Kyushu Medical Center, Department of Neurology and Cerebrovascular Medicine, Fukuoka, Japan
[7]NHO Nagoya Medical Center, Department of Neurology, Nagoya, Japan
[8]Kawasaki Medical School, Department of Stroke Medicine, Kurashiki, Japan
[9]Kitasato University School of Medicine, Department of Neurology, Sagamihara, Japan
[10]Kyoto Second Red Cross Hospital, Department of Neurology, Kyoto, Japan
[11]Japanese Red Cross Kumamoto Hospital, Department of Neurology, Kumamoto, Japan

Background and Aims: Blood pressure (BP) variability is one of potential therapeutic targets for secondary prevention in ischemic stroke patients. We assessed whether visit-to-visit BP variability was associated with clinical outcomes in patients with non-valvular atrial fibrillation (NVAF) after ischemic stroke or TIA.
Method: Of 1192 patients who were registered in the SAMURAI-NVAF study (a prospective, multicenter, observational study), those who had $\geq$3 times BP measurements at discharge, and 3-month, 1-year, and 2-year follow-up clinic visits were analyzed. Using logistic regression models, we assessed the associations of coefficient variance [CV] and average real variability [ARV] for visit-to-visit BP levels with clinical outcomes involving ischemic and hemorrhagic events, and death during 2-year follow-up.
Results: Of all, 678 patients had $\geq$3 times BP measurements. The median follow-up period was 1.95 (IQR, 1.89–2.02) years. Mean systolic BP (SBP) and diastolic BP (DBP) at discharge were 122.9 ± 16.6 and 72.2 ± 12.8 mmHg, respectively. Adjusted odds ratios per 10% for CV and per 10 mm Hg for ARV (95% confidence interval) for ischemic stroke or TIA were as follows: 1.68 (0.92–3.00) for SBP CV, 1.48 (1.03–2.08) for SBP ARV, 1.63 (1.07–2.45) for DBP CV, 1.84 (1.19–2.83) for DBP ARV. ARV had similar trends for all ischemic event, and adjusted odds ratios were as follow; 1.37 (1.00–1.87) for SBP, 1.66 (1.12–2.45) for DBP. Any variability indexes were not associated with stroke or systemic embolism, major bleeding, or death.
Conclusion: BP variability seemed to be associated with ischemic events in secondary stroke prevention in patients with NVAF.

AS16-026

RISK FACTORS FOR STROKE

THYROID DISEASES: A CONSIDERABLE RISK FACTOR FOR CEREBRAL VENOUS SINUS THROMBOSIS?

M. Hieber[1], C. von Kageneck[1] and J. Lambeck[1]
[1]University Medical Center, Department for Neurology, Freiburg, Germany

Background and Aims: Cerebral venous sinus thrombosis (CVST) represents a small fraction of stroke. Etiological work-up often reveals risk factors, such as thrombophilia, malignancies, infections and certain drugs. Whereas an increasing number of case reports describe a possible association between CVST and hyperthyroidism, in large epidemiologic trials thyroid diseases in general (including hypothyroidism) were found only in a small proportion (1.7%) of CVST-patients. Previous studies described an association of hyperthyroidism and subclinical hypothyroidism with a prothrombotic state, whereas overt hypothyroidism was linked to an increased bleeding tendency.
We performed a retrospective single-center analysis of all cases of CVST, with (re-)evaluation of risk factors and thyroid parameters to provide further support for the possible association of CVST and thyroid diseases.
Method: A computerized full text search for „CVST" in the local medical documentation system was followed by screening of the resulting reports for the diagnosis of CVST (confirmed by cerebral imaging). In the resulting cases a (re-)evaluation of risk factors as well as thyroid parameters was carried out.
Results: Within 1303 reports, the subsequent manual analysis revealed 182 cases of confirmed CVST in the years 1996–2016. Whereas distribution of gender, age, localization and common risk factors were similar to previous results, we found a markedly higher proportion of thyroid disease in general (20.9 vs. 1.7%) and hyperthyroidism in particular (7.1%), both clearly exceeding the common prevalence.
Conclusion: Based on these results we propose to consider thyroid disease (and in particular hyperthyroidism) as a relevant risk factor for CVST and recommend thorough evaluation by default.

AS16-027

RISK FACTORS FOR STROKE

THE IMPORTANCE OF HDL CHOLESTEROL LEVELS FOR CEREBROVASCULAR ACCIDENT IN DIABETIC INDIVIDUALS

K. Ina[1], T. Hayashi[2] and M. Kuzuya[1]
[1]Nagoya University Graduate School of Medicine, Department of Geriatrics, Nagoya, Japan
[2]Nagoya University Graduate School of Medicine, Division of Health Science, Nagoya, Japan

Background and Aims: The risk factors for cerebrovascular accident (CVA) in elderly diabetic individuals with type IIb dyslipidemia are not fully known. Therefore, we investigated the relationship between lipid levels and CVA in diabetic individuals with type IIb dyslipidemia.
Method: The Japan Cholesterol and Diabetes Mellitus Study is a prospective cohort study of 4,014 type 2 diabetic patients (1,936 women; age 67.4 ± 9.5 years) with 9.2 years of follow-up. The primary end points were the onset of ischemic heart disease (IHD) or CVA. Lipid and glucose levels and other factors were investigated in relation to the occurrence of events. 483 subjects were included in the group of patients with type IIb dyslipidemia.
Results: 138 cases of CVA occurred over 9.2 years. In this study, we focused on type IIb dyslipidemia. 483 diabetic participants with type IIb

dyslipidemia were divided into those who were aged ≧65 years, 65–74 years, and 75 years (n = 175, 202, and 106, respectively). HDL-cholesterol (HDL-C) was significantly associated with risk of CVA in diabetic individuals with type IIb dyslipidemia who were aged <65 years. Risk factors for CVA appear to change with advancing age.
Conclusion: HDL-C was an important risk factor for CVA in diabetic individuals with type IIb dyslipidemia who were aged ≧65 years. The importance of HDL-C is different for each age-group. This result is important for developing individualized strategies to prevent atherosclerotic disease.

AS16-028

RISK FACTORS FOR STROKE

UNDERTREATMENT OF VASCULAR RISK FACTORS IN PATIENTS WITH ISCHAEMIC OCULAR EVENTS: RESULTS FROM 395 PATIENTS FROM A TERTIARY LONDON CENTRE

A. Zarkali[1], A. Cheng[1], A. Dados[1], R. Simister[1] and A. Chandratheva[1]
[1]University College London Hospital NHS Foundation Trust, Stroke, London, United Kingdom

Background and Aims: Ischaemic ocular events are often considered lower risk than other transient ischaemic attacks (TIA). We aimed to determine their recurrence risk, prevalence and management of vascular risk factors.
Method: Setting: University College Hospital London daily TIA clinic, main referral centre for North-Central London and Moorfields Eye Hospital. Consecutive records for patients with transient or permanent ischaemic visual loss were reviewed, 1st January 2014–30th September 2016.
Results: Of 395 patients, 220(56%) male, mean age 64 years (SD = 15.1), 261(66%) had transient and 134(34%) permanent events. 51.1% had hypertension, 34.4% hypercholesterolaemia, 14.7% diabetes, 10.9% ischaemic ocular events, 10.1% ischaemic heart disease (IHD), 7.1% atrial fibrillation (AF), 6.3% TIA, 5.1% stroke, and 12.4% were smokers. The median number of these eight risk factors present at event onset was 1(range 1–6), but 88(22.3%) had ≥3.
Permanent visual loss was more common in patients with previous IHD($p < 0.001$), TIA($p < 0.001$), ocular events ($p < 0.001$), diabetes ($p = 0.032$), hypertension ($p < 0.001$) and smokers ($p = 0.077$).
90-day recurrence for stroke/TIA/ocular ischaemia was 10.1% despite treatment; this was higher (14.8%) in patients with ≥3 risk factors (HR = 1.67, 95%CI = [0.89–3.09], $p = 0.120$).
Patients with past TIA were more likely to be on secondary prevention than those with ocular ischaemic events; 60% vs 45% received antiplatelets and 92% vs 51% statins. At presentation only 16(51.6%) with known AF were anticoagulated, despite all having CHADSVASC ≥ 1.
Conclusion: Approximately one-fifth of patients with ischaemic ocular events had ≥ 3 vascular risk factors with higher recurrences in these patients. Yet only half of those with previous ocular events were on antiplatelets or statins. These patients should be investigated and treated as aggressively as other forms of TIA/stroke.

AS16-030

RISK FACTORS FOR STROKE

CLINICAL OUTCOMES OF ACUTE ISCHEMIC STROKE PATIENTS TREATED BY DIRECT CATETHER-BASED TROMBECTOMY DEPENDING ON THEIR BASELINE CHARACTERISTIC

J. Vavrova[1], B. Koznar[1], T. Peisker[2], P. Vasko[2], F. Rohac[1], J. Kroupa[1], I. Stetkarova[2] and P. Widimsky[1]
[1]Charles University- Third Faculty of Medicine- University Hospital Kralovske Vinohrady, Department of Cardiology, Prague, Czech Republic
[2]Charles University- Third Faculty of Medicine- University Hospital Kralovske Vinohrady, Department of Neurology, Prague, Czech Republic

Background and Aims: Direct catheter-based thrombectomy (d-CBT) was proven to be an effective treatment for proximal occlusions of major intracranial arteries in acute stroke patients. The aim of this study was to compare clinical outcomes of patients treated by d-CBT depending on their baseline characteristic.
Method: A single center, prospective, observational registry of consecutive pacients treated by d-CBT for acute ischemic stroke. The degree of dependence after stroke was measured by the modified Rankin scale (mRS) in 3 months follow-up and pacients were divided into 2 subgroups based on functional independence/dependence (mRS 0–2 vs. 3–6).
Results: A total of 111 consecutive patients (mean age 65,9 ys, men 55%) have been enrolled. A favorable outcome (mRS ≤ 2 at 3 months) was reached in 39,8% (44 patients). Pacients with favourable outcome (mRS ≤ 2) compared to patients with poor outcome (mRS 3–6) were younger (61ys vs. 70ys, $p < 0{,}01$), had higher prevalence of cigarette smoking (45,5% vs. 25,4%, $p < 0{,}01$) and were less frequently on an antitrombotic therapy (31,8% vs. 49,3%, $p = 0{,}02$). There were no significant differencies between the subgroups in sex (men 50% vs. 58%, $p = 0{,}27$), body mass index (27,8 vs. 29,2, $p = 21$), arterial hypertension (70,5% vs. 77,6%, $p = 0{,}26$), diabetes mellitus (15,9% vs. 25,4%, $p = 15$), chronic kidney disease (11,4% vs. 22,4%, $p = 0{,}08$) and NIHSS on admission (15 vs.18, $p = 0{,}69$).
Conclusion: Mechanical thrombectomy achieved better clinical results in younger patients, in smokers and in those not treated by antithrombotic drugs prior to stroke onset.

AS16-032

RISK FACTORS FOR STROKE

LOW MOLECULAR WEIGHT PROTEINURIA AND RISK OF ISCHAEMIC SUFFERENCE

P. Fiori[1], A. Corbo[1], L. Iorillo[1], P. Savino[2], G. Romano[3], L.M. Giannetti[4], E. Mazza[5], C. Tammaro[6] and M. Antonio[1]
[1]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Neurology, Ariano Irpino AV, Italy
[2]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Internal Medicine, Ariano Irpino AV, Italy
[3]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Nephrology, Ariano Irpino AV, Italy
[4]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Infantile Neuropsychiatry, Ariano Irpino AV, Italy
[5]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Radiology, Ariano Irpino AV, Italy
[6]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Laboratory, Ariano Irpino AV, Italy

Background and Aims: Renal dysfunctions are present in metabolic, cardiovascular, cerebrovascular diseases. The aim of our study was to evaluate proteinuria in cerebrovascular diseases.
Method: We recruited 669 acute strokes (AS), 269 chronic cerebrovascular diseases (CCVD), 110 other neurological diseases (OND) patients. Blood and urine samples were gathered within 24 hours from admission.
Results: Proteinuria (mg/dl) was observed in 47% AS, 22% CCVD, 21% OND. It was significantly higher in CCVD (12,06 sd 27,17, p 0,03) and AS (29,15 sd 61,03, p 0,0006) compared to OND (8,9 sd 22,6). Levels of albuminuria (mg/l), urinary k and l chains (mg/l) were 97,53 sd 98,41 (p 0,01), 59,23 sd 72,85 (0,02), 33,5 sd 48,41 (p 0,04) in AS, 20,11 sd 26,74 (p 0,03), 35.96 sd 54,39 (p 0,0002), 16,93 sd 23,24 (p 0,005) in CCVD, 12 sd 17,20, 16,23 sd 15,93, 10,29 sd 12,11 in OND, respectively.
The reliability of the assays is reported:

	Proteinuria	Albuminuria	kappa chains	lambda chains
Sensibility	47%	79%	92%	93%
Specificity	79%	67%	42%	32%
Positive predictive value	93%	93%	90%	89%
Negative predictive value	20%	25%	46%	45%
Precision	51%	68%	84%	85%

Proteinuria correlated with MMSE (r 0,20), Blessed scale (r 0,24), Hachinski scale (r -0,21), albuminuria with Glasgow Outcome Scale (r -0,62) in AS.
Conclusion: Proteinuria is a red flag in cerebrovascular diseases. Urinary low molecular weight proteins may predict a higher risk of ischaemic sufferance, before massive proteinuria and hydroelectrolitic imbalance. Further studies are needed to assess it also in asymptomatic subjects.

AS16-033

RISK FACTORS FOR STROKE

IMMUNOLOGICAL STATUS IN ACUTE STROKE

P. Fiori[1], A. Corbo[1], L. Iorillo[1], S. Patrizia[2], L.M. Giannetti[3], M. Emerico[4], C. Tammaro[5] and A. Monaco[1]
[1]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Neurology, Ariano Irpino AV, Italy
[2]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Internal Medicine, Ariano Irpino AV, Italy
[3]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Infantile Neuropsychiatry, Ariano Irpino AV, Italy
[4]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Radiology, Ariano Irpino AV, Italy
[5]Ospedale S. Ottone Frangipane - ASLAV - II University of Naples, Laboratory, Ariano Irpino AV, Italy

Background and Aims: Inflammatory markers are increased in cerebrovascular diseases. Previous infections are reported and an increased susceptibility to infections is observed during hospitalization.
The aim of our study was to assess inflammatory markers, blood cells and proteinogram in cerebrovascular patients.
Method: So far we recruited 333 acute strokes (AS), 167 chronic cerebrovascular diseases (CCVD) and 76 other neuropsychiatric diseases (OND) patients. Blood withdrawals were performed within 24 hours.
Results: We detect increased erythrosedimentation rate (mm) and C Reactive Protein (mg/l) in CCVD (20,96 sd 19,27, 16,92 sd 31,92, p 0,0001) and AS (26,98 sd 22,2, 36,5 sd 133,79, p 0,01) compared to OND (10,54 sd 11,3, 5,05 sd 10,14). The percentage of gamma globulins was higher in AS (16,14 sd 3,93, p 0,001) and CCVD (15,95 sd 4,09, p 0,008), compared to OND (14,61 sd 2,64). A tendency to leukocytosis was present in AS (12,07 sd 3,69 x 10^3, p 0,08) compared to OND (6,65 sd 0,35 x 10^3), mainly constituted by neutrophils.
Conclusion: Humoral immunity represents the first line of defense against microorganisms. Cellular immunity is a second line response, reinforcing brief and long term immunocompetence. Both may promote or hinder immunoregulatory mechanisms. Inflammatory markers and gammaglobulins reflect an activation of humoral immunity in AS. Likely, because of exhaustion/suppression by cortisol, it fails in stimulating cellular immunity. The relative lower number of lymphocytes in AS compared to OND may stand for a state of cellular immunodepression with further increased risk of infections and worst outcomes, although it may be a protective factor against autoimmunity.

AS16-035

RISK FACTORS FOR STROKE

PREVALENCE OF CYP2C19 ALLELES IN THE MAESTRO STUDY PARTICIPANTS

S.W. Han[1] and J.H. Park[1]
[1]Sanggye Paik Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Cytochrome P450 2C19 (CYP2C19) plays a major role in the metabolism of the clopidogrel. The major alleles of the CYP2C19 gene are *1, *2, *3, and *17, and approximately 30% of Caucasians and 55% of Asians have one or more loss-of-function allele (*2 or *3).
Method: In this study, patients with at least two *2 or *3 alleles (*2/*2, *2/*3, or *3/*3) were classified as poor metabolizer (PM), those with one *2 or *3 allele (*1/*2 or *1/*3) were classified as intermediate metabolizer (IM), and those without a *2, *3, or *17 allele (*1/*1) were classified as extensive metabolizer (EM). Individuals carrying at least one *17 allele (*1/*17 or *17/*17) were classified as ultrarapid metabolizer (UM). In addition, those with (*2/*17 or *3/*17) were classified as unknown metabolizer.
Results: A total of 784 patients were enrolled for this trial. The mean age was 61 years, and 32% were women. 61% had a history of hypertension, 29% of diabetes, and 28% of dyslipidemia. Of the participants, 291 (37%) were classified as EM, 9 (1%) as UM, 348 (45%) as IM, 126 (16%) as PM, and 10 (1%) as unknown metabolizer. 300 (38%) had good genotype for clopidogrel metabolism and 484 (62%) had poor genotype. There were no significant differences in the demographic and clinical findings between the good and poor genotype groups.
Conclusion: The prevalence of CYP2C19 polymorphisms is different according to the ethnicity. The racial difference in platelet function may lead to differences in treatment as well as new targets for antiplatelet therapy.

AS16-037

RISK FACTORS FOR STROKE

RISK FACTORS FOR CAROTID PLAQUE INFLAMMATION: A POSITRON EMISSION TOMOGRAPHY STUDY

P. Camps-Renom[1], A. Fernández-León[2], L. Prats-Sánchez[1], I. Castrillón[1], J.M. González de Echavarri[1], P. Marrero-González[1], R. Delgado-Mederos[1], A. Martínez-Domeño[1], E. Jiménez-Xarrié[1], D. Guisado-Alonso[1] and J. Martí-Fàbregas[1]
[1]Hospital De La Santa Creu I Sant Pau, Neurology, Barcelona, Spain
[2]Hospital De La Santa Creu I Sant Pau, Nuclear Medicine, Barcelona, Spain

Background and Aims: Positron Emission Tomography (PET) with ^{18}fluorodeoxyglucose (18FDG) can quantify carotid inflammation, which have been related to plaque progression and recurrent stroke. Little is known about risk factors associated with carotid inflammation.
Method: We conducted a prospective study of consecutive adult patients admitted to our centre with an acute anterior circulation stroke and at least one atherosclerotic plaque in the internal carotid artery (ICA) ipsilateral to the stroke symptoms, regardless of the degree of stenosis. We excluded cardioembolic strokes according to the TOAST criteria. We recorded demographic data, vascular risk factors and previous treatments at admission. All patients underwent an 18FDG PET-CT within three weeks from the index stroke. We determined the peak Standardized Uptake Value (SUV) and the peak Target to Background Ratio (TBR) in both ICA. We conducted two different linear regression analyses to determine the association between vascular risk factors and either the SUV or the TBR.
Results: We included 30 patients with a mean age of 74 ± 10.4 years and 21 (70%) were men. A stenosis > 50% was observed in 20 (66.7%) patients. The linear regression model demonstrated that obesity ($\beta = 0.589$ 95%CI 0.207–0.972, p = 0.004) and female gender ($\beta = 0.789$ 95%CI 0.389–1.189, p < 0.001) were independently associated with a higher SUV, and obesity ($\beta = 0.169$ 95%CI 0.008–0.330, p = 0.040) was related to a higher TBR in the ICA ipsilateral to stroke. Prior antiplatelet therapy ($\beta = -0.203$ 95%CI -0.345-(-0.060), p = 0.007) was associated with lower TBR.
Conclusion: Obesity is associated with carotid plaque inflammation assessed by 18FDG PET-CT. Prior antiplatelet therapy may play a protective role in carotid inflammation.

AS16-038

RISK FACTORS FOR STROKE

POOR GLYCEMIC CONTROL IS ASSOCIATED WITH THE SEVERE INTRACRANIAL ATHEROSCLEROSIS IN DIABETIC PATIENTS

N. Choi[1], J.Y. Lee[1], J.S. Sunwoo[1], H. Roh[1], M.Y. Ahn[1], S.T. Park[2] and K.B. Lee[1]
[1]Soonchunhyang University Hospital, Neurology, Seoul, Republic of Korea
[2]Soonchunhyang University Hospital, Radiology, Seoul, Republic of Korea

Background and Aims: Diabetes mellitus is a specific risk factor for intracranial atherosclerosis regardless of race. However, it is largely unknown whetherpoor glycemic control is associated with the severity of intracranial stenosis in diabetic patients.
Method: We selected diabetic patients with acute ischemic stroke who was prospectively registered between Mar 2005 and Dec 2015. The patients who had a high risk source of cardiogenic embolism were excluded. Intracranial atherosclerosis was graded from 0 to 3 by the number of significant (>50%) stenosis on intracranial magnetic resonance angiography, and was divided into 4 types: unilateral anterior, bilateral anterior, posterior, and anterior plus posterior. Ordinal and multinominal regression test were applied for the associated factors with the number and types of intracranial stenosis.
Results: A total 774 patients had diabetes among 1,967 noncardioembolic strokes. The multiplicity of intracranial stenosis was significantly associated with age (OR 1.035 per 1 year, 1.018–1.052; $P < .001$), hypertension (OR 1.992, 1.336–2.965; $P = .001$), and hemoglobin A1c (OR 1.207 per 1%, 1.089–1.338; $P < .001$) in the ordinal regression model. In multinominal regression, bilateral anterior stenosis was correlated with age (OR 1.042, 1.008–1.077; $P = .016$) and low-density lipoprotein (OR 1.037 per 1 md/dL, 1.009–1.067; $P = .009$). Stenosis in both anterior and posterior was closely linked to age (OR 1.056, 1.029–1.084; $P < .001$), hypertension (OR 2.584, 1.404–4.762; $P = .002$), and hemoglobin A1c (OR 1.272, 1.070–1.511; $P = .006$).
Conclusion: Age, concomitant hypertension, and hemoglobin A1c were independently associated with severe intracranial stenosis. Further study is warranted to elucidate whether poor glycemic control facilitates intracranial atherosclerosis in diabetic patients.

AS16-039

RISK FACTORS FOR STROKE

PREVALENCE OF DYSLIPIDEMIA AND STATIN PRESCRIPTION ACCORDING TO DIFFERENT CRITERIA IN PATIENT WITH ACUTE ISCHEMIC STROKE

J.M. Park[1], K. Kang[1], Y.J. Cho[2], K.S. Hong[2], K.B. Lee[3], T.H. Park[4], S.J. Lee[5], J. Lee[6], J.K. Cha[7], D.E. Kim[8], J.T. Kim[9], J.C. Choi[10], M.S. Oh[11], K.H. Yu[11], D.I. Shin[12], W.J. Kim[13], S.I. Sohn[14], J.S. Lee[15], J. Lee[16] and H.J. Bae[17]
[1]Nowon Eulji Medical Center- Eulji University, Neurology, Seoul, Republic of Korea
[2]Ilsan Paik Hospital- Inje University College of Medicine, Neurology, Goyang, Republic of Korea
[3]Soonchunhyang University Hospital, Neurology, Seoul, Republic of Korea
[4]Seoul Medical Center, Neurology, Seoul, Republic of Korea
[5]Eulji University Hospital, Neurology, Daejeon, Republic of Korea
[6]Yeungnam University Hospital, Neurology, Daegu, Republic of Korea
[7]Dong-A University Hospital, Neurology, Busan, Republic of Korea
[8]Dongguk University Ilsan Hospital, Neurology, Goyang, Republic of Korea
[9]Chonnam National University Hospital, Neurology, Gwangju, Republic of Korea
[10]Jeju National University Hospital, Neurology, Jeju, Republic of Korea
[11]Hallym University College of Medicine, Neurology, Anyang, Republic of Korea
[12]Chungbuk National University Hospital, Neurology, Cheongju, Republic of Korea
[13]Ulsan University Hospital, Neurology, Ulsan, Republic of Korea
[14]Keimyung University Dongsan Medical Center, Neurology, Daegu, Republic of Korea
[15]Asan Medical Center, Clinical Research Center, Neurology, Republic of Korea
[16]Korea University College of Medicine, Biostatistics, Seoul, Republic of Korea
[17]Seoul National University Bundang Hospital, Neurology, Seongnam, Republic of Korea

Background and Aims: We investigated dyslipidemia prevalence and statin prescription rates in acute ischemic stroke patients according to different dyslipidemia criteria.
Method: Using a multicenter stroke registry database, patients with acute ischemic stroke were identified. Dyslipidemia prevalence among ischemic stroke patients at discharge were analyzed using the 4 different dyslipidemia criteria; Health Insurance Review & Assessment Service in Korea in 2006, Adult Treatment Panel III guidelines in 2004, American Stroke Association (ASA) guidelines in 2010 and 2014. Statin prescription rates were calculated among dyslipidemic stroke patients according to the different dyslipidemia criteria. Secular trends of dyslipidemia prevalence and statin prescription rates from 2008 to 2015 were also investigated.
Results: Of 29,703 patients with acute ischemic stroke hospitalized within 7 days of onset with relevant ischemic lesions on DWI between April 2008 and March 2015, 28,416 patients were enrolled for this study. Dyslipidemia prevalence varied according to the different criteria, from

15.5% to 57.5%; while statin prescription rates were rather homogenous, from 85.1% to 91.5%. After adjusting age and sex, dyslipidemia prevalence by ASA 2010 criteria decreased from 45.8% in 2008 to 41.2% in 2015. (p for linearity <0.01) After adjusting age, sex and other relevant variables, statin prescription rates by ASA 2010 criteria increased from 65.9% to 94.2% during this period. (p for linearity <0.05)
Conclusion: Dyslipidemia prevalence in acute ischemic stroke patients was different across the various criteria and decreased from 2008 to 2015. Statin prescription rate improved during this period.

AS16-041

RISK FACTORS FOR STROKE

RISK FACTORS IN YOUNG CRYPTOGENIC ISCHEMIC STROKE PATIENTS: FINDINGS FROM THE HISTORY STUDY

P. Divisova[1], D. Sanak[1], P. Kanovsky[1], T. Veverka[1], T. Dornak[1], D. Franc[1], M. Kral[1], M. Hutyra[2], D. Vindis[2], J. Precek[2], A. Bartkova[1] and M. Taborsky[2]
[1]FN Olomouc, Department of Neurology, Olomouc, Czech Republic
[2]FN Olomouc, Department of Cardiology, Olomouc, Czech Republic

Background and Aims: The cause of ischemic stroke (IS) remains often unclear – cryptogenic, especially in younger patients. Moreover, the presence of known relevant risk factors (RF) is not enough established in this population. Our aim was to assess frequency and spectrum of relevant RF in young CIS patients.
Method: The study set consisted of young acute IS patients <50 years enrolled in the prospective HISTORY (Heart and Ischemic STrOke Relationship studY) study registered on ClinicalTrials.gov (NCT01541163). In all patients, the brain ischemia was confirmed on CT or MRI. Admission ECG, serum specific cardiac and thrombophilia markers, neurosonology, TEE, 24-hour and 3-week ECG-Holter were performed in all patients to assess CIS.
Results: Out of 1006 patients enrolled in the HISTORY study, 176 (95 males, mean age 40.3 years ±8.4 years) were <50 years. 130 (74 %) were identified as CIS (72 males, mean age 40.9 ± 7.8 years). In total, relevant RF were present in 88 % of CIS patients; 36% of patients had elevated serum cholesterol, 32% of patients were smokers, 30% had detected PFO with right-left shunt, and 28% arterial hypertension. 43% of CIS females used hormonal contraception. Recurrent IS occurred in 5% of CIS patients and all of them had at least one of known RF.
Conclusion: The relevant RF were present in 88% of young CIS patients, hypercholesterolemia and hormonal contraception in females were the most frequent RF.

AS16-042

RISK FACTORS FOR STROKE

NOVEL CHARACTERISTICS IN KOREAN PATIENTS WITH CADASIL

Y. Kim[1] and S.H. Lee[2]
[1]Kangdong Sacred Heart Hospital- Hallym University College of Medicine, Department of Neurology, Seoul, Republic of Korea
[2]Seoul National University Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Previous studies found differences in the characteristics of Notch3 mutations between Caucasian ethnicity and Asian populations. Our hypothesis is that because a specific gene plays novel roles, changes of amino acid may provoke alterations functional deficits.
Method: We screened patients with a suspected diagnosis of CADASIL between 2005 and 2015. Mutational hotspots of the Notch3 gene in exons 2–23 were screened via Sanger sequencing.
Results: A total of thirty-four subjects (women, n = 21 and mean age, 52.5 ± 9.5 years) were included in this study. The majority of the mutations were in exon 3 and exon 11. R75P mutations, followed by Y465C and R544C mutations were the most prevalent in this study. Patients with those mutations exhibited less frequent anterior temporal (AT) or external capsular (EC) hyperintensities compared to patients with other locus mutations.
Conclusion: Conclusions: In contrast to westernized countries, CADASIL patients in our study frequently had mutations in exon 3 and exon 11, and they did not show typical AT or EC hyperintensities. Although the underlying genetic mechanisms remain unclear, we suggest that some CADASIL mutations appear to have specific characteristics.

AS16-044

RISK FACTORS FOR STROKE

VARIATION OF ISCHEMIC STROKE RISK FACTORS IN ASIAN AND WHITE POPULATION IN KYRGYZSTAN : A RETROSPECTIVE COHORT STUDY

I. Lutsenko[1] and S. Zhumakeeva[1]
[1]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan

Background and Aims: Kyrgyzstan has the highest mortality for ischemic stroke (IS) conditions in the European Region. The aim of this investigation was to determine the importance of ethnicity as a in important risk-factor of IS in Kyrgyzstan.
Method: Residents from Kyrgyzstan, underwent IS were hospitalized for acute ischemic stroke (n = 181, Azians (Kyrgyz) 74%, White 26 %) were evaluated about stroke risk factors retrospectively. According TOAST ischemic strokes were classified as atherosclerotic (56,9%), lacunar (7,2%), cardioembolic (14,9%), cryptogenic (9,4%), and other (3,9%).
Results: The proportion of large artery atherosclerosis was higher in Kyrgyz population 56,7% vs 44.%, while lacunar strokes were prevalent in whites 14.9% versus 4.5%. OR for nonwhites was 3.2 (confidence interval [CI], 3.0–4.11) for extracranial and 4.6 (CI, 2.04 to 11.7) for intracranial atherosclerosis. The RRs of total stroke for each 10 mm Hg rise in SBP and DBP in White group (2.3 and 1.9, respectively) were higher than in Asians (1.8 to 1.6 and 1.6 to 1.8, respectively). In Asian group, during the past 12 months, 50.6% of men and 72.4% of women abstained from alcohol. Kyrgyz patients were more overweight, physically inactive, had more diabetes, metabolic syndrome preferred animal fat in daily diet (p = 0.001) and were more from high social status. Prevalence of large infarction on MRI was higher in Kyrgyz population (17.2% vs 14.9%).
Conclusion: There were significantly more atherosclerosis and LAA in Asians than in Whites, while Whites expressed more arterial hypertension. Kyrgyz population prefers traditional animal fatty food and is less physically active with equal BMI with whites (25).

AS16-045

RISK FACTORS FOR STROKE

CAN MORPHOLOGIC FEATURES SERVE TO IDENTIFY ETIOLOGIC HETEROGENEITY OF RECENT SMALL SUBCORTICAL INFARCTS?

S. Eppinger[1], F. Fazekas[1], C. Enzinger[1], T. Gattringer[1], S. Ropele[2], S. Fandler[1] and L. Pirpamer[1]
[1]Medical University of Graz, Neurology, Graz, Austria
[2]Medical University of Graz, NEUROIMAGING RESEARCH UNIT, Graz, Austria

Background and Aims: Recent small subcortical infarcts (RSSI) are commonly supposed to result from the occlusion of a single small

perforating brain artery due to intrinsic cerebral small vessel disease (CSVD). However, some RSSI may be attributable to other causes such as cardiac embolism or large artery disease (LAD). Given the potential therapeutic implications, to identify possible hints in these directions, we examined whether morphological RSSI features on MRI were indicative of specific risk factor profiles or additional signs of CSVD.

Method: We retrospectively identified all inpatients with a single MRI-confirmed RSSI between 2008–2013. RSSI were rated for size, shape, location and CSVD signs. Demographic and clinical data were extracted from our electronic patient database.

Results: Among 335 patients with RSSI (mean age 71 ± 12 years), 131 infarcts were >15 mm in axial diameter and 66 tubular shaped. Atrial fibrillation (AF) was present in 44 (13%), an ipsilateral intra- or extracranial vessel stenosis >50% in 30 (9%) patients. Arterial hypertension and CSVD MRI markers were significantly more frequent in patients with anterior circulation RSSI, whereas diabetes was more prevalent in the posterior cerebral circulation. Pontine RSSI were associated with a proximal vessel stenosis (15.4% vs. 4.6–9.8% in other locations, p: 0.049) Patients with concomitant AF had no specific MRI profile.

Conclusion: Our findings suggest the contribution of different pathophysiological mechanisms to the occurrence of RSSI in the anterior and posterior circulation. While there appears to be some general association of larger infarcts in the pons with LAD, we found no pattern suggestive of AF in RSSI.

AS16-046

RISK FACTORS FOR STROKE

TWENTY-YEAR TRENDS IN RISK FACTORS ASSOCIATED WITH ISCHEMIC STROKE IN A SECONDARY CARE STROKE UNIT, 1992–2013

S. Fastré[1], K. de Fays[1], F. London[1], Y. Vandermeeren[1] and P. Laloux[1]

[1]CHU UCL Namur Site Mont-Godinne, neurology, Yvoir, Belgium

Background and Aims: Prevention of ischemic stroke (IS) improved during the last two decades, mainly due to a better control of cardiovascular risk factors (RF). The aim of this study was to evaluate the trend of RF associated with IS between three periods of time.

Method: All patients with IS were prospectively collected in a stroke database. We extracted 3 cohorts of patients according to the time of admission: C1, 1992–1993 (n = 208); C2, 2002–2003 (n = 438); C3, 2012–2013 (n = 386). We then compared the prevalence of stroke RF.

Results: 94 patients (44.2%) had hypertension in C1, 306 (69.9%) in C2, and 283 (73.3%) in C3. 38 (18.3%) had diabetes in C1, 96 (21.9%) in C2, 80 (20.7%) in C3. There were 76 smokers (36.5%) in C1, 116 (26.5%) in C2 and 116 (30.1%) in C3. Hypercholesterolemia was found in 60 patients (28.8%) in C1, 63 (14.4%) in C2 and 28 (7.3%) in C3. Thirty-two (15.4%) patients were known having atrial fibrillation in C1, 65 (14.8%) in C2, and 74 (19.2%) in C3.

Conclusion: Hypertension remains the main RF in IS and the rate increased over time. In contrast, the prevalence of hypercholesterolemia decreased during the two last periods, probably due to a larger use of statins in the general population. The proportion of the other RF did not change significantly.

AS16-047

RISK FACTORS FOR STROKE

PROFILE OF RETICULATED PLATELETS AND RED CELL RETICULOCYTES IN PATIENTS WITH RECENTLY SYMPTOMATIC VERSUS ASYMPTOMATIC CAROTID STENOSIS:RESULTS FROM THE HAEMOSTASIS IN CAROTID STENOSIS (HEIST) STUDY

S. Murphy[1], S.T. Lim[1], J. Kinsella[2], C. Coughlan[1], S. Tierney[3], B. Egan[3], M. Feeley[3], S. Murphy[4], R. Walsh[1], R. Collins[5], T. Coughlan[5], D. O'Neill[5], J. Harbison[6], P. Madhavan[7], S. O'Neill[7], M.P. Colgan[7], D. Cox[8], N. Moran[8], G. Hamilton[9] and D. McCabe[1]

[1]The Adelaide and Meath Hospital, Neurology, Dublin, Ireland
[2]St Vincent's University Hospital, Neurology, Dublin, Ireland
[3]The Adelaide and Meath Hospital, Vascular Surgery, Dublin, Ireland
[4]The Adelaide and Meath Hospital, Academic Unit of Neurology, Dublin, Ireland
[5]The Adelaide and Meath Hospital, Age-Related Health Care, Dublin, Ireland
[6]St James Hospital, Medicine for the Elderly/Stroke Service, Dublin, Ireland
[7]St James Hospital, Vascular Surgery, Dublin, Ireland
[8]Royal College of Surgeons in Ireland, Molecular and Cellular Therapeutics, Dublin, Ireland
[9]Royal Free Campus- UCL Institute of Neurology, Vascular Surgery, London, United Kingdom

Background and Aims: The mechanisms responsible for the disparity in stroke risk between asymptomatic and symptomatic carotid stenosis are not fully understood. Profiles of 'reticulated platelets' and red cell reticulocytes in carotid stenosis patients are poorly understood.

Method: This prospective, multi-centre, observational analytical study compared full blood count parameters and platelet production/turnover biomarkers in early-phase (≤4 weeks after TIA/stroke) and late-phase (≥3 months) symptomatic *versus* asymptomatic moderate-severe (≥50–99%) carotid stenosis patients. Reticulated platelets were quantified by whole-blood flow cytometry and by an 'automated assay' (Sysmex XE-2100™). Multiple linear regression analysis controlled for the potential influence of independent variables on observed differences between groups.

Results: Data from 43 early-phase symptomatic and 37 late-phase symptomatic patients were compared with 34 asymptomatic patients. The mean platelet count in citrate-anticoagulated blood was higher in early-phase ($P = 0.040$) and late-phase symptomatic ($P = 0.045$) than asymptomatic patients. Mean platelet volume was higher in early symptomatic than asymptomatic patients (10.8 *vs.* 10.45fl; $P = 0.04$). There were no differences in % reticulated platelets between groups using flow cytometry. However, the 'automated assay' revealed a higher 'unadjusted' reticulated-platelet fraction (%RPF) in early-phase (5.78%; $P < 0.001$) and late-phase symptomatic (5.11%; $P = 0.001$) *vs.* asymptomatic patients (3.48%). The % red cell reticulocytes was lower in early (0.92%; $P = 0.035$) and late symptomatic (0.93%; $P = 0.036$) than asymptomatic patients (1.07%).

Conclusion: There is an ongoing stimulus to increased platelet production/secretion/reduced clearance, and an increased population of immature, potentially 'more-reactive' reticulated platelets in symptomatic carotid stenosis patients which may contribute to the higher risk of stroke in symptomatic *vs.* asymptomatic carotid stenosis.

AS16-048

RISK FACTORS FOR STROKE

OBESITY PARADOX IN ACUTE ISCHEMIC STROKE: NEW CELLULAR AND CLINICAL EVIDENCES

E. Rodríguez-Castro[1], T. López-González[1], M. Rodríguez-Yáñez[1], M. Pérez-Mato[1], E. López-Arias[1], F. Campos[1], J. Castillo[1] and T. Sobrino[1]
[1]Health Research Institute of Santiago de Compostela IDIS, Clinical Neurosciences Research Laboratory, Santiago de Compostela, Spain

Background and Aims: Obesity is considered a risk factor for stroke; however, the obesity paradox suggests that obese patients may have higher survival rates after stroke. Therefore, our aim was to study the effect of obesity in the neurological and functional outcome of IS patients.
Method: We have conducted a case-control study in which a total of 80 consecutive IS patients (55 % males; mean age, 70.8 ± 12.9 years) were randomized to 2 groups matched by age/sex: obesity group and normal-weight (control) group. The main outcome variable was good functional outcome at 3 months (modified Rankin scale ≤2) considering the NIHSS improvement at 3 months, lesion volume, and the number of circulating progenitor cells as secondary variables. Progenitor cell count (CD34+/CD45-/CD31- staining cells in the lymphocyte gate) was measured at admission, 72 h and day 7 by flow cytometry.
Results: No differences were found on functional outcome between the obesity and control groups (70.0 % vs 62.5 %; p = 0.318). However, obese patients showed a higher NIHSS improvement at 3 months compared to the control group (84.5 % vs 50.4 %; p = 0.001). No differences were also found between groups for lesion volume. Moreover, obese patients showed a higher mobilization of progenitor cells at admission, 72 h and day 7 (all $p < 0.0001$); and a positive correlation was found between circulating progenitor cells at admission (r = 0.468) and 72 h (r = 0.461) with the NIHSS improvement at 3 months.
Conclusion: Obesity, probably through mechanisms of mobilization of progenitor cells, may play a role in the improvement of neurological deficit in IS patients.

AS16-049

RISK FACTORS FOR STROKE

HEALTH PROFILE OF KYRGYZ INHABITANTS : ANALYSIS OF LIFESTYLE OF PATIENTS WITH ISCHEMIC STROKE AND IMPLEMENTATION OF MEDITERRANEAN DIET IN KYRGYZSTAN

A. Ismailova[1], I. Lutsenko[2] and S. Zhumakeeva[2]
[1]Bishkek, Kyrgyzstan
[2]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan

Background and Aims: Healthy lifestyle consists of use of Mediterranean diet (MD), no smoking, regular physical exercises, no alcohol abusing, moderate consumption of red wine and intake of big amount of vegetables and olive oil. We conducted a cross-sectional with nested case-control study to evaluate the style of nutrition and healthy profile of patients with IS in Kyrgyzstan.
Method: The total sample was 280 people: 180 patients underwent IS and 100 controls. Objects were interviewed according to our detailed questionnaire.
Results: Age range was 42 to 86 years; median age was 60,16. 47% were women. According TOAST ischemic strokes there was a prevalence of large artery atherosclerosis (LAA) (56,9%). In the group of IS we among LAA strokes we found significantly higher consumption of animal fats and carbohydrates (OR = 2.8 (95% 3.1–4.6), low consumption of vegetables (p = 000.1), fruits and water less than 2 l in daily intake. 34% of patients consider fat as traditional food preference. 87,5% (p = 0.001) do not consume olives and olive oil. 85,7% of patients do not lead a healthy lifestyle, are physically inactive (OR 4.1 (95% 2.1–11.1), 40,6% were smokers in LAA group. Only 6.3% of all IS had enough time for exercises. BMI in all TOAST subtypes was not significantly different and was 25 (p = 0.01), but lower in control group (24).
Conclusion: Because of traditional food intake (high consumption of animal fat and carbohydrates), Kyrgyz people tend to be overweight, have higher BMI and do not adhere MD. Kyrgyz inhabitants need to change food preferences in order to change rates for IS.

AS16-050

RISK FACTORS FOR STROKE

RESISTANCE TO ASPIRIN AND CLOPIDOGREL IN STROKE PATIENTS

E. Pucite[1,2], E. Miglane[1,2], A. Millers[1,2], I. Logina[1,2], A. Novasa[1] and R. Aleksejeva[1]
[1]Pauls Stradins Clinical University hospital, Neurology, Riga, Latvia
[2]Riga Stradins University, Depatment of Neurology and Neurosurgery, Riga, Latvia

Background and Aims: The aim of the study was to evaluate the prevalence of aspirin and clopidogrel resistance in patients with ischemic stroke and to explore possible associations between certain demographics, life style and clinical characteristics.
Method: Prospective single centre study included 88 patients with acute stoke who were treated with aspirin and clopidogrel at least for first 5 days from the stroke onset. Aspirin and clopidogrel resistance was established using Verify Now System. Aspirin resistance was defined if ARU (aspirin reaction units)were ≥550, and clopidogrel resistance was defined if platelet inhibition was <40%.
Results: All patients were divided in 2 groups: first-time stroke (FT) (n = 47, 53,4%) and recurrent stroke (RR) (n = 41, 46,6%). Six out of 47 patients (12,8%) were found to be aspirin resistant and 29 (61,7%) - clopidogrel resistant in FT stroke patients ($p < 0,01$). Six out of 41 patients (14,6%) were found to be aspirin resistant and 23 (56,1%) - clopidogrel resistant in RR stroke patients ($p < 0,01$). There was no statistical significant difference between FT and RR groups comparing frequency of antiagregant resistance ($p = 0,7$), patients age, comorbidities, comedications, laboratory tests, except aorta coronary bypass surgery ($p = 0,043$), atrial fibrillation ($p = 0,011$), perindopril use ($p = 0,03$) was more often in RR group. No statistically significant difference between resistant and non-resistant groups were observed for any of comorbidities, comedications, laboratory tests.
Conclusion: Prevalence of clopidogrel resistance is more frequent as aspirin resistance in ischemic stroke patients. Statistically significant correlations between probable predictive factors and antiplatelet resistance was not found.

AS16-052

RISK FACTORS FOR STROKE

HYPERTENSION IMPAIRS REGIONAL CEREBROVASCULAR REACTIVITY TO ISOCAPNIC HYPOXIA IN HUMANS

I.A. Fernandes[1], M.P. Rocha[1], M.O. Campos[1], J. Dario[1], D.E. Mansur[1] and A.C. Nóbrega[1]
[1]Fluminense Federal University, Physiology and Pharmacology, Niterói, Brazil

Background and Aims: While hypertensive animal models indicate impairment in cerebrovascular reactivity to isocapnic hypoxia, it is still uncertain whether these findings could be translated to a setting of human hypertension. Therefore, the main purpose of this investigation was to determine the impact of hypertension on cerebrovascular reactivity to isocapnic hypoxia in humans.
Method: Six normotensive (NT, 44 ± 11yrs, mean arterial pressure (MAP) 87 ± 6 mmHg) and 5 hypertensive men (HT, 46 ± 11yrs, MAP 110 ± 9 mmHg) were exposed to 5-min bouts of: (1) Normoxia (21% O_2) and (2) isocapnic-Hypoxia (10%O_2). Oxygen saturation (pulse oxymetry), beat-to-beat MAP (photoplethysmography), muscle sympathetic nerve activity (MSNA [microneugraphy]) and partial pressure of end-tidal carbon dioxide (PET_{CO2}) were monitored throughout the study. Clamping of PET_{CO2} was also performed along the whole protocol via a rebreathing system. Blood flow in the internal carotid (ICA) and vertebral arteries (VA) was simultaneously quantified via Doppler Ultrasound at the last 30s of each condition.
Results: Both groups showed similar reductions in oxygen saturation as a result of isocapnic-hypoxia exposure (NT -23.7 ± 5.1 vs. HT -20.6 ± 4.2%, $p > 0.05$). No substantial changes on MAP and PET_{CO2} were observed during hypoxia. While comparable increases in ICA perfusion were observed (NT + 205.4 ± 29.7 vs. HT + 104.8 ± 55.3 ml.min^{-1}, $p > 0.05$), only NT exhibited a significant increment in VA blood flow (+78.1 ± 24.5 vs. HT +8.5 ± 7.9 ml.min^{-1}, $p < 0.05$). MSNA recordings revealed marked increases in sympathetic activation of hypertensive individuals (HT + 12.7 ± 6.7 vs. NT + 3.6 ± 1.6 bursts/min, $p < 0.05$).
Conclusion: Hypertension impairs regional cerebrovascular reactivity to isocapnic hypoxia and MSNA recordings may suggest a contribution of a sympathetic overdrive in this response.

AS16-053

RISK FACTORS FOR STROKE

NATURAL HISTORY OF TIA AND MINOR STROKE IN PATIENTS ENGAGING WITH CONTEMPORARY AUSTRALIAN PRIMARY AND SECONDARY HEALTH CARE SYSTEMS

C. Levi[1], P. Magin[2], D. Quain[2], D. Lasserson[3], H. Dewey[4], N. Spratt[1], M. Parsons[1], J. Demeestere[5], C. Garcia Esperon[1], M. Russell[1], S.Z. Abarghoui[6], P. Rothwell[7], G. Donnan[8], V. Feigin[9], A. Barber[10], D. Cadilhac[11] and J. Valderas-Martinez[12]
[1]John Hunter Hospital, Neurology, Newcastle, Australia
[2]University of Newcastle, General Practice, Newcastle, Australia
[3]Oxford University, Medical Sciences Division, Oxford, United Kingdom
[4]Box Hill Hospital, Neurology, Melbourne, Australia
[5]Leuven Hospital, Neurology, Leuven, Belgium
[6]Royal Brisbane Hospital, Neurology, Brisbane, Australia
[7]Oxford University, Clinical Neurosciences, Oxford, United Kingdom
[8]Florey, Neuroscience and Mental Health, Melbourne, Australia
[9]University of Auckland, Natural Institute for Stroke and Applied Neurosciences, Auckland, New Zealand
[10]University of Auckland, School of Medicine, Auckland, New Zealand
[11]Monash University, Stroke and Aging Research Group, Melbourne, Australia
[12]Exeter University, Health Services and Policy Research, Exetar, United Kingdom

Background and Aims: TIA and minor stroke (TIAMS) can be associated with high-risk for recurrent stroke and intervention studies have demonstrated benefit of early introduction of preventative therapies. Recent observational studies suggest a more benign prognosis for TIAMS in some populations, especially with management in more expert secondary care settings. Prognosis in community-based practice in Australia is unknown. We aimed to evaluate the natural history of TIAMS in a contemporary primary care setting in Australia.
Method: An inception cohort study of patients from 16 regional Australian general practices. Possible TIAMS were ascertained by multiple overlapping methods including GP identification and general practice and hospital database searches. Data was extracted from GP and hospital medical records and from structured interviews at baseline, 3-months and 12-months. A 3 clinician panel adjudicated cases as TIAMS or TIAMS-mimic. Kaplan-Meier survival curves were constructed for the outcome of recurrent stroke.
Results: 611 patients had an acute potential neurovascular event. Of 553 patients with 12-month follow-up at time of analysis, 280 (50.6%) were adjudicated as TIAMS: 273 (49.4%) as mimics. The 12-month recurrent stroke rate in TIAMS was 3.2% (95% CI 1.5–6.0), and in mimics was 0.7% (95% CI 0.09–2.6). Kaplan–Meier survival curves for both recurrent strokes and TIAs showed an absence of the 'front-loaded' stroke risk demonstrated in historical cohorts.
Conclusion: TIAMS in this cohort were more benign than historical cohorts. The absence of front-loaded stroke risk has important implications.

AS16-054

RISK FACTORS FOR STROKE

DOES THE ABCD2 RISK SCORE INFLUENCE HEALTH SYSTEM RESPONSES IN THE MANAGEMENT OF TIA AND MINOR STROKE IN AUSTRALIA?

C. Levi[1], P. Magin[2], D. Quain[2], D. Lasserson[3], H. Dewey[4], N. Spratt[1], M. Parsons[1], M. Russell[1], J. Demeestere[5], C. Garcia Esperon[1], J. Valderas-Martinez[6], D. Cadilhac[7], A. Barber[8], V. Feigin[9], G. Donnan[10], P. Rothwell[11] and S.Z. Abarghoui[12]
[1]John Hunter Hospital, Neurology, Newcastle, Australia
[2]University of Newcastle, General Practice, Newcastle, Australia
[3]Oxford, Medical Sciences Division, Oxford, United Kingdom
[4]Box Hill Hospital, Neurology, Melbourne, Australia
[5]Leuven Hospital, Neurology, Leuven, Belgium
[6]Exetar, Health Services and Policy Research, Exetar, United Kingdom
[7]Monash University, Sroke and Aging Research Group, Melbourne, Australia
[8]University of Auckland, School of Medicine, Auckland, New Zealand
[9]University of Auckland, Stroke and Applied Neuroscience, Auckland, Australia
[10]Florey, Neuroscience, Melbourne, Australia
[11]Oxford University, Clinical Neuroscience, Oxford, United Kingdom
[12]Royal Brisbane Hospital, Neurology, Brisbane, Australia

Background and Aims: In Australia, many transient ischaemic attacks and minor strokes (TIAMS) are managed initially by general practitioners (GPs). Current guidelines recommend urgency of specialist-referral and investigation based on ABCD2 stroke-risk score. We aimed to document healthcare-systems responses to TIAMS according to the ABCD2 risk-level.
Method: An inception cohort study of patients of 16 regional Australian general practices. Possible TIAMS were ascertained by multiple overlapping methods including GP identification and general practice and hospital database searches. Data was extracted from GP and hospital medical records and from structured interviews at baseline, 3-months and 12-months. A 3 clinician panel adjudicated cases as TIAMS or TIAMS-mimic. Differences in presentation and referral, patient management and process-of-care for low-risk (ABCD2 score 0–3) and high-risk (score 4–7) patients were tested with age- and sex-adjusted logistic regression.
Results: Of 298 TIAMS patients, 188 were high-risk, 110 were low-risk. High-risk TIAMS sought medical help significantly more urgently and

were significantly more likely to be initially hospital-presenting, to be hospital-managed, to be admitted, and were significantly less likely to be wholly GP-managed. High-risk TIAMS were significantly more likely to receive brain-imaging, cardiac rhythm assessment and new or intensified antiplatelet/anticoagulant therapy within 24 hours of symptom onset, even though there was a trend for longer delay in initial specialist assessment.

Conclusion: Overall management reflected ABCD2-based risk-based urgency and intensity. However, initial high-risk TIAMS treatment is predominantly delivered by generalists while awaiting specialist assessment.

AS16-055

RISK FACTORS FOR STROKE

THE 'REAL WORLD' OF TRANSIENT NEUROLOGY IN AUSTRALIA

C. Levi[1], P. Magin[2], D. Quain[2], D. Lasserson[3], H. Dewey[4], N. Spratt[1], M. Parsons[1], M. Russell[1], J. Demeesteere[5], C. Garcia Esperon[1], J. Valderas-Martinez[6], A. Barber[7], F. Velery[7], D. Cadilhac[8], G. Donnan[9], P. Rothwell[10] and S.Z. Abarghoui[11]
[1]John Hunter Hospital, Neurology, Newcastle, Australia
[2]University of Newcastle, General Practice, Newcastle, Australia
[3]Oxford University, Medical Sciences Division, Oxford, United Kingdom
[4]Box Hill Hopital, Neurology, Melbourne, Australia
[5]Leuven, Neurology, Leuven, Belgium
[6]Exeter, Health Services and Policy Research, Exeter, United Kingdom
[7]University of Auckland, School of Medicine, Auckland, New Zealand
[8]Monash University, Stroke and Aging Research Group, Melbourne, Australia
[9]Florey, Neuroscience, Melbourne, Australia
[10]Oxford University, Clinical Neuroscience, Oxford, United Kingdom
[11]Royal Brisbane Hospital, Neurology, Brisbane, Australia

Background and Aims: Diagnosis of transient ischaemic attack or minor stroke (TIAMS) (that is, the judgement of whether a transient neurological event is vascular or TIAMS-mimic) can be challenging. There is only modest agreement of diagnoses even among neurologists and stroke neurologists. General practitioners (GP) find this a difficult area, especially given full-time GP's will see on average only two TIAs and two mimics per year. We aimed to characterise conditions mimicking TIAMS in a community-based sample and to establish associations of transient neurological events being TIAMSs rather than mimics.

Method: An inception cohort study of patients of 16 regional Australian general practices. Possible TIAMS were ascertained by multiple overlapping methods including GP identification and general practice and hospital database searches. Data was extracted from GP and hospital medical records and from structured interviews at baseline, 3-months and 12-months. A 3 clinician panel adjudicates cases as TIAMS or TIAMS-mimic based on clinical characterisation plus vascular and neuroimaging. Differences in TIAMS and mimic demographics, symptoms and presentation patterns were tested with logistic regression.

Results: TIAMS was significantly associated with male sex and older age. Mimics were significantly less likely to experience unilateral motor disturbance, speech disturbance, or diplopia, and more likely to experience transient loss of consciousness or binocular visual disturbance. The duration of symptoms in mimics was significantly shorter than in TIAMS.

Conclusion: Differentiating between vascular and non-vascular neurological events can be difficult, but consideration of the associations in our data may aid community-based GP diagnosis.

AS16-058

RISK FACTORS FOR STROKE

COMPARISON OF AMBULATORY BLOOD PRESSURE RESULTS BETWEEN TONOMETRIC AND CUFF BASED DEVICES

P. Bourke[1], N. Akhtar[1], A. Salam[1], S. Joseph[1], M. Santos[1], M. Ahmed[1] and A. Shuaib[1]
[1]Hamad General Hospital, Neuroscience, Doha, Qatar

Background and Aims: Hypertension is a well-established risk factor for cardiovascular disease, the standard for diagnosis is 24-hour ambulatory blood pressure (ABP) monitoring. Evidence has shown that both the circadian rhythm and the BP level are associated with an increased risk. The traditional ABP recording is by cuff-based oscillatory now a watch-like device (BPro) has become available for arterial tonometry. We hypothesized that there was no difference in treatment regardless of device used.

Method: There were 30 volunteers, they underwent ABP monitoring over 48 hours, using first device for 24 hours, followed by second device for next 24 hours applied on the same arm. The mean-total, day and night were recorded along with the percentage dipping in nocturnal rhythm.

Results: Inter rater reliability was assessed using a two-way mixed, average-measure infraclass correlation (ICC) to assess the agreement between the two devices. The resulting ICC was in the good range, ICC = 0.681 ($p = 0.002$), indicating a significant good degree of agreement for measuring BP. The mean-average BP for BPro was 123/85 and 122/82 for cuff device. However the resulting ICC for the % nocturnal dipping was poor [ICC = 0.01 ($p = 0.488$)], mean-average 12.2% Bpro compared to 8.2% on cuff device. Nineteen volunteers were in normal range of dipping with Bpro compared to 6 with cuff, indicating poor degree of agreement, and disparate nocturnal dipping measurement.

Conclusion: Tonometric and oscillatory BP devices results are comparable. Tonometric was better tolerated, not disturbing daily routine or sleep pattern, and the circadian rhythm were more obvious with this device.

AS16-061

RISK FACTORS FOR STROKE

RISK FACTORS OF ISCHEMIC STROKE IN YOUNG-AGE (UNDER 50 YEAR-OLD) COMPARED WITH OLD-AGE (OVER 74 YEAR-OLD)

C. Choi[1] and I. Kim[1]
[1]Korea university Guro Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: The prevalence of stroke in young adult is increased these days. Risk factor profiles for ischemic stroke differ between young and old patients. Our aim was to investigate differences of risk factors between young and old age patients with ischemic stroke.

Method: We reviewed data which the patients diagnosed with ischemic stroke upon admission at our center were retrospectively enrolled into stroke registry from January 1st,2014 to December 30th,2016. Young age patient with stroke was defined by patient with ischemic stroke under 50year-old and old age stroke was over 74year-old. We compared gender distribution,prior diseases,family history,current smoking and body mass index (BMI) between two groups.

Results: A total of 1264 patients diagnosed with ischemic stroke. Of all the patients,136 patients were young age (66.7% male ; mean age 42.8 years, SD 5.3) and 404 patients were old (45.8% male ; mean age 80.6 years, SD 4.5). Smoking, male gender ($p < 0.001$), obesity (BMI > 30 kg/m2) ($p = 0.002$) were more common in patients with young age. Smoking (odds

ratio,4.07, 95% C.I = 2.64–6.28) and obesity (odds ratio,3.2, 95% C.I = 1.5 –6.59) were associated with an increased stroke risk in young age stroke patients than that of old age.
Conclusion: Smoking and obesity are well known for major risk factors of ischemic stroke and might be corrigible. Strictly stopping smoking and maintaining proper body weight should be emphasized in young adult to reduce ischemic stroke. Furthermore, effective and practical health care programs for life-style modification must be needed.

AS16-062

RISK FACTORS FOR STROKE

INCIDENCE AND TRENDS OF CARDIOVASCULAR EVENTS AFTER STROKE: THE SOUTH LONDON STROKE REGISTER

C. Flach[1], C. Wolfe[1], A. Rudd[1], S. Crichton[1] and A. Douiri[1]
[1]King's College London, HSCR, London, United Kingdom

Background and Aims: Stroke survivors are at high risk of subsequent cardiovascular (CVD) events. We evaluate stroke recurrence, myocardial infarction (MI) and CVD death rates after stroke considering risk factors and trends over time.
Method: A cohort of 5,371 patients (23,000 person-years) from the longitudinal South London Stroke Register between 1995 and 2015 were analysed. Competing risk survival analyses were conducted to estimate incidences, trends and predictors of subsequent cardiovascular outcomes. Models were adjusted for demographic factors, stroke types and stroke severity.
Results: The 10 years cumulative incidence of subsequent cardiovascular events were 11% (CI 10%-12%) for recurrences, 18% (CI 16%-20%) for MI and 38% (CI 36%-39%) CV deaths (ICD-10 codes I00-I99 and equivalent). Stroke recurrence rates decreased from the late 90s ($p = 0.002$) to early 2000s maintaining a similar rate thereafter. CVD deaths has reduced continuously over time ($p < 0.001$). Increased risk of a second stroke were observed among Atrial fibrillation (HR 1.33, 1.01–1.75) and Black ethnicity (HR 1.36, 1.08–1.72), however, risk of CV deaths were lower among black ethnic group (HR 0.73, 0.61–0.86).
Conclusion: Atrial fibrillation and ethnicity were associated with subsequent cardiovascular (CVD) events after stroke. Focus on early preventive therapies in these groups may reduce repeat cardiovascular events and improve outcomes.

AS16-063

RISK FACTORS FOR STROKE

AN INVESTIGATION OF THE PREVALENCE OF AND RISK FACTORS FOR ASYMPTOMATIC CAROTID STENOSIS AMONG 2.4 MILLION US AND UK ADULTS

D. Morris[1], P. Sherliker[2], R. Clack[2], H. Lam[2], J. Carter[2], A. Halliday[3], R. Bulbulia[1] and S. Lewington[2]
[1]University of Oxford, Clinical Trial Service Unit & Epidemiological Studies Unit, OXFORD, United Kingdom
[2]University of Oxford, Medical Research Council Population Health Research Unit, Oxford, United Kingdom
[3]University of Oxford, Nuffield Department of Surgical Sciences, Oxford, United Kingdom

Background and Aims: Carotid stenosis is an important cause of ischaemic stroke, but there is a lack of reliable, contemporary prevalence estimates for asymptomatic carotid artery stenosis in western countries.
Method: Between 2008 and 2012, 3.3 million individuals attended privately funded cardiovascular screening clinics (Life Line Screening) in the US and UK, including carotid duplex screening for carotid stenosis. Major cardiovascular risk factors and medical history were recorded via questionnaire. Participants with incomplete data and those with prior cardiovascular disease, cerebrovascular disease, and peripheral artery disease were excluded, yielding 2.4 million individuals in the current report.
Results: The mean age at screening was 64.2 ± 10.0 years, and 64.9% were female. The prevalence of carotid artery disease was 2.9% (1.8% minor [110–140 cm/s], 1.1% moderate/severe [>140 cm/s]), with 3.2% of males and 2.8% of females affected. The presence of carotid stenosis increased with age (40–49: 0.6%, 50–59: 1.3%, 60–69: 2.7%, 70–79: 4.5%, 80–89: 6.8%). Carotid stenosis was strongly positively associated with smoking (odds ratio (OR) = 3.42, 95%CI 3.33–3.50 for current vs never), systolic blood pressure (1.30 per 10 mmHg, 1.29–1.31; adjusted for regression-dilution), and other established stroke risk factors.
Conclusion: Among the self-referred adults with no known history of cardiovascular disease, 3% overall had asymptomatic, but clinically significant, carotid stenosis on screening with higher prevalence in men and the elderly. Established risk factors for ischaemic stroke were also associated with carotid stenosis. These results could help identify people who would benefit from carotid screening for stroke prevention, and reinforce the importance of smoking cessation and blood pressure lowering.

AS16-067

RISK FACTORS FOR STROKE

RISK FACTORS IN SUBTYPES OF ISCHEMIC STROKE: COMMUNITY BASED STUDY IN BRNO, CZECH REPUBLIC

J. Jackova[1,2], P. Sedova[1,2,3,4], R.D. Brown- Jr.[3], M. Zvolsky[5], M. Volna[1], J. Baluchova[1], S. Belaskova[1], J. Bednarik[2,6] and R. Mikulik[1,2,7]
[1]St. Anne's University Hospital, International Clinical Research Centre, Brno, Czech Republic
[2]Masaryk University, Faculty of Medicine, Brno, Czech Republic
[3]Mayo Clinic, Department of Neurology, Rochester- Minnesota, USA
[4]University Hospital Brno, Department of Internal Medicine-Haematology and Oncology, Brno, Czech Republic
[5]Institute for Health Information and Statistics of the Czech Republic, Department of Clinical Classification DRG, Prague, Czech Republic
[6]University Hospital Brno, Department of Neurology, Brno, Czech Republic
[7]St. Anne's University Hospital, Department of Neurology, Brno, Czech Republic

Background and Aims: It is unclear if and how prevalence of traditional risk factors differs between ischemic stroke (IS) subtypes in Central and Eastern European population. We provide a community based assessment of the risk factors in IS subtypes in the community of Brno, the second largest city in the Czech Republic (CR) with 378,968 inhabitants.
Method: Based on the National Register of Hospitalised Patients in CR, all patients with IS occurring in 2011 in Brno were identified. Discharge summaries from hospitalisation were retrospectively collected and reviewed. IS subtype according to the TOAST classification and risk factors were recorded in every patient. The age- and sex-adjusted frequency of stroke risk factors were compared across IS subtypes.
Results: Overall, 671 Brno residents with first-ever IS were identified in Brno hospitals in 2011: 209(31%) had cardioembolism, 197(29%) had large-artery atherosclerosis, 162(24%) had small-artery occlusion, 49(7%) had stroke of other etiology and 54(8%) had stroke of undetermined etiology. Several of the risk factors showed high prevalence – e.g. hypertension (84%) or hyperlipidaemia (61%). In comparing frequency of risk factors between IS subtypes, sex, age at stroke onset, history of cardiac failure, myocardial infarction, atrial fibrillation, and

hyperlipidaemia differed between IS subtypes. There was no difference in frequency of hypertension or cigarette smoking.
Conclusion: To our knowledge, this the first comprehensive population-based assessment of risk factors in IS subtypes in the Czech Republic and in Central and Eastern Europe. The notably high prevalence of selected risk factors (e.g. hypertension, hyperlipidaemia) has important implications for future stroke prevention strategies.

AS16-068

RISK FACTORS FOR STROKE

SHOULD WE SCREEN FOR JAK2 V617F MUTATION IN CEREBRAL VENOUS THROMBOSIS?

P. PALAZZO[1,2], M. LAMY[1], P. AGIUS[1], J.C. CHOMEL[3], J. CIRON[1], A. BERTHOMET[1], P. INGRAND[4], M. PUYADE[5] and J.P. NEAU[1]
[1]CHU Poitiers, Department of Neurology, Poitiers, France
[2]S. Giovanni Calibita-Fatebenefratelli Hospital, Department of Neurology, Rome, Italy
[3]CHU Poitiers, Laboratory of Cancer Biology, Poitiers, France
[4]CHU Poitiers, Clinical Investigation Center INSERM, Poitiers, France
[5]CHU Poitiers, Department of Oncology-Hematology and Cell Therapy, Poitiers, France

Background and Aims: The presence of *JAK2* V617F mutation represents a major diagnostic criterion for myeloproliferative neoplasms (MPN) and even in the absence of overt MPN, is associated with splanchnic vein thrombosis. However, the actual prevalence and diagnostic value of the *JAK2* V617F mutation in patients with cerebral venous thrombosis (CVT) are not known. We aimed to assess *JAK2* V617F mutation prevalence in a large group of consecutive CVT patients, to detect clinical, biological and radiological features associated with the mutation, and to determine the long-term venous thrombosis recurrence rate in CVT patients with JAK2 mutation but without overt MPN in order to recommend the best preventive treatment.
Method: This was a prospective study conducted on consecutive patients with a first-ever radiologically-confirmed CVT. *JAK2* V617F mutation analysis was assessed in all the study subjects. *JAK2* V617F-positive patients were followed up to detect new venous thrombotic events.
Results: Of the 125 included subjects, seven (Table 1) were found to have *JAK2* V617F mutation (5.6%; 95% CI: 2.3–11.2%). Older age ($p = 0.039$) and higher platelet count ($p = 0.004$) were independently associated with *JAK2* V617F positivity in patients without overt MPN (Table 2). During a mean follow-up period of 59 (SD 46) months, 2 *JAK2* V617F-positive patients presented four new venous thromboembolic events.
Conclusion: Screening for the *JAK2* V617F mutation in CVT patients seems to be useful even in the absence of overt MPN and/or in the presence of other risk factors for CVT because of its relatively high prevalence (Table 3) and the risk of thrombosis recurrence.

AS16-069

RISK FACTORS FOR STROKE

CAROTID ARTERY STENOSIS, AN UNDERESTIMATED CAUSE OF RECURRENCE IN PATIENTS WITH ISCHAEMIC MONOCULAR VISUAL LOSS

S.F. Cheng[1], A. Zarkali[2], T. Richards[1], A. Dados[3], R.J. Simister[2] and A. Chandratheva[2]
[1]UCL, Division of Surgery and Interventional Science, London, United Kingdom
[2]UCL, Institute of Neurology, London, United Kingdom
[3]University College London Hospitals, Stroke Research Team, London, United Kingdom

Background and Aims: We aimed to determine the prevalence and risk factors of significant carotid artery stenosis (CAS) $\geq$50% in patients with ischaemic transient or permanent monocular visual loss.
Method: Setting: TIA clinic, regional referral centre for North-Central London and Moorfields Eye Hospital, London. Consecutive records for all patients with transient or permanent ischaemic monocular visual loss at presentation to the clinic were reviewed from 1st January 2014–30th September 2016. Stroke, TIA or ischaemic monocular visual loss recurrence within 90 days were recorded. CAS was assessed with duplex, CTA or MRA.
Results: 395 patients presented with visual loss, 214 were male (55.4%), mean age 64.5(SD15.0). Causality was symptomatic CAS $\geq$ 70% according to the NASCET criteria in 8.0%, CAS $\geq$ 50% in 13.7% and 5.4% had asymptomatic CAS $\geq$ 50%. Patients with permanent visual loss (n = 129) were more likely to have significant CAS compared to patients with transient visual loss (n = 257), 20.2% versus 10.5%, p = 0.012. 90-day recurrence rate of stroke/TIA/monocular ischaemia was significantly greater in patients with symptomatic CAS $\geq$ 50% compared to patients without symptomatic CAS $\geq$ 50%,18.9% versus 8.7%, p = 0.045. Recurrent stroke was 3.8% versus 0.6% p = 0.093 in these groups respectively. Age, male sex and hypertension were associated with symptomatic CAS but hypercholesterolaemia, diabetes and smoking were not.
Conclusion: CAS $\geq$ 50% in patients with ocular ischaemia is higher than previously described, approximately one fifth of those with persistent visual loss and 10% of those with transient visual loss. Those with CAS have a higher risk of recurrence and should be investigated and treated as aggressively as other forms of TIA.

AS16-070

RISK FACTORS FOR STROKE

THE INCREASED RISK OF STROKE IN OCCULT AND MANIFEST CANCER IS MAINLY CARRIED BY CANCERS RELATED TO SMOKING

K.K. Andersen[1] and T.S. Olsen[2]
[1]Danish Cancer Society Research Center, Section of Statistics, Copenhagen, Denmark
[2]Bispebjerg University Hospital - Copenhagen, Neurology, Copenhagen, Denmark

Background and Aims: Cancer increases risk for stroke. Cancer and stroke shares smoking as a risk factor. We studied the influence of smoking on the risk for stroke in both occult and manifest cancer.
Method: We identified all incident cases of cancer in Denmark 2003–2012 (n = 264.376) from the Danish Cancer Registry. Using the Danish Registry of Persons each person with cancer was matched by age, sex and income with 10 randomly selected persons without cancer at index date (n = 2.571.260). By linking data to the Danish Stroke Registry we studied

risk for ischemic (IS)/hemorrhagic (HS) stroke in the year before (occult cancer (OC)) and after cancer was diagnosed (manifest cancer (MC)) and stratified into the 15 commonest cancer-types related (8)/unrelated (7) to smoking.
Results: Risk of IS/HS was increased for both OC (RR 1.75/2.00) and MC (RR 1.31/1.41). For OC risk of IS was increased for all of 8 smoking related cancers (lung, colon, bladder rectum, pancreas, kidney, stomach and head and neck cancer) but among 7 cancers unrelated to smoking only lymphoma, central nervous system and endometrial cancer were associated with increased risk of stroke; breast, prostate, melanoma and ovarian cancer were not. For OC risk for HS was generally increased for smoking-related cancers while not for cancer unrelated to smoking. For MC risk for IS and HS was generally increased for cancers related to smoking while not to cancers unrelated to smoking.
Conclusion: The increased risk of stroke in manifest and occult cancer was mainly carried by cancers related to smoking.

AS16-071

RISK FACTORS FOR STROKE

CAROTID OCCLUSIVE DISEASE: THE NOTTINGHAM EXPERIENCE

M. Maddula[1], S. Munshi[2], P. Bath[3] and N. Sprigg[3]
[1]Tauranga Hospital, Acute Stroke Unit, Tauranga, New Zealand
[2]Nottingham University Hospitals NHS Trust, Stroke Department, Nottingham, United Kingdom
[3]University of Nottingham, Division of Stroke Medicine, Nottingham, United Kingdom

Background and Aims: Carotid artery occlusion (CAO) is an important cause of cerebrovascular disease. While many patients with CAO may be asymptomatic, it is an important risk factor for stroke/TIA. We present details of our experience of patients with CAO.
Method: A database of patients with CAO at Nottingham University Hospitals was maintained for service improvement purposes. Most patients presented with stroke or TIA and so had vascular imaging which revealed the presence of CAO.
Results: From 2003 to 2013, 205 patients were found to have CAO. Complete data entry in all the required fields was achieved in 159 patients (unilateral occlusion 139, bilateral occlusion 20). The aetiology for CAO was atherosclerosis in most (134, 84%) followed by dissection (10, 6.3%), radiation angiitis (4, 2.5%), other causes (7, 4.4%) and unclear (4, 2.5%). 147 patients had a cerebrovascular event (TIA 44; stroke 103). In these patients, the cerebrovascular event was clearly ipsilateral to the CAO in 105 patients, and 21 patients had an occlusion of the contralateral carotid. The underlying mechanism was haemodynamic in 55 (37%), embolic in 50 (34%), and unclear in 42 (29%). At follow up (median time 45 months) 40 patients (25%) had died. 37 patients had further cerebrovascular events (26 were ipsilateral to CAO; 9 contralateral; and 2 in posterior circulation). 5 patients had attempted revascularisation (EC-IC bypass 2; angioplasty 3).
Conclusion: Patients with CAO have significant mortality and subsequent ipsilateral cerebrovascular events. We need to further evaluate the natural history of patients with carotid occlusive disease.

AS16-077

RISK FACTORS FOR STROKE

ISCHEMIC CEREBRAL VASCULAR ACCIDENT AND OVARIAN HYPER-STIMULATION SYNDROME

E. Ranxha[1], O. Taka[1], D. Dobi[1], E. Basha[1], E. Roci[1] and M. Rakacolli[2]
[1]Qendra Spitalore Universitare "Nene Tereza" Tirane, Neurosience/ Stroke Unit, Tirane, Albania
[2]Qendra Spitalore Universitare "Nene Tereza" Tirane, Neurosience/Chief of Stroke Unit, Tirane, Albania

Background and Aims: Ovarian hyper-stimulation syndrome (OHSS) is a rare and serious complication of hormonal treatment in order to stimulate ovulation. Hemoconcentration as a consequence of the fluid displacement from the intravascular bed into the peritoneal cavity which leads to increased blood viscosity and latter arterial or venous occlusion. Stroke, cerebral venous thrombosis and systemic arteriovenous thrombosis are the most frequent symptoms of the ovarian hyper-stimulation syndrome.
Method: The case report to be presented is a 26 year old woman who has undergone an unsuccessful procedure of in vitro fertilization.
She arrived at emergency department suffering from immediate installation of left hemiplegia.
CT showed massive hypodensity in the right hemisphere - the infarct of the MCA territory as a result of the clot in the M1 branch.
Further laboratory and radiological (abdominal magnetic resonance) evaluations were made to find the cause of stroke.
Results: The patient was treated with oral aspirine, human albumin, mannitol and the isotonic fluids. After three months of medical care, she had a good recovery without damaging her quality of life.
Conclusion: The cause of thrombo-embolic phenomena in ovarian hyper-stimulation syndrome is unclear but hemo-concentration as a consequence of this large displacement of the liquid leads to blood viscosity changes (increases) which is accused of/considered to be the cause of arterial and venous occlusions.
We will present a young adult case report which suffered from this rare complication of ovarian stimulation and a review of the literature showing rare risk factors for stroke in young adults

AS16-082

RISK FACTORS FOR STROKE

INCREASED PREVALENCE OF UNDERWEIGHT OVER TIME AND PRESENCE OF UNSATISFACTORY CHOLESTEROL LEVELS IN SURVIVORS TEN YEARS AFTER STROKE ONSET

A.C. Jönsson[1], H. Lövkvist[2], B. Norrving[1] and A. Lindgren[1]
[1]Lund University- Skane University Hospital, Department of Clinical Sciences- Neurology, Lund, Sweden
[2]Lund University, Department of Clinical Sciences- Neurology, Lund, Sweden

Background and Aims: Nutritional status and unsatisfactory serum cholesterol levels may influence outcome and health after stroke.
Method: All 145 (35%) stroke survivors from a one-year period in Lund Stroke Register, median age 78.1 range 28–97 years, were followed up at 16 months and ten years after stroke. Presence of underweight and overweight was examined among patients with all stroke subtypes; for those <70 years defined as BMI below or above 20–24.9 kg/m^2; for those ≥ 70 defined as BMI below or above 22–26.9 kg/m^2. Satisfactory total-

cholesterol levels were defined as <5 mmol/L and LDL-cholesterol levels as <3 mmol/L and were examined among patients with cerebral infarction (n = 126).

Results: At follow-up 16 months after stroke, 13 (9%) persons were underweight vs. 24 (17%) at ten years (p = 0.019), but there was no significant difference in proportion of patients with overweight, 73 (50%) vs. 68 (47%). All with underweight were ≥70 years (mean age 84 years) at ten years. At 10 years after stroke, 74 (59%) of the 126 patients with cerebral infarction were on treatment with statins and 59 (80%) of these had satisfactory total-cholesterol as well as LDL-cholesterol levels. However, among the 52 (41%) not on statin treatment, 28 (54%) patients had total-cholesterol ≥5 mmol/L and 31 (60%) LDL-cholesterol ≥3 mmol/L at ten years.

Conclusion: Nutritional status may change over time in stroke patients and particularly elderly are at risk of underweight. There is a clear potential to improve treatment of cholesterol levels among long-term stroke survivors.

AS16-084

RISK FACTORS FOR STROKE

SIDEDNESS OF CAROTID ARTERY STENOSIS AND BRAIN VOLUME LOSS IN THE LEFT AND RIGHT HEMISPHERE: THE SMART-MR STUDY

R. Ghaznawi[1], J. de Bresser[1], H. Kuijf[2], Y. van der Graaf[3], J. Hendrikse[1] and M. Geerlings[3]

[1]UMC Utrecht, Radiology, Utrecht, The Netherlands
[2]UMC Utrecht, Image Sciences Institute, Utrecht,The Netherlands
[3]UMC Utrecht, Epidemiology, Utrecht, The Netherlands

Background and Aims: Previous studies found an association between carotid stenosis degree and progression of brain atrophy, however no study reported on the relationship between sidedness of carotid stenosis and brain volume (BV) in the left and right hemispheres. We assessed the association between carotid stenosis side and changes in cerebral hemispheric volumes in patients with vascular disease.

Method: Within the SMART-MR study 1.5 tesla MRI was performed in 1232 patients at baseline (mean age 58 ± 10 years) and 663 after 4 years of follow-up. Carotid artery stenosis duplex measurements were performed at baseline and stenosis was defined at the cutpoint of 70%. Using ANCOVA mean volume at baseline and mean change in volume between baseline and follow-up of the left and right hemisphere was estimated across 4 groups: no stenosis; left-sided stenosis only; right-sided stenosis only; bilateral stenosis adjusting for age and sex.

Results: Cross-sectionally, participants with left-sided stenosis had a significantly smaller volume of the left, but not the right hemisphere compared to participants without stenosis. Right-sided stenosis was associated with smaller volumes of both hemispheres (Figure 1).

Longitudinally, a significant decrease in volume of both hemispheres was found in participants with right-sided stenosis, but not in participants with left-sided stenosis (Figure 2).

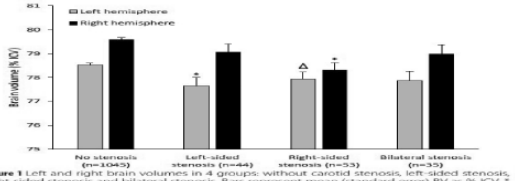


Figure 1 Left and right brain volumes in 4 groups: without carotid stenosis, left-sided stenosis, right-sided stenosis and bilateral stenosis. Bars represent mean (standard error) BV as % ICV. * p < 0.05 for difference in BV compared to corresponding hemisphere of the group without carotid stenosis (mean difference left hemisphere in left-sided stenosis -0.86 %ICV; 95% CI -1.55 to -0.17, right hemisphere in right-sided stenosis -1.28 %ICV; 95% CI -1.90 to -0.67). Δp = 0.06 for difference in BV compared to the left hemisphere of the group without carotid stenosis (mean difference -0.69 %ICV; 95% CI -1.22 to 0.03). ICV = intracranial volume.

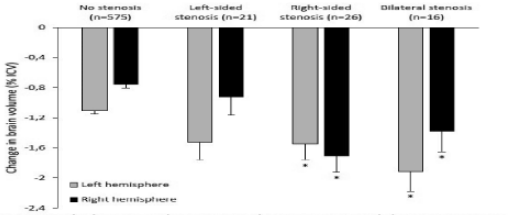


Figure 2 Longitudinal association between carotid stenosis groups and change in BV. Bars represent mean (standard error) change in BV as % ICV after a mean 3.9 years of follow-up. * p < 0.05 for decrease in BV compared to corresponding hemisphere of the group without carotid stenosis (mean difference left hemisphere in right-sided stenosis -0.45 %ICV; 95% CI -0.86 to -0.03, right hemisphere in right-sided stenosis -0.95 %ICV; 95% CI -1.37 to -0.53, left hemisphere in bilateral stenosis -0.81 %ICV; 95% CI -1.36 to -0.29, right hemisphere in bilateral stenosis -0.62 %ICV; 95% CI -1.16 to -0.09). ICV = intracranial volume.

Conclusion: Right-sided stenosis, as opposed to left-sided stenosis, resulted in a smaller BV in both hemispheres and a faster decrease in BV of both hemispheres. Future studies should investigate whether other factors may explain this association or whether brain hemispheres have a different vulnerability to the effects of aging.

AS16-085

RISK FACTORS FOR STROKE

PRELIMINARY RESULTS OF STROKE RISK FACTORS SURVEY BASED ON STROKE RISKOMETER APP IN RUSSIA

M. Kravchenko[1], E. Gnedovskaya[1], Y. Varakin[1], M. Tanashyan[1], M. Piradov[1], R. Bhattacharjee[2], R. Krishnamurthi[2], T. Hussein[3] and V. Feigin[2]

[1]Research center of neurology,., Moscow, Russia
[2]National Institute for Stroke and Applied Neurosciences,., Auckland, New Zealand
[3]AUT University, Auckland, New Zealand

Background and Aims: Stroke Riskometer App is a new tool for stroke risk calculation. Additionally there is a feature which allows anyone to participate in epidemiological survey.

Method: Stroke Riskometer was presented for the first time on national health related TV show. After this It was downloaded from the app stores about 30.000 times and 3210 users decided to participate the survey. Using the App they answered 20 questions, accepted Participant Consent Form and sent their data to research database

Results: The data of 1478 men and 1732 women mean age 42 were obtained and analized.

Table 1

	Men n, % (95% CI)	Women % (95% CI)
Smoking	433, 29 (27-32)	328, 19 (17-21)
Alcohol abuse	252, 18 (16-20)	125, 7 (6-8)
Low fruit and veg. diet	1178, 80 (78-82)	1377, 79 (77-81)
Low phys. activity	772, 52 (50-55)	1095, 63 (61-65)
Psychoemotional stress	923, 63 (60-65)	1245, 72 (70-74)
BMI > 30	562, 38 (36-40)	476, 27 (25-30)
Cardiovascular dis. family history	395, 27 (25-29)	516, 30 (28-32)

Table 2

	Men % (95% CI)	Women % (95% CI)

(continued)

Continued

	Men % (95% CI)	Women % (95% CI)
Arterial hypertension (SBP > 140)	271, 18 (16-20)	156, 9 (8-10)
Diabetes	95, 6 (5-8)	77, 4 (3-6)
Coronary heart disease	149, 10 (9-12)	119, 7 (6-8)
Left ventricular hypertrophy	233, 16 (14-18)	201, 12 (10-13)
Dementia	26, 2 (1-3)	31, 2 (1-3)
History of stroke or TIA	67, 4 (3-6)	63, 4 (3-7)

Conclusion: Smartphone based technology is a new feasible method for epidemiological surveys.

AS27-001

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

SERUM CADMIUM LEVEL IS POSITIVELY ASSOCIATED WITH INTRACRANIAL NONRUPTURED ANEURYSM INCIDENCE

J.B. Lee[1]
[1]Hong-Ik hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Cadmium and arsenic are toxic elements abundant in cigarette smoking, drinking water and contaminated food. They are known to be associated with cerebrovascular diseases, although little is known if they contribute to the occurrence of cerebral aneurysm. Observational studies have revealed smoking is related to atherosclerosis and aneurysmal ruptures. We hypothesized cadmium and arsenic positively correlated intracranial cerebral aneurysm formation.
Method: We retrospectively analyzed medical records of patients who head headache and underwent brain magnetic resonance angiography (MRA) or computed tomography angiography (CTA) in our center between March 2014 and August 2016. Patient group was defined as aneurismal dilatation. We used whole blood for cadmium and random urine for arsenic respectively. Student's t-test was used to compare mean cadmium and arsenic level between patient and control group. Multivariate logistic regression analysis was used to identify risk factors of intracranial unruptured aneurysm incidence.
Results: Total number of enrolled patient was 415. Two hundred and two persons were patients and the other 213 persons were control. There was statistically significant difference in smoking between patient and control groups. (Table 1) Cadmium only showed statistically significant difference between patient and control groups. (Cadmium, patient 1.85 ± 0.12, control 0.87 ± 0.21 $p = 0.031$; Arsenic, patient 67.4 ± 23.5, control 62.2 ± 18.3 $p = 0.271$) (Table 2). Multivariate regression analysis showed that smoking (odds ratio [OR], 1.48; 95% confidence interval [CI], 1.06–2.33) and cadmium (OR, 1.39; 95% CI, 1.15–1.84) were independently associated with intracranial unruptured aneurysm incidence. (Table not shown)

Table 1. Patient Characteristics

Non ruptured cerebral aneurysm (number)	Patient (202)	Control (213)	P value
Sex (M:F)	57:145	68:145	0.104
Age (mean±STD)	65.01±11.13	63.47±12.81	0.853
Smoker:never smoker (ratio)	**153:49 (3.12)**	**121:92 (1.31)**	**0.041**
Hypertension	138:64	143:70	0.436
Diabets Mellitus	82:120	92:121	0.138
LDL cholesterol	145.38± 28.17	148.24±30.02	0.822
HDL cholesterol	45.74± 8.75	49.16± 9.92	0.623

Table 2. Cadmium and Arsenic levels between patient and control groups

	Aneurysm(+)	Aneurysm (-)	P value
Cadmium (ug/L)	**1.85±0.12**	0.87±0.21	0.031
Arsenic (ug/L)	**67.4±23.5**	62.2±18.3	0.271

Conclusion: The present study showed cadmium level is positively associated with cerebral aneurysm incidence.

AS27-003

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

15-YEAR EXPERIENCE OF BYPASS SURGERY FOR COMPLEX INTRACRANIAL ANEURYSMS AT A SINGLE INSTITUTION

J.E. Kim[1], S.P. Ban[2], J.S. Bang[2], Y.J. Son[3], W.S. Cho[4] and C.W. Oh[2]
[1]Seoul National University College of Medicine, Department of Neurosurgery, Seoul, Republic of Korea
[2]Seoul National University Bundang Hospital, Department of Neurosurgery, Seongnam-Si, Republic of Korea
[3]Seoul National University Boramae Hospital, Department of Neurosurgery, Seoul, Republic of Korea
[4]Seoul National University Hospital, Department of Neurosurgery, Seoul, Republic of Korea

Background and Aims: Bypass surgery is a treatment option for complex intracranial aneurysms. We aimed to determine the utility of bypass surgery for the treatment of complex intracranial aneurysms.
Method: Sixty-two patients with a mean age of 46.7 ± 14.8 years (range, 18–77 years) were included in this retrospective study. Unruptured aneurysms were dominant ($n = 50$, 80.6%), and the internal carotid artery was the most common location of the aneurysm (35 patients; 56.4%), followed by the middle cerebral artery (12 patients; 19.4%). The mean maximal diameter of the aneurysms was 20.5 ± 11.4 mm (range, 2–40 mm). The clinical and angiographic status was evaluated preoperatively, immediately after surgery (within 3 days) and at the last follow-up. The mean angiographic and clinical follow-up durations were 34.2 ± 38.9 months (range, 1–151 months) and 46.5 ± 42.5 months (range, 1–161 months), respectively.
Results: Sixty-one patients (98.3%) underwent extracranial-intracranial bypass, and 1 underwent intracranial-intracranial bypass. At the last follow-up angiography, 58 aneurysms (93.5%) were completely obliterated and 4 were incompletely obliterated, with a graft patency of 90.3% ($n = 56$). Surgical mortality was zero, and morbidity was 14.5% ($n = 9$) including permanent morbidity of 8.1% ($n = 5$). A good clinical outcome (Karnofsky Performance Scale ≥ 70 and modified Rankin Scale score ≤ 2) was achieved in 91.9% of patients ($n = 57$).
Conclusion: With a proper selection of bypass type,bypass-associated treatment can be a good alternative for patients with complex intracranial aneurysms when conventional microsurgical clipping or endovascular intervention is not feasible.

AS27-004

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

EFFICACY OF CILOSTAZOL IN STENT-ASSIST COIL EMBOLIZATION OF UNRUPTURED INTRACRANIAL ANEURYSMS

S. Kasakura[1] and K. Yoshioka[1]
[1]Shonan Kamakura General Hospital, Stroke center, Kamakura, Japan

Background and Aims: Dual antiplatelet therapy (DAPT) is used for preventing perioperative thromboembolic complications and long-term in-stent stenosis in stent-assist coil embolization of intracranial aneurysms. DAPT generally consists of aspirin and clopidogrel. Efficacy of cilostazol is unknown.
We investigated whether DAPT including not aspirin but cilostazol prevented thromboembolic complications and in-stent stenosis for a long-term.
Method: We included patients who underwent stent-assist coil embolization of unruptured intracranial aneurysms between 2010 October and 2016 July and received DAPT consisting of cilostazol (100 mg/day) and clopidogrel (50 or 75 mg/day). We evaluated patients' characteristics, detail of stents, symptomatic thromboembolic events, in-stent stenosis in follow up angiograms and hemorrhagic complications. In-stent stenosis is defined as a reduction of percent diameter of 20% or more.
Results: Twenty patients and 20 aneurysms were analyzed. Aneurysms were located on the internal carotid artery in 11 patients, the anterior cerebral artery in 2, the vertebral artery in 3 and the basilar artery in 4. Enterprise VRD was used in 11 patients, Neuroform EZ was in 8 and Lvis Jr. was in 1. Symptomatic thromboembolic events occurred in 3 patients (15%) and all of them happened during procedures. In-stent stenosis never occurred among 17 patients who underwent follow-up angiograms. No hemorrhagic complications occurred during follow-up period.
Conclusion: Although DAPT consisting of cilostazol and clopidogrel did not sufficiently prevent perioperative thromboembolic complications in stent-assist coil embolization, it had beneficial effects on keeping stent patency.

AS27-005

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

MICRORNA EXPRESSION PROFILING OF SERUM IN PATIENTS WITH SUBARACHNOID HEMORRHAGE

S. Takahashi[1], T. Akiyama[2], T. Hotiguchi[2], K. Mizutani[2] and K. Yoshida[2]
[1]Tokyo, Japan
[2]Keio University, Department of Neurosurgery, Tokyo, Japan

Background and Aims: We have evaluated the microRNA expression profiling of serum in patients with aneurysmal subarachnoid hemorrhage (SAH) to know whether there are differences between microRNA profiling of serum from aneurysmal SAH and non-SAH (i.e. patients with unruptured aneurysm) patients.
Method: Serum samples were taken from both a patients group of aneurysmal SAH, as well as a patients group of non-SAH (SAH patient samples, $n = 7$; non-SAH patient samples, $n = 4$). The microRNA was isolated and purified and then analyzed on 3D-Gene Human miRNA Oligo chips (Toray, Kamakura, Japan) to identify some micro RNA differentially expressed in the two groups. The data were imported into the 3D-Gene Extraction software for differential microRNA expression analysis.
Results: From a total of 2565 microRNAs that could be detected with 3D-Gene Human microRNA Oligo chips, a total of 49 microRNAs that were expressed less than one fourth in SAH group compared to non-SAH group were identified. These included hsa-miR-119-3p, hsa-miR-6765-3p, and hsa-miR-223-3p. On the other hand, a total of 27 microRNAs that were expressed more than twice in SAH group compared to non-SAH group were identified. These included hsa-miR-451a, hsa-miR-619-5p, and hsa-miR-3619-3p.
Conclusion: The current results indicate that microRNA profiling can detect differences between serum from aneurysmal SAH and non-SAH patients.

AS27-006

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

HERITABILITY OF CIRCLE OF WILLIS VARIATIONS IN FAMILIES WITH INTRACRANIAL ANEURYSMS

M. Sanchez van Kammen[1], C. Moomaw[2], I. van der Schaaf[3], R. Brown[4], D. Woo[2], J. Broderick[2], J. Mackey[5], G. Rinkel[1], J. Huston[6] and Y. Ruigrok[1]
[1]University Medical Centre Utrecht, Department of Neurology and Neurosurgery- Brain Centre Rudolf Magnus, Utrecht, The Netherlands
[2]University of Cincinnati, Department of Neurology and Rehabilitation Medicine, Cincinnati, USA
[3]University Medical Centre Utrecht, Department of Radiology, Utrecht, The Netherlands
[4]Mayo Clinic, Department of Neurology, Rochester, USA
[5]Indiana University School of Medicine, Department of Neurology, Indianapolis, USA
[6]Mayo Clinic, Department of Radiology, Rochester, USA

Background and Aims: Intracranial aneurysms are more likely to occur in the same arterial territory in first-degree relatives (FDRs) than in unrelated individuals. Several aneurysm locations are associated with specific circle of Willis (CoW) variations. We investigated whether CoW variations are also more likely to occur within families.
Method: We assessed four CoW variations (classical, A1-asymmetry, incomplete posterior communicating artery (PcomA) and fetal circulation) in two independent cohorts of families with familial aneurysms and $\geq$2 FDRs with CoW imaging on MRA/CTA.
In each (index) family we determined the proportion of FDRs with the same CoW variation as the proband and compared it to the proportion of FDRs of a randomly selected unrelated (comparison) family with the same CoW variation as the index family's proband (see Table). Concordance in index families and comparison families was compared with a conditional logistic events/trials model. The analysis was simulated 1001 times; we report the median concordances, odds ratios (ORs), and 95% confidence intervals (95%CI). Cohorts were analyzed separately and together by meta-analysis.

Table 1. Sample calculation of concordance proportions for index and comparison family units*

Index family unit: proband and FDRs	Circle of Willis variation(s)	Same circle of Willis variation as index proband?		
		incomplete PcomA	A1 asymmetry	Total
Proband (female)	incomplete PcomA, A1 asymmetry			
Daughter	incomplete PcomA	yes	no	yes
Son	incomplete PcomA, A1 asymmetry	yes	yes	yes
Concordance proportion		**2/2**	**1/2**	**2/2**
Comparison family unit: proband and FDRs	**Circle of Willis variation(s)**	**Same circle of Willis variation as index proband?**		
		incomplete PcomA	**A1 asymmetry**	**Total**
Proband (male)	classical circle			
Brother	A1 asymmetry, fetal PC	no	yes	yes
Sister	classical circle	no	no	no
Concordance proportion		**0/2**	**1/2**	**1/2**

* Family units shown here are hypothetical. Note that the index proband is not compared with the comparison proband because the circle of Willis configuration of the comparison proband is different, by definition, from that of the index proband. Thus, inclusion of the comparison proband would result in biased (lower) concordance proportions—in this example, 0/3, 1/3, and 1/3 rather than 0/2, 1/2, and 1/2.

FDR = first-degree relative; PcomA = posterior communicating artery; A1 = proximal segment of anterior cerebral artery; fetal PC = fetal posterior circulation

Results: We found a higher overall concordance in CoW configuration in index families than in comparison families (meta-analysis, 244 families: OR 2.2, 95%CI 1.6–3.0) mostly attributable to a higher concordance in incomplete PcomA (meta-analysis: OR 2.8, 95%CI 1.8-4.3). No association was found for the other three CoW variations.

Table 2. Concordance proportions in circle of Willis variation between index probands and FDRs of index proband's families and of comparison families*

Circle of Willis variation	Discovery cohort		Replication cohort	
	index families	comparison families†	index families	comparison families†
Classical circle	33.8%	19.7%	24.7%	21.0%
A1 asymmetry	25.1%	21.9%	20.3%	20.1%
Incomplete PcomA	65.5%	43.2%	64.3%	39.2%
Fetal PC	36.1%	20.7%	25.3%	25%
Any variation	52.3%	35.3%	48.6%	35.5%

* Odds ratios comparing concordance proportions between index and comparison families are given in Table 3.

† Values represent medians of 1001 iterations

A1 = proximal segment of anterior cerebral artery; PcomA = posterior communicating artery; fetal PC = fetal posterior circulation

Table 3. Odds ratios for concordance proportions in index versus comparison families: discovery cohort, replication cohort and meta-analysis

Circle of Willis variation	OR (95% CI)			Meta-analysis heterogeneity (I^2, %)†
	Discovery cohort*	Replication cohort*	Meta-analysis†	
Classical circle	2.2 (0.8-6.0)	1.2 (0.4-3.3)	1.7 (0.8-3.4)	0
A1 asymmetry	1.1 (0.4-3.4)	1.1 (0.3-4.0)	1.1 (0.5-2.5)	0
Incomplete PcomA	2.9 (1.7-5.2)	2.7 (1.4-5.1)	2.8 (1.8-4.3)	0
Fetal PC	2.3 (0.9-5.9)	1.0 (0.4-2.9)	1.5 (0.8-3.1)	28
Any variation	2.5 (1.6-3.9)	1.8 (1.1-2.9)	2.2 (1.6-3.0)	0

* Values represent medians of 1001 iterations

† Inverse variance fixed effects model

OR = odds ratio; 95% CI = 95% confidence interval; A1 = proximal segment of anterior cerebral artery; PcomA = posterior communicating artery; fetal PC = fetal posterior circulation

Conclusion: In two independent cohorts of families with familial aneurysms, CoW variations occurred more often within than between families suggesting heritability of some CoW variations. Further studies should investigate genetic variants associated with CoW formation.

AS27-008

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

BLOOD PRESSURE AND THE RISK OF REBLEEDING AND DELAYED CEREBRAL ISCHAEMIA AFTER ANEURYSMAL SUBARACHNOID HAEMORRHAGE IN THE INTENSIVE CARE UNIT

C. Gathier[1], I. Zijlstra[2], A. Slooter[3], G. Rinkel[1], K. Groenhof[3], J. Horn[4], P. Vandertop[5], W. Van den Bergh[6] and M. Eijkemans[7]

[1]University Medical Center Utrecht, Department of Neurology and Neurosurgery, Utrecht, The Netherlands

[2]Academic Medical Center, Radiology, Amsterdam, The Netherlands

[3]University Medical Center Utrecht, Department of Intensive Care, Utrecht, The Netherlands

[4]Academic Medical Center, Department of Intensive Care, Amsterdam, The Netherlands

[5]VU University Medical Center, Neurosurgical Center Amsterdam, Amsterdam, The Netherlands

[6]University Medical Center Groningen, Department of Critical Care, Groningen, The Netherlands

[7]Julius Center for Health Sciences and Primary Care, Julius Center for Health Sciences and Primary Care, Utrecht, The Netherlands

Background and Aims: To assess the association of blood pressure and rebleeding or delayed cerebral ischaemia (DCI) in patients with aneurysmal subarachnoid haemorrhage (aSAH) admitted to the intensive care unit (ICU).

Method: We retrospectively studied a consecutive series of aSAH-patients admitted to the ICU's of two university hospitals in The Netherlands of whom data on mean arterial pressure (MAP) and occurrence of rebleeding and DCI was available. DCI was defined as new focal deficits and/or decreasing consciousness not attributable to other causes. The association between the highest MAP within 1, 3 and 6 hours prior to rebleeding, and the lowest MAP within 12 and 24 hours prior to DCI was assessed. We computed hazard ratios (HR) with 95% confidence intervals, with MAP as time-dependent covariable, for rebleeding and DCI, adjusted for possible confounders.

Results: Of the 1167 patients, rebleeding occurred in 45 and DCI in 110 patients during ICU-stay. The aHR for DCI was 1.0 (1.0–1.0; both within 12 and 24 hours). The aHRs for rebleeding were 1.7 (0.9–3.2; 1 hour); 1.5 (0.8–2.6; 3 hours); and 1.0 (0.6–1.8; 6 hours).
Conclusion: No association was found between lowest MAP within 12 or 24 hours preceding DCI and occurrence of DCI. We found a time dependent increase in aHR for the relation between highest MAPs and rebleeding in the hours before rebleeding, with the highest aHR one hour before rebleeding, although this relation was not statistically significant. This might support a role for active blood pressure lowering in preventing rebleeding.

AS27-009

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

CLINICAL RESULTS OF MULTIDISCIPLINARY TREATMENT FOR DURAL ARTERIOVENOUS FISTULAS: 15-YEAR TOYAMA EXPERIENCE IN 122 CASES

N. Akioka[1], K. Daina[1], K. Naoya[1] and K. Satoshi[1]
[1]University of Toyama, Neurosurgery, Toyama city, Japan

Background and Aims: This study was aimed to review clinical results of endovascular/surgical treatments in patients with intracranial dural arteriovenous fistulas (dAVFs).
Method: Totally 122 patients underwent endovascular and/or surgical treatments between April 2001 and May 2016. There were 62 males and 60 females. Their mean age was 67 years, ranging from 26 to 86 years. Transvenous embolization (TVE) was first indicated for sinus-type dAVFs, while trans-arterial embolization (TAE) w/o direct surgery was first indicated for non-sinus-type dAVFs. TVE was selected for patients with isolated sinus. Treatments of choice depended on angioarchitectures in each patient with spinal dAVFs. Totally 258 procedures were performed. Coils, NBCA, and Onyx were appropriately selected as embolic materials in each procedure.
Results: The location of dAVFs included transverse-sigmoid sinus (n = 46), cavernous sinus (n = 40), anterior condylar confluence (n = 9), cerebellar tentorium (n = 8), spine (n = 8), superior sagittal sinus (n = 7), cranio-cervical junction (n = 4), and the others (n = 7). Multiple lesions were found in 14 patients. Retrograde cortical venous reflux was observed in 68 patients (56%). Of 122 patients, 17 (15%) presented with intracranial hemorrhage. Treatment procedures included TVE only (n = 33), TAE only (n = 58), TAE and TVE (n = 21), direct surgery only (n = 7), and combined endovascular and surgical treatments (n = 3). Total or almost total obliteration of the lesions was achieved in 106 patients (87%). There were 8 procedure-related complications (3%), which did not affect functional outcome. One patient (0.8%) was deceased because of severe venous congestion in spite of 17 endovascular and surgical treatments.
Conclusion: Endovascular and surgical treatments are safe and effective for patients with intracranial dAVFs.

AS27-011

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

INCREASED PREVALENCE OF CEREBRAL ANEURYSMS IN ADULT PATIENTS WITH SICKLE CELL DISEASE

N. Gaudré[1], C. Michelozzi[2], P. Cougoul[3], M.J. Kamsu[2] and N. Nasr[4]
[1]CHU Toulouse Rangueil, Vascular Medicine, TOULOUSE, France
[2]CHU Toulouse Purpan, Neuroradiology, Toulouse, France
[3]IUCT, Internal Medicine, Toulouse, France
[4]CHU Toulouse Purpan, Neurology, Toulouse, France

Background and Aims: Sickle cell disease has been associated with cerebrovascular disease. Hemorrhagic stroke can be caused by rupture of intracranial aneurysm or moyamoya disease. Sickle cell adult patients have been reported having a higher prevalence of aneurysm as compared to the general population with high occurrence of multiple aneurysms and aneurysms of the posterior circulation. We described our cohort of consecutive sickle cell patients with cerebral magnetic resonance angiography (MRA)
Method: We retrospectively reviewed patient's charts between 2009 and 2015 from the adult sickle cell cohort of the Hemoglobinopathy Competence Center of Toulouse, France. All patients with cerebral MRA were included in this study.
Results: 155 patients were included in this cohort. MRA was performed in 28 patients (18%). Intracranial aneurysms were found in 8 patients (28%).
Indication for MRA was subarachnoid hemorrhage for 1 patient (12%), other neurological symptoms for 2 patients (25%) (diplopia; headache), abnormal TCD in 3 cases (37%) and systematic screening for cerebrovascular abnormalities in 2 cases (25%).
5 patients (63%) had multiple intracranial aneurysms, with a total of 13 aneurysms in 8 patients.
Size was of at least 3 mm for 7 aneurysms (54%). Among these, 2 (15%) were above 7 mm. Localization was anterior circulation in 5 cases (63%) and anterior and posterior circulation in 3 cases (37%).
Conclusion: Prevalence of cerebral aneurysms in this consecutive retrospective cohort of adult sickle cell patients was of 28%. In these patients, aneurysms were multiple in 63% of cases. These results need to be confirmed in a larger cohort.

AS27-012

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

CLINICAL COMPARISON BETWEEN RUPTURED CEREBRAL SACCULAR ANEURYSMS VERSUS RUPTURED INTRACRANIAL ARTERIAL DISSECTIONS

I. Dunca[1], G.J. Luijckx[1], M. van Dijk[2], R. Groen[2], J. Metzemaekers[2], R. Stewart[3], O. Eshghi[4], A. Mazuri[4] and M. Uyttenboogaart[1]
[1]University Medical Center Groningen, Neurology, Groningen, The Netherlands
[2]University Medical Center Groningen, Neurosurgery, Groningen, The Netherlands
[3]University Medical Center Groningen, Health Sciences, Groningen, The Netherlands
[4]University Medical Center Groningen, Radiology, Groningen, The Netherlands

Background and Aims: The most frequent cause of subarachnoid hemorrhage (SAH) is rupture of a saccular aneurysm. A minority of SAH (1–10%) is caused by intracranial artery dissection (IAD). A widespread assumption is that the risk of rebleeding is higher in IAD but clear data are lacking. The aim of this study was to compare the clinical outcome between two cohorts of saccular aneurysms and IADs presenting with SAH.

Method: A retrospective single center case cohort study was performed including 984 consecutive patients with saccular aneurysm and 52 patients with IAD presenting with SAH. Clinical characteristics, rebleed rate, functional outcome and mortality were compared. A favorable functional outcome was defined as a mRS score of 0–2 at last follow up. Multivariable logistic regression analysis was performed for confounding factors: age, gender, WFNS grade, occurrence and timing of rebleeding, location of aneurysm/IAD, hydrocephalus and complications.

Results: Rebleed rate did not differ between saccular aneurysms (14.1%) and IADs (15.4%, $p = 0.8$), nor did the ictus to rebleed time (median days 2 versus 3). In the unadjusted analysis, 65.3% of saccular aneurysm group and 63.3% of IAD group had a favorable outcome ($p = 0.77$). In a multivariable analysis, IADs were associated with a favorable outcome (OR 4.93 (1.85–13.10), $p = 0.001$). Mortality was 16.4% in saccular aneurysms compared to 11.5% in IADs. There was no significant difference in survival ($p = 0.33$).

Conclusion: The risk and timing of rebleed, and mortality are similar in patients with SAH due to IAD and saccular aneurysms. IAD may be associated with a better clinical outcome.

AS27-014

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

CLINICAL PRESENTATION AND OUTCOME OF PATIENTS WITH SINGLE VS MULTIPLE CEREBRAL CAVERNOUS MALFORMATIONS IN A HISPANIC POPULATION FROM MEXICO

J. Calleja[1], I. Gutierrez[2], A. Cadena[3] and F. Coss[3]
[1]Instituto Nacional de Neurologia y Neurocirugía, Neurology, Mexico City, Mexico
[2]Instituto Nacional de Neurología y Neurocirugía Mexico, Neurology, Mexico City, Mexico
[3]ABC Medical Center, Internal Medicine, Mexico City, Mexico

Background and Aims: Cerebral cavernous malformations (CCMs) are common vascular lesions of the CNS. As much as 10 to 40% can be familial, which are more commonly multiple. Specific genes such as CCM1 (KRIT1) have been described with CCMs, specially in Hispanic populations. We hereby describe the general characteristics, clinical presentation, and outcome of patients with single vs multiple CCMs.

Method: We conducted a retrospective analysis of a group of patients with CCMs treated at the Stroke Clinic of our institution and compared patients with single vs multiple CCMs.

Results: Sixty-seven cases were analyzed. Fifty-four patients had a single and 13 had multiple CCMs. Four (6%) had a known familial history of CCM. Initial symptoms were: hemorrhage in 47 patients (70%), epilepsy in 15 (22%), and headache in 5(7.5%).

We compared patients with single vs multiple CCMs (table). The main difference between groups was that hemorrhage was more frequent at clinical onset in the single CCM group, contrary to what has been reported. Outcome was similar in both groups.

	SINGLE CCM n (%)	MULTIPLE CCMs n (%)	p value
Female Sex	29(53.7)	9 (69)	.310
Age at diagnosis	38 ± 15	37 ± 12	.831
Presenting as hemorrhage	41(76)	6(46)	.04*
Presenting with headache	3(5.6)	2(15)	.24
Presenting with epilepsy	10(18)	5(38)	.146
Neurological sequelae	36 (67)	9(69)	1.0
Refractory epilepsy	5(41)	1 (13)	.325
Recurring Hemorrhage	10 (21)	2(22)	1.0
Good outcome (mRS < 2)	34(65)	10(76)	.52

Conclusion: Number of CCMs appears to influence presentation but not outcome. Further genetic analysis of patients may determine outcome and need for more aggressive treatment.

AS27-017

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

CEREBRAL PERFUSION AND DIFFUSION IN ACUTE AND SUBACUTE PERIMESENCEPHALIC SUBARACHNOID HEMORRHAGE

I. Fragata[1] and P. Canhão[2]
[1]Centro Hospitalar Lisboa Central, Neuroradiology, Lisbon, Portugal
[2]Hospital de Santa Maria- CHLN- Faculty of Medicine- University of Lisbon, Department of Neurosciences and Mental Health- Neurology, Lisbon, Portugal

Background and Aims: Cerebral blood flow (CBF) is higher in perimesencephalic hemorrhage (PMH) compared to aneurysmal subarachnoid hemorrhage (aSAH) early after SAH.

We aimed to compare CT and MR perfusion (MRP) in PMH and aSAH at <72 h, and during vasospasm period, and to compare acute ischemic lesions on DWI in PMH versus aSAH patients.

Method: From a prospective cohort of 80 acute spontaneous SAH, we included all PMH patients ($n = 15$) and selected aSAH matching clinical grade (WFNS I/II, $n = 39$). CTP and MRP were obtained at <72H and/or 8–10 days after SAH. ROIs were drawn in vascular territories and global mean perfusion was calculated. DWI lesions at <72 h and 8–10 days were quantitatively assessed. Differences between perfusion parameters were calculated with 95% confidence intervals. Subgroup analyses were performed for anterior versus posterior circulation aneurysms.

Results: At <72 h, we found no significant differences in perfusion parameters in CTP and MRP. PMH patients had higher mean CBF ($p = 0.04$), CBV ($p = 0.02$) and TTP ($p = 0.03$) on CTP than posterior circulation aneurysm patients.

At 8–10 days, on CTP, PMH patients had a trend for higher CBF ($p = 0.07$), and had significant lower MTT ($p = 0.00$) and Tmax ($p = 0.03$). On MRP, there were no significant differences in CBF between both groups.

There were no significant differences in the number of acute ischemic lesions at <72 h, or at 8–10 days.

Conclusion: There are differences in cerebral perfusion between PMH and aSAH patients, with globally higher perfusion in PMH patients. Ischemic lesions were not different between groups. Our findings support different etiologies for PMH and aSAH.

AS27-020

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

ASSOCIATION OF QUANTIFIED LOCATION-DEPENDENT HEMORRHAGE VOLUMES WITH DELAYED CEREBRAL ISCHEMIA IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HEMORRHAGE

W.E. van der Steen[1,2,3,4], I.A. Zijlstra[3], D. Verbaan[2], A.M.M. Boers[1,3,5], R. van den Berg[3], G.J.E. Rinkel[6], B.A. Coert[2], Y.B.W.E.M. Roos[4], C.B.L.M. Majoie[3] and H.A. Marquering[1,3]

[1]Academic Medical Center, Biomedical Engineering & Physics, Amsterdam, The Netherlands
[2]Academic Medical Center, Neurosurgical Center Amsterdam, Amsterdam, The Netherlands
[3]Academic Medical Center, Radiology, Amsterdam, The Netherlands
[4]Academic Medical Center, Neurology, Amsterdam, The Netherlands
[5]University of Twente, Department of Robotics and Mechatronics, Enschede, The Netherlands
[6]University Medical Center, Department of Neurology, Utrecht, The Netherlands

Background and Aims: Delayed cerebral ischemia (DCI) is a severe complication of aneurysmal subarachnoid hemorrhage (aSAH) and associated with a high case morbidity and fatality. The presence and distribution of blood in different regions (cisternal, intraventricular or intraparenchymal) of the brain is associated with the occurrence of DCI. The volume of the hemorrhage at these locations may improve prediction of DCI. This study aims to quantify location-dependent hemorrhage volumes and independently associate these volumes with the occurrence of DCI.

Method: Clinical and radiological data were collected retrospectively from consecutive patients with aSAH and CT available <24 hours after ictus admitted to two academic centers between January 2009 and December 2011. Total hemorrhage volume was quantified using an automatic hemorrhage segmentation algorithm. Segmented blood was manually classified as cisternal, intraventricular, or intraparenchymal. Adjusted odds ratios (aOR) with 95% confidence intervals for DCI per milliliter cisternal, intraventricular and intraparenchymal blood were calculated using multivariable logistic regression analysis.

Results: We included 329 patients in the analysis. Per milliliter increase in volume, the aOR for DCI were 1.02 (95%CI 1.01 – 1.04) for cisternal, 1.03 (95%CI 1.00 – 1.05) for intraventricular, and 0.99 (95%CI 0.97 – 1.02) for intraparenchymal blood. For the total hemorrhage volume, the aOR was 1.02 (95%CI 1.01 – 1.03) per milliliter blood.

Conclusion: A significant association between cisternal and intraventricular hemorrhage volume and DCI was found, which was not found for intraparenchymal hemorrhage volume. This suggests that cisternal and intraventricular volume, not intraparenchymal volume should be taken into account in the relation between blood and DCI.

AS27-022

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

FUNCTIONAL OUTCOME IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HEMORRHAGE: ASSOCIATION WITH QUANTIFIED HEMORRHAGE VOLUME

W.E. van der Steen[1,2,3,4], H.A. Marquering[1,4], R. van den Berg[4], B.A. Coert[2], A.M.M. Boers[1,5], Y.B.W.E.M. Roos[3], C.B.L.M. Majoie[4], W.P. Vandertop[2] and D. Verbaan[2]

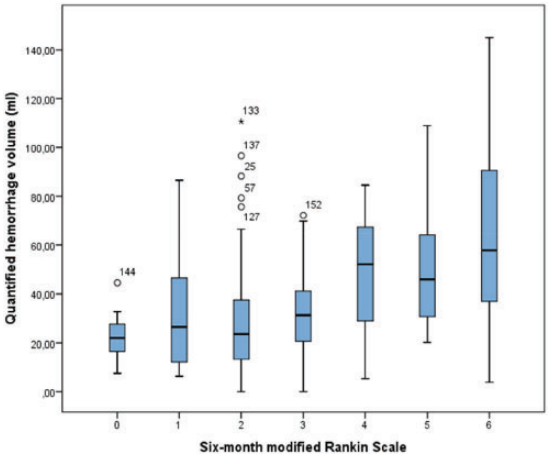
[1]Academic Medical Center, Biomedical Engineering & Physics, Amsterdam, The Netherlands
[2]Academic Medical Center, Neurosurgical Center Amsterdam, Amsterdam, The Netherlands
[3]Academic Medical Center, Neurology, Amsterdam, The Netherlands
[4]Academic Medical Center, Radiology, Amsterdam, The Netherlands
[5]University of Twente, Department of Robotics and Mechatronics, Enschede, The Netherlands

Background and Aims: One of the most significant prognostic markers in patients with aneurysmal subarachnoid hemorrhage (aSAH) is the amount of blood on CT, which is frequently estimated with the modified Fisher scale or the Hijdra sum score. Drawbacks of these scales are that they are coarse, have moderate interobserver agreement and are cumbersome. Quantitative volume measurement assesses hemorrhage volume more precisely, however the clinical value is currently unknown. The aim of this study was to associate quantified hemorrhage volume with functional outcome.

Method: All consecutive patients with aSAH from the prospective cohort admitted to our institution between December 2011 and January 2016 with non-contrast CT (NCCT) within 24 hours after ictus available were included. Automatic hemorrhage segmentation software was used to determine the hemorrhage volume. Functional outcome was assessed after 6 months on the modified Rankin scale (mRS). Ordinal regression was used to calculate the odds ratio (OR) with 95% confidence interval for a shift in the direction of poor outcome on the mRS per dl increase in hemorrhage volume.

Results: We included 244 patients. Median hemorrhage volume increased significantly with increasing mRS. (Figure 1). The OR of increase in mRS was 1.43 (95%CI 1.30 – 1.58) per dl increase in hemorrhage volume.

Figure 1



Conclusion: This preliminary analysis shows a strong association between quantified hemorrhage volume and functional outcome in aSAH patients.

AS27-023

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

INTRAOPERATIVE USE OF TRANSCRANIAL EVOKED POTENTIAL MONITORING, IS IT REALLY RELIABLE DURING IN CLIPPING OF INTRACRANIAL ANEURYSM?: EVALUATION OF FALSE POSITIVE AND FALSE NEGATIVE CASES

J. Chung[1], W. Park[1], J.C. Park[1], J.S. Ahn[1] and B.D. Kwun[1]
[1]Asan Medical Center, Department of Neurosurgery, Seoul, Republic of Korea

Background and Aims: Somatosensory evoked potentials (SEP) and motor evoked potentials (MEP) became popular to prevent ischemic complication during aneurysm surgery. However, surgeons often encounter cases of suspicious false positive and false negative of MEP/SEP monitoring from experience, but the incidence and possible causes for these events are not well established.
Method: From January 2012 to April 2016, 1514 patients underwent unruptured intracranial aneurysm (UIA) surgery with intraoperative EP monitoring. EP amplitude decrease of 50% or more compare to the baseline amplitude was defined as significant EP change. Correlation between immediate post-operative motor weakness and EP monitoring results were reviewed retrospectively. Sensitivity, specificity, and the positive and negative predictive values, incidence of false positive and false negative of intraoperative MEP monitoring were calculated.
Results: There were 18 patients with symptomatic infarction (1.18%) and 4 cases of symptomatic hemorrhage (0.26%). Total 15 patients showed motor weakness, and 10 were detected by immediate post-operative motor function test. We've encountered 15 false positive cases (1.25%), and false negative cases (0.53%). Therefore, MEP results during UIA surgery resulted in a sensitivity of 0.10, a specificity of 0.94, a positive predictive value of 0.01, and a negative predictive value of 0.99.
Conclusion: The intraoperative EP monitoring has high specificity and negative predictive value. However, there are existence of false positive and false negative. Therefore, intraoperative EP monitoring combined with other intraoperative monitoring method will provide maximum safety during aneurysm surgery.

AS27-025

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

PREDICTORS OF DELAYED CEREBRAL ISCHEMIA IN SUBARACHNOID HEMORRHAGE

J. Villacieros[1], S. Trillo[1], S. Bashir[1], C. Aguirre[1], L. Pérez[1], C. Ramos[1], L. Martínez[1], A. Ruiz[1], P. Alcántara[1], J. Vivancos[1] and L. Vega[2]
[1]Hospital La Princesa, Neurología, MADRID, Spain
[2]Hospital La Princesa, Unidad de apoyo metodológico, MADRID, Spain

Background and Aims: Delayed cerebral ischemia (DCI) is one of the most dreaded complications in subarachnoid haemorrhage (SAH), especially because it is still a challenge to predict what patients will develop it. We aimed to evaluate the correlation among different variables refered in the literature with the development of DCI and our patients' outcome.
Method: Retrospective study of consecutive cases of non traumatic SAH in our hospital from December2008 to January2016. We collected demographic and clinical variables, radiology characteristics of SAH in an initial CT and laboratory parameters. DCI was defined as a neurological deficit or loss in the level of consciousness related or not to new CT hipodensity and not attributable to other causes. Outcome was estimated using the mRS on discharge date.
Results: N = 128. Average age: 57. Women 70,1%, median initial GCS: 15, Intraventricular hemorrhage (IVH) 52.8%, presence of aneurysm 72.4%, mean highest thickness of blood clot (Tclot) 11,54 mm, development of DCI 22,83%, median mRS 1. A significant correlation was found between DCI and Tclot ($p < 0,01$), presence of aneurysm ($p < 0.01$), leukocytes level at 48–72 h ($p < 0.05$), platelets at 7 days ($p < 0.05$) and GCS ($p < 0.05$). The most important factors associated with the mRS were initial blood glucose level, Tclot, presence of aneurysm and leukocytes levels at 48–72 h. A significant correlation between Fisher scale and DCI or mRS was not found.
Conclusion: In our sample, DCI had a significant correlation with variables associated with the initial magnitude of SAH, specially the Tclot. Thus, it could be a useful tool to identify patients with a higher risk of developing DCI.

AS27-026

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

ENDOVASCULAR VERSUS SURGICAL TREATMENT IN INDIVIDUALS AGE OF 75 AND OLDER.: DOES AGE STILL LIMIT THE TREATMENT STRATEGY? SINGLE INSTITUTE EXPERIMENT

J. Chung[1], J.S. Ahn[1], J.C. Park[1], W. Park[1] and B.D. Kwun[1]
[1]Asan Medical Center, Department of Neurosurgery, Seoul, Republic of Korea

Background and Aims: The elderly population is rapidly growing last decades, however, the treatment strategy for the unruptured intracranial aneurysms in the elderly population is still in debate. And, yet there is great pressure performing surgical treatment in the elderly population.
Method: From January 2012 to December 2015, 65 patients with age of 75 and over underwent unruptured intracranial aneurysm (UIA) treatment. They had either surgical or endovascular treatment. Medical records, radiological findings and neurological outcomes, Glasgow outcome scale, and modified Rankin score were reviewed retrospectively. Comorbidities such as cerebrovascular attack, cardiac and kidney problems, malignancies were also reviewed.
Results: There were 36 patients underwent surgical treatment while 29 patients had endovascular treatment. Patients with endovascular treatment were slightly older and they had a shorter hospital stay and post-operative stay period. However, the there was no statistical significance in most of the variables and especially in patient outcomes between two groups.
Conclusion: The elderly patients have a relatively high probability of comorbidities, which could affect the outcome of the patient. However, both surgical and endovascular treatment group had similar treatment outcomes. As a conclusion, careful patient selection and meticulously designed treatment strategy would be necessary, and age as a single variable might not limit the treatment strategy.

AS27-027

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

TREATMENT WITH MILRINONE OF DELAYED CEREBRAL ISCHEMIA IN PATIENTS WITH ANEURYSMAL SUBARACHNOID HEMORRHAGE: A TERTIARY ACADEMIC HOSPITAL EXPERIENCE

C. Rouanet[1], D. Reges[1], E. Rocha[2], V. Gagliardi[2] and G. Silva[1]
[1]Federal University of São Paulo, Neurology, Sao Paulo, Brazil
[2]Federal University of São Paulo, Neurology, São Paulo, Brazil

Background and Aims: The main causes of mortality and morbidity after aneurysmal subarachnoid hemorrhage (SAHa) are rebleeding and delayed cerebral ischemia (DCI) secondary to cerebral vasospasm. Milrinone, an inotropic and vasodilator agent, is a treatment option for refractory symptoms.
Objective: To describe the experience of our neurocritical care service with the use of milrinone in accordance with the Montreal Protocol for refractory vasospasm.
Method: Retrospective study based on data of SAHa patients with refractory vasospasm treated with milrinone from February 2015 to December 2016
Results: From 83 SAHa patients, 15 developed refractory vasospasm. Patients treated and not treated with milrinone were similar in age (mean age 48.3 +/- 13.32 versus 49.7 +/- 12.81, $p = 0.27$). All patients treated with milrinone were females versus 69% in patients not treated with the drug ($p = 0.21$). The median Hunt-Hess, WFNS and modified Fisher scale scores were similar in both groups (2 [1,4] versus 2[1,3]; 1[1,4] versus 1[1,2]; 3 [1,4] versus 3[2,3], respectively). In 75% of the patients treated with milrinone, hypertension was previously induced. Two cases were also treated with intraarterial Milrinone and angioplasty. The most common adverse event with Milrinone was hypotension (50%). Vasospasm started after a mean of 8.7 days after bleeding (mean duration of 8.5 days). Favorable functional outcome at discharge was observed in 46% of cases.
Conclusion: A favourable outcome was observed in almost half of patients with DCI treated with milrinone. Cardiac arrhythmias or other severe adverse effects were not observed. The use of milrinone seems to be safe in the treatment of DCI secondary to vasospasm.

AS27-029

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

IMPACT OF SEIZURES AND STATUS EPILEPTICUS ON HOSPITAL UTILIZATION, IN-HOSPITAL MORTALITY, HOSPITAL CHARGES AND LENGTH OF STAY AMONG SUBARACHNOID HEMORRHAGE (SAH) PATIENTS

I.A. Qureshi[1], M.R. Afzal[1], M.A. Qureshi[1], G. Rodriguez[1], R. Khatri[1], P. Piriyawat[1] and S. Cruz-Flores[1]
[1]Texas Tech University Health Sciences Center, neurology, El Paso, USA

Background and Aims: To determine the effect of developing in-hospital seizures/status epilepticus in SAH patients on in-hospital complications, procedures, length of stay, hospital charges, in-hospital mortality, palliative care (PC) and do not resuscitate (DNR).
Method: We identified subarachnoid hemorrhage (SAH) patient from Nationwide Inpatient Sample database for years 2011–2014 using codes (DX1 = 430) from the International Classification of Diseases, 9th edition. SAH patients who developed in-hospital seizures (DX = 345 or 780.3) or status epilepticus (DX = 345.3) were determined by using secondary (Dx2. . .. Dx25) ICD-9 codes. Baseline variables were compared among the groups. Adjustments were made for age, gender, race and comorbidities.
Results: Out of 101,576 hospitalized patients with SAH, 89,203 (87.8%), 11,752 (11.5%), and 620 (0.6%) did not have seizures/status epilepticus, had seizures, or status epilepticus respectively. SAH with either seizures/status epilepticus had higher rate of in-hospital complications (sepsis, pneumonia, DVT, and UTI), in-hospital procedures (mechanical ventilation (MV), gastrostomy and transfusions). Mean LOS and hospital charges, in-hospital mortality and palliative care (PC) were also significantly higher among patients with seizures/status epilepticus.
Conclusion: Seizures and status epilepticus affect 11.5% and 0.7% of patients with SAH and significantly increase the rate of in-hospital complications/procedures, length of stay, in-hospital charges, and in-hospital mortality

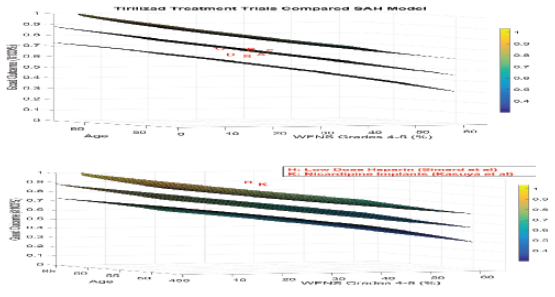
AS27-030

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

IDENTIFICATION OF PROMISING THERAPEUTICS FOR SUBARACHNOID HEMORRHAGE

N. Shah[1], V. Shah[1], C. Rao[1], P. Mandava[2] and T. Kent[1]
[1]Baylor College of Medicine, Neurology, Houston, USA
[2]Michael E. DeBakey VA Medical Center, Neurology, Houston, USA

Background and Aims: No treatment definitively improves outcome from subarachnoid hemorrhage (SAH). Outcome is strongly related to baseline factors, yet imbalances are common in early trials. We have developed a technique to identify promising treatments at early phase using a pooled control arm model (pPREDICTS: Neurology 2016) that compares early studies at their own baselines. We applied this method to SAH.
Method: Models were derived from 25 SAH placebo arm trials representing 5123 subjects. Statistical surfaces were generated to visualize the threshold needed to overcome to be positive. 61 treatment trials were then screened.
Results: The best model fit was for good outcome (modified Rankin Score 0–2 equivalents) compared to % patients with WFNS 4–5 and age (Fig. 1a; middle surface is the outcome model $r^2 = 0.52$;$p = 0.001$, plus $p + 0.1$ surfaces). Seven trials of known negative drug tirilizad are superimposed and within the surfaces (Fig 1a) confirming futility. A case series using implanted prolonged-release nicardipine and a low dose heparin study (Fig 1b) are above the $+p = 0.1$ surface, suggesting promise.



Conclusion: An outcome model based on percentage of high grade WFNS and age was successfully developed. This approach may be useful to prioritize treatments worthy of further study.

AS27-031

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

TRANSCRANIAL DOPPLER VERSUS COMPUTED TOMOGRAPHY ANGIOGRAPHY FOR THE DETECTION OF CEREBRAL VASOSPASM AFTER ANEURYSMAL SUBARACHNOID HEMORRHAGE

J. van der Harst[1], G.J. Luijckx[1], O. Eshghi[1], A. Mazuri[2], R. Bokkers[2], R. Groen[3], M. van Dijk[3] and M. Uyttenboogaart[3]
[1]University Medical Center Groningen, Department of Neurology, Groningen, The Netherlands
[2]University Medical Center Groningen, Department of Radiology, Groningen, The Netherlands
[3]University Medical Center Groningen, Department of Neurosurgery, Groningen, The Netherlands

Background and Aims: Delayed cerebral ischemia (DCI) is an important complication in aneurysmal subarachnoid hemorrhage (aSAH). Vasospasm is recognized as an important cause of DCI. This study investigated the diagnostic accuracy of TCD and CTA for the detection of angiographic vasospasm, prediction of DCI and unfavorable clinical outcome.
Method: In a prospective study of aSAH patients underwent CTA and TCD on day 5 and 10. The degree of vasospasm was divided into none, mild and severe vasospasm. Most severely affected arteries were used for the analyses. DCI was defined as clinical manifest vasospasm and/or ischemic lesions on CT/MRI not explained otherwise. Functional outcome after six months was assessed with the modified Rankin Scale (mRS). Statistical analyses were done with contingency tables and kappa analyses. (Dutch trial register NTR4157)
Results: 59 patients were included. CTA determined vasospasm in 54 patients. TCD revealed vasospasm in 26 patients. The kappa agreement of CTA with TCD was respectively 0.077 and 0.059 for vasospasm. DCI occurred in 16 and poor outcome in 12 patients. The predictive value of CTA and TCD for DCI/poor outcome is presented in table 1.
Table 1. TCD and CTA

	TCD Sensitivity	TCD Specificity	CTA Sensitivity	CTA Specificity
DCI	0.500	0.571	1.000	0.024
Poor outcome	0.636	0.596	1.000	0.043

Conclusion: There is only a slight agreement between CTA and TCD. CTA has a higher sensitivity than TCD for predicting DCI and unfavorable outcome but a lower specificity. The predictive value of CTA and TCD in prediction of DCI and clinical outcome seems to be limited.

AS27-032

SAH, ANEURYSMS AND VASCULAR MALFORMATIONS

CEREBRAL ANEURYSM TREATMENT IN THE LAST 5 YEARS IS THE SURGERY ERA OVER?

G. Reig Rosello[1], C. Ramos[1], L. Martinez Vicente[1], J. Villacieros[1], G. Zapata Wainberg[1], S. Trillo[1], E. Bárcena[1], J.L. Caniego[1], J. Vivancos[1] and F. Nombela[1]
[1]Hospital de La Princesa. IP, Neurology department, Madrid, Spain

Background and Aims: Treatment of cerebral aneurysms requires a multidisciplinary approach, specialized and individualized according to the patient. We have reviewed the treatment of cerebral aneurysms in our center in the last 5 years.
Method: We performed a retrospective observational study of patients treated for ruptured and unruptured cerebral aneurysm from 2011 to 2015 in our center. The type of treatment was decided in an individualized multidisciplinary session in cases of non-urgent treatment (scheduled). Demographic, clinical and procedural variables were collected.
Results: Total number patients treated were 219: 46,6% received urgent treatment and 54,4% scheduled (non-urgent) treatment. 83% underwent endovascular treatment, 17% sugery.
Urgent treatment group: mean age 58 years (SD 13), 70% women, clinical presentation as HSA 85% and epileptic seizure 14%, Hunt and Hess median 2. Endovascular treatment 89%, being coils embolization the most frequent treatment, 14 % presented remnant neck. Complications of treatment 16%. Mortality at 3 months was 15% and 29% had residual neurological deficit.
Scheduled treatment group: mean age 57 years, 78% women. Incidental aneurysm in 78%, endovascular treatment 78%, being the most frequent treatment flow diversion stent, 15% presented remnant neck. 12% had complications of treatment, 11 % with associated neurological deficit. Mortality rate 0.
Conclusion: In our center in the last 5 years, endovascular treatment is the treatment of choice. It was chosen in 9 out of 10 patients in urgent cases and in 4 out of 5 patients undergoing scheduled treatment. Early availability of the technique could explain the preference for endovascular treatment.

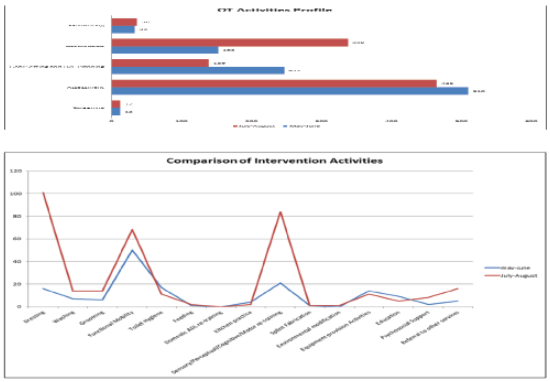
AS25-003

SERVICE ORGANISATION

USING CORE INPUT DATA COLLECTION TOOL TO IMPROVE STROKE PATIENTS' BENEFIT FROM OCCUPATIONAL THERAPY AT WEST SUFFOLK HOSPITAL NHS FOUNDATION TRUST

A.R. Magpantay[1]
[1]West Suffolk Hospital, Occupational Therapy Neurology and Stroke, Bury St Edmunds, United Kingdom

Background and Aims: It is essential to be able to measure the core activities delivered by a service to allow performance quality review. Core Input (COIN) Data Collection tool was developed to collect the core input of Occupational Therapy necessary to identify service aspects that require improvement at the Stroke unit of West Suffolk Hospital.
Method: COIN Data Collection tool was used as a pretest-post test evaluation tool to establish status and changes in service delivery to stroke patients.
Results:



COIN Data Collection tool collated face to face intervention increase of 18% particularly in dressing training and restorative interventions. Assessment lowered by 4% while goal and discharge planning activities were lessened by 12%.

Conclusion: The initial findings established the activity profile of OT service and patients were guided to receive more face to face retraining and interventions based on the feedback information supplied by the 'COIN' Data Collection Tool.

COIN Data Collection tool picked up an increase of 85 extra sessions on dressing training and an increase of 63 sessions focused on restorative interventions on sensation, perception, movement and cognition. It also picked up decline on activities of assessment and discharge planning.

The 'COIN' Data Collection tool was able to highlight and quantify activities of Occupational Therapy team which enabled the service to be improved and be adjusted to increase the benefits to patients receiving Occupational Therapy. It can present useful and detailed information that can be utilized to monitor and maintain the quality of OT input received by Stroke patients.

AS25-004

SERVICE ORGANISATION

QUALITY IMPROVEMENT: IMPROVING TIA CLINIC FOR PATIENTS AND DOCTORS

H. Sims[1] and L. Shaw[1]
[1]Royal United Hospitals Bath NHS Foundation Trust, Acute Stroke Unit, Bath, United Kingdom

Background and Aims: There are 46,000 first incidences of TIA in the UK annually[1]. 15% of ischaemic strokes are preceded by TIA, and 1/12 patients who have a TIA, have a stroke within a week[2]. The greatest risk is in the first few days[3–4], hence the need for rapid-access clinics where Stroke specialists assess and investigate patients, initiating appropriate management.

Method: This project used LEAN methodology to streamline TIA clinic from both patients' and doctors' perspectives, to improve efficiency and structure. It also aimed to gather qualitative data in order to improve the experience for both patients and Doctors.

Results: Results showed significant delays in CT/MRI, with maximum waiting times of 5-hours. 72% of referrals were low-risk (ABCD2 score $\leq$3) and of these 40% were diagnosed as TIA/stroke, compared to 60% of high-risk referrals. 69% of referrals diagnosed as non-TIA/stroke came from GPs, 11% from ED. Both patients and Doctors were dissatisfied with clinic organisation, especially location of investigations. Overall 85% of patients felt communication was excellent and rated the clinic 4.8/5.

Conclusion: We changed timings of reserved MRI slots and arranged prompter reporting of scans. We suggest a consultant-led triage line for low-risk referrals and provision of other 'rapid-access' clinics for referrals triaged as unlikely TIA. Although guidelines no longer recommend using ABCD2 scores to stratify risk, results demonstrate correlation between high/low risk referrals and diagnostic accuracy, suggesting ongoing value of ABCD2 score in triaging. We produced written information for GPs about referrals to clinic and produced leaflets for patients containing information and directions.

AS25-005

SERVICE ORGANISATION

LONDON PRE-HOSPITAL STROKE ASSESSMENT: HIGH SENSITIVITY BUT LOW SPECIFICITY

G. Mahir[1], D. Gill[2], P. Sivakumaran[1] and A. Kar[3]
[1]IMPERIAL COLLEGE NHS TRUST, School of Medicine, LONDON, United Kingdom
[2]IMPERIAL COLLEGE NHS TRUST, Postgraduate Centre, LONDON, United Kingdom
[3]IMPERIAL COLLEGE NHS TRUST, Hyper Acute Stroke Unit- Charing Cross Hospital, LONDON, United Kingdom

Background and Aims: Specialist stroke services in London have been reconfigured to create a centralized "hub and spoke" model[1]. The integration of emergency services and introduction of Hyper-Acute Stroke Units (HASUs) allows acute stroke patients to be immediately directed towards specialist services, increasing the chances of thrombolysis within the critical 4.5 hour timeframe[2,3].

We sought to audit such "thrombolysis calls" to a London HASU to determine accuracy of the pre-hospital diagnostic assessments and rate of progression to thrombolysis.

Method: We retrospectively reviewed all London Ambulance Service directed potential thrombolysis cases presenting to an Imperial College Healthcare NHS Trust (UK) HASU between 2nd September 2014 and 2nd April 2015, inclusive.

Results: A total of 500 cases presented over the 215-day period; discharge reports were used to ascertain the discharge diagnosis. A total of 70 cases had incomplete results, with data likely missing completely at random.

Of the 430 patients considered, 187 (43%) were given a non-stroke diagnosis on discharge. The three most common were functional disorder (37%), seizure (17%) and infection (13%). The most common comorbidity of non-stroke patients was a previous stroke (19.8%) with a previous TIA or seizure seen in 5.3% and 3.7% of patients respectively. The proportion of presentations with non-stroke diagnoses did not vary outside of weekday working hours (9am to 5 pm, Monday to Friday, $p < 0.05$ derived using Chi squared test).

Conclusion: Consistent with previous studies, our results show that approximately 15% (95% confidence interval 8%-25%) of potential thrombolysis cases progress to thrombolysis[4,5], suggesting a high sensitivity but low specificity of pre-hospital assessment.

AS25-006

SERVICE ORGANISATION

THE WORK OF THE WORLD STROKE ORGANISATION (WSO) IN ESTABLISHING, SUPPORTING AND STRENGTHENING A GLOBAL NETWORK OF STROKE SUPPORT ORGANISATIONS (SSOS)

S. Belson[1]
[1]Bromsgrove, United Kingdom

Background and Aims: A theme of the 2016–2020 WSO Strategy is: *Strengthen global capacity to reduce the impact of stroke*. A priority within this theme is to work towards establishing, supporting and strengthening a global network of SSOs, particularly in low and middle income countries.
The specific aims of this priority are:
To increase the number and sustainability of SSOs globally
To increase the number of SSO and individual members of WSO
To improve the knowledge and skills of SSOs
To facilitate collaboration between SSOs and a range of stakeholders
Method: The WSO co-funds the role and activities of an International Development Officer with the Stroke Association UK.
The methods employed by the International Development Officer are:
Focal point for all SSO enquiries from around the world
Audit knowledge needs of SSOs and identify resources
Knowledge exchange and networking through online platforms, signposting to resources and international conferences
Maintenance and update of the WSO Patient Education Repository
Utilise the WSO SSO Committee members as stroke champions within their regions
Results: During 2017 outputs and outcomes of the SSO development programme will be measured on a monthly basis against the following key performance indicators:
Outputs: Number of responses to enquiries
Number of new materials in the Patient Education Repository and number of downloads
Number of knowledge exchange activities
Outcomes: Number of newly registered SSO members and lay members of WSO
Feedback on usefulness of enquiry responses and knowledge exchange activities
Number and type of activity of SSO Committee champions
Conclusion: A preliminary conclusion will be drawn from the results of the programme at the 5 month point, at output and outcome level.

AS25-007

SERVICE ORGANISATION

A SURVEY TO DETERMINE CURRENT SERVICE PROVISION FOR FUNCTIONAL WEAKNESS IN STROKE UNITS ACROSS THE UNITED KINGDOM

B. Walters[1] and R. Sanyal[2]
[1]Keele University, Medicine, Keele, United Kingdom
[2]University Hospital of North Midlands NHS Trust, Stroke Medicine, Stoke-on-Trent, United Kingdom

Background and Aims: Functional weakness (FW) is an internally inconsistent neurological disorder not due to a structural disease. Approximately 5% of patients presenting to the stroke unit are functional, with a high recurrence rate of 83%. We devised a survey to better understand current service provision.
Method: The survey was created using Survey Monkey and disseminated to the British Association of Stroke Physicians during August and September 2016. Eleven questions were asked, covering incidence, method of diagnosis and treatment of the condition. Responses were collected and analysed using Microsoft Excel.
Results: Thirty-two members responded, after removing duplications 30 were analysed. Five percent of patients presenting with stroke were reported to be functional, being more common in females. Female patients presenting with functional weakness are younger compared to male counterparts. Most of the respondents [87%] diagnosed FW using a combination of clinical and radiological means. Hoover's test was the most common clinical sign [83%] to aid in diagnosis. MRI was the most common [88%] radiological investigation. Physiotherapy was the most common treatment [66%] offered in hospital. Seven percent report using CBT and 3% used hypnotherapy. The mean in-patient stay was 3.7 days, with reported recurrence rate of 21%. 45% of patients required support post-discharge, psychology was the most commonly used. 23% had access to specific FW clinics.
Conclusion: Functional weakness is not an uncommon clinical presentation. Speciality Functional Weakness clinics are uncommon, and not readily accessible in the UK. More research and novel treatment should be evolved to treat this difficult condition.

AS25-008

SERVICE ORGANISATION

ESO-EAST STROKE UNIT NURSE EDUCATIONAL PROJECT (SUNEP): PILOT PHASE RESULTS AND FUTURE DIRECTIONS

Y. Flomin[1,2], J. Glahn[3], M. Guliaieva[1,4], D. Gulyayev[5], T. Fischer[6], R. Mikulik[7] and V. Caso[7]
[1]MC 'Universal Clinic 'Oberig', Stroke Center, Kyiv, Ukraine
[2]NGO 'Ukrainian Anti-Stroke Association', Board Member, Kyiv, Ukraine
[3]Johannes Wesling Klinkum, Universitätsklinik für Neurologie und Neurogeriatrie, Minden, Germany
[4]NGO 'Ukrainian Anti-Stroke Association', Executive Director, Kyiv, Ukraine
[5]NGO 'Ukrainian Anti-Stroke Association', Research and Publishing Division, Kyiv, Ukraine
[6]Boehringer Ingelheim GmbH, Corporate TA CardioMetabolism, Ingelheim am Rhein, Germany
[7]ESO, ESO-EAST Steering Committee, Basel, Switzerland

Background and Aims: Nurses play a pivotal role in all phases of stroke patients care. However, despite the 2013 ESO recommendations and Stroke Unit certification criteria calling for Nurse training on acute stroke care, it is not included in most stroke care agendas of the ESO-EAST countries.
Method: In December 2015,the ESO launched the Stroke Unit Nurse Educational Project (SUNEP) within the ESO-EAST project. English-speaking representatives from ESO-EAST countries, appointed by national stroke/neurological societies, were invited to a kick-off meeting followed by an e-learning and an on-site training on a certified Stroke Unit.
Results: Overall, 15 Nurses and five Physicians representing 12 ESO-EAST countries were selected to participate in the SUNEP project. At the 3-day kick-off meeting held in March, the 20 participants were instructed on the project and its web-based platform. Six months later, 19 participants had successfully completed the "Special Care on Stroke Units" training modules (set up under the auspices of the German Stroke Society) and visited the certified Stroke Unit at Johannes Wesling Klinikum in Minden, Germany. All costs were covered by an unrestricted grant provided by Boehringer Ingelheim. To share the experience, the participants will be responsible for organizing educational activities, giving presentations at national and local conferences, and providing hands-on trainings in 2017 to 2019.
Conclusion: The ESO-EAST SUNEP, the first comprehensive Nurse training on acute stroke care in the ESO-EAST countries, fully recognized the role Nurses play in all phases of stroke care. This project is scheduled to be scaled up within both the ESO-EAST and ANGELS initiatives.

AS25-010

SERVICE ORGANISATION

TELESTROKE IN RUSSIA: RESULTS OF THE SURVEY 2016

A. Alasheev[1], N. Shamalov[2] and E. Prazdnichkova[1]
[1]Sverdlovsk Regional Clinical Hospital #1, Stroke Unit, Yekaterinburg, Russia
[2]Pirogov Russian National Research Medical University, Research Institute of Cerebrovascular Disease and Stroke, Moscow, Russia

Background and Aims: Telemedicine is recognized as one of the priority directions of increasing an availability of healthcare for stroke patients. It is necessary to have an idea of the use of telemedicine technologies for stroke patients for the telestroke development in the Russian Federation.
Method: From the 5th September, 2016 to the 19th November, 2016 a survey on the use of telemedicine technologies for stroke patients was conducted for the first time in Russia. The Russian version of the European Stroke Organisation Telestroke Subcommittee questionnaire was sent to stroke leaders in all 85 regions of the Russian Federation. The questionnaire consisted of 30 questions grouped into five parts: administrative aspects, medical aspects, information technology, funding, academic and research activities.
Results: Stroke leaders from six (7,1 %) regions of the Russian Federation filled out the questionnaire: Arkhangelsk oblast, Voronezh oblast, Primorsky krai, Rostov oblast, Sverdlovsk oblast, Khanty-Mansi autonomous okrug. Thus, the telestroke covered 10.6 % of Russia's population on 8.5 % of its territory. Overall, Russian telestroke network have 39 hubs with 141 spoke hospitals. The average distance between hubs and spoke hospitals is 284 km. All six regions use a telestroke network for patient selection for surgical intervention. The telemedicine consultations have reimbursement from health insurance only in two regions of the Russian Federation.
Conclusion: Russia's first survey on telestroke showed a low prevalence of the use of telemedicine technology for stroke patients. Low prevalence of telestroke in Russia may be related to inadequate funding of telemedicine.

AS25-011

SERVICE ORGANISATION

SILENT BRAIN INFARCTION – ASSESSING CLINICAL DECISION MAKING

L. Leung[1], P. Han[2], C. Lundquist[3], G. Weinstein[4], D. Thaler[1] and D. Kent[3]
[1]Tufts Medical Center, Neurology, Boston, USA
[2]Maine Medical Center, Center for Outcomes Research and Evaluation, Portland, USA
[3]Tufts Medical Center, Predictive Analytics and Comparative Effectiveness Center, Boston, USA
[4]Massachusetts General Hospital, Radiology, Boston, USA

Background and Aims: Silent brain infarction (SBI) is an insidious condition that increases risk for symptomatic stroke and dementia, but optimal management strategies have not been established. With an estimated prevalence of 20% among U.S. adults over age 50, an absence of treatment studies, and an uncertain path forwards for research on stroke prevention after detecting SBI, we explored perspectives of practicing clinicians regarding their approaches to SBI to help guide future studies.
Method: We performed semi-structured interviews of vascular neurologists, general neurologists, and internists. We used purposeful sampling to achieve variance in sex, specialty, practice setting, and experience. The interviews explored a priori specified themes and emergent themes. We used a constant comparative method to develop a coding schema, find consensus among coders, and modify the interview guide. We interviewed 15 clinicians to achieve thematic saturation.
Results: The primary themes were diagnostic and prognostic uncertainty, knowledge gaps, clinical practices, evidence synthesis, and screening. Most vascular neurologists followed secondary prevention approaches to SBI, whereas internists and general neurologists were more varied in approach. Some clinicians did not report SBI to patients. Internists would change their practices in response to a comparative effectiveness study, whereas neurologists were hesitant to modify their approach with this type of data. Most clinicians expressed concerns about equipoise and feasibility in conducting a clinical trial. Most identified screening as a potentially useful practice but were concerned about cost.
Conclusion: There is no consensus among neurologists and internists regarding the significance of SBI or the optimal management approach.

AS25-014

SERVICE ORGANISATION

HOSPITAL DISCHARGE DATA UNDERESTIMATE ACUTE ISCHEMIC STROKE EVENTS AND T-PA TREATMENTS: DATA FROM A MULTICENTER VALIDATION SURVEY IN THE FLORENCE AREA (ITALY)

M. Baldereschi[1], D. Balzi[2], V. Di Fabrizio[3], S. Gaggelli[3], L. De Vito[4], R. Ricci[5], P. D'Onofrio[6], F. Bellomo[7] and D. Inzitari[8]
[1]Italian National Research Council, Inst.of Neurosciences, Florence, Italy
[2]AZIENDA USL TOSCANA CENTRO, Epidemiology and Prevention, Florence, Italy
[3]Azienda Regionale di Sanità, Osservatorio di Epidemiologia, Florence, Italy
[4]AZIENDA USL TOSCANA CENTRO, SOC 118, Florence, Italy
[5]AZIENDA USL TOSCANA CENTRO, Professioni Tecnico-Sanitarie, Florence, Italy
[6]AOU-Careggi, Direzione Sanitaria, Florence, Italy
[7]SC Clinical Governance, Regione Toscana, Florence, Italy
[8]University of Florence, Dept. of Neurology, Florence, Italy

Background and Aims: Monitoring hospital performance using administrative data sets, i.e. hospital-discharge-data, is commonplace in several countries, and remains the only source of information also for acute stroke everywhen ad-hoc registration systems are not affordable. However, in the routine practice, reliability of diagnostic coding of acute ischemic stroke (AIS) based on ICD-9CM may be questionable. This study aimed at estimating accuracy of ICD-9CM codes for the identification of hospitalized AIS events and the use of t-PA treatment.
Method: We compared hospital-discharge-data with clinical records reviewed in all the six hospitals of the Florence Area, Italy, trough 2015, looking at consistency of ICD-9CM codes 433*1, 434*1 and 99.10 with single patient's charts information.
Results: Over 2015 there were 1270 hospitalized AIS events. The hospital-discharge-data identified correctly only 898 events (true positive cases), but missed 375 events (false negative cases), and 104 events were not eventually AIS (false positive cases). Code-specific positive predictive value was 85.7 % (95%CI,74.6–93.3)for 433*1 and 89.9% (95%CI, 87.8–91.7)for 434*1 codes, T-PA use, as identified by ICD-9CM code 99.10, was only documented in 6% of AIS events, but was 13.3% in medical record review (sensitivity 44.7%; 95%CI,37.1–52.5).
Conclusion: In our study the high proportion of false-negative cases (30% and 55.3%) seriously limits the use of hospital-discharge-data to identify AIS events and t-PA treatments, respectively. AIS frequency, management and outcome can be undermined by inaccurate coding. An ad-hoc training of all physicians involved in the coding process should precede the use of hospital-discharge-data to allow reliable measurements of hospital AIS care performance.

AS25-015

SERVICE ORGANISATION

THE STROKE ALLIANCE FOR EUROPE AND RESEARCH

S. Jackson[1] and J. Barrick[2]
[1]Stroke Association, London, United Kingdom
[2]Stroke Alliance for Europe, N/A, London, United Kingdom

Background and Aims: The aim of the poster is to advise the medical profession of the research projects that SAFE is involved in, and the importance of involving stroke survivors in research
The Stroke Alliance for Europe (SAFE) a non-profit-making organisation formed in 2004. It is the voice of stroke patients in Europe, representing a range of patient groups from over 30 European countries. SAFE's goal is to decrease the number of strokes in Europe by advocating for better prevention, access to adequate treatment, post-stroke care and rehabilitation. In 2016, SAFE and ESO joined forces by signing the Memorandum of Understanding in order to gain priority for stroke as a disease among decision makers and additional resources to achieve progress in improving stroke care and prevention. The first SAFE/ESO meeting with representatives of the EU Health Commission in EU Parliament took place in November 2016. The most important project for SAFE in 2017 is the Burden of Stroke Report. As more people survive stroke, the burden of care and support is great and increasing. However, the implementation of guidelines, interventions and organised stroke care varies across Europe, contributing to variation in outcomes for stroke survivors. The Report provides insights on stroke care pathway across Europe, resulting in an up-to-date report on: stroke incidence, prevalence and outcomes; policy; healthcare infrastructure, service provision and quality; and the uptake of new technologies.
Method: Not applicable
Results: Not applicable
Conclusion: Not applicable

AS25-017

SERVICE ORGANISATION

HOW DOES EXTERNAL AUDIT INFLUENCE THERAPY PROVISION? SELECTED FINDINGS FROM AN ETHNOGRAPHIC CASE-STUDY SERIES IN ENGLISH STROKE UNITS (REACT)

L.J. Burton[1] and D.J. Clarke[1]
[1]Academic Unit of Elderly Care and Rehabilitation, University of Leeds, Leeds, United Kingdom

Background and Aims: On-going national audit of stroke care has driven improvements in English services. National clinical guidelines recommend increased frequency and intensity of therapy for in-patient stroke survivors. Performance against this standard is monitored by the Sentinel Stroke National Audit Programme and reported quarterly. We aimed to examine the influence of external audit on achievement of the nationally recommended target of 45 minutes of each appropriate therapy per day.
Method: Non-participant observations, semi-structured interviews with staff and analysis of clinical records.
Results: 197 staff and 77 patients participated in observations across eight stroke units. 131 staff were subsequently interviewed. Staff recognised the contribution of the audit in improving services. However, they reported three areas of concern. Firstly, therapists admitted confusion about what should be recorded as therapy, highlighting an awareness of variable recording practices and a resultant feeling of unfair comparison between units. Secondly, they expressed concern that the quality of individualised therapy was measured against a numerical target. Thirdly, delay in receiving timely feedback on audit of therapy provision was highlighted as a barrier to local service improvement. We also noted at some sites that, in response to the audit, therapists' behaviour was negatively shaped and focused on increasing recorded minutes rather than providing more therapy more often.
Conclusion: Therapists require simple, accessible guidance to standardise recording across services and facilitate meaningful comparisons. Targeted education about the purpose of clinical audit and the evidence behind clinical recommendations will help staff to improve stroke services to provide more therapy more often.

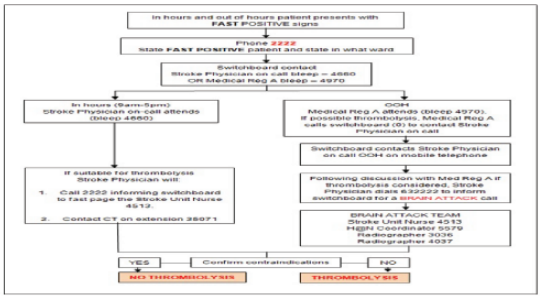
AS25-019

SERVICE ORGANISATION

IMPLEMENTATION OF A NOVEL FAST POSITIVE PATHWAY FOR RECOGNITION AND MANAGEMENT OF INPATIENT STROKE

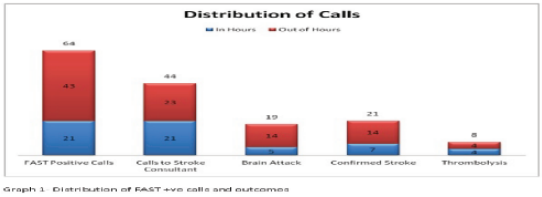
W.M. Yu[1], A. Doney[1], I. Logan[1], M. Lambert[1], P. Nair[2], S. Johnston[2], Y. Imam[1] and H. Chandrashekar[1]
[1]Ninewells Hospital, Acute Stroke Unit, Dundee, United Kingdom
[2]Perth Royal Infirmary, Acute Stroke Unit, Perth, United Kingdom

Background and Aims: Fast-tracked Emergency department pathways for acute stroke patients from the community has been established. However, there are no existing pathways for recognition of hyperacute stroke in inpatients which may delay treatment, particularly out-of-hours. Standardised emergency 2222 number is an established cardiac arrest call in the United Kingdom. The aim is to use this number for FAST positive inpatients.
Method: Introduction of FAST (Face drooping-Arm weakness-Speech difficulties-Time) Positive Pathway in December 2014 for Ninewells Hospital and Perth Royal Infirmary (Flowchart 1). The service is available 24/7, providing timely specialist stroke advice, assessment and management for FAST positive patients.



Flowchart 1: Local inpatient stroke communication pathway

Stroke team collaborated with switchboard to implement a new 2222 FAST positive call. Stroke recognition training provided to all nursing staff to gain proficiency to access this service.
Results: Data collected from 1st December 2014 to 24th November 2015. 32% of FAST +ve calls were confirmed acute strokes, and 38% of the confirmed strokes were thrombolysed (Graph 1).



Graph 1: Distribution of FAST +ve calls and outcomes

Conclusion: Implementation of inpatient FAST +ve pathway improved timely recognition of stroke and facilitated thrombolysis in suitable patients.

AS25-021

SERVICE ORGANISATION

CHANGES IN HOSPITAL USAGE IN THE FIRST YEAR FOLLOWING ACUTE STROKE

N.E. Andrew[1], M.F. Kilkenny[1,2], V. Sundararajan[3], J. Kim[1,2], A.G. Thrift[1], T. Johnston[4], R. Grimley[5] and D.A. Cadilhac[1,2]
[1]Monash University, School of Clinical Sciences at Monash Health, Clayton, Australia
[2]Florey Institute of Neuroscience and Mental Health, Stroke Division, Heidelberg, Australia
[3]Melbourne University, Department of Medicine, Melbourne, Australia
[4]Queensland Department of Health, Health Statistics Branch, Brisbane, Australia
[5]University of Queensland, School of Medicine, Brisbane, Australia

Background and Aims: Stroke is a complex disorder and can result in a substantial burden on healthcare systems. We examined the change in number of hospital contacts before and after stroke and identified factors associated with increased hospital utilisation.
Method: The index stroke event was obtained from the Australian Stroke Clinical Registry. Patient-level data were linked with Queensland emergency department and hospital admission and Australian death registration data. For those surviving to 30 days, discreet hospital contacts (admissions plus non-admitted emergency department contacts) were compared between pre- and post-stroke, to determine changes in use of hospital services. Disability at 3 months was determined using an algorithm based on responses to the EQ-5D. Negative binomial regression, adjusted for patient clustering by hospital and pre-stroke contacts, was used to determine the contribution of demographic, comorbidity, and clinical covariates to increases in hospital utilisation.
Results: N = 3,667 adults from 23 hospitals (54% male, median age 74 years, 81% ischaemic stroke) were included. Hospital contacts increased from 764/month in the 30–365 days before stroke to 1187/month in the 30–365 days following stroke. Usage in patients aged < 65 years increased by 80% compared to those aged >84 (IRR: 1.81, 95%CI: 1.15, 2.84) and increased with low social advantage (IRR: 1.39, 95%CI: 1.1, 1.8). Among participants followed up at 3 months (n = 2,012) those with disability experienced a 75% greater increase in contacts than those without (IRR: 1.75, 95%CI: 1.43, 2.13).
Conclusion: Stroke substantially increases the burden on healthcare systems particularly among younger patients, and those who are socially disadvantaged or have chronic disability.

AS25-022

SERVICE ORGANISATION

STRATEGIES TO IMPROVE VACCINATION UPTAKE RATES: A CASE STUDY FROM NEUROLOGY CENTER

N. Jungtragool[1], P. Tangchitthavorngul[2], N. Sornsriwichai[2] and P. Thepphawan[3]
[1]Bumrungrad International Hospital, Neurology Center, Bangkok, Thailand
[2]Bumrungrad International Hospital, Neurology Services, Bangkok, Thailand
[3]Bumrungrad International Hospital, Nursing Reseach, Bangkok, Thailand

Background and Aims: Joint Commission International (JCI) and the Centers for Disease Control and Prevention (CDC) recommend influenza and pneumococcal vaccinations as the most important step in protecting against risk of serious complications focused on people 65 years or older, especially people have had a stroke may developing serious influenza-related complications which may cause long-term health problems worse. Despite these recommendations, the Neurology Center vaccination rates remain low. This study was conducted strategies to improve influenza and pneumococcal vaccine uptake rates among people aged 65 years or older, and who have had strokes.
Method: Multi-component strategies was led by the registered nurses and other healthcare professionals at Neurology Center, Bumrungrad International Hospital in the second quarter of 2016, including: (1) marketing campaign targeting patients; (2) vaccination reminder service for patients; (3) automated catch-up vaccination schedule calculator; (4) promoting immunization training for all health professionals who are responsible for administering the vaccines and source of information for patients, and (5) electronic medical record to generate performance feedback reports with their rates of captured the immunization opportunities.
Results: One hundred patients were recruited during the intervention. Over a 3-month period, Influenza and pneumococcal vaccination uptake rates increased to 59%, and revenue increased 18.5% from previous quarter of 2016.
Conclusion: The strategies identified here could help health care providers to substantially increase their vaccination rates towards targets.

AS25-023

SERVICE ORGANISATION

THE DEPLOYMENT OF TELESTROKE IN FRANCE IN 2016: STUDY PROTOCOL

R. Ohannessian[1], T. Moulin[2], F. Chauvin[3], C. Colin[4] and A.M. Schott[1]
[1]Lyon University, HESPER EA 7425, LYON, France
[2]University Hospital of Besançon, Department of Neurology, Besançon, France
[3]Lyon University, HYGEE-ICLN EA HESPER 7425, Lyon, France
[4]Hospices Civils de Lyon, Pôle IMER, Lyon, France

Background and Aims: Telestroke is the use of telemedicine for stroke care. The first telestroke project in France began in 2001 in Franche-Comté region. Telestroke was integrated in 2009 in clinical guidelines for acute stroke care. The national deployment of telestroke was supported by the Ministry of Health since 2010 within the national stroke plan 2010 – 2014 and the national telemedicine deployment strategy with dedicated public funding.
To date, no national description of telestroke deployment has been conducted. The only available information was from a national survey conducted in 2012 that identified 30 telestroke projects. The objective of the study was to describe all telestroke projects planned or implemented in France in 2016. The secondary objective was to identify success factors or barriers for telestroke implementation in France.
Method: A review based on published literature, and broad Internet search was conducted to describe telestroke projects. All regional health agencies were contacted to gather data on the projects design and implementation. Collected data included the year of project initiation and date of first patient, the number and characteristics of hospitals involved, the medical and organizational model, the presence of an evaluation protocol, and the number of patients and thrombolysis realized with telemedicine.
Results: The study is ongoing and final results will be available by May 2017.
Conclusion: This is the first study to describe the national deployment of telestroke in France. The results will provide useful information to decision makers at regional and national level to improve telestroke implementation.

AS25-024

SERVICE ORGANISATION

FUTURE DELIVERY OF THROMBECTOMY SERVICES IN ENGLAND: A DELPHI STUDY AND RANKING EXERCISE

K. Halvorsrud[1], D. Flynn[1], G.A. Ford[2,3], P. McMeekin[4], A. Bhalla[5], J. Balami[6,7] and P. White[8]
[1]Institute of Health and Society, Newcastle University, Newcastle upon Tyne, United Kingdom
[2]Oxford University Hospitals, NHS Foundation Trust, Oxford, United Kingdom
[3]Radcliffe Department of Medicine, Oxford University, Oxford, United Kingdom
[4]School of Health- Community and Education Studies, Northumbria University, Newcastle upon Tyne, United Kingdom
[5]Guy's and St Thomas', NHS Foundation Trust, London, United Kingdom
[6]Centre for Evidence-Based Medicine, Oxford University, Oxford, United Kingdom
[7]Norfolk & Norwich University Hospitals, NHS Foundation Trust, Norwich, United Kingdom
[8]Stroke Research Group- Institute of Neuroscience, Newcastle University, Newcastle upon Tyne, United Kingdom

Background and Aims: Intra-arterial thrombectomy (IAT) is the standard treatment for large artery occlusive (LAO) stroke; however optimal models for implementation of IAT are unclear. We aimed to establish consensus on future organisation of thrombectomy services among physicians with clinical experience in the treatment of stroke.
Method: A survey was developed with 12 options. A nomination process facilitated representative recruitment of stroke physicians from the British Association of Stroke Physicians (BASP) that deliver 24/7 IV thrombolysis. Propositions that reached consensus for approval after two Delphi rounds (≥75% approve, quite or very strongly approve on a 7-point Likert scale) informed a subsequent ranking exercise with full members of the British Society of Neuroradiologists (BSNR) and wider BASP membership.
Results: Eleven panellists completed two Delphi rounds. Three options achieved consensus: selective transfer to nearest neuroscience centre (NNC) for Interventional Neuroradiologist (INR)-delivered thrombectomy (100% approval); local CT/CTA then transfer to NNC for INR-delivered thrombectomy (91% approval); and local CT/CTA then transfer to NNC for advanced imaging and INR-delivered thrombectomy (82% approval). In the subsequent ranking exercise, the majority of BSNR (n = 21, 86%) and wider BASP members (n = 43, 97%) approved the following option: patients with LAO stroke are transferred for thrombectomy (i.e. to nearest NNC) based on local CT/CTA alone.
Conclusion: The current preferred option of UK stroke physicians and INRs for organisation of IAT services is a 'drip and ship' model with suspected stroke patients taken to the nearest hospital able to undertake CT/CTA with review by [neuro]radiology and secondary transfer of patients with LAO to a Neuroscience Centre.

AS25-026

SERVICE ORGANISATION

REGISTRY FOR STROKE CARE QUALITY (RES-Q) – A REGISTRY TOOL FOR EVALUATING STROKE CARE QUALITY INDICES

A. Grecu[1], S. Simsic[1] and R. Mikulik[1]
[1]St. Anne's University Hospital Brno, Neurology - Stroke, Brno, Czech Republic

Background and Aims: To improve stroke care, we must first have a significant baseline measurement. Evaluation of stroke care quality in the Eastern European is currently challenging due to factors including low resource availability, lack of a centralized collection system, and overarching healthcare policies which prevent the establishment of a reliable performance baseline. To address this gap, we have developed a tool for: 1) monitoring the quality of the healthcare system, 2) recognizing crucial challenges, 3) developing region specific plans for improving stroke care, and 4) monitoring the improvement.
Method: We are utilizing multiple open-source platforms, coupled and customized to our needs, primarily built around the open-sourced OpenClinica. We targeted countries in Eastern Europe and Western Asia. We collect a minimum of 26 well recognized variables, tailoring our electronic case report form (eCRF) to country specific needs.
Results: Deployment of the registry has begun and we have successfully concluded the first round of center recruitments, totaling 148 centres in 23 countries (January 2017), as well as the first month of data collection with part of our registered sites. We have collected data for 1520 patients in this month and are expecting the next round of data collection, with higher participation from centers, in the months of March-April 2017.
Conclusion: We have successfully constructed a scalable, inexpensive and modular application for collecting stroke care quality indices in a pan-European setting, allowing for decreasing disparity in stroke care between different countries.

AS25-028

SERVICE ORGANISATION

SMART EMERGENCY MEDICAL SYSTEMS FOR FAST ACTIVATION OF TRIAGE PROCEDURE FOR STROKE PATIENTS

E. Park[1], H.S. Nam[2], G. Nam[3], Y. Shin[3], T. Han[3] and H.J. Chang[4]
[1]Yonsei University College of Medicine, Cardiovascular Research Institute, Seoul, Republic of Korea
[2]Yonsei University College of Medicine, Department of Neurology, Seoul, Republic of Korea
[3]Yonsei University College of Medicine, Health-IT Acceleration Center, Seoul, Republic of Korea
[4]Yonsei University College of Medicine, Department of Cardiology, Seoul, Republic of Korea

Background and Aims: Fast and proper activation of triage specialized for stroke patients is critical to reduce the onset to treatment time. The provision of up-to-date health status of patients facilitates the decision and procedure of pre-hospital care systems.
Method: We developed a prototype system meeting the imperative needs for the interoperated IoT healthcare platform of emergency medical services for stroke patients. Wearable devices with Near Field Communication (NFC) chips were distributed as a tool for the emergency medical identification of patients and NFC tagging between a paramedic's smartphone and a wearable devices provides recent health status of the device owner.
Results: We have developed smart emergency medical system (SEMS) provides extracted information from electronic medical records (EMR) from hospital information systems (HIS). The EMR agent server extracts current health information from EMR to SEMS database which is updated daily for the purpose of providing the up-to-date health information including allergy, blood type, diagnosis, doctor operation, dialysis, medication, and lab result. We measured the accuracy of self-reported diagnosis of 3100 patients over the diagnosis in SEMS database. The accuracy of self-reported diagnosis was 48.5% and 5% patients reported incorrect blood types.
Conclusion: The accurate emergency medical identification by referring the current medical status from EMR facilitates paramedics' proper and fast activation of triage for stroke patients.

AS25-029

SERVICE ORGANISATION

A STROKE NETWORK IN INTERNAL AREAS OF CENTRAL ITALY

F. Corea[1], A. Gamboni[2], P. Brustenghi[3], M. Bracaccia[4], P. Manzi[5] and M. Zampolini[6]
[1]Neurology and Rehabilitation, Foligno, Italy
[2]Ospedale di Orvieto, Pronto Soccorso, Orvieto, Italy
[3]Rehabilitation, Foligno, Italy
[4]Ospedale di Orvieto, Medicina, Orvieto, Italy
[5]Usl Umbia 2, Direzione Sanitaria, Terni, Italy
[6]Ospedale San Giovanni Battista, Rehabilitation, Foligno, Italy

Background and Aims: In Umbria a third of the population is living in internal areas with high access times to health services. In the catchment area of the USL2-Umbria, 5 hospitals are running with coverage of 400k inhabitants (>250k km2) . Only 1 hospital has a stroke centre with thrombolysis protocol. Therefore, attempts are being made to establish a coverage of the necessary specific competence and infrastructural requirements. The largest hospital without access to stroke services is Orvieto Hospital (30k inhabitants and above 120 strokes/year).
Method: From 2014 Stroke was prioritized as medical emergency and started a reorganization of services. Intensive CME training in all hospitals (>3 hrs monthly) and an optimization of the dispatchment from satellite hospitals was chosen with policy of "always available" stroke beds. This was matched with a Teleconsult connection established using a videoconference system (Meytec TM, Werneuchen; Germany) for real-time evaluation of patients in Orvieto emergency room to Neurology of Foligno.
Results: From May to December 1–2 cases per week were screened for stroke code in teleconsult. The centralization of lysis-eligible patients raised of a 30% from the previous year (134 to 179) and another 9% in 2015 (187) while the rate of lysis on ischemic stroke raised to 10% in 2015–2016 from 5–6% ($p > 0.05$ 95%) in 2013–2014. No mortality rate increase was found.
Conclusion: An optimization of stroke care is feasible in isolated internal areas even in low resources availability. To maintain and improve the service performance will be the challenge for the next three years.

AS25-030

SERVICE ORGANISATION

TEMPORAL VARTIATION AFFECT STROKE UNIT ADMISSION RATES, OBSERVATIONS FROM THE NATIONAL SWEDISH STROKE REGISTER

D. Darehed[1], M. Blom[2], E.L. Glader[3], J. Niklasson[4], B. Norrving[5] and M. Eriksson[6]
[1]Gällivare Hospital, Department of Medicine, Gällivare, Sweden
[2]IKVL, Department of Medicine- Lund University, Lund, Sweden
[3]Umeå University, Department of Medicine, Umeå, Sweden
[4]Sunderby Sjukhus, Sunderby Sjukhus, Luleå, Sweden
[5]Neurology Lund, Deprtment of Clinical Sciences- Lund University, Lund, Sweden
[6]Umeå University, Department of Public Health and Clinical Medicine, Umeå, Sweden

Background and Aims: It is firmly established that management of acute stroke patients at dedicated stroke units (SU) improves functioning and survival. Previous studies have also shown that temporal variations affect stroke care. The primary objective of this study was to investigate if there were any temporal variation on direct SU admissions as 1st destination from the emergency department (ED).
Method: This register study comprised data on 111 523 patients with acute stroke in Sweden from January 1, 2011 to December 31, 2015. Unadjusted analyses as well as logistic regression analyses were conducted.
Results: In total, 78.0% of the patients were directly admitted to a SU from the ED. Unadjusted analyses revealed differences in direct SU admission as a function of time of week; while 84.6% of the patients admitted on Friday mornings were directly admitted to a SU, only 68.9% of patients admitted Sunday night were directly admitted to a SU. During office hours, the rate was 81.0%, compared to 75.9% during off-hours. Monthly variation ranged from 76.6% in January to 79.1% in June. The adjusted analyses revealed an OR of 2.706 (95% CI 2.367–3.094) for direct admission on Friday morning versus Monday night. Off-hours exhibited an OR of 0.727 (95% CI 0.705–0.750) versus office-hours. June exhibited an OR for direct admission of 1.206 (95% CI 1.119–1.300) compared to January.
Conclusion: There are several patterns of time affecting admission rates to a SU as 1st destination from the ED. We believe quality improvement efforts should focus on reducing temporal variations.

AS25-031

SERVICE ORGANISATION

MULTICENTER STUDY OF A PERSONALIZED, DIGITAL COACHING PROGRAM AFTER STROKE: DESIGN AND RATIONALE

P. Vanacker[1], D. Standaert[2], S. Vos[2], D. Mahieu[1], N. Libbrecht[2], V. Maqueda[2], I. Vansteenkiste[2], P. Maere[2], S. De Blauwe[3], R. Brouns[4], H. Fernandez[4], A. Convents[4], A. Valenzuela[5], L. Yperzeele[1] and G. Vanhooren[3]
[1]Antwerp University Hospital, Neurology, Antwerp, Belgium
[2]Sint-Lucashospital, Neurology, Bruges, Belgium
[3]Sint-Janhospital, Neurology, Bruges-Ostend, Belgium
[4]Vrije Universiteit Brussel VUB and Universitair Ziekenhuis Brussel, Center for Neurosciences C4N, Brussels, Belgium
[5]Vrije Universiteit Brussel VUB, Interuniversitary Center for Health Economic Research, Brussels, Belgium

Background and Aims: Increasing number of patients, caregivers and medical professionals are using online applications or web-based portals to optimize the post-stroke care. Focus on better supported discharge, regular patient coaching by telemedicine and mobile health solutions show promise to augment therapeutic adherence, reduce length of stay and readmissions. We aimed to assess feasibility of in-hospital initiated and post-discharge, personalized coaching program and its impact on self-reported adherence to risk factor management.
Method: This prospective, multicenter cohort study is being conducted in four Belgian stroke centers. Recruitment of eligible inpatients (175) will be allowed between February-August 2017 and patients will be coached during 6 months' post-discharge. Baseline, risk factors follow-up, and video consultancy (at 0,5-1-3-6 months) are guided by the mobile health application specifically designed.
Results: The primary study outcome is risk factor control. A summary score of four objective measures of risk factor control (systolic blood-pressure, LDL cholesterol, fasted glucose level and antiplatelet adherence selfreport) will be used. Goals for the different risk factors were described in detail. In addition, secondary endpoints are (a) quality-of-life (EQ-5D); (b) impact on long term clinical outcome (mRS) and (c) stroke recurrence rate at six months. A detailed health-economic evaluation will also be conducted.
Conclusion: If proven effective and feasible, implementation of this innovative model executed by a personal stroke coach, initiated during hospitalization and using a web-based intervention program, can easily be

unrolled in other stroke units. The program can be cost-effective in case of improved recurrence rates, self-care and adherence.

AS25-033

SERVICE ORGANISATION

THE BURDEN OF STROKE MIMICS - THE PRESENT AND FUTURE PROJECTIONS

K.W. Faiz[1], A.S. Labberton[2] and M. Barra[3]
[1]Akershus University Hospital, The Health Services Research Unit - HØKH & Department of Neurology, Lørenskog, Norway
[2]Akershus University Hospital & University of Oslo, The Health Services Research Unit - HØKH & Institute of Clinical Medicine- Faculty of Medicine, Lørenskog, Norway
[3]Akershus University Hospital, The Health Services Research Unit - HØKH, Lørenskog, Norway

Background and Aims: Stroke treatment has transformed from a life-supporting endeavor into an emergency pathway, emphasizing timely diagnosing and dedicated stroke units (SU). As the health system's sensitivity for stroke-cases is nearing 100%, inevitably, so-called *stroke mimics* are increasingly entering the case-mix. To meet future demands on the stroke pathway both stroke incidence rates (IR) *and* mimic IRs must be studied.
This study focuses on the mimics in an unselected cohort of admissions to the SU of Akershus University Hospital, with the aim of estimating age/sex-adjusted SU-admission specificity, heterogeneities in resource consumption, and to provide forecasts for the mimic IRs in Norway towards 2050.
Method: Data consists of all 1883 admissions to the SU between 01.03.2012—28.02.2013. The estimated age- and sex-specific absolute IRs were paired with Statistics Norway's projected future demographics, we calculated the expected numbers of strokes, TIAs and mimics towards 2050 (5 year intervals) for three scenarios: 1. unchanged IR; 2. (3.) annual 1% decrease (increase) in IR. We also analyzed mimics' consumption of resources (LOS, MRI-scans, EKGs etc.)
Results: Mimics account for >1/3 of the admissions, consume less than stroke cases– the exception is MRI-scans – but the burden of mimics will continue to be substantial under all scenarios.
Conclusion: Even if stroke IRs fall, population aging paired with the observed mimic IRs will strain available resources unless provisions are made. Alternatively, to counterbalance the increased volume, the admission strategies must be reevaluated. We briefly discuss increased use of MRI to detect stroke mimics before admission to the SU as a possibility.

AS25-035

SERVICE ORGANISATION

WHY TO APPLY FOR ESO STROKE UNIT AND ESO STROKE CENTRE CERTIFICATION?

A. Zini[1], D. Dippel[2], I. Staikov[3], F.D. Orken[4], S. Engelter[5], D. Jenkinson[6], D. Nabavi[7], O. Skoda[8], P. Lyrer[5], J. Arenillas[9] and U. Waje-Andreassen[10]
[1]Nuovo Ospedale Civile Sant'Agostino Estense, Dept. of Neuroscience-University Hospital of Modena, Modena, Italy
[2]Erasmus University Medical Center, Neurology, Rotterdam, The Netherlands
[3]Tokuda Hospital Sofia, Neurology, Sofia, Bulgaria
[4]Sisli Etfal Education and Research Hospital, Neurology, Istanbul, Turkey
[5]University Hospital of Basel, Department of Neurology and Stroke Center, Basel, Switzerland
[6]Dorset County Hospital NHS Foundation Trust, NHS Foundation Trust, Bournemouth Dorset, United Kingdom
[7]Vivantes Klinikum Neukölln, Neurology and Stroke Unit, Berlin, Germany
[8]Charles University, Dept of Neurology, Prague, Czech Republic
[9]Hospital Clínico Universitario Valladolid, Dept. of Neurology, Valladolid, Spain
[10]Haukeland University Hospital, Dept. of Neurology, Bergen, Norway

Background and Aims: Stroke unit care improves patient outcome, reducing the likelihood of death and disability, independently of sex, age or stroke severity.
The ESO Stroke Unit Committee (SUC) presented, during the last ESOC in Barcelona, the creation of the ESO Stroke Unit and Stroke Centre Certification Process, according to the ESO recommendations[1]. The aim is to offer to ESO members and European National Stroke Organisations (Figure 1) the possibility to improve quality in stroke care by certification process for their Stroke Units/Centres.
Method: The certification process is based on an online platform with two certification levels: "Stroke Unit" or "Stroke Centre". Applicants have to submit all required information (competence of the personnel, general infrastructure of the institution, Standard Operating Procedures about investigations and interventions, research activities, quality indicators, number of thrombolysis and number of intervention). Applications are evaluated by an Audit Team that consists of a national auditor and members of the ESO SUC. If certification is successful, the ESO SUC provides the label of "ESO certified" Stroke Unit or Stroke Centre.
Results: Already 9 applications have been submitted from 8 different European countries.
Why to apply? Because application for ESO Certification will focus on own knowledge, skills, and quality to improve stroke patient care. The ESO wants to provide a benchmark for quality of stroke management, to equalise stroke care in Europe and to build a network of ESO Stroke units and centres with approved clinical excellence.
Conclusion: Please look for more information and how to apply at www.eso-certification.org.

References:
1. Ringelstein et al. *Stroke* 2013;44(3):828–40.

AS25-036

SERVICE ORGANISATION

"FALLING INTO A BLACK HOLE" – THE NEED FOR IMPROVEMENT IN DISCHARGE CARE PLANNING FOR STROKE SURVIVORS

S. Mcgowan[1], K. Hill[1], P. Young[1], D. Cadilhac[2], M. Kilkenny[2] and T. Purvis[2]
[1]National Stroke Foundation, National Stroke Foundaiton, melbourne, Australia
[2]Monash University, Translational Public Health Unit- Stroke & Ageing Research Centre- Southern Clinical School, Melbourne, Australia

Background and Aims: *"Falling into a black hole"* is how many stroke survivors describe the experience of going home post stroke. Patients with discharge care plans are more likely to have higher Quality of Life at 3–6months (Andrews et al, 2014). A Care Plan should include:
- Monitoring and managing symptoms and signs of illness
- Adherence to treatment regimes
- Managing impacts on lifestyle, emotions and interpersonal relationships

This presentation aims to describe discharge planning process for stroke survivors in Australian rehabilitation hospitals in 2016 and note changes over time.
Method: A clinician at each participating hospital completed a self-reported survey regarding organisational aspects of stroke service. Most sites retrospectively audited up to 40 consecutive stroke admissions from the previous calendar year. Standardised training, a data dictionary and support in data collection were provided by National Stroke Foundation staff. Descriptive univariate statistics are presented.

Results: In the 2016 national audit 3514 patients were audited from 103 hospitals. Mean age 76 years, 56% males, 79% ischaemic stroke. Adherence to discharge planning declined (2016 versus 2014): evidence that a care plan outlining post-discharge care was developed with the stroke survivor (78% versus 84%); providing information covering stroke, hospital management and secondary prevention (50% versus 72%). Education about lifestyle behaviour change for modifiable risk factors improved (42% versus 51%) but is still poor.
Conclusion: These data support the need to improve discharge planning processes nationally and continue to audit the process.

AS25-039

SERVICE ORGANISATION

DIFFERENCES IN PRE-HOSPITAL DELAY TIMES IN GREATER OSLO AND AKERSHUS COUNTY, NORWAY IN 1994 VERSUS 2012

A.S. Labberton[1,2], K.W. Faiz[1,3], B. Thommessen[3], O.M. Rønning[2,3] and M. Barra[1]
[1]Akershus University Hospital, Health Services Research Unit, Lørenskog, Norway
[2]University of Oslo, Department of Medicine, Oslo, Norway
[3]Akershus University Hospital, Department of Neurology, Lørenskog, Norway

Background & aims: Pre-hospital delay is a challenge to the stroke treatment pathway given the availability of time-critical treatments for ischemic stroke patients. Previous studies indicate that median pre-hospital delay has decreased by 6% per annum since the first study published in 1981, however a large proportion of patients still arrive to hospital later than 3–3.5 hours.
This study investigates how pre-hospital delay has changed in Greater Oslo and Akershus County, Norway over the last two decades.
Method: We have compared ictus-to-admission times in two cohorts of stroke patients admitted to Akershus University Hospital in 1994–95 ($n = 550$) and 2012–13 ($n = 522$).
Results: Patients in 2012 were more likely to arrive to the emergency department or treating unit within 3 hours of symptom onset compared to in 1994 (proportion 47.1% vs 19.3%, $p < 0.001$). After adjusting for age, sex and stroke severity, the between cohort difference remained; patients in 2012 were more likely to arrive early, compared to those in 1994 (odds ratio (OR): 5.14, 95% CI: 3.69 – 7.15). As in previous studies, we found that stroke severity was independently associated with early arrival. For patients with moderate strokes OR was 2.06 (95% CI: 1.41 – 3.00) and for severe strokes 4.52 (95% CI: 2.97 – 6.87), compared to those with mild strokes.
Conclusion: Pre-hospital delay in Norway has considerably improved over the last two decades, and since the introduction of time-critical treatments, however a large proportion of patients still arrive late to hospital. There is an urgent need to reduce the number of delayed admissions.

AS25-040

SERVICE ORGANISATION

ADAPTATION OF THE MONASH TIA PATHWAY FOR MANAGEMENT OF AMAUROSIS FUGAX AND CENTRAL RETINAL ARTERY OCCLUSION IN A SPECIALTY EYE HOSPITAL

L. Sanders[1,2,3], N. Shuey[1,4] and C. Crock[5]
[1]St Vincent's Hospital, Neurosciences, Fitzroy, Australia
[2]University of Melbourne, Medicine, Melbourne, Australia
[3]Royal Victorian Eye and Ear Hospital, Neuro-otology, East Melbourne, Australia
[4]Royal Victorian Eye and Ear Hospital, Neuro-ophthalmology, East Melbourne, Australia
[5]Royal Victorian Eye and Ear Hospital, Emergency Medicine, East Melbourne, Australia

Background and Aims: Central Retinal Artery Occlusion (CRAO) is an ophthalmologic emergency with high 30-day vascular risk (~14%). No pathway specific to secondary prevention post-CRAO has been evaluated. We adapted the Monash TIA pathway (M3T) to accommodate patients with CRAO, Branch RAO and Amaurosis Fugax.
Method: Our specialty eye and ear hospital, sees ~40,000 Emergency Department (ED) attendances yearly. In 2015, the existing CRAO pathway was revised, based on M3T, which guides urgent ED management with outpatient review triaged according to underling mechanism. Our adaptation considered local staff expertise and available resources.
Results: We developed a checklist flow-chart to guide ED doctors through appropriate emergency ocular intervention and secondary prevention workup, including neck vessel and brain imaging. Patients are discussed with our affiliated hospital's stroke registrar and patient-specific advice provided regarding pathway recommended treatment. Antithrombotic and statin therapy are commenced/adjusted, prior to ED discharge. A dedicated referral form, identifying mechanism, is faxed to the new ad hoc Rapid Assessment TIA clinic (available daily) and triaged by a neurologist. Appointment targets are: 2 days (Carotid Stenosis >70%), 1 week (atrial fibrillation), 2 weeks (others). Patients with uncertain diagnoses or possible giant cell arteritis attend Neuro-ophthalmology Clinic. From December 2015 to December 2016, 81 patients were referred (CRAO:32, BRAO:20, Amaurosis: 20, Other:13). Seven were admitted and 18 declined/didn't attend review. Median time to clinic was 9 days (IQR:4–13), carotid stenosis 2 days (IQR:1.5–5), atrial fibrillation 4.5 days (IQR:2–10).
Conclusion: The M3T pathway can be successfully adapted, within local resources, to guide management of patients with CRAO and Amaurosis Fugax.

AS25-041

SERVICE ORGANISATION

NATIONAL GUIDELINE FOR SWALLOW SCREENING IN STROKE IN IRELAND

E. Mc Guinness[1], J. Boyle[2], H. Coetzee[3], N. Cunningham[4], K. Fitzgerald[5], M. Flanagan[6], S. Gallagher[7], E. Gibney[8], J. Keane[9], O. Mahon[10], J. Mc Cormack[11], M.K. Meagher[12], J. Moloney[13] and F. Shinkins[14]
[1]Our Lady Of Lourdes Hosptial Drogheda Co. Louth, Speech and Language Therapy, Drogheda, Ireland
[2]St Mary- Phoenix Park, Dietetics, Dublin, Ireland
[3]Mater Misericordiae University Hospital, Speech and Language Therapy, Dublin, Ireland
[4]University Hospital Limerick, Nursing, Limerick, Ireland
[5]Mercy University Hosptial, Nursing, Cork, Ireland
[6]Our Lady's Hospital Navan, Nursing, Navan, Ireland
[7]Midland Regional Hospital- Tullamore, Nursing, Tullamore, Ireland
[8]St James Hospital-, Speech and Language Therapy, Dublin, Ireland
[9]Tallaght Hospital, Speech and Language Therapy, Dublin, Ireland
[10]St. James's Hospital- Dublin, Nursing, Dublin, Ireland
[11]Royle College of Physicians Ireland, National Stroke Project, Dublin, Ireland
[12]St. Vincent's University Hospital, Nursing, Dublin, Ireland
[13]Beaumont Hospital, Speech and Language Therapy, Dublin, Ireland

[14]University Hospital Limerick, Speech and Language Therapy, Limerick, Ireland

Background and Aims: The provision of early swallow screening by trained personnel has been identified as integral to the acute care for all stroke patients[1]. In 2015 the National Stroke Audit showed a lack of access to formal swallow screening for stroke patients in hospitals, citing a 6% screening rate[2]. In 2016, The National Clinical Programme for Stroke (NCP-S) decided to develop a swallow screening guideline. A multidisciplinary sub-group was established to develop a National Guideline for Swallow Screening in Stroke for Ireland.
Method: A MDT group was formed with NCP-S(1), Speech and Language Therapy (6), Nursing (6) and Dietetics (1). The sub-group carried out a review of literature and other available guidelines, to determine the current best available evidence for swallow screening in stroke with particular focus on the following parameters; background to swallow screening, core components for swallow screening and swallow screening training. Based on evidence obtained, draft National Guidelines for Swallow Screening in Stroke were developed and distributed for external consultation to relevant professional bodies.
Results: The external consultation period closes in mid-December 2016. Following any recommended revisions, National Guidelines for Swallow Screening in Stroke will be published in early 2017. Swallow screening for patients admitted with acute stroke will be monitored and reported out nationally through the National Stroke Register.
Conclusion: The National Guidelines for Swallow Screening in Stroke will support Irish acute stroke services in the development of swallow screening programmes. These guidelines are a key development in acute stroke care and contribute to promotion of best practice, person-centered care for people post stroke.

AS25-049

SERVICE ORGANISATION

DIAGNOSTIC UTILITY OF ROUTINE MRI IN A HYPER-ACUTE STROKE UNIT

D. Austin[1], J. Eng[2] and R. Simister[2]
[1]UCL Institute of Neurology, Sobell Department of Motor Neuroscience, London, United Kingdom
[2]UCL Hospitals NHS Foundation Trust, Stroke Services, London, United Kingdom

Background and Aims: Hyper-acute treatment of ischaemic stroke involves an inevitable trade-off between time and diagnostic certainty, with imaging able to guide clinicians only so far as it is deliverable within a specific time frame. Routine MRI for all suspected stroke admissions allows post-hoc review of working diagnoses with improved identification of stroke mimics. We set out to assess the utility of an "MRI for all" service which has been running at our hospital since January 2016.
Method: Data were collected from the UK Sentinel Stroke National Audit Program (SSNAP) and from internal UCLH audit.
There were 2398 admissions to the Stroke Service at UCLH from January to December 2014. Data for January to December 2016 (following introduction of routine MRI) are currently being collected.
Results: From admissions in 2014, there were 1193 cases of confirmed stroke and 431 diagnoses of TIA. 774 patients had a non-stroke diagnosis, constituting 32.3% of admissions. Patients with a non-stroke diagnosis had an average length of stay of 30 hours 32 minutes.
In 2016, following introduction of routine MRI, there were 1208 cases of confirmed stroke and 790 of TIA. Data for non-stroke admissions are currently being collected, but of 333 cases so far identified average length of stay had fallen to 26 hours 25 minutes.
Conclusion: Routine MRI should result in increased pick-up and faster discharge for patients with a non-stroke diagnosis. We are now performing sub-group analyses to identify which diagnoses were changed as a result of MRI and which patients saw the biggest reduction in length of stay.

AS25-050

SERVICE ORGANISATION

IMPLEMENTATION OF BETTER ORGANIZATIONAL STRATEGY IN ACUTE STROKE MANAGEMENT: 7-YEARS SINGLE CENTER EXPERIENCE

P. Vasko[1], T. Peisker[1], I. Stetkarova[1], B. Koznar[2], F. Rohac[2], P. Widimsky[2], J. Kroupa[2] and J. Vavrova[2]
[1]Teaching Hospital Royal Vineyard, Neurology, Prague, Czech Republic
[2]Teaching Hospital Royal Vineyard, Kardiology, Prague, Czech Republic

Background and Aims: Stroke is one of the leading causes of mortality and morbidity. Brain tissue is one of the most vulnerable, especially to ischemia. Several trials as well as daily practice shows shortening time "onset to treatment" in stroke patients leads to better results. Therefore door-to-needle time (DNT) reduction worldwide recommended by stroke organizations. Prospective single centre study focused on comparing time period before/after organization changes in stroke patient treatment pathway.
Method: During 2010 – 2016 years we did implement several changes in stroke management in our pavilion type hospital – prehospital (communication with ambulance) and in-hospital ones. A total of 129 CBT + 338 IVT (CBT - catheter based thrombectomy; IVT - intra venous thrombolysis) patients (54% males, mean age 69 years) have been enrolled during this period of time.
Results: More organizational changes appear as we started with mechanical recanalization, with great afford to shorten door-to-groin puncture time. Statistical significant shortening of average DNT from 80 minutes in 2010,, to 40 minutes in 2013 to 27 minutes in last six month in 2016. Moreover, statistically significant increase in amount of annually treated patients was also observed in last two years.
Conclusion: DNT multidisciplinary approach is essential. Neurologist is the main team leader and collaborator in acute stroke management. In our center, organizational changes and better collaboration among neurologist, radiologist, interventionist and cardiologist led to significant shortening of DNT and increase of treated patients. This is crucial and essential to reach better results in stroke care.
Supported by the Charles University Research Project Progress Q35

AS25-051

SERVICE ORGANISATION

OBSTACLES FOR ACCOMPLISHMENT OF SYSTEMIC THROMBOLYSIS IN STROKE CARE IN UKRAINE

D. Gulyayev[1], M. Guliaieva[2], S. Ivchuk[3] and S. Kirilov[3]
[1]Ukrainian Anti-Stroke Association, Education- research and publishing projects, Kyiv, Ukraine
[2]Universal Private Clinic "Oberig", Stroke Centre, Kyiv, Ukraine
[3]National University of "Kyiv-Mohyla Academy", School of Public Health, Kyiv, Ukraine

Background and Aims: Although Ukraine is one of the world "leaders" in stroke morbidity and stroke-related mortality and disability, the rate of use of thrombolysis in Ukraine is extremely low. We intended to find the reasons for this underuse.
Method: 456 specialists involved into stroke care were invited to take part in online survey. The survey included questions regarding current practice of systemic thrombolysis in Ukraine and obstacles for its wider

implementation, and was based on Google Forms. 76 specialists participated in survey. The descriptive statistics of answers was analyzed using Microsoft Excel.
Results: The main obstacles for accomplishment of systemic thrombolysis to stroke patients in Ukraine significantly differed among respondents from hospitals which did not (group A) or did (group B) perform thrombolysis. In group A main mentioned obstacles were alteplase unavailability (52%), lack of education and training (58%). In group B main obstacles were late arrival of patients to hospital (84%), lack of knowledge of population on stroke signs and treatment (72%). Less important reasons mentioned in both groups were lack of cooperation among institutions, fear of risks, uninterestedness of physicians, lack of support from leaders and management, unwillingness to share experience and resources.
Conclusion: Accomplishment of systemic thrombolysis very much depends on attitude and experience of healthcare providers. The lack of financing and unavailability of resources are important, but not leading obstacles for wider use of systemic thrombolysis in routine clinical practice in Ukraine.

AS25-054

SERVICE ORGANISATION

CLINICAL GUIDELINES AND PROTOCOLS FOR STROKE CARE IN UKRAINE: ATTITUDE OF HEALTHCARE PROFESSIONALS AND OBSTACLES FOR APPROPRIATE IMPLEMENTATION

D. Gulyayev[1], M. Guliaieva[2], S. Kirilov[3] and S. Ivchuk[3]
[1]Ukrainian Anti-Stroke Association, Education- research and publishing projects, Kyiv, Ukraine
[2]Universal Private Clinic "Oberig", Stroke Centre, Kyiv, Ukraine
[3]National University of "Kyiv-Mohyla Academy", School of Public Health, Kyiv, Ukraine

Background and Aims: Quality of stroke care in Ukraine remains rather poor, despite presence of national guidelines and protocols on stroke care. We intended to evaluate, if this situation is related to quality of documents or other factors.
Method: 453 specialists involved into stroke care were invited to take part in online survey. The survey included questions regarding quality (credibility and urgency) of stroke care guidelines and protocols, attitude of respondents to their use in everyday practice, and obstacles to appropriate implementation of protocols and guidelines in routine practice, and was based on Google Forms. 84 specialists participated in survey. The descriptive statistics of answers was analyzed using IBM SPSS.
Results: Most of respondents displayed positive appraisal regarding content, currency, credibility, availability, detailing of national guidelines and protocols, and agreed that these documents were elaborated to improve quality of stroke care and are a good instrument to educate the specialists in the area. The highest rate of negative attitude to the protocols of stroke care was revealed among the youngest (<30 years) and least experienced (<5 years) respondents – 27,8% and 31,3% respectively. The factors appraised as main obstacles for appropriate implementation of protocols and guidelines into routine clinical practice were insufficient resource provision (87%), deficiency of qualified staff (69%) and lack of educational support (42%).
Conclusion: Attitude of stroke care providers to unified clinical protocols and guidelines is generally positive. The most important obstacles to follow the protocols and guidelines are related to lack of governmental support.

AS25-055

SERVICE ORGANISATION

STROKE PATHWAYS IN A UK DISTRICT GENERAL HOSPITAL (FROM PRE-HOSPITAL TO REHABILITATION) INCORPORATING INNOVATIVE AWARD-WINNING ELECTRONIC TIA REFERRAL SYSTEM AND BEST PERFORMING VASCULAR SURGERY DEPARTMENT

S. Shah[1], P. Guyler[2], I. Vlahovic[2], I. Grunwald[1], N. Menon[2], K. Ng[2], S. Rashmi[2], R. Nusrat[2], I. Haq[2], S. Kelavkar[2] and D. Ngo[2]
[1]Southend University Hospital NHS Foundation Trust- Anglia Ruskin University, Stroke Medicine, Southend, United Kingdom
[2]Southend University Hospital NHS Foundation Trust, Stroke Medicine, Southend, United Kingdom

Background and Aims: Structured stroke services improve patient outcomes. Every aspect of our pathway was mapped for enhancement to optimise patient care.
Method: Our stroke pathway incorporates pre-hospital alert direct to the stroke team, enabling rapid thrombolysis and thrombectomy. Imaging requests, patient history and contraindications happen pre- and post-patient arrival. 24/7 Stroke consultant 24/7, immediate brain imaging (including CT angiography/perfusion) and an endovascular service are rapidly available.TIA referral via an online form automatically risk stratify patients, ensures immediate treatment and organises one-stop assessment and investigations. Those requiring carotid endarterectomy/stenting have consultant-to-consultant same day planning. Regular multi-disciplinary meetings facilitate early discharge and specialist rehabilitation to match patient needs.
Results: Intensive training developed highly motivated teams of healthcare professionals able to deliver at high speeds. Close working with paramedic and other hospital departments optimized stroke door-to-needle times and thrombectomy decision-to-arterial puncture times.
Conclusion: A combination of good planning, enthusiastic team and robust pathways enables state-of-the-art high quality, specialist stroke care thereby improving outcomes at a district general hospital.

AS25-060

SERVICE ORGANISATION

TIME LOGISTICS AND RESULTS OF ENDOVASCULAR STROKE TREATMENT IN A REGIONAL SPOKE-HUB MODEL

G. Vanhooren[1], S. De Blauwe[1], D. Decoo[2], L. Defreyne[3], Y. Geerts[4], J. Ghekiere[5], J. Kager[5], P. Kirilova[6], J. Maes[7], A. Terwecoren[8], P. Vanacker[9], C. Vandycke[10] and M.D. Verhalle[1]
[1]AZ Sint-Jan Brugge-Oostende AV, Neurology, Brugge, Belgium
[2]AZ Alma, Neurology, Eeklo, Belgium
[3]UZ Gent, Vascular and Interventional Radiology, Gent, Belgium
[4]AZ ZENO, Neurology, Knokke, Belgium
[5]AZ Sint-Jan Brugge-Oostende AV, Radiology, Brugge, Belgium
[6]AZ Sint-Augustinus, Neurology, Veurne, Belgium
[7]AZ Sint-Rembert, Neurology, Torhout, Belgium
[8]AZ Damiaan, Neurology, Oostende, Belgium
[9]AZ Sint-Lucas, Neurology, Brugge, Belgium
[10]AZ Sint-Jan Brugge-Oostende AV, Anesthesiology, Brugge, Belgium

Background and Aims: In Belgium, ambulances must transport patients to the nearest hospital. No reliable pre-hospital scales exist to select patients for endovascular treatment. If eligible, IV tPA is

administered in all hospitals, both spoke and hub. The local neurologist selects patients for endovascular treatment based on CT and CTA, NIHSS, ASPECTS and premorbid mRS.
Method: The Stroke Network Northwest of Flandres comprises 8 hospitals; 1 hub and 7 spoke. It is a local, non-governmental imitative established in 2014 for organizing endovascular treatment of stroke patients in the region. A prospective database with baseline patient characteristics, imaging information, time logistics and outcome for patients treated endovascularly was established.
Results: 170 patients were treated with thrombectomy over 3 years. The median over-all door-to-groin delay for the patients primary presenting at the HUB is 74 minutes. Details for day and night services will be presented in the final poster. The median HUB_door-to-groin delay for patients presenting at the SPOKE centers is only 26 minutes. We present more details on logistics of transferring patients from SPOKE to HUB and the thrombectomy decision process.
Conclusion: Timely referrals for endovascular treatment in a spoke-hub organization are crucial. Organization of between-hospital transport appears to be the weakest link. Nevertheless we demonstrate not all transport delay is time lost and within a well-organized network with decision-to-groin delays of less than 50 minutes, including transportation delay, patients presenting to a SPOKE center are offered as timely treatment as those presenting at the HUB, supposing the pre-CTA acute stroke measures are uniform for the network.

AS25-062

SERVICE ORGANISATION

LONG-TERM OUTCOME OF ENDOVASCULAR STROKE TREATMENT

S. De Blauwe[1], D. Decoo[2], L. Defreyne[3], Y. Geerts[4], J. Ghekiere[5], J. Kager[5], P. Kirilova[6], J. Maes[7], A. Terwecoren[8], P. Vanacker[9], C. Vandycke[10], M.D. Verhalle[1] and G. Vanhooren[1]
[1]AZ Sint-Jan Brugge-Oostende AV, Neurology, Brugge, Belgium
[2]AZ Alma, Neurology, Eeklo, Belgium
[3]UZ Gent, Vascular and Interventional Radiology, Gent, Belgium
[4]AZ ZENO, Neurology, Knokke, Belgium
[5]AZ Sint-Jan Brugge-Oostende AV, Radiology, Brugge, Belgium
[6]AZ Sint-Augustinus, Neurology, Veurne, Belgium
[7]AZ Sint-Rembert, Neurology, Torhout, Belgium
[8]AZ Damiaan, Neurology, Oostende, Belgium
[9]AZ Sint-Lucas, Neurology, Brugge, Belgium
[10]AZ Sint-Jan Brugge-Oostende AV, Anesthesiology, Brugge, Belgium

Background and Aims: The Stroke Network Northwest of Flandres comprises 8 hospitals; 1 hub and 7 spoke. It is a local, non-governmental iniative established in 2014 for organizing endovascular treatment of stroke patients in the region.
Method: A prospective database with baseline patient characteristics, imaging information, time logistics and outcome for patients treated endovascularly was established for quality control. Long-term mRS scores were collected from patient files. If follow-up was missing, the patient or his relatives were contacted and mRS was determined through standardized telephone interview.
Results: 3-months (n = 149), 1-year (n = 94) and limited 2-year (n = 30) mRS scores are reported. The percentage of good outcome (mRS 0–2) remained stable at 50%, while mortality rose from 18% to 30%. Median stroke-to-groin delay in the whole group (primary and secondary referred patients) was 185 minutes. More detailed numbers will be available in the final poster.
Conclusion: Good outcomes (mRS 0–2) are favorable (50%) compared to the original pivotal trials (in meta-analysis at 43%). This could, at least partially be explained by the shorter stroke-to-groin delay compared to the published trials varying between 208 and 269 minutes. Within the network we realize a major clinical improvement for these severe stroke patients, surpassing the good outcomes within a shorter treatment delay.

AS25-063

SERVICE ORGANISATION

SATISFACTION WITH THE QUALITY OF STROKE CARE IN RUSSIA AND CHINA

E. Melnikova[1], Y. Xiaoxuan[1], A. Shmonin[2], A. Shumeeva[3], J. Zhou[4] and E. Bondareva[1]
[1]The First Pavlov State Medical University of St. Petersburg, Neurology, St. Petersburg, Russia
[2]Federal Almazov North-West Medical Research Centre, Institute of Experimental Medicine, St. Petersburg, Russia
[3]St. Petersburg, Russia
[4]The first clinical hospital of Chongqing medical University, Neurology, Chongqing, China

Background and Aims: The study focuses on comparison and analysis of the satisfaction of patients with stroke health care quality in Russia and China to identify major problems and most successful organizational solutions in the system of stroke care.
Method: 522 patients was conducted in Russia and China stroke centers. Analysis was performed on the following parameters: quality of care in the hospital; the ratio of medical and nursing staff physician to patients; timely diagnosis and treatment; the level of staff qualifications; satisfaction with the outcome of treatment; availability and the volume of conversations held with the patient about the nature and causes of the disease; the test results on the quality of life scale EQ-5D.
Results: Patients in China are more satisfied with medical care by the nursing staff. There were significant differences in the main reasons for dissatisfaction with the quality of care in Russia and China (time latency for examination in the Russian hospital, the high cost of treatment and the long transfer waiting period in a specialized clinic in the Chinese stroke centers). The common cause of dissatisfaction with the quality of medical care was an insufficient awareness about their state and communication with their doctor.
Conclusion: Patient satisfaction with the quality of care in general isn't defined by national and cultural characteristics. It depends on the quality of care and involvement of the patient in the process of treatment. It confirms the appropriateness of a patient-centered approach and a multidisciplinary principle used in the treatment and rehabilitation of patients with stroke.

AS25-064

SERVICE ORGANISATION

PREHOSPITAL TIMES AND THEIR INFLUENCE ON STROKE TO NEEDLE TIMES

S. Trinh[1], O. Siddiqi[2], G. Zachariah[3] and A. Mathews[3]
[1]Chelmsford, United Kingdom
[2]Broomfield Hospital, Stroke Medicine, Chelmsord, United Kingdom
[3]Broomfield Hospital, Stroke Medicine, Chelmsford, United Kingdom

Background and Aims: In the UK, NICE guidelines for thrombolysis state that treatment with alteplase should start within 4.5 hours of onset of stroke symptoms. Thrombolysed patients have a quicker recovery and length of stay, especially if thrombolysis is given earlier. This study examines the factors that may influence pre-hospital delay by comparing the timings of different stages in the pre-hospital journey.
Method: For this study, a total of 50 patients at Broomfield Hospital (England) were suspected as an acute stroke and went on to have thrombolysis between January 2015 and December 2015. Ambulance records

were then reviewed to collect the different times. Of those patients, only 18 had all the specific times recorded.

Results:

	Median (minutes)
Stroke Onset to Call	*28.50* (1 – 176)
From Call to Arrival	*24.83* (5 – 68)
Time spent on Scene	*25.33* (10 – 50)
Journey to Hospital	*21.94* (8 – 41)
Total Time	*100.6* (43 – 275)

Each stage of the pre-hospital journey contributes between 21.8% to 28.3% of the total time, with the stroke onset to call contributing the most at 28.3%.

Conclusion: There is potential to improve the pre-hospital times by focusing on the recognition of stroke by patients, those around them and even the emergency services and ambulance crews who receive the calls. Greatest reduction can be best achieved at stroke onset to call where the range is greatly varied and those with the longest times at this stage would also have the longest total times.

AS25-065

SERVICE ORGANISATION

KNOWLEDGE OF ACUTE STROKE GUIDELINES AMONGST GENERAL AND EMERGENCY PHYSICIANS IN 2 STROKE CENTRES

C. Mc Carthy[1], J. McCabe[2], C. Small[2], H. Smyth[1], S. Coveney[1], Y. Lee[3], M. Wall[3], Y. O'Donoghue[3], A. O'Shea[3], J. Thornton[3], D. Williams[3], J. Duggan[2], L. Kyne[2], M. Marnane[4], P. Kelly[4] and S. Murphy[4]

[1]Mater Misercordiae University Hospital/University College Dublin, Stroke/School of Medicine, Dublin, Ireland
[2]Mater Misercordiae University Hospital, Geriatrics, Dublin, Ireland
[3]Beaumont Hospital, Stroke, Dublin, Ireland
[4]Mater Misercordiae University Hospital, Stroke, Dublin, Ireland

Background and Aims: Acute stroke care has radically changed with the advent of time-dependent therapies. The American Stroke Association (ASA) has published guidelines on appropriate time windows for managing patients with acute stroke. Knowledge of these guidelines is a key performance indicator for all stroke centres.

Method: An anonymous, standardised, multiple choice questionnaire assessing knowledge of ASA guidelines was distributed to both general medical and emergency department (ED) physicians.

Results: 86 completed questionnaires were returned (ED n = 34, general n = 52). 67% of ED and 83% of generalists reported that they were aware of at least 1 acute stroke care guideline. Knowledge of the correct time window for thrombolysis amongst ED and generalists was 88% and 85% respectively. Knowledge of the time window up until which thrombectomy can be considered in anterior circulation strokes amongst ED and generalists was 33% and 54% respectively. 29% of ED and 23% of generalists were aware of the recommended door to CT time of <25 minutes. 59% of ED and 40% of generalists were aware of the target door to needle time of <60 minutes. 15% of ED physicians and 42% of generalists reported that they were certified in conducting an NIHSS assessment.

Conclusion: In our study the awareness of ASA guidelines amongst ED and general physicians was sub-optimal. Furthermore the majority of physicians were not certified in NIHSS assessment. Educational interventions are necessary to improve guideline awareness and standards of stroke care delivery in the two study sites.

AS25-067

SERVICE ORGANISATION

REPORT FROM QUESTIONNAIRE STUDY ON SITUATION OF „POST-STROKE PATIENT" IN POLAND IN OPINION OF PATIENTS AND THEIR CARE-GIVERS

A. Siger[1], D. Wlodzimierz[2], D. Bienkowska[4], A. Wroblewska[4], J. Tomczak[4] and J. Rozniecki[3]

[1]Jonscher Hospital in Lodz, Neurology, Lodz, Poland
[2]Jonscher Hospital, Neurology, Lodz, Poland
[3]Medical University of Lodz, Neurology Stroke & Neurorehabilitation, Lodz, Poland
[4]Polish Stroke Foundation, 14 Milionowa Street, 93–113 Lodz

Background and Aims: Little is known about opinions, problems, unmet needs and expectations of patients in Poland who had suffered form stroke. The main goal was to identify the most important problems these patients and their care-givers most frequently deal with.

Method: The study was based on questionnaire available through Polish Stroke Foundation website or in paper version which was responded by 213 individuals who either had stroke in the past or were the care-givers of these patients. The questionnaire contained 62 questions in 6 topic areas for past-stroke patients. Finally the 68% of responders were post-stroke patients and 32% - stroke-patients care-givers.

Results: The most important results of the study show that: the "age of stroke" of responders was 40–49 years (19%) followed by 50–59 years (18.5%); most of the patients (85%) had had stroke more than one year before answering the questionnaire; 78% of patients had recurrent stroke; the most important problems of patients was disability (55%), speech and communication problems – 30.5%, fatigue – 44%, spasticity – 41%, memory problems – 33%, lack of self-confidence (37%), depression – 23.5%; the most difficult for stroke patients to accept after stroke was disability (53%) and memory and concentration problems (18.5%). The other reported problems accounted for spasticity, access to rehabilitation, psychological problems, problems of care at home. According to the patients stroke had extremely significant impact on their lives.

Conclusion: The report presents the most important problems of "post-stroke" patients, their opinions on impact of stroke on life, and unmet needs

AS25-068

SERVICE ORGANISATION

IMPLEMENTING A RESPONSIVE TIA MODEL OF CARE WITH EMBEDDED LONGITUDINAL CAPABILITIES

J. O'Brien[1], A. Gilligan[1] and G. Yip[1]

[1]Epworth Eastern, Neuroscience, Box Hill, Australia

Background and Aims: Instituting a new TIA service that incorporates all ideal elements is challenging due to system constraints. The service must combine early comprehensive assessment with integrated long-term follow up that promotes sustained adherence to stroke prevention strategies.

Method: In Australia at Epworth Eastern, a new rapid assessment service for patients suspected of having TIA opened in 2016. With no in-house Emergency Department (ED), direct admission occurred via a 24 hour hotline available to primary care and ED physicians. On discharge, planned telephone contact at 1, 6, 12, 26 and 52 weeks was made by the stroke specialist nurse. Patients were also booked for review with neurologists. This co-ordinated approach was designed to facilitate continual

reinforcement of secondary prevention strategies. Data were collected from February to December 2016.
Results: Sixty patients were admitted with subsequent diagnosis of TIA or confirmed stroke. Successful telephone follow up occurred in 75%. Among these, 15% had cancelled neurologist appointments but agreed to ongoing telephone follow up. At 6 months, 75% (N = 34) of patients remained on prescribed stroke prevention medication. Antihypertensives were the most frequently ceased medication with (N = 5) patients reporting "dizziness" as the reason for cessation. 50% were adhering to recommended lifestyle modifications for stroke prevention. Diet and exercise advice were the commonest aspects of non-adherence. One patient has had a subsequent stroke (1.6%).
Conclusion: The benefits of effective stroke prevention could be maximally realised through a TIA model of care that places stronger emphasis on rapid comprehensive assessment and efficient, structured, longitudinal follow up.

AS25-009

Service Organisation

PARAMEDIC ACCURACY REMAINS A SIGNIFICANT OBSTACLE FOR LVO TRIAGE SCALE OPERATIONALISATION

H. Zhao[1], L. Pesavento[1], K. Smith[2], S. Bernard[2], L. Churilov[3], S. Davis[1] and B. Campbell[1]
[1]The Royal Melbourne Hospital, Neurology, Parkville, Australia
[2]Ambulance Victoria, Research & Evaluation, Melbourne, Australia
[3]Florey Institutes of Neurosciences and Mental Health, Heidelberg Campus, Melbourne, Australia

Background and Aims: Large vessel occlusion (LVO) triage scales are increasingly gaining attention as a method of prehospital identification of LVO, especially by paramedics. However, validation studies using paramedics are either lacking or show unfavourably low specificity. We hypothesised that inclusion of difficult to assess items may be contributing to inaccuracy, and examined the reliability of paramedic assessment of common scale examination items and screening history questions.
Method: Paramedics delivering suspected stroke patients to Royal Melbourne Hospital, Australia, were asked to assess stroke onset time, mimic screening, motor, speech, eye deviation, extinction and RACE cortical items. Inter-rater agreement with contemporaneous physician assessment was tested using kappa. Three LVO scales (RACE, LAMS, FAST-ED) were calculated and their diagnostic performance assessed. A sample size of 102 was calculated for 80% power to detect k = 0.80 against k = 0.40 assuming 10% prevalence.
Results: Interim results of the first 52 patients (19 infarcts with 6 LVO, 6 haemorrhages and 21 mimics) showed excellent agreement between paramedics and doctors for arm/leg drift, severe speech deficit and eye deviation (k = 0.84–1.00) but lower agreement for grip, facial palsy, neglect and history questions (k = 0.27–0.71). LVO scales displayed relatively low specificities (0.67–0.76) and very low positive predictive values (0.25–0.27).
Conclusion: Current LVO scales appear to contain items prone to inaccuracy when assessed by paramedics without additional training. Low specificity would inaccurately bypass non-LVO patients to endovascular centres and potentially delay intravenous thrombolysis. Results of the full sample will be available for presentation in May and will provide valuable information on the optimisation of LVO triage for paramedics.

AS25-025

Service Organisation

THE CHANGE OF TRIAGE SIGNIFICANTLY SHORTENS PREHOSPITAL TIME INTERVAL FOR MECHANICAL THROMBECTOMY CANDIDATES

L. Kasickova[1,2], D. Vaclavik[3], D. Holes[4,5], L. Klecka[6], R. Mikulik[7,8] and M. Bar[1,2]
[1]University hospital Ostrava, Deparment of Neurology, Ostrava, Czech Republic
[2]University hospital Ostrava, Comprehensive Stroke Center, Ostrava, Czech Republic
[3]Agel Research and Training Institute- Ostrava Vitkovice Hospital- Czech Republic, Department of Neurology, Ostrava, Czech Republic
[4]Emergency Medical Service Moravian-Silesian Region- Czech Republic, Emergency Medical Service, Ostrava, Czech Republic
[5]Comenius University in Bratislava-Slovak Republic, Jessenius Faculty of Medicine in Martin, Bratislava, Slovak Republic
[6]City Hospital Ostrava, Department of Neurology, Ostrava, Czech Republic
[7]St. Annés University Hospital and Faculty of Medicine- Masaryk University- Brno- Czech Republic, Department of Neurology, Brno, Czech Republic
[8]St. Annés University Hospital- Brno- Czech Republic, International Clinical Research Centre- Stroke Research Program, Brno, Czech Republic

Background and Aims: One of the important factors influencing outcome of acute stroke pacients is stroke onset-to-door time (ODT) or emergency services arrival-to-comprehensive stroke centre (CSC) door time (ADT). The main aim of the study was to evaluate how intervention in pre-hospital triage wil influence ODT/ADT.
Method: Once pre-hospital stroke scale (FAST PLUS test) has been implemented in daily clinical practice the triage of the patients with acute stroke has changed. The test is used by paramedics and evaluates the severity of hemiparesis in order to predict large vessel occlussion. FAST+ patients are transported directly to CSC as candidates for MT. The study compares the ADT and ODT before the triage intervention (2014–2015) and after (2016) in all patients who underwent MT in CSC University Hospital Ostrava (catchment area: 0, 9 milion inhabitants).
Results: In 2014–2015, 86 patients underwent MT, 42 (49%) male, median age 68y, median NIHSS at admission 18, ODT average 143,3 min; median ADT 110, 5 min. In 2016, 34 patients (33 FAST+ positive) underwent MT, male 19 (56%), median age 70 y, median NIHSS at admission 15, median ODT 115 min, median ADT 61,2 min. ODT was shortened from 143,3 to 115 min and ADT from 110,5 to 61,2 min.
Conclusion: The introduction of simple pre-hospital scale (FAST+) has reduced prehospital time delays in candidates for mechanical thrombectomy. All patients with positive FAST PLUS test up to 6 hours from stroke onset are recommended for direct transportation to CSC as the potential candidates for mechanical thrombectomy in catchment area of our CSC.

AS25-027

Service Organisation

ISITS – AN IMAGING DATABASE FOR STROKE RESEARCH IN EUROPE

S. Simsic[1], A. Grecu[1], N. Ahmed[2], W. Nils[3] and R. Mikulik[1]
[1]St. Anne's University Hospital Brno, Neurology - Stroke, Brno, Czech Republic

[2]Karolinska Institutet, Neurology, Stockholm, Sweden
[3]Karolinska Institutet, Clinical Neuroscience, Stockholm, Sweden

Background and Aims: The Safe Implementation of Treatments in Stroke (SITS) registry is currently the largest repository of clinical stroke treatment data in Europe. Image reading data is part of SITS, however, images are not currently collected in SITS. As current best practice guidelines for stroke treatment include modern medical imaging techniques as a central component, access to the images in conjunction with currently collected SITS data is necessary for accurately assessing clinical stroke management efficacy.
Method: A technical feasibility analysis was conducted to assess the goals, needs, and existing capabilities among participating SITS sites. The analysis identified four key areas of concern to be addressed to ensure the viability of the project; 1) Data Integrity and Consistency, 2) Data Security and Patient Privacy, 3) Technical Performance and Sustainability, 4) Ease of Use and Availability.
Results: The repository was developed around an open-source software stack, including the XNAT software package (Neuroinformatics Research Group, Washington University), and the Clinical Trial Processor (Radiological Society of North America). A proprietary Picture Archiving and Communication System (PACS) from TatraMed was also selected to meet data management and security needs. Custom development was necessary to implement a shared authentication system between the new platform and the existing SITS registry.
Conclusion: The resultant image repository platform is capable of interfacing with the existing SITS registry and meets initial performance, security, and reliability targets. Current hardware capabilities will accommodate projected data collection for the next five years.

AS25-032

Service Organisation

INTER-HOSPITAL TRANSFER WORKFLOW IN ACUTE ISCHEMIC STROKE WITH LARGE VESSEL OCCLUSION: REAL-WORLD DATA IN THE ENDOVASCULAR ERA

F. Ng[1], E. Low[2], E. Andrew[3], K. Smith[3], D. Crompton[1], T. Wijeratne[2], H. Dewey[4,5] and P. Choi[4,5]
[1]Northern Health, Department of Neurology, Melbourne, Australia
[2]Western Health, Neuroscience Research Unit, Melbourne, Australia
[3]Ambulance Victoria, Research and Evaluation Department, Melbourne, Australia
[4]Eastern Health, Department of Neurosciences, Melbourne, Australia
[5]Monash University, Eastern Health Clinical School- Faculty of Medicine-Nursing and Health Sciences, Melbourne, Australia

Background and Aims: Inefficiencies in Inter-Hospital Transfer (IHT) for Endovascular Clot Retrieval (ECR) contribute to delay in treatment. We sought to characterise IHT workflow from Primary to Comprehensive Stroke Centres (PSC, CSC).
Method: A retrospective multicentric study. Consecutive patients with acute anterior circulation Large Vessel Occlusion (LVO) transferred for ECR from three high-volume academic PSC to a single CSC between January 2015 to August 2016 were included. Analysis was performed to determine patient and process related factors associated with Door-in-Door-out time (DIDO) at PSC.
Results: 67 patients were included. The median age was 69.4 (IQR 63.5–78) and NIHSS 17 (IQR 12–21). Five patients had primary ECR. The median DIDO time was 106 minutes (IQR 86–143), representing 46.9% of time from symptoms-onset to CSC arrival. Median time spent between CT acquisition to IHT request was 56 minutes (IQR 44–83), IHT ambulance arrival to Door-out time was 17 minutes (IQR 14–21) and road-transport time was 19 minutes (IQR 17.3–22.8).
The fastest DIDO time was 51 minutes. 32.8% (n = 22), 37.3% (n = 25), and 16.4% (n = 11) had DIDO of <90, >120, and >150 minutes respectively.
DIDO times were significantly different between the three PSCs (p = 0.005). On preliminary univariate analysis, no other process or patient related factors were associated with DIDO times.
Conclusion: Median DIDO time exceeds 1.5 hours even in high-volume PSCs. Variation in PSC practices may contribute to IHT delays and require further investigation. Further quality improvement efforts should be directed at optimising PSC IHT workflow.

AS25-037

Service Organisation

MOOD IMPAIRMENT AND PSYCHOLOGICAL ASSESSMENT IN REHABILITATION

S. Mcgowan[1], K. hill[1], P. Young[1], D. Cadilhac[2], M. kilkenny[2] and T. purvis[2]
[1]National Stroke Foundation, National Stroke Foundaiton, melbourne, Australia
[2]Monash University, Translational Public Health Unit- Stroke & Ageing Research Centre- Southern Clinical School, Melbourne, Australia

Background and Aims: Depression and mood disorders are a significant problem for stroke survivors. Mood impairment has a negative effect on patient outcome and often impact the wider family/support networks as well.
This presentation will describe access of mood and psychological assessment for stroke survivors in Australian rehabilitation hospitals in 2016 and note changes over time.
Method: A clinician at each participating hospital completed a self-reported survey regarding organisational aspects of stroke service. In addition, most sites retrospectively audited up to 40 consecutive stroke admissions from the previous calendar year. Standardised training, a data dictionary and support in data collection were provided by Stroke Foundation staff. Descriptive univariate statistics are presented.
Results: In the 2016 national audit 3514 patients were audited from 103 hospitals. Mean age 76 years, 56% males, 79% ischaemic stroke. 53% of patients had a documented mood assessment of whom 47% were reported to have a mood impairment. Encouragingly mood assessment has increased from only 34% in 2012 and 42% in 2014. However, only 37% of patients with mood impairment on admission were assessed by psychology (similar to 2012 [41%] and 2014 [39%] audits). Access to psychology services remains a barrier. 31% of patients with a mood impairment were not seen by psychology as there was no one employed to provide this service.
Conclusion: Access to psychology services and assessment of mood impairments for stroke survivors continues to be an area that requires greater focus during hospital rehabilitation care and is in need of improvement.

AS26-001

SMALL VESSEL DISEASE & COGNITION

INCIDENT LACUNES IN CEREBRAL AUTOSOMAL DOMINANT ARTERIOPATHY WITH SUBCORTICAL INFARCTS AND LEUKOENCEPHALOPATHY

Y. Ling[1], F. De Guio[1], M. Duering[2], E. Jouvent[1], D. Hervé[1], O. Godin[1], M. Dichgans[2] and H. Chabriat[1]
[1]Hôpital Lariboisière- APHP, neurologie, PARIS, France
[2]Institute for Stroke and Dementia Research- Klinikum der Universität München- Ludwig-Maximilians-University, Neurology, Munich, Germany

Background and Aims: Previous studies in CADASIL showed that accumulation of lacunes strongly relate to clinical severity. However, the potential predictors of incident lacunes and their clinical consequences over a short time frame have not been investigated. This study aimed to determine the predictors and clinical impact of such lesions in a large cohort of patients.
Method: Two hundred six NOTCH3 mutation carriers (mean age, 49.5 ± 10.6 years) were followed up over 3 years. Incident lacunes were identified using difference imaging from 3D T1 images. Clinical events and change in different clinical scores such as the Mattis Dementia Rating Scale, Modified Rankin Scale, Barthel index and time to complete Part A and part B of Trail Making Test were recorded. Associations were analyzed with multivariable logistic regression analysis and ANCOVA.
Results: Over a mean period of 3.4 ± 0.7 years, incident lacunes occurred in 51 of 206 patients. Both the number of lacunes ($P < 0.0001$) and systolic blood pressure (SBP) at baseline ($P < 0.01$) were independent predictors of incident lacunes during follow-up. The results were still significant after excluding patients with SBP higher than 140 mm Hg. Incident lacunes were also independently associated with incident stroke and with change in time to complete Trail Making Test Part B, initiation/perseveration subscale of the Mattis Dementia Rating Scale and Barthel Index over the study period.
Conclusion: SBP and the number of prevalent lacunes are independent predictors of incident lacunes in CADASIL. These lesions mainly impact executive performances and functional independence over 3 years.

AS26-002

SMALL VESSEL DISEASE & COGNITION

BLOOD-BRAIN BARRIER LEAKAGE PREDICTS COGNITIVE DECLINE OVER TWO YEARS IN SMALL VESSEL DISEASE

E. Zhang[1], S.M. Wong[2], R. Uiterwijk[1], W. Backes[2], J. Jansen[2], C. Jeukens[2], R. van Oostenbrugge[1] and J. Staals[1]
[1]Maastricht University Medical Center, Neurology, Maastricht, The Netherlands
[2]Maastricht University Medical Center, Radiology, Maastricht, The Netherlands

Background and Aims: Blood-brain barrier (BBB) dysfunction is one of the pathophysiological mechanisms in cerebral small vessel disease (SVD). Recently, it was shown that BBB leakage volume is larger (i.e. more widespread BBB leakage) in patients with SVD compared with controls. In this study, we investigated the relationship between BBB leakage volume and cognitive decline in patients with SVD.
Method: At baseline, 43 patients with clinically overt SVD (lacunar stroke or mild vascular cognitive impairment) received a dynamic contrast enhanced MRI scan to quantify BBB leakage volume in the normal appearing white matter (NAWM), white matter hyperintensities (WMH) and cortex. All patients were neuropsychologically tested in the cognitive domains executive function, information processing speed and memory. After two years, the neuropsychological assessment was repeated. The relationship between baseline BBB leakage and cognitive decline over two years was determined in linear regression analysis, corrected for age, sex and education.
Results: Larger leakage volume in the NAWM and cortex at baseline was significantly associated with decline in executive function after two years ($\beta = 0.299$, $p = 0.045$ and $\beta = 0.317$, $p = 0.032$ respectively). No significant associations were found between BBB leakage volume and the other cognitive domains.
Conclusion: In SVD patients, more widespread BBB leakage in the NAWM and cortex at baseline predicts decline in executive function after two years. Our finding may indicate that BBB leakage is an early marker of SVD.

AS26-003

SMALL VESSEL DISEASE & COGNITION

THE RELATION BETWEEN TOTAL CEREBRAL SMALL VESSEL DISEASE BURDEN AND GAIT IMPAIRMENT IN MINOR STROKE PATIENTS

C.M.J. Loos[1], J. Staals[1], C. McHutchison[2], V. Cvoro[2], F. Chappell[2], R.J. van Oostenbrugge[1] and J.M. Wardlaw[2]
[1]MUMC+, Neurology and Cardiovascular Research Institute Maastricht CARIM, Maastricht, The Netherlands
[2]University of Edinburgh, Brain Research Imaging Centre- Division of Clinical Neurosciences- SINAPSE Collaboration, Edinburgh, United Kingdom

Background and Aims: Individual MRI markers of cerebral small vessel disease (cSVD) are associated with gait impairment, however total cSVD-related brain damage, which can be expressed in a cSVD burden score, has not been considered. We determined if the total cSVD MRI burden score is associated with gait impairment three years after minor stroke.
Method: In total, 165 minor stroke patients underwent a brain MRI at presentation. Presence of lacunes, white matter hyperintensities, cerebral microbleeds and perivascular spaces at the basal ganglia were summed in a total cSVD MRI burden score (range 0–4). Gait disturbances, objectively measured by the timed-up-and-go test and subjectively assessed by self-reported Stroke Impact Scale mobility domain score, were assessed three years later. We tested associations adjusted for major confounders by linear regression analysis.
Results: Total cSVD burden was not associated with gait impairment three years after minor stroke in the total group of patients, nor in lacunar stroke patients ($n = 73$) separately. In cortical stroke patients ($n = 92$), the total cSVD burden score was associated with lower Stroke Impact Scale mobility domain scores (unstandardized B -6.68; 95%CI, -9.96;-3.40, $p < 0.01$), also after correction for age, vascular risk factors and stroke severity (unstandardized B -4.61; 95%CI -8.42;-0.79, $p < 0.05$).
Conclusion: As minor cortical stroke patients with a higher total cSVD burden report more often mobility impairment three years after stroke, the total cSVD MRI burden score is a possible neuroimaging marker that could be used to identify minor stroke patients at risk for gait impairment.

AS26-006

SMALL VESSEL DISEASE & COGNITION

ACUTE ISCHEMIC LESIONS OCCURRING IN HYPOPERFUSED BRAIN TISSUE MAY BE LESS PRONE TO PROVOKE STROKE SYMPTOMS: A DIFFUSION STUDY IN CADASIL

O. Osman[1], F. De Guio[2], H. Chabriat[1] and E. Jouvent[1]
[1]AP-HP- Lariboisière Hospital- Department of Neurology- F-75475 Paris-France- and DHU NeuroVasc Sorbonne Paris Cité- Paris- France, Neurology, Paris, France
[2]INSERM, UMRS1161, Paris, France

Background and Aims: Most acute ischemic lesions lead to stroke (ischemic stroke lesions – ISL) but others are discovered by chance (acute silent lesions of presumed ischemic origin – ASLI). We aimed to compare ISL and ASLI to determine, in addition to lesion site and volume, predictors of the presence of stroke symptoms.

Method: We studied 179 CADASIL patients with a previous history of stroke followed in Lariboisière (Paris). All available diffusion-weighted MRI data obtained every 18 months during prospective follow-up or in case of ischemic stroke in some patients (1203 MRI scans) were screened for acute ischemic lesions while blind to the clinical status. Logistic regression models were built to determine predictors of the presence of stroke symptoms: lesion site and volume, age, gender, pre-existing white matter hyperintentisites (WMH) at site of the acute ischemic lesion, volume of WMH and of lacunes, number of microbleeds.
Results: We identified 73 acute ischemic lesions (30 ISL and 43 ASLI) in 55 patients. As expected, in multivariable analyses, larger ischemic lesions and those lying on corticospinal tracts were more likely associated with stroke symptoms (485 vs 293mm3, $p = 0.03$ and 66% vs 23% and, $p = 0.0002$). In addition, stroke symptoms were less often observed when ischemic lesions appeared at site of pre-existing WMH (36% versus 70%, $p = 0.01$).
Conclusion: Independently of factors expectedly associated with stroke symptoms, acute ischemic lesions appearing at site of pre-existing white matter lesions less likely lead to stroke symptoms. Hypoperfused brain tissue may be less prone to provoke stroke symptoms.

AS26-009

SMALL VESSEL DISEASE & COGNITION

TOTAL MRI CEREBRAL SMALL VESSEL DISEASE BURDEN CORRELATES WITH COGNITIVE PERFORMANCE, CORTICAL THICKNESS AND NETWORK MEASURES IN A MEMORY CLINIC POPULATION

G. Banerjee[1], H. Jang[2], H.J. Kim[2], S.T. Kim[3], J.S. Kim[4], J.H. Lee[5], K. Im[6], H. Kwon[7], J.M. Lee[7], D.L. Na[2], S.W. Seo[2] and D.J. Werring[1]
[1]UCL Institute of Neurology, UCL Stroke Research Centre, London, United Kingdom
[2]Sungkyunkwan University School of Medicine- Samsung Medical Center, Department of Neurology, Seoul, Republic of Korea
[3]Sungkyunkwan University School of Medicine- Samsung Medical Center, Department of Radiology, Seoul, Republic of Korea
[4]University of Ulsan College of Medicine- Asan Medical Center, Department of Nuclear Medicine, Seoul, Republic of Korea
[5]University of Ulsan College of Medicine- Asan Medical Center, Department of Neurology, Seoul, Republic of Korea
[6]Boston Children's Hospital- Harvard Medical School, Division of Newborn Medicine, Boston, USA
[7]Hanyang University, Department of Biomedical Engineering, Seoul, Republic of Korea

Background and Aims: We investigated whether a measure of total MRI-visible cerebral small vessel disease (SVD) burden correlates with cognitive performance, cortical atrophy and brain network measures in a memory clinic population.
Method: We determined the SVD score of 243 patients with either clinically diagnosed Alzheimer's disease related cognitive impairment or subcortical vascular cognitive impairment. We then investigated the relationship between SVD score, cognitive measures, brain amyloid (measured by PiB PET), cortical atrophy and network measures.
Results: Total SVD score was associated with the performance of frontal (β -4.31, SE 2.09, $p = 0.040$) and visuospatial (β -0.95, SE 0.44, $p = 0.032$) tasks, and with reduced cortical thickness in widespread brain regions. Total SVD score (but not PiB positivity) was negatively correlated with measures of network regional nodal efficiency, as well as changes in brain network organisation, with evidence of reduced integration (increasing path length, lower global efficiency) and increasing segregation (clustering coefficient, transitivity, modularity). Path analyses showed that the associations between SVD score and frontal and visuospatial scores were partially mediated by decreased their corresponding nodal efficiency and/or cortical thickness.
Conclusion: Total SVD burden has clinical and mechanistic relevance in a memory clinic population. Since total SVD score includes features of both deep perforating arteriopathy and cerebral amyloid angiopathy, our findings suggest that both processes influence these cognitive and imaging markers in dementia populations. Future longitudinal work is needed to confirm the potential of the total SVD score as a surrogate outcome marker.

AS26-010

SMALL VESSEL DISEASE & COGNITION

TEXTURE ANALYSIS: A NEW TOOL FOR THE STUDY OF SMALL VESSEL DISEASE AND BLOOD BRAIN BARRIER INTEGRITY

M. Valdés Hernández[1], V. Gonzalez-Castro[1], F. Chappell[1], E. Sakka[1], S. Makin[1], P. Armitage[2], W. Nailon[3] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]University of Sheffield, Cardiovascular Sciences, Sheffield, United Kingdom
[3]University of Edinburgh, Oncology Physics, Edinburgh, United Kingdom

Background and Aims: Blood-brain barrier (BBB) leakage may play a role in small vessel disease (SVD) but it is difficult to assess from magnetic resonance imaging (MRI). We evaluate the alternative use of texture analysis for this purpose.
Method: We used FLAIR brain MRI from 204 SVD patients presenting with minor ischaemic stroke ($n = 93$ lacunar), acquired before and 20 minutes after intravenous gadolinium administration. We segmented tissues, CSF, white matter hyperintensities (WMH) and applied validated visual scores. We measured six second-order-statistic parameters in all tissues pre- and post-contrast, three of which expressed 'variability' in the image intensity vs. the other three expressing 'homogeneity'. We used 1) ANCOVA to evaluate the effect of age, hypertension, WMH and basal ganglia perivascular spaces (BGPVS) burden on the pre-/post-contrast change, 2) Kruskal-Wallis for significance between patient groups and 3) linear mixed models for pre-/post-contrast variations in CSF with white matter disease.
Results: Texture in normal tissues was consistently more 'homogeneous' than in abnormal tissues. Textural 'homogeneity' increased with age, BGPVS scores ($p < 0.01$) and SVD scores ($p < 0.05$) and was significantly higher in hypertensive patients ($p < 0.002$) and patients with lacunar stroke ($p = 0.04$). Hypertension (74% of patients), WMH load (median $= 1.5 \pm 1.6\%$ of intracranial volume) and age (mean $= 65.6$ years,SD $= 11.3$) predicted the pre-/post-contrast change in normal white matter, WMH and index stroke lesion. CSF signal increased with increasing SVD features post-contrast.
Conclusion: A consistent general pattern of increasing textural 'homogeneity' with hypertension, in lacunar stroke and with increasing SVD, and significant post-contrast change in CSF with increasing WMH suggest that texture analysis may be useful for the study of BBB integrity and associated tissue properties.

AS26-012

SMALL VESSEL DISEASE & COGNITION

CARDIAC BUT NOT RENAL HYPERTENSIVE ORGAN DAMAGE IS ASSOCIATED WITH COGNITIVE PERFORMANCE

R. Uiterwijk[1,2], J. Staals[1,3], M. Huijts[4], P. De Leeuw[3,5,6], A. Kroon[3,5] and R. Van Oostenbrugge[1,2,3]
[1]Maastricht University Medical Center+, Department of Neurology, Maastricht, The Netherlands

[2]Maastricht University, School for Mental Health and Neuroscience MHeNs, Maastricht, The Netherlands
[3]Maastricht University, Cardiovascular Research Institute Maastricht CARIM, Maastricht, The Netherlands
[4]Maastricht University Medical Center+, Department of Psychiatry and Psychology, Maastricht, The Netherlands
[5]Maastricht University Medical Center+, Department of Internal Medicine, Maastricht, The Netherlands
[6]Zuyderland Medical Center, Department of Internal Medicine, Sittard/Heerlen, The Netherlands

Background and Aims: Hypertension is associated with cognitive deficits, probably caused by brain damage as a result of cerebral Small Vessel Disease (cSVD). Hypertension is also related to other organ damages, such as cardiac and renal damage. We examined if these other expressions of organ damage are predictive of cognitive performance, independent of cSVD.
Method: In patients with essential hypertension, cSVD burden score was determined at baseline brain MRI. This score (range 0–4), proposed by Staals et al. (Neurology, 2014), includes white matter hyperintensities, lacunes, perivascular spaces and microbleeds. Cardiac damage was determined by echocardiography-based left ventricular mass index (LVMI). Renal damage was determined by estimated creatinine clearance (eGFR, calculated by CKD-EPI) and albuminuria. At 9-year follow-up, an extensive neuropsychological assessment was performed. With linear regression analyses, we tested if LVMI, eGFR and albuminuria were associated with cognition, independent of age, sex, premorbid cognition and cSVD score.
Results: 78 patients with hypertension (mean age 51.2 ± 12.0) were included. LVMI was independently associated with lower cognition ($p = 0.032$), but eGFR and albuminuria were not ($p = 0.624$ and $p = 0.714$, respectively).
Conclusion: Since LVMI is predictive of lower cognitive performance 9 years later, independent of MRI-visible SVD brain damage, cardiac organ damage might be a marker for more severe hypertensive disease burden. In patients with hypertensive cardiac organ damage, there should be awareness of the consequences for cognition.

AS26-014

SMALL VESSEL DISEASE & COGNITION

COGNITIVE IMPAIRMENT BEFORE INTRACEREBRAL HAEMORRHAGE IS ASSOCIATED WITH NEUROIMAGING MARKERS OF CEREBRAL AMYLOID ANGIOPATHY

G. Banerjee[1], D. Wilson[1], G. Ambler[2], K. Osei-Bonsu Appiah[1], C. Shakeshaft[1], S. Lunawat[1], H. Cohen[3], T. Yousry[4], R. Al-Shahi Salman[5], G.Y. Lip[6], K.W. Muir[7], M.M. Brown[1], H.R. Jäger[4] and D.J. Werring[1]
[1]UCL Institute of Neurology, UCL Stroke Research Centre, London, United Kingdom
[2]University College London, Department of Statistical Science, London, United Kingdom
[3]University College London Hospitals NHS Foundation Trust, Department of Haematology, London, United Kingdom
[4]UCL Institute of Neurology, Lysholm Department of Neuroradiology, London, United Kingdom
[5]University of Edinburgh, Division of Clinical Neurosciences, Edinburgh, United Kingdom
[6]g.y.h.lip@bham.ac.uk, University of Birmingham, Centre for Cardiovascular Sciences, United Kingdom
[7]University of Glasgow, Institute of Neuroscience & Psychology, Glasgow, United Kingdom

Background and Aims: Cognitive impairment often develops in survivors of spontaneous intracerebral haemorrhage (ICH) and may be particularly associated with neuroimaging markers of cerebral amyloid angiopathy (CAA). The presence of cognitive impairment before ICH provides an opportunity to investigate the associations of cerebral small vessel disease with cognition, free of the cognitive impact of the ICH itself. We therefore investigated cognitive decline at the time of presentation with ICH (as measured by the Informant Questionnaire on Cognitive Decline in the Elderly; IQCODE). We hypothesised that cognitive decline would be associated with neuroimaging features of CAA.
Method: We studied 166 patients with appropriate MRI sequences out of a total cohort of 797 patients with an admission IQCODE in a prospective multicentre observational UK hospital-based study of ICH confirmed by neuroimaging.
Results: The prevalence of cognitive impairment before ICH was 35.4% (282 of 797 patients), and 24.7% (41 of 166 patients) in the MRI subgroup. Adjusted analyses in the MRI subgroup found that cognitive decline before ICH was associated with fulfilling the modified Boston criteria for probable CAA at presentation (odds ratio [OR] 4.01, 95% CI 1.53 to 10.51, $p = 0.005$), and increase in a composite CAA score (for each point increase, OR 1.42, 95% CI 1.03 to 1.97, $p = 0.033$). Exploratory analyses also found associations with lobar ICH location (OR 2.29, 95% CI 0.99 to 5.31, $p = 0.053$) and the presence of cortical superficial siderosis (OR 4.08, 1.28 to 13.05, $p = 0.018$).
Conclusion: Our results suggest that CAA contributes to cognitive impairment prior to ICH.

AS26-015

SMALL VESSEL DISEASE & COGNITION

TYPE II DIABETES MELLITUS AND IMPAIRED RENAL FUNCTION ARE ASSOCIATED WITH MICROSTRUCTURAL BRAIN ALTERATIONS AND POST-STROKE COGNITIVE DECLINE: THE TABASCO STUDY

E. Ben Assayag[1], R. Eldor[2], A. Korczyn[3], E. Kliper[4], S. Shenhar-Tsarfaty[4], O. Tene[5], J. Molad[4], I. Shapira[4], V. Volfson[4], L. Shopin[4], Y. Strauss[3], H. Hen[4], N. Bornstein[4] and E. Auriel[4]
[1]Tel Aviv Sourasky Medical Center, Tel-Aviv, Israel
[2]Tel Aviv Sourasky Medical Center, Diabetes Unit- Institute of Endocrinology- Metabolism & Hypertension, Tel Aviv, Israel
[3]Tel Aviv University, Faculty of Medicine, Tel Aviv, Israel
[4]Tel Aviv Sourasky Medical Center, Neurology, Tel-Aviv, Israel
[5]Tel Aviv Sourasky Medical Center, Psychiatry, Tel-Aviv, Israel

Background and Aims: Type 2 diabetes mellitus (T2DM) is associated with brain atrophy, cerebrovascular diseases and chronic kidney disease (CKD), which is also associated with structural brain changes. We examined whether stroke patients with T2DM and CKD will present greater brain pathology on imaging, and increased risk for cognitive impairment (CI).
Method: Cognitive assessments at baseline and 2 years post-stroke were available for 507 non-demented ischemic stroke/TIA patients from the TABASCO (Tel Aviv brain acute stroke cohort) study, as well as 3T MRI and comprehensive cognitive assessments. The volume and integrity of white matter (WM), brain and hippocampus were measured.
Results: At baseline, T2DM and CKD were associated with brain atrophy and worse WM microstructural integrity (T2DM: $p = 0.002$, $p = 0.003$, CKD: $p < 0.001$, $p < 0.001$). Two years post-stroke, T2DM and CKD were associated with poorer results in cognitive scores ($p = 0.001$), independent of age, gender, education, and APOE $\varepsilon 4$ allele, and 19.7% of the participants developed CI. Multiple logistic regression

showed a significant independent association of T2DM and CKD with development of CI (OR = 1.96; OR = 1.97, respectively).
Conclusion: Both T2DM and CKD are independently associated with brain atrophy, abnormal microstructural WM integrity and poorer performance in cognitive tests post-stroke. The presence of both conditions quadruples the risk CI. Brain atrophy and WM integrity may be the link connecting T2DM and CKD to post-stroke CI.

AS26-016

SMALL VESSEL DISEASE & COGNITION

INCREASED CEREBROVASCULAR RESISTANCE IN CEREBRAL SMALL VESSEL DISEASE

Y. Shi[1], M. Thrippleton[1], G. Blair[1], I. Marshall[1], I. Hamilton[1], F. Doubal[1] and J. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Cerebral small vessel disease (CSVD) is highly prevalent in older people and causes up to 20% of strokes. Increased small vessel stiffness has been suggested as an underlying pathology of CSVD. In this cross-sectional study, we used cerebrovascular resistance to investigate the association between cerebrovascular stiffness and CSVD.
Method: We recruited and scanned 60 patients with minor stroke and CSVD in a 1.5T GE scanner. We generated blood flow rate curve for internal carotid arteries (ICA), superior sagittal sinus (SSS) and internal jugular veins (IJV) from phase-contrast MRI. We calculated resistance index (RI) of each vessel as $(Flow_{max}\text{-}Flow_{min})/Flow_{max}$, and total arterial resistance as total arterial flow/mean arterial pressure (MAP). We used white matter hyperintensities (WMH) volume to represent CSVD burden.
Results: We obtained complete data on 56 patients (40 male) (67.95 ± 8.69yrs). Median WMH volume was 10.74 ml (range 1.40–74.97 ml), representing median 0.74% (range 0.11–5.17%) of intracranial volume. In univariate linear regression analysis, increased WMH were significantly associated with higher RI in ICA (Beta = 0.35, P = 0.009) and SSS (Beta = 0.39, P = 0.003), and with higher total arterial resistance (Beta = 0.03, P = 0.02). After adjustment for age, gender and MAP, increased WMH remained significantly associated with higher RI in SSS (Beta = 0.31, P = 0.009). Older age is also an important predictor of higher WMH burden (Beta = 0.54, $P < 0.001$).
Conclusion: Higher CSVD burden is related to increased resistance in large cerebral arteries and the SSS, which remained significant in SSS after adjustment for important confounders. Further research is required to elucidate whether resistance in SSS is a marker specifically of brain small vessel stiffness.

AS26-017

SMALL VESSEL DISEASE & COGNITION

INCREASED FREE WATER UNDERLIES DIFFUSION TENSOR IMAGING ABNORMALITIES IN CEREBRAL SMALL VESSEL DISEASE

M. Düring[1], E. Baykara[1], A.M. Tuladhar[2], B. Gesierich[1], M. Konieczny[1], R. Malik[1], N. Franzmeier[1], M. Ewers[1], E. Jouvent[3], R. Schmidt[4], G.J. Biessels[5], F.E. de Leeuw[2], O. Pasternak[6] and M. Dichgans[1]
[1]Institut für Schlaganfall- und Demenzforschung ISD, Klinikum der Universität München, München, Germany
[2]Radboud University Medical Center, Department of Neurology, Nijmegen, The Netherlands
[3]AP-HP - Lariboisière Hospital, Department of Neurology, Paris, France
[4]Medical University of Graz, Department of Neurology, Graz, Austria
[5]Brain Center Rudolf Magnus - University Medical Center, Department of Neurology, Utrecht, The Netherlands
[6]Brigham and Women's Hospital - Harvard Medical School, Departments of Psychiatry and Radiology, Boston, USA

Background and Aims: Diffusion tensor imaging (DTI) emerged as a key MRI method for characterizing small vessel disease (SVD). While DTI alterations in SVD, i.e. reduction in fractional anisotropy (FA) and increase in mean diffusivity (MD), are strongly associated with clinical deficits, little is known about their morphological underpinnings. This was explored in the current study using an advanced, compartmentalized diffusion model (free water imaging).
Method: We included patients with genetically defined SVD (CADASIL, n = 57) and sporadic SVD from the RUN DMC study (n = 444), as well as healthy controls (n = 30). Diffusion data were analyzed using the free water imaging toolbox, which models two compartments: the free water compartment reflecting interstitial fluid including edema and the tissue compartment reflecting the fiber structure of white matter. We further quantified other SVD imaging markers (white matter hyperintensities, lacunes, microbleeds, brain volume) and assessed relationships with processing speed and disability.
Results: Diffusion alterations in SVD (compared with healthy controls) were mostly driven by increased free water content. Alterations in FA could be largely restored when correcting for free water. Moreover, free water had the strongest impact on clinical deficits (R^2 up to 34%, $p < 0.0001$) when compared with other MRI measures. Findings were consistent across patients with genetic and sporadic SVD.
Conclusion: Diffusion abnormalities in SVD are largely determined by free water, i.e. interstitial fluid increase rather than alterations in the white matter fiber structure. These findings define free water as a major target for future research on SVD.

AS26-019

SMALL VESSEL DISEASE & COGNITION

EVOLUTION OF COGNITIVE IMPAIRMENT IN TIA AND MINOR STROKE PATIENTS DURING THE FIRST YEAR OF FOLLOW-UP

A. Carnes[1], J. Deus[2], J. Pifarre[3], F. Purroy[1] and J. Molina[1]
[1]Institut de Recerca Biomedica de Lleida, Clinical Neurosciences, Lleida, Spain
[2]Universitat Autónoma de Barcelona, Department of Clinical and Health Psychology, Bellaterra, Spain
[3]Institut de Recerca Biomedica de Lleida, Psychiatry, Lleida, Spain

Background and Aims: To determine the frequency and the evolution of cognitive impairment (CI) of transient ischemic attack (TIA) and minor stroke (MIS) during the first year of follow-up.
Method: We included 82 consecutive TIA or MIS patients (NIHSS ≤ 4), of whom 70 completed follow-up at 12 months. We classified the neuropsychological tests into eight cognitive domains. We compared the cognitive performance at baseline and at one year.
Results: Mean age was 66.4 (SD 11.0) years, 72% were male. At baseline we observed CI in up to 72 (97.3%) patients, of which 66 (94.3%) persisted with some kind of cognitive impairment at 12 months. Of the eight cognitive domains evaluated, we observed a significant improvement in verbal (43.2% versus 20%; $p < 0.001$) and visual memory (9.7% versus 1.4%; $p = 0.031$), attention and processing speed (40.5% versus 22.9%; $p = 0.006$), naming ($p < 0.001$) and executive functions (23% versus 2.9%; $p = 0.001$). However, psychomotor ability, visuospatial integration and praxis remained stable over time.

Conclusion: Although the percentage of global cognitive impairment did not show a significant improvement, a better performance was observed in five cognitive domains. Considering that previous literature of cognitive development after TIA and MIS is very little, further research is needed to clarify which factors influence on the recovery of cognitive impairment.

AS26-020

SMALL VESSEL DISEASE & COGNITION

NEUROIMAGING AND CLINICAL PREDICTORS OF NEUROPSYCHOLOGICAL IMPAIRMENT AMONG TIA AND STROKE MINOR PATIENTS

A. Carnes[1], J. Deus[2], J. Molina[1], J. Pifarre[3] and F. Purroy[1]
[1]Institut de Recerca Biomedica de Lleida, Clinical Neurosciences, Lleida, Spain
[2]Universitat Autónoma de Barcelona, Department of Clinical and Health Psychology, Bellaterra, Spain
[3]Institut de Recerca Biomedica de Lleida, Psychiatry, Lleida, Spain

Background and Aims: Few previous studies focused on cognitive impairment after transient ischemic attack (TIA) and minor stroke (MIS) took into account neuroimaging data. We determined the neuropsychological profile of patients during the subacute phase of the brain ischemia.
Method: We prospectively included 74 consecutive TIA or MIS patients (NIHSS ≤ 4). All patients underwent diffusion-weighted magnetic resonance imaging (DWI). We classified the neuropsychological tests into eight cognitive domains. We correlated clinical, sociodemographic and neuroimaging data with the neuropsychological profile.
Results: 44 (59.5%) patients were DWI positive. Cognitive impairment (CI) of more than four cognitive domains was present in 13 (17.6%) subjects. The most affected domains were psychomotor ability (87.8%), verbal memory (43.2%) and attention (40.5%). We observed that lower education remained a significant predictor of attention (odds ratio 3.85, 95 CI 1.08–13.7, $p = 0.038$) and executive dysfunction (OR 8.97, 1.10–73.38, $p = 0.041$). Moreover, hypercholesterolemia was related to verbal memory impairment (OR 3.22, 1.14–9.09, $p = 0.027$) while ex-smoking was associated with visual memory impairment (VMI). The most important neuroimaging variable was the presence of acute ischemic lesions in superficial medial cerebral artery territory. This lesions were predictors of VMI (OR 7.22, 1.19–44.05, $p = 0.032$), attention dysfunction and the impairment of >4 domains (OR 4.79, 1.02–22.56, $p = 0.047$). Additionally, subcortical pattern was related to ideomotor apraxia (OR 9.33, 1.53–56.93, $p = 0.015$).
Conclusion: TIA and MIS patients did have a great percentage of CI. Lower level of education, vascular risk factors and neuroimaging variables were related to CI.

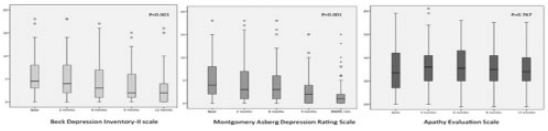
AS26-021

SMALL VESSEL DISEASE & COGNITION

DEPRESSION AND APATHY AFTER TIA OR MINOR STROKE: PREVALENCE, EVOLUTION AND PREDICTORS

A. Carnes[1], J. Deus[2], J. Molina[1], J. Pifarre[3] and F. Purroy[1]
[1]Institut de Recerca Biomedica de Lleida, Clinical Neurosciences, Lleida, Spain
[2]Universitat Autonoma de Barcelona, Department of Clinical and Health Psychology, Bellaterra, Spain
[3]Institut de Recerca Biomedica de Lleida, Psychiatry, Lleida, Spain

Background and Aims: Few previous studies focusing have been focused on affective impairment after transient ischemic attack (TIA) or minor stroke (MIS)
Method: We prospectively included 82 consecutive TIA and MIS patients (NIHSS ≤ 4). 78 patients underwent diffusion-weighted magnetic resonance imaging (DWI). We established the prevalence of post-stroke depression (PSD) (determined by Montgomery Asberg Depression Rating Scale [MADRS] and Beck Depression Inventory-II [BDI-II]) and apathy (determined by Apathy Evaluation Scale [AES]) over a 12-month follow-up period (at 10 days, 2, 6 9 and 12 months). 70 patients completed the follow-up. We correlated clinical, sociodemographic and neuroimaging data with patient affective profiles.
Results: 36 (43.9%) and 28 (34.1%) subjects had apathy and PSD respectively. At 12 months, 25 out of 70 (35.7%) remained with apathy and only 6 out of 70 (8.6%) with PSD. MADRS and BDI-II scores decreased significantly during the follow-up. However, AES scores remained stable. Hypertension (odds ratio [OR] 5.70, 1.37–23.79, $p = 0.017$) and previous depression (OR 5.22, 1.89–14.41, $p = 0.001$) were predictors of basal PSD. Alcohol consumption was a predictor of basal apathy (OR 3.72, 1.12–12.41, $p = 0.033$). Parietal acute lesions were related to basal PSD and apathy. Acute basal ganglia lesions were also associated with apathy. In addition, Leukoariosis measured by Fazekas scales was related to persistent PSD and apathy.



Conclusion: Despite transient or few symptoms PSD and apathy are frequent early after TIA and MIS. In contrast with PSD, apathy persists during the follow-up.

AS26-022

SMALL VESSEL DISEASE & COGNITION

SMALL VESSEL DISEASE IS ASSOCIATED WITH CIRCULATING MARKERS OF ENDOTHELIAL DYSFUNCTION AFTER ACUTE ISCHAEMIC STROKE

F. Arba[1], A. Giannini[1], B. Piccardi[2], V. Palumbo[3], S. Biagini[1], A.M. Gori[4], M. Nesi[3], B. Giusti[4], P. Nencini[3], G. Pracucci[1] and D. Inzitari[1]
[1]University of Florence, NEUROFARBA, Florence, Italy
[2]University of Florence-Careggi University Hospital, NEUROFARBA, Florence, Italy
[3]Careggi University Hospital, Stroke Unit and Neurology, Florence, Italy
[4]University of Florence- Careggi University Hospital, Department of Experimental and Clinical Medicine, Florence, Italy

Background and Aims: Background and purpose: Pathogenesis of small vessel disease (SVD) is poorly understood, although increasing evidence suggests that endothelial dysfunction may have a relevant role in development and progression of SVD. In this cross-sectional study, we investigated the associations between imaging signs of SVD and circulating biomarkers of endothelial dysfunction at two different time-points in a population of ischaemic stroke patients.
Method: We took blood samples of von Willebrand Factor (vWF), Intercellular Adhesion Molecule-1 (ICAM-1), Vascular Cell Adhesion Molecule-1 (VCAM-1) and Vascular Endothelial Growth Factor (VEGF). SVD was assessed by three independent reviewers using computed tomography (CT). At baseline and 90 days after the index stroke, we tested the associations between single and combined SVD features and levels of circulating biomarkers using linear regression analysis adjusting for age, sex, hypertension, diabetes, smoke.

Results: A total of 263 patients were available for the analysis. Mean age (±SD) was 69(±13) years, 154(59%) patients were male. We did not found any relation between SVD and endothelial dysfunction at baseline. At 90 days, presence leukoaraiosis was independently associated with ICAM-1 ($\beta = 0.21$; $p = 0.016$) and VCAM-1 ($\beta = 0.22$; $p = 0.009$), and lacunes were associated with VEGF levels ($\beta = 0.21$; $p = 0.009$). A combined score between leukoaraiosis and lacunes was associated with ICAM-1 ($\beta = 0.20$; $p = 0.024$), VCAM-1 ($\beta = 0.20$; $p = 0.024$) and VEGF ($\beta = 0.22$;$p = 0.009$).
Conclusion: SVD was associated with endothelial dysfunction 90 days after the stroke, whereas there was no relation during the acute phase. Our results suggest that endothelial dysfunction is a chronic process in SVD.

AS26-023

SMALL VESSEL DISEASE & COGNITION

HYPERTENSION-FREE PATIENTS WITH CEREBRAL SMALL VESSEL DISEASE HAVE LESS SEVERE BRAIN LESIONS

A. Pavlovic[1], T. Pekmezovic[2] and N. Sternic[1]
[1]Neurology Clinic, Department for Cerebrovascular Disorders, Belgrade, Serbia
[2]Neurology Clinic, Neuroepidemiology, Belgrade, Serbia

Background and Aims: Cerebral small vessel disease (SVD) is traditionally associated with an old age and hypertension (HT). However, there are patients with typical sporadic SVD but free of HT. Objective. We aimed to investigate differences in clinical and neuroradiological presentation in patients with SVD in regard to presence of HT as a risk factor.
Method: In a cohort of 130 patients demographic data, vascular risk factors, cognitive and functional status were evaluated. Patients were classified in two age- and gender-matched groups in regard to presence of HT as risk factor. Severity of vascular lesions was assessed on 1.5 T magnetic resonance imaging with Age-Related White Matter Changes scale total score (tARWMC) and Fazekas scale periventricular (PV) and deep subcortical (DS) scores.
Results: No difference between groups in risk factor frequency or mean total number of risk factors was noted, although there was a trend for HT-free patients to have more risk factors. Presence of HT was strongly and independently associated with tARWMC (OR 1.3, 1.1–1.5 95%CI, $p = 0.002$) and Fazekas DS score (OR 2.8, 2.8–5.0 95%CI, $p = 0.001$). Duration of HT significantly correlated with VCI (Pearson's coefficient $r = 0.549$, $p < 0.0001$), depression ($r = 0.436$, $p < 0.0001$), functional status ($r = 0.403$, $p = 0.0002$) and tARWMC score ($r = 0.583$, $p < 0.0001$), but did not correlate with age, total number of risk factors or Fazekas' scores.
Conclusion: In patients with SVD, HT is contributing to more severe neuroradiological presentation.

AS26-024

SMALL VESSEL DISEASE & COGNITION

LACUNAR INFARCTS, BUT NOT PERIVASCULAR SPACES, ARE PREDICTORS OF COGNITIVE DECLINE IN CEREBRAL SMALL VESSEL DISEASE

S. Trippier[1], P. Benjamin[2], E. Zeestraten[3], C. Lambert[3], A.J. Lawrence[4], O.A. Williams[3], B. Patel[3], T.R. Barrick[3], A.D. MacKinnon[1] and H.S. Markus[4]
[1]St George's Hospital NHS Trust, Atkinson Morley Regional Neuroscience Centre, London, United Kingdom
[2]Imperial College NHS trust, Department of Radiology, London, United Kingdom
[3]St George's University of London, Neurosciences Research Centre-Cardiac and Cell Signaling Institute, London, United Kingdom
[4]University of Cambridge, Stroke Research Group- Clinical Neurosciences, Cambridge, United Kingdom

Background and Aims: Aim: Cerebral SVD is a major cause of cognitive impairment in the elderly. Perivascular spaces (PvS) are found in SVD but their relationship to cognitive impairment remains uncertain, perhaps due to difficulty in distinguishing between lacunes and PvS. We determined the relationship between baseline PvS score and PvS volume with cognitive change over a 5 year follow-up period and compared this with equivalent lacune data.
Method: Data from the prospective SCANS (St Georges Cognition And Neuroimaging in Stroke) study of patients with symptomatic lacunar stroke and confluent leukoaraiosis were used ($n = 121$). Multimodal MRI was performed annually (3 years) and neuropsychological testing annually (5 years). Lacunes were manually identified and carefully distinguished from PvS. PvS were rated using a validated visual rating scale, and PvS volumes calculated using T1-weighted images. Linear mixed effect models were used to determine the impact of baseline PvS and lacunes on cognition while adjusting for brain volume, T2 White Matter Hyperintensities (WMH) volume and microbleeds.
Results: Baseline PvS scores or volumes showed no association with cognitive indices. There was no detectable change in PvS volumes over a 3 year observational period. Lacunes however, had a significant effect on all cognitive indices in the same cohort and predicted cognitive decline over a 5 year follow-up period.
Conclusion: Conclusion: In comparison to lacunes PvS do not appear to be a predictor of cognitive decline, although lacunes are in the same cohort. This study underlines the importance of carefully differentiating between lacunes and PvS in studies investigating vascular cognitive impairment.

AS26-025

SMALL VESSEL DISEASE & COGNITION

EDUCATION AND CHILDHOOD SOCIOECONOMIC STATUS AND LATE LIFE BURDEN OF CEREBRAL SMALL VESSEL DISEASE IN 3 COHORT STUDIES

E.V. Backhouse[1], S.D. Shenkin[2], A. McIntosh[1], I. Deary[3], M. Bastin[1], S. de Rooij[4], T. Roseboom[4] and J.M. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom
[2]University of Edinburgh, Geriatric Medicine- Department of Clinical and Surgical Sciences, Edinburgh, United Kingdom
[3]University of Edinburgh, Psychology, Edinburgh, United Kingdom
[4]University of Amsterdam, Department of Epidemiology and Biostatistics, Amsterdam, The Netherlands

Background and Aims: Cerebral small vessel (cSVD) disease is a major cause of stroke and dementia. Midlife vascular disease and adult socioeconomic status (SES) are well established risk factors. Less is known about the effect of factors earlier in life on cSVD risk. A recent meta-analysis found that lower levels of childhood SES and education increased the risk of cSVD in later life, but was unclear if these relationships persist after adjustment for vascular risk factors or adult SES.
Method: We analysed data from community dwelling participants from 3 cohort studies:the Dutch famine cohort ($n = 95$), the Lothian Birth Cohort 1936 ($n = 617$) and the Simpson cohort ($n = 110$). The presence of each cSVD feature was analysed individually and summed to form a total "cSVD score" (range 1–4). Data were adjusted for vascular risk

factors and adult SES, analysed separately for each cohort and meta-analysed.

Results: Across the 3 cohorts (n = 822) the associations of childhood SES with WMH and total cSVD score showed no statistically significant effects on WMH (OR 1.27 95% CI 0.83–1.95, p = 0.27) and cSVD score (OR 1.31 95% CI 0.62–2.78, p = 0.23) independent of adult factors, albeit that the point estimates were greater than 1 and of potentially significant public health importance. Low levels of education were associated with increased cerebral micro-bleeds (OR 1.78 95% CI 1.04–3.04, p = 0.04).

Conclusion: It is unclear from these data whether childhood SES or education contribute independently to WMH or cSVD in later life or not. The effects sizes and potential impact of these findings suggest that larger samples are needed to robustly test these associations.

AS26-026

SMALL VESSEL DISEASE & COGNITION

MEMORY FUNCTION EARLY AFTER STROKE IS ASSOCIATED WITH APOE E4 STATUS AND HIPPOCAMPAL VOLUME

E. Werden[1], T. Cumming[1], L. Bird[1], A. Brodtmann[1,2] and V. Thijs[1]

[1]The Florey Institute of Neuroscience and Mental Health, Behavioural Neuroscience, Melbourne, Australia

[2]Austin Health, Neurology, Melbourne, Australia

Background and Aims: Cognition is affected early after ischemic stroke, but may already be compromised in some patients prior to their events. The aim of the Cognition And Neocortical Volume After Stroke (CANVAS) study is to identify pre-stroke (e.g., brain volume, vascular risk burden, APOE ε4 status) and post-stroke (e.g., infarct volume, stroke site) factors that are associated with cognition in the first six weeks after ischemic stroke.

Method: Seventy-nine ischemic stroke patients without dementia (age = 69 ± 13 years; 59 men; education = 12.8 ± 3.9 years; NIHSS = 3.5 ± 3.1) completed a neuropsychological assessment and high resolution 3T MPRAGE MRI scan within six weeks of their events (days post-stroke = 25.4 ± 9.3). Five cognitive domains were assessed (global cognition, processing speed, attention, working memory, and long-term memory) using a combination of computerized and paper-and-pencil tasks. Multivariate regressions examined associations between each cognitive domain, and a range of pre- and post-stroke factors, with age, sex, education, and stroke infarct volume included as covariates.

Results: Older age and larger stroke infarct volumes were independently associated with poorer performances in all cognitive domains ($p < .05$). Possession of at least one APOE ε4 allele ($p = .002$) and smaller hippocampal volumes ($p = .02$) were independently associated with poorer long-term memory. Pre-morbid cognition, vascular risk burden, stroke site, and stroke etiology, were not associated with post-stroke cognition ($p > .05$).

Conclusion: Age and infarct volume are important predictors of cognition early after stroke, with APOE ε4 status and hippocampal volume closely associated with memory function.

AS26-027

SMALL VESSEL DISEASE & COGNITION

PERFORMANCE ON THE BRIEF MEMORY AND EXECUTIVE TEST, A SCREEN FOR COGNITIVE IMPAIRMENT IN SMALL VESSEL DISEASE, ASSOCIATES WITH LACUNE COUNT

N. Giagkou[1], R.L. Brookes[1], D.J. Tozer[1], R.G. Morris[2] and H.S. Markus[1]

[1]University of Cambridge, Stroke Research Group- Department of Clinical Neurosciences, Cambridge, United Kingdom

[2]King's College London, Institute of Psychiatry Psychology and Neuroscience, London, United Kingdom

Background and Aims: The Brief Memory and Executive test (BMET) (www.bmet.info) is a freely available screening tool designed to detect cognitive impairment in small vessel disease (SVD) and to facilitate differentiation from Alzheimer's disease associated deficits. BMET has been evaluated in populations with both MRI confirmed sporadic lacunar stroke and CADASIL and performed better than the MMSE and MOCA in identifying those individuals with SVD who had Vascular Cognitive Impairment (VCI) (*BMC Med.* 2015; 11;13:51). To further validate the BMET, we determined the association of MRI markers of SVD with cognition assessed by the BMET.

Method: We hypothesized that MRI markers of SVD (normalized brain volume, white matter hyperintensities volume and lacune count) would correlate better with the BMET score than the MMSE score. Data from 125 patients with symptomatic lacunar stroke and clinical MRI scans recruited across 19 centres in the UK were analysed, mean age 63.0 (10.6) years.

Results: 37 patients (29%) had VCI, according to published BMET cut-offs. On multiple regression, only lacune count independently correlated with BMET and MOCA. Associations between lacune count were stronger for the BMET (*Beta, 95% CIs; - 0.574, 95%CIs:* -0.881, -0.266) than for the MOCA (-0.482, 95%CIs: -0.816, -0.148) or MMSE (-0.369, 95%CIs: -0.636, -0.102). On further analysis of components of the BMET score, lacune count was found to be a significant and independent predictor of performance on executive function and delayed recall subtests.

Conclusion: Performance on the BMET associates with MRI markers of SVD, more specifically lacune count.

AS26-028

SMALL VESSEL DISEASE & COGNITION

HIPPOCAMPAL ENLARGED PERIVASCULAR SPACES ARE ASSOCIATED WITH AGEING AND POOR COGNITIVE FUNCTION IN HYPERTENSIVE INDIVIDUALS

J. Jiménez Balado[1], I. Riba-Llena[2], B. Gutiérrez[3], F. Pujadas[3] and P. Delgado[4]
[1]VALL D'HEBRÓN INSTITUT DE RECERCA, Neurovascular Research Lab, BARCELONA, Spain
[2]Vall Hebron Research Institute VHIR, Neurovascular, Barcelona, Spain
[3]Hospital Universitario Vall d'Hebron, Dementia Unit, Barcelona, Spain
[4]Vall Hebron Research Institute VHIR, Neurovascular Research Lab, Barcelona, Spain

Background and Aims: The clinical importance of hippocampal enlarged perivascular spaces (H-EPVS) remains uncertain. We aimed to study their association with vascular risk factors (VRF), cognitive function and Mild Cognitive Impairment (MCI).
Method: Data were obtained from the ISSYS cohort which is a prospective study in hypertensive patients aged 50 to 70 without prior stroke or dementia. During clinical evaluation participants underwent the cognitive screening test Dementia Rating Scale-2 (DRS-2) that includes five cognitive subscales: attention, initiation-perseveration, conceptualization or abstract reasoning, construction and memory. Besides, they were diagnosed of MCI or normal cognitive aging following standard criteria.
H-EPVS were counted on brain MRI according to Adams et al. and defined as extensive when H-EPVS count was $\geq$7 (upper quartile). Multivariate models were created to study the relationship between H-EPVS, VRF and cognitive function and diagnosis.
Results: 723 participants, median age was 64 (59–67) and 49% were male. 72 of them (10%) were diagnosed with MCI and 612 (84.6%) had at least 1 H-EPVS (in 26% were extensive). Older age (OR = 1.04, 95%CI: 1.01–1.08) and poor blood pressure treatment compliance (OR = 1.5, 95%CI: 1.07–2.16) were independently associated with extensive H-EPVS. Regarding cognitive function, H-EPVS were negatively correlated to the conceptualization subscale score ($\beta = -0.02$, 95%CI: -0.004, -0.396) but not to other subscale scores. No association was found between H-EPVS and cognitive diagnosis.
Conclusion: H-EPVS were associated with higher age, poor adherence to anti-hypertensive drugs and lower abstract reasoning. However, H-EPVS did not show any relation with MCI.

AS26-030

SMALL VESSEL DISEASE & COGNITION

HIGH INCIDENCE OF ACUTE INCIDENTAL INFARCTS IN SMALL VESSEL DISEASE: A HIGH-FREQUENCY SERIAL IMAGING STUDY

A. ter Telgte[1], K. Wiegertjes[1], A. Tuladhar[1], J. Marques[2], B. Gesierich[3], M. Huebner[3], S. Elias-Smale[4], D. Norris[2], M. Duering[3] and F.E. de Leeuw[1]
[1]Radboud University Medical Centre- Donders Institute for Brain- Cognition and Behaviour- Centre for Neuroscience, Neurology, Nijmegen, The Netherlands
[2]Donders Institute for Brain- Cognition and Behaviour- Centre for Cognitive Neuroimaging, Radboud University, Nijmegen, The Netherlands
[3]Institute for Stroke and Dementia Research, Klinikum der Universität München- Ludwig-Maximilians-University LMU, Munich, Germany
[4]Radboud University Medical Centre, Cardiology, Nijmegen, The Netherlands

Background and Aims: Recently, small acute infarcts on diffusion-weighted imaging (DWI), rather than chronic ischemia, have been proposed as the cause of white matter hyperintensities (WMH). To further unravel the origin of cerebral small vessel disease (SVD), we initiated a high-frequency serial imaging study, with the aim to investigate the monthly incidence of acute infarcts in SVD and their evolution to SVD lesions.
Method: 51 individuals from the RUNDMC study with moderate to severe SVD, as documented on preceding MRIs (2006, 2011, 2015) participated (mean age 70.5 [SD6.3] years, 61% male). Exclusion criteria included large-artery disease, atrial fibrillation, dementia and Parkinson's disease. Monthly, participants underwent a state-of-the-art 3 T MRI protocol, including DWI and FLAIR. DW images (b = 1000 and 3000 s/mm^2) of the first two months were screened for acute infarcts.
Results: 49 individuals completed their first two MRIs. The prevalence of acute infarcts was 4% (n = 2) at baseline. Four individuals (10%) developed seven acute infarcts on their second MRI (one month after baseline). Five acute infarcts were accompanied by a hyperintensity on FLAIR, of which one disappeared in the following month. Individuals with acute infarcts tended to have more progression of WMH between 2006 and 2015 ($p = 0.063$) and had more lacunes in 2015 ($p = 0.040$) than individuals without acute infarcts.
Conclusion: Small acute infarcts are a common finding in individuals with moderate to severe SVD and likely play a pivotal role in the cause of WMH. Our study is able to further unravel the origin of SVD and to follow-up SVD lesions on an almost real-time basis.

AS26-031

SMALL VESSEL DISEASE & COGNITION

THE SPATIAL PATTERN OF WHITE MATTER HYPERINTENSITIES RESULTS FROM THE COMBINATION OF DIFFERENT UNDERLYING MECHANISMS: A CLINICO-RADIOLOGICAL STUDY IN CADASIL

E. Duchesnay[1], H. Chabriat[2], F. Hadj-Selem[1], F. De Guio[3], J.F. Mangin[4], M. Duering[5], M. Dichgans[5] and E. Jouvent[2]
[1]LNAO- Neurospin- I2BM- CEA- Saclay- France, Statistics, Saclay, France
[2]AP-HP- Lariboisière Hosp- Department of Neurology- F-75475 Paris-France and DHU NeuroVasc Paris Sorbonne, Neurology, Paris, France
[3]INSERM, UMRS1161, Paris, France
[4]LNAO- Neurospin- I2BM- CEA- Saclay- France, CATI, Saclay, France
[5]Institute for Stroke and Dementia Research- Klinikum der Universität München- Ludwig-Maximilians-University LMU- Feodor-Lynen-Str. 17- D 81377 Munich- Germany, Neurology, Munich, Germany

Background and Aims: Recent results in CADASIL suggested that white matter hyperintensities (WMH) result from several mechanisms. To better understand these mechanisms, we aimed to determine the sources of variation of the WMH spatial pattern (WMH_SP) and their relationships with clinical severity
Method: We studied the WMH distribution of 301 CADASIL patients with spatially-regularized principal component analysis and used linear regression modelling to predict cognitive performances (Mattis Dementia Rating scale – MDRS) and disability (modified Rankin's scale - mRS). We used analysis of variance to compare models based on variables known to influence clinical severity (age, sex, level of education, brain atrophy, volume of WMH, volume of lacunes and number of microbleeds) to others also including the 3 main sources of variations of WMH_SP
Results: The first source of variation (PC1, see fig1) appeared to reflect of the global extent of WMH while PC2 and PC3 revealed that different sources modulate the whole WMH_SP. For both MDRS and mRS, models including sources of variations of WMH_SP performed better than those

without ($p < 0.01$ for both). Voxels highlighted in blue in PC2 and PC3 were independently associated with milder clinical scores

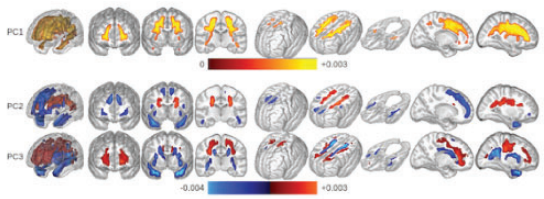


Figure 1: Weight maps corresponding to the 3 principal components (PC). The first component PC1 is exclusively positive and seems to parallel the global burden of white matter hyperintensities. The 2 other components, PC2 and PC3 comprise blue and red voxels that are inversely correlated (the presence of blue voxels is associated with the absence of red voxels). The spatial pattern of white matter hyperintensities for each patient can be reconstructed by integrating the effect of PC1 modulated by that of PC2 and PC3.

Conclusion: Sources of variations of WMH_SP reveal various links with the clinical status, supporting the hypothesis that the whole WMH burden results from the combination of various spatially determined mechanisms

AS26-033

SMALL VESSEL DISEASE & COGNITION

ON THE SVD CROSSROAD; BRAIN ATROPHY AS A SIGNPOST TO EITHER MOTOR OR COGNITIVE DECLINE

M. Bergkamp[1], E. van Leijsen[1], M. Ghafoorian[1,2], H. van der Holst[1], I. van Uden[1], D. Norris[3,4], B. Platel[5], A. Tuladhar[1], F.E. de Leeuw[1] and E. van Dijk[1]
[1]Radboudumc, Neurology, Nijmegen, The Netherlands
[2]Radboud University, Institute for Computing and Information Sciences, Nijmegen, The Netherlands
[3]Donders Institute for Brain- Cognition and Behaviour, Centre for Cognitive Neuroimaging, Nijmegen, The Netherlands
[4]University of Duisburg-Essen, Erwin L. Hahn Institute for Magnetic Resonance Imaging, Essen, Germany
[5]Radboudumc, Radiology, Nijmegen, The Netherlands

Background and Aims: Despite similarities in imaging, the clinical symptoms of patients with cerebral small vessel disease (SVD) patients are heterogeneous and include both cognitive and motor disturbances. We investigated whether, apart from SVD, grey or white matter atrophy drives the development towards decline in motor or cognitive function.
Method: 366 participants from the prospective RUN DMC study were included for the current analysis. The Mini Mental State examination and the motor part of the Unified Parkinson's Disease Rating Scale were used to assess decline in cognitive and motor function during a 9-year follow-up. Brain atrophy for quartiles of decline were calculated with linear mixed effect analysis, adjusted for age, gender and baseline WMH volume.
Results: Baseline mean age was 64 year (SD 8.5), 54.9% were male and median WMH volume was 2.8 mL (IQR 0.9–8.7). Patients who experienced the most rapid decline in primarily motor function had a significantly higher mean annual atrophy of normal appearing white matter (4.7 mL, 95%CI 3.8–5.6) than those with primarily cognitive decline (2.0 mL, 95%CI 1.2–2.8; $p < 0.001$). In contrast, mean annual grey matter atrophy rates were similar between those with primarily motor function decline (2.7 mL, 95%CI 1.8–3.6) and those with primarily cognitive decline (2.6 mL, 95%CI 1.9–3.4).
Conclusion: In SVD patients with similar SVD burden, especially white matter atrophy may determine the direction at the crossroad of development of clinical symptoms.

AS26-035

SMALL VESSEL DISEASE & COGNITION

NEUROIMAGING MARKERS OF CEREBRAL SMALL VESSEL DISEASE IN PATIENTS WITH SPONTANEOUS CEREBELLAR HEMORRHAGE

M. Pasi[1], A. Charidimou[1], P. Fotiadis[1], A. Morotti[1], G. Boulouis[2], L. Xiong[1], A. Ayres[1], A.D. Warren[1], J.N. Goldstein[3], J. Rosand[3], M.E. Gurol[1], S.M. Greenberg[1] and A. Viswanathan[1]
[1]Massachusetts General Hospital- Harvard Medical School, J. Philip Kistler Stroke Research Center, Boston, USA
[2]Université Paris-Descartes- INSERM UMR 894, Department of Neuroradiology- Centre Hospitalier Sainte-Anne, Paris, France
[3]Massachusetts General Hospital- Harvard Medical School, Division of Neurocritical Care and Emergency Neurology, Boston, USA

Background and Aims: Cerebellar hemorrhage can be associated with both cerebral amyloid angiopathy (CAA) and hypertensive small vessel disease (HTN-SVD), which have distinctive neuroimaging profile. In order to better understand the etiology of cerebellar hemorrhage, we aimed to evaluate the SVD neuroimaging profiles of patients with cerebellar hemorrhage.
Method: We enrolled consecutive cerebellar hemorrhage patients presenting to a single center. Clinical variables and MRI-based markers of SVD were assessed. These included cerebral microbleed (MB) location, white matter hyperintensity severity (WMH; Fazekas scale), enlarged perivascular spaces (EPVS) location (Basal Ganglia [BG], Centrum Semiovale [CSO]) and severity (>20), and presence of lacunes. Patients were classified into categories according to the topography of MB defined as strictly-lobar, strictly-deep, and mixed. Two multivariate models were performed to evaluate clinical and MRI-predictors of mixed-MB presence.
Results: Ninety-four patients with cerebellar hemorrhage were enrolled. Fifty-three percent of patients showed moderate/severe WMH, 40 percent had lacunes, and severe EPVS were more frequent in BG than in CSO (30% vs 10%). Ten patients had strictly-lobar MB meeting Boston criteria for probable-CAA, while 12 patients showed strictly-deep MB. Mixed-MB were present in 25 cerebellar hemorrhage patients. In multivariate analyses, the presence of mixed-MB was positively associated with history of hypertension, WMH and BG-EPVS while it was negatively associated with CSO-EPVS (all $p < 0.05$).
Conclusion: The majority of cerebellar hemorrhage patients did not present a clear predominant microangiopathy pattern suggestive of a single SVD pathology. In contrast to supratentorial intracerebral hemorrhage, the majority of cerebellar hemorrhage patients with MB showed a mixed lobar and deep distribution.

AS26-036

SMALL VESSEL DISEASE & COGNITION

BENIGN CLINICAL COURSE IN PATIENTS WITH REGRESSION OF SMALL VESSEL DISEASE

E. van Leijsen[1], M. Bergkamp[1], I. van Uden[1], K. Wiegertjes[1], H. van der Holst[1], M. Ghafoorian[2], B. Platel[2], D. Norris[3], A. Tuladhar[1] and F.E. de Leeuw[1]
[1]Radboudumc - Donders institute for Brain - Cognition and Behaviour, Neurology, Nijmegen, The Netherlands
[2]Radboudumc- Diagnostic Image Analysis Group, Department of Radiology and Nuclear Medicine, Nijmegen, The Netherlands
[3]Radboud University- Donders Institute for Brain- Cognition and Behaviour, Centre for Cognitive Neuroimaging, Nijmegen, The Netherlands

Background and Aims: Recent studies have shown that neuroimaging markers of cerebral small vessel disease (SVD) can also regress over time. If, and how, regression affects clinical outcome remains to be established. We investigated the clinical correlates of SVD regression in a cohort of elderly with SVD.
Method: 264 participants of the RUNDMC study underwent neuroimaging and cognitive assessments at three time-points over 8.7 years. We assessed WMH volumes semi-automatically and rated lacunes and microbleeds manually. We analyzed differences in neuroimaging characteristics and cognitive decline between participants with regression, progression and without progression or regression (reference group) using ANOVA and Chi-square tests.
Results: 53 participants (20.1%) showed regression of SVD markers: 29 participants (11.0%) showed WMH regression, 9 (3.4%) vanishing lacunes and 27 (10.2%) vanishing microbleeds. 19 of these participants (7.2%) showed only regression of SVD markers. In participants with regression gray matter and total brain volumes were comparable or slightly higher compared to the reference group and significantly higher compared to participants with progression ($p < 0.05$). We observed lower gray matter, hippocampus and total brain volume in participants with progression ($p < 0.01$ vs. reference group). Participants with regression showed equal or less decline in cognitive index, memory and psychomotor speed domains compared to the reference group and less decline compared to the progression group ($p < 0.01$).
Conclusion: SVD burden can diminish over time. Regression of SVD markers was associated with equal or less decline in cognitive performance, suggesting that SVD regression follows a relatively benign clinical course.

AS26-038

SMALL VESSEL DISEASE & COGNITION

SUBTLE FLAIR WHITE MATTER INTENSITY CHANGES ON NORMAL APPEARING WHITE MATTER ARE CORRELATED WITH BURDEN OF LEUKOARAIOSIS

P. Cougo[1] and O. Pontes-Neto[2]
[1]Ribeirão Preto Medical School, Neurosciences and Behavior Sciences, Rio de Janeiro, Brazil
[2]Ribeirão Preto Medical School, Neurosciences and Behavior Sciences, Ribeirão Preto, Brazil

Background and Aims: INTRODUCTION. Leukoaraiosis underlies the pathophysiology of lacunar stroke and vascular cognitive decline, and has been throughly associated with worse clinical and tissue outcomes after stroke. Recent studies have shown, however, that microstructural white matter damage predates visible leukoaraiosis. We hypothesized that patients with higher burden of leukoaraiosis would also present subtle white matter intensity changes in regions of normal appearing white matter (NAWM).
Method: METHODS. We selected consecutive adult patients from out stroke clinic with a diagnosis of ischemic stroke of transient ischemic attack within the last 12 months and with available MRI. Leukoaraiosis was segmented manually using a threshold of four standard deviations above mean signal intensity of normal white matter from the splenium. White matter probability masks from the International Consortium for Brain Mapping atlas were coregistered to subject scans and used for white matter segmentation. Leukoaraiosis was excluded from white matter masks to obtain final NAWM regions.
Results: RESULTS. Among 71 eligible patients, NAWM signal intensity was correlated with leukoaraiosis volume (rho = 0,25; P = 0,04). Regions of higher signal intensity on NAWM was observed on regions adjacent to leukoaraiosis, but also on central white matter non-contiguous with diseased white matter. NAWM signal intensity was not associated with classic risk factors for small vessel disease.
Conclusion: CONCLUSION. Subtle white matter intensity changes are present on NAWM and are correlated with the burden of leukoaraiosis, but not with classic risk factors for small-vessel disease. Such changes could represent an early marker of small-vessel disease injury related to disease activity.

AS17-007

STROKE PROGNOSIS

IS PALLIATIVE CARE APPROPRIATE FOR ALL PEOPLE AFTER MAJOR STROKE?

M. Barber[1], M. Kendall[2], E. Cowey[3], S. Borthwick[4], K. Boyd[2], C. McAlpine[5], D. Stott[6], G. Mead[7] and S. Murray[2]
[1]NHS Lanarkshire, Stroke MCN, Airdrie, United Kingdom
[2]Edinburgh University, Primary Palliative Care Research Group, Edinburgh, United Kingdom
[3]Glasgow University, Nursing and Health Care, Glasgow, United Kingdom
[4]NHS Lothian, Speech and Language Therapy Services, Edinburgh, United Kingdom
[5]Glasgow Royal Infirmary, Geriatric Medicine, Glasgow, United Kingdom
[6]Glasgow University, Geriatric Medicine, Glasgow, United Kingdom
[7]Edinburgh University, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: The prognosis of people with total anterior circulation strokes (TACS) is as poor as many cancers, yet they are rarely identified for a palliative care approach. We aimed to describe their experiences and unmet multi-dimensional needs.
Method: We conducted serial qualitative interviews with patients from 3 Scottish regions and their informal and professional carers at 6, 26 and 52 weeks. Patients, when able, completed the Patient Outcome Scale and the Euroqol5D-5L, and carers the Carer Strain Index. We conducted a data linkage study of TACS patients in the same regions.
Results: We conducted 99 interviews with 29 patients and their carers. 19 patients died. Patients and carers faced life and death decisions from the onset; patients experienced anxiety, pain and difficulty adapting to hospital life. Uncertainty about the future and the sudden onset made good communication vital. Transition home or to care home often brought a feeling of abandonment. Patients and families wished ongoing support, with aphasia causing particular challenges. Adapting to new roles and identities and accessing various resources took time. Participants found it difficult to discuss and plan for the future. Data linkage (n = 219) showed that 60% of TACS patients died within 12 months, of whom 92% died in hospital.
Conclusion: Death is common in TACS stroke. We obtained a rich understanding of participants' experiences, needs and wishes. Improving communication, assessment, and planning were key themes. Integrating the WHO principles of 'palliative care' into stroke care could improve people's quality of life and death after major stroke.

AS17-009

STROKE PROGNOSIS

WEAKNESS OF EYE CLOSURE WITH CENTRAL FACIAL PARALYSIS AFTER UNILATERAL HEMISPHERIC STROKE PREDICTS A WORSE OUTCOME

Y. Chen[1], J. Lin[2], H. Wen[3], Z. Yang[4] and J. Zeng[2]
[1]The First Affiliated Hospital- Sun Yet-sen University, Department of Stroke and Neurology Center, Guangzhou, China

[2]The First Affiliated Hospital- Sun Yat-sen University, Department of Stroke and Neurology Center, Guangzhou, China
[3]The Third Affiliated Hospital- Sun Yat-sen University, Department of Rehabilitation Medicine, Guangzhou, China
[4]The First Affiliated Hospital- Sun Yat-sen University, Department of Radiology, Guangzhou, China

Background and Aims: For patients with unilateral hemispheric stroke, upper facial dysfunction is not generally considered a feature of central facial paralysis, however, weakness of eye closure (WEC) has been observed in some cases. The present study aimed to investigate the frequency and characteristics of WEC in unilateral stroke, and its association with stroke prognosis.
Method: Patients with unilateral stroke and central facial paralysis were recruited within 7-days of onset. Facial paralysis was evaluated via the fourth item in the National Institute of Health Stroke Scale (NIHSS-4) and the Japan Facial Score (JFS) on admission, and days 7, 14, 21, and 30 after stroke. Eye closure strength was measured daily using an ergometer over 30 days. Primary outcome was assessed using the modified Rankin Scale (mRS) at 90 and 180 days post-stroke. Univariate and multivariate analyses were performed to investigate risk factors of WEC.
Results: WEC was identified in 16 of 242 patients (6.6%). Baseline characteristics, stroke risk factors, and lesion volume were balanced between WEC and non-WEC patients. WEC patients featured higher NIHSS-4 scores and lower JFS between admission and 21 days. Severe central facial paralysis (odds ratio [OR] = 8.1, 95% conference interval [CI] = 2.3–28.6, P = .001) and right hemispheric stroke (OR = 13.7, 95% CI = 3.7–51.2, P < .001) were potential predictors of WEC. At 180 days, WEC patients demonstrated a lower rate of functional independence (mRS = 0–2: 37.5% versus 72.1%, P < .001).
Conclusion: WEC, which predicts a worse functional outcome at 180 days after unilateral stroke, demonstrates an association with severe central facial paralysis and right hemispheric stroke.

AS17-010

STROKE PROGNOSIS

ROLE OF BLOOD LEUKOCYTE COUNT AS A BIOMARKER FOR PREDICTING OUTCOME AFTER SPONTANEOUS INTRACEREBRAL HEMORRHAGE: A PROSPECTIVE COHORT STUDY

S. Misra[1], A. Kumar[1], D. Vibha[1], D. Mohania[2], R. Sagar[1] and K. Prasad[1]
[1]All India institute of Medical sciences, Department of Neurology, New Delhi, India
[2]All India institute of Medical sciences, RP Centre, New Delhi, India

Background and Aims: Background: After spontaneous intracerebral hemorrhage (sICH), increase in peripheral leukocytes is considered as an important marker of response of immune system.
Aim: To determine whether total leukocyte count (TLC) can predict the neurological outcome in patients with intracerebral hemorrhage within 72 hours' onset.
Method: In a prospective cohort study, patients with ICH were recruited after obtaining written informed consent. Venous blood samples (3 ml) were collected and automated cell counter method was used for the assessment of leukocyte count. All the patients were telephonically followed using the modified Rankin Scale (mRS) at 3 months by an observer blinded to the baseline clinical and leukocyte count data. All the statistical analyses were performed in STATA software (Version 13.1).
Results: A total of 338 ICH patients were recruited in the study. The mean age of patients was 56.19 ± 13.63. After performing the logistic regression analysis, high leukocyte count at a cut-off value of 10900 cells/μl was found to be significantly predictive of 90-day mortality after sICH (OR 1.73; 95% CI 1.11 to 2.72; p = 0.015). A higher leukocyte count within 72 hours was also significantly predictive of poor outcome (mRS: 4 to 6) after 90 days (OR 1.83; 95% CI 1.10 to 3.06; p = 0.02).
Conclusion: Our findings clearly suggest that a higher leukocyte count within 72 hours is an important prognostic biomarker for death and poor outcome after 90-day follow up. The study might have clinical implications by using TLC as a prognostic biomarker for patient stratification and early intervention.

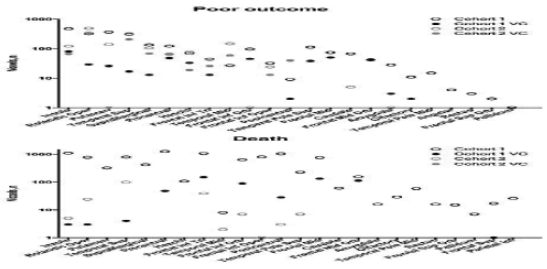
AS17-011

STROKE PROGNOSIS

PROGNOSTIC SIGNIFICANCE OF INSULAR STROKE: A VOXEL-BASED LESION SYMPTOM MAPPING ANALYSIS

C. Laredo[1], X. Urra[1], J.C. Pariente[1], Y. Zhao[1], S. Rudilosso[1], A. Renú[1] and Á. Chamorro[1]
[1]Hospital Clínic- Barcelona, Functional Unit of Cerebrovascular Diseases, Barcelona, Spain

Background and Aims: The insular cortex is involved in many functions, and strokes involving the insula have been associated with diverse complications. However, some investigators have argued that these associations could only reflect the greater severity of insular strokes.
Method: In two independent cohorts of patients with supratentorial ischemic stroke (n = 90 and 127), we used voxel-based lesion symptom mapping in MRI images to study whether lesions of the insula (and other brain areas in the Automated Anatomical Labeling atlas) were associated with poor outcome (modified Rankin Scale > 2) and death. The analyses were repeated after volume control (VC), which better accounts for total lesion volume, and after flipping all lesions to the same side to increase the statistical power of the study.
Results: Strokes affecting the insula (63% and 67% in each cohort) were significantly larger. Both the left and right insula were overrepresented in patients with poor outcome and death, but only the left insula remained associated in voxel-based lesion symptom mapping analysis. The relationship between the number of voxels associated with each outcome in the insula (and a number of other areas) was more consistent with poor outcome than with death, especially after VC (Figure).



Conclusion: Strokes affecting the left insula are at higher risk of poor outcome and death. The association is greater with poor outcome and is independent of the infarct volume.

AS17-012

STROKE PROGNOSIS

PRE-TREATMENT PREDICTORS OF MALIGNANT EVOLUTION IN PATIENTS WITH ISCHEMIC STROKE UNDERGOING MECHANICAL THROMBECTOMY

A. Davoli[1], C. Motta[1], G. Koch[1], M. Diomedi[1], S. Napolitano[1], A. Giordano[1], M. Panella[1], D. Morosetti[2], S. Fabiano[2], R. Floris[2], R. Gandini[2] and F. Sallustio[1]

[1]Tor Vergata Hospital, Neuroscience- Stroke Center, Roma, Italy
[2]Tor Vergata Hospital, Diagnostic Imaging - Interventional Radiology and Neuroradiology, Roma, Italy

Background and Aims: Few data exist on malignant middle cerebral artery infarction (MMI) among patients with acute ischemic stroke (AIS) after endovascular treatment (ET). Numerous predictors of MMI evolution have been proposed, but a comprehensive research including only patients undergoing ET has not been performed. Our purpose was to find an accurate practical model able to determine robust predictors of MMI in patients undergoing ET.

Method: Patients from a prospective single-centre database with AIS secondary to large intracranial vessels occlusion of the anterior circulation, treated with ET, were included in the analysis. We investigated demographic, clinical and radiological data. Multivariate regression analysis was used to identify clinical and imaging predictors of MMI.

Results: 98 patients were included in the analysis, 35 developing MMI (35.7%). No differences in rate of successful reperfusion and in time from stroke onset to reperfusion are found between MMI and non-MMI group. The following parameters were identified as independent predictors of MMI: Systolic Blood Pressure (SBP) on admission ($P = 0.008$), Blood Glucose (BG) on admission ($P = 0.024$) and the CTA ASPECTS ($P = 0.001$). A score ≤ 5 in CTA ASPECTS was the best cut-off to predict MMI evolution (sensitivity 46%; specificity 97%; positive predictive value 78%; negative predictive value 65%).

	MMI Patients (n=35)	Non-MMI Patients (n=63)	P-Value
Intravenous thrombolysis (%)	26 (74.2)	37 (58.7)	0.186
Time from stroke onset to groin puncture min, mean (SD)	234.94 ±62.90	230.94 ±77.85	0.794
Time from stroke onset to reperfusion, min, mean (SD)	313.54 ±60.89	312.11±80.06	0.926
Number of device passages, mean (SD)	2.91±1.77	2.56±1.55	0.300
Successful reperfusion (TICI ≥2b) (%)	22 (62.8%)	42 (66.6%)	0.825

	MMI Patients (n=35)	Non-MMI Patients (n=63)	P-Value
NNCT ASPECTS, median (IQR)	6 (4-10)	9 (7-10)	0.0001
CTA ASPECTS, median (IQR)	2 (1-4)	5 (3-7)	0.0001
CTA P-ICF (%)	24 (68.5)	15 (23.8)	0.0001
CA P-ICF (%)	28 (80)	15 (23.8)	0.0001
Tandem ICA+MCA occlusion rate (%)	15 (42.8)	24 (38)	0.672
Haemorrhagic transformation (%)	24 (68.5)	20 (31.7)	0.001
HI-1 (%)	3 (12.5)	2 (10)	1.0
HI-2 (%)	2 (8.3)	8 (40)	0.027
PH-1 (%)	7 (29.2)	5 (25)	1.0
PH-2 (%)	12 (50)	5 (25)	0.12

	OR	95% CI	P-Value
Model 1 – without imaging [n=98]			
AUC 0.779 Correct classifications: 73/98 (74.4%)			
Systolic blood pressure on admission [mmHg]	0.970	0.951-0.989	0.002*
Blood glucose on admission [mg/dl]	0.989	0.979-0.999	0.036*
NIHSS on admission [per point]	0.852	0.748-0.971	0.017*
Model 2 – including ICF CTA [n=98]			
AUC 0.843 Correct classifications: 78/98 (79.6%)			
ICF CTA (dichotomized P-ICF / G-ICF)	7.391	2.441-22.376	<0.0001*
Systolic blood pressure on admission [mmHg]	0.966	0.947-0.986	0.001*
Blood glucose on admission [mg/dl]	0.991	0.981-1.001	0.099
NIHSS on admission [per point]	0.926	0.801-1.072	0.309
Model 3 – including ICF CTA and CTA ASPECTS [n=98]			
AUC 0.892 Correct classifications: 81/98 (82.6%)			
CTA ASPECTS [per point]	1.640	1.216-2.212	0.001*
ICF CTA (dichotomized P-ICF / G-ICF)	2.372	0.651-8.647	0.190
Systolic blood pressure on admission [mmHg]	0.971	0.950-0.992	0.008*
Blood glucose on admission [mg/dl]	0.987	0.976-0.998	0.024*
NIHSS on admission [per point]	0.970	0.824-1.141	0.714

Conclusion: Early clinical and radiological findings are useful to create a practical model able to strongly predict MMI evolution of AIS; the presence of high SBP and BG on admission, associated to a CTA ASPECTS ≤ 5 may help in making quickly decisions, independently of time to treatment and successful reperfusion.

AS17-019

STROKE PROGNOSIS

DAILY LIFE IMPACT, COGNITIVE IMPAIRMENT, AND FATIGUE AFTER TRANSIENT ISCHEMIC ATTACK: CASE AND CONTROL STUDY

J.M. Ramirez-Moreno[1], P.J. Muñoz Vega[2], S. Bartolomé Alberca[3], D. Peral Pacheco[4], A.B. Constantino-Silva[2] and A.M. Roa Montero[2]

[1]Hospital Universitario Infanta Cristina., Neurology. Department of Biomedical Sciences. UNEX., Badajoz, Spain
[2]Hospital Universitario Infanta Cristina., Neurology. Stroke Unit., Badajoz, Spain
[3]Hospital Universitario Infanta Cristina., Neurology. Division Clinical Neuropsychology., Badajoz, Spain
[4]University of Extremadura, Terapéutica Medico Quirúrgica, Badajoz, Spain

Background and Aims: Studies suggest that fatigue and cognitive impairment may be present after transient ischemic attack (TIA), but little is known about consequences in daily life. The main aim was to explore the presence of fatigue, cognitive impairment, and consequences in daily life after clinically diagnosed TIA at 3 months after the event.

Method: This was a prospective cohort study of TIA patients admitted to stroke unit. Patients ($n = 43$, mean age 57.8) were assessed within 2

weeks of hospital admission for first-ever TIA and 3 months later. The controls (n = 30, mean age 56,6) were selected from relatives who attended the study hospital and without previous stroke. Measures included the Fatigue Assessment Scale (FAS) and Montreal Cognitive Assessment (MOCA). The EQ-5D-5L was used to assess health-related quality of life.

Results: The level of fatigue in patients with TIA was considerably higher than in healthy controls (30,3 vs 19,1; $P < 0.0001$). Using the healthy controls as a reference group, logistic regression revealed that patients with TIA were at 1.5 times greater risk (OR = 1.49 95%IC = 1.20–1.84; $P < 0.0001$) for having fatigue symptoms. Among TIA patients, 32(76,2%) complained of cognitive symptoms vs 3(9,7%) of controls ($p < 0,0001$). FAS showed the strongest negative correlation score with the quality of life ($r = -0.639$; $p < 0,0001$), higher levels of fatigue are associated with lower cognitive performance ($r = -0.336$; $p < 0.005$) and the correlation between MOCA, and EQ-5D-5L was significantly positive ($r = 0.401$; $p < 0.0001$).

Conclusion: Fatigue and cognitive impairment were common problems observed in TIA patients at 3 months after the event, and they are clearly related with a daily life impact.

AS17-020

STROKE PROGNOSIS

COGNITIVE IMPAIRMENT FOLLOWING TRANSIENT ISCHAEMIC ATTACK: CASE-CONTROL STUDY

J.M. Ramirez-Moreno[1], S. Bartolomé Alberca[2], P. Muñoz Vega[1] and E. Guerrero Barona[3]

[1]Hospital Universitario Infanta Cristina., Neurology. Department of Biomedical Sciences. UNEX., Badajoz, Spain

[2]Hospital Universitario Infanta Cristina., Neurology. Neuropsychology Division. Stroke Unit., Badajoz, Spain

[3]Extremadura University, Psicología y Antropología. Facultad de Educación., Badajoz, Spain

Background and Aims: By definition, the symptoms of a transient ischemic attack (TIA) subside completely within 24 hours. Imaging studies show signs of persistent ischemic tissue damage in a substantial amount of patients with TIA. Cerebral infarction can cause permanent cognitive impairment. This study aimed to study cognitive functions post-TIA using a Neuropsychological battery. The Neuronorma Battery includes the selection of frequently used tests that covers the main domains of cognitive abilities: attention, work memory, mental control, psychomotor speed, language, visuo-perceptive and constructive capacities, memory and executive functions.

Method: Patients with TIA aged 40 to 70 years without prior stroke or dementia underwent comprehensive neuropsychological testing within 3 months. Z scores per cognitive domain were obtained, based on the mean of a control group within the same age range. Cognitive impairment was defined using the Petersen method and subclassified as single or multiple domain, both with and without subjective memory impairment. All patients underwent MRI brain imaging.

Results: Forty three patients with TIA (30.2% women, mean age, 58.8y) were included and compared with 31 controls (48.4% women, mean age, 56.6y). Patients performed worse on all cognitive domains. Seventy-four percent of patients with TIA vs. 13.3% of controls had neuropsychological abnormalities ($p < 0.0001$). Total numbers with mild cognitive impairment in TIA patients and with the different subtypes: non-amnestic single-domain (n = 2), amnestic single-domain (n = 10), amnestic multiple-domain (n = 19), non-amnestic multiple-domain (n = 3).

Conclusion: Almost three third of patients with TIA have impairment of at least a cognitive domain within 3 months after their TIA. The affected domains fit in the vascular cognitive impairment profile.

AS17-021

STROKE PROGNOSIS

AUTONOMIC DYSFUNCTION PREDICTS CLINICAL OUTCOME AFTER ACUTE ISCHEMIC STROKE: A PROSPECTIVE OBSERVATIONAL STUDY

L. Xiong[1], G. Tian[1], H. Leung[1], X. Chen[1], T. Leung[1] and K.S. Wong[1]

[1]The Chinese University of Hong Kong, Medicine & Therapeutics, Shatin-N.T., Hong Kong S.A.R.

Background and Aims: Central autonomic dysfunction increases the risk of mortality after stroke. We aimed to investigate whether the severity of autonomic dysfunction as classified by Ewing's battery test can predict poor outcome after acute ischemic stroke.

Method: In this prospective observational study we enrolled consecutive ischemic stroke patients within 7 days of symptom onset. Autonomic function was assessed by Ewing's battery tests. We dichotomized the severity of autonomic dysfunction into two groups: severe (definite, severe or atypical) and minor (normal or early). Modified Rankin Scale (mRS) (good outcome: mRS 0 ~ 2; poor outcome: mRS 3 ~ 6) was evaluated 3 months after index stroke.

Results: 150 patients were recruited (mean age, 66.4 ± 9.9 years; 70.7% males). From Ewing's battery of autonomic function tests, minor autonomic dysfunction was identified in 36 patients (24.0%) and severe autonomic dysfunction was identified in 114 patients (76.0%), respectively. At month 3, a poor functional outcome was found in 32.5% of severe group patients compared to 13.9% in the minor group ($P = 0.031$). Crude odds ratios (ORs) of the severity of autonomic dysfunction and 3-month unfavorable functional outcome after acute ischemic stroke were 2.979 (95% CI, 1.071–8.284; $P = 0.036$). After adjusting for confounding factors such as diabetes mellitus and ischemic heart disease, which were the 2 variables affecting autonomic dysfunction, the severity of autonomic dysfunction still showed significant association with unfavourable outcome, with ORs of 3.171 (95% CI, 1.116–9.009; $P = 0.030$).

Conclusion: The severity of autonomic dysfunction as measured by Ewing's battery test predicts poor clinical functional outcome after acute ischemic stroke.

AS17-022

STROKE PROGNOSIS

PREMORBID MALNUTRITION AS ASSESSED BY NUTRITIONAL RISK INDEX PREDICTS POOR SHORT-TERM FUNCTIONAL OUTCOME IN PATIENTS WITH ACUTE ISCHEMIC STROKE

T.J. Kim[1], M.K. Kang[1], C.H. Lee[1], H. Mo[1], H.Y. Jeong[1], S.B. Ko[1] and B.W. Yoon[1]

[1]Seoul National University Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: Malnutrition has negative consequences for stroke patients. Therefore, we investigated the prognostic role of premorbid undernutrition using objective assessment method, Nutritional Risk Index (NRI), in patients with ischemic stroke.

Method: A consecutive 1,248 patients who were admitted within 7 days after ischemic stroke onset between March 2010 and December 2015 were included. The patients were categorized into three groups on the basis of NRI [No risk (NRI > 97.5), Moderate risk (NRI 83.5–97.5), and Severe risk (NRI < 83.5)]. We evaluated the short-term outcomes using a modified Rankin Scale (mRS) at three-months after stroke onset. We divided patients into two groups with favorable outcome (mRS score ≤ 2)

and unfavorable outcome (mRS score ≥ 3). We compared clinical characteristics and NRI between two groups.
Results: Among the included patients (mean age, 67 years, male, 63.1%), 322 (25.8%) patients had unfavorable outcome. The unfavorable outcome group was older and more likely to have atrial fibrillation, lower body mass index, and higher initial NIHSS. The lower NRI patients (Moderate risk and Severe risk) were more frequent in unfavorable outcome group (50.7% vs. 32.0% and 12.7% vs. 2.7%, $P < 0.001$). After adjustment for covariates, lower NRI groups were independently associated with a higher risk of unfavorable outcome [Odds ratio (95% confidence interval); Moderate risk 2.75 (1.23 – 6.13); Severe risk 4.29 (1.93 – 9.62), P for trend <0.001].
Conclusion: This study demonstrated that the lower NRIs predicted unfavorable outcome at 3 months following ischemic stroke. This suggests that premorbid undernutrition could be a modifiable risk factor for prognosis following stroke.

AS17-023

STROKE PROGNOSIS

IMPAIRED CEREBRAL VENOUS DRAINAGE IS NOT ASSOCIATED WITH POOR OUTCOME IN PATIENTS WITH SPACE-OCCUPYING MIDDLE CEREBRAL ARTERY INFARCTION

V. Puetz[1], J. Gerber[2], P. Krüger[3], M. Kuhn[4], H. Reichmann[1] and H. Schneider[1]
[1]University Hospital- TU Dresden, Dept. of Neurology, Dresden, Germany
[2]TU Dresden, Dept. of Neuroradiology, Dresden, Germany
[3]Klinikum Dortmund, Dept. of Anesthesiology, Dortmund, Germany
[4]TU Dresden, Institute for Medical Informatics and Biometry, Dresden, Germany

Background and Aims: Space-occupying infarction occurs in up to 10% of all patients with supratentorial stroke. Venous drainage of cerebral blood is variable and might influence brain edema characteristics and functional outcome of patients with severe ischemic stroke. The objective was to evaluate whether impaired venous drainage is associated with poor functional outcome in patients with space-occupying middle cerebral artery (MCA) infarction and decompressive surgery.
Method: We performed a retrospective analysis of patients with space-occupying MCA infarction treated with decompressive surgery. Baseline imaging data were evaluated for venous drainage by internal jugular veins (IJV) and transverse sinuses (TS). Composite variables for drainage were defined (ipsilateral, contralateral and overall hypoplasia/aplasia of IJV or TS). We assessed functional outcome at 12 months with the modified Rankin scale (mRS) score dichotomized into mRS scores 0–4 and 5–6 (poor outcome).
Results: We identified and analyzed 88 patients with complete baseline imaging data sets (mean patient age 52.8+/-8.6 years; median time to decompressive surgery 30.5[22–51] hours). At 12 months 43 patients (48.9%) had a poor outcome. Impaired venous drainage was not associated with poor functional outcome, either if impaired ipsilaterally ([OR 1.98; 95%CI 0.75–5.40), contralaterally (OR 1.56; 95% CI 0.59–4.24) or overall (OR 1.6; 95%CI 0.68–3.79). In multivariate analyses, higher patient age and baseline stroke severity were independent predictors of poor functional outcome, but not an impaired venous drainage.
Conclusion: Impaired cerebral venous drainage was not associated with poor functional outcome in our cohort of patients with space-occupying MCA infarction.

AS17-026

STROKE PROGNOSIS

ONE YEAR SURVIVAL OF VERY OLD ISCHEMIC STROKE PATIENTS

A. Brito[1], A. Leitão[2], J. Pinho[3], R. Costa[4], J. Araújo[3], J. Nuno Alves[3], I. Pinho[2] and C. Ferreira[3]
[1]Hospital Conde de Bertiandos- Unidade Local de Saúde do Alto Minho, Internal Medicine 2 Department, Ponte de Lima, Portugal
[2]Hospital de Santa Maria Maior, Internal Medicine Department, Barcelos, Portugal
[3]Hospital de Braga, Neurology Department, Braga, Portugal
[4]University of Minho, School of Medicine, Braga, Portugal

Background and Aims: Ageing of the European population will have a significant impact in the global burden of disease and, specifically, in ischemic stroke associated burden. We aimed to study clinical characteristics and medium-term survival of very old ischemic stroke patients.
Method: Retrospective cohort of consecutive ischemic stroke patients admitted in a university hospital in 2013. Clinical characteristics were collected from medical records. Survival during the first year after stroke was assessed using the Portuguese electronic Health Data Platform. Very old patients ($\geq$85 years) were compared to younger patients ($<$85 years) using univariate analyses, Kaplan-Meier curves and Cox regression models.
Results: Among the 554 ischemic stroke patients included, 146 (26.4%) were very old patients. Very old patients more frequently had arterial hypertension, heart failure and previous ischemic stroke, and less frequently had dyslipidemia or smoked. Older patients presented more severe neurological deficits at admission and less frequently received intravenous thrombolysis. Cardioembolism was more frequent in very old patients and small vessel disease was more frequent in younger patients. One-year mortality was higher in older patients (55.2% Vs. 21.8%). Severity of neurological deficits at admission, admission glucose, cardioembolism and age as a continuous variable were the only independent predictors of one-year mortality.
Conclusion: Very old patients consisted of 1/4 of all ischemic stroke patients in our cohort and have a different profile of vascular risk factors and stroke etiologies. Higher frequency of cardioembolism and more severe deficits at admission may explain the higher one-year mortality in older patients.

AS17-028

STROKE PROGNOSIS

PROSPECTIVE ANALYSIS OF ELECTROENCEPHALOGRAPHIC PREDICTORS OF SEIZURE RECURRENCE IN STROKE SURVIVORS

S. Abe[1], T. Tanaka[1], H. Ishiyama[1], Y. Nakamura[2], T. Nakamura[1], T. Arimizu[2], S. Matsubara[2], Y. Yamaguchi[2], K. Nagatsuka[3], K. Toyoda[2] and M. Ihara[1]
[1]National Cerebral and Cardiovascular Center, Department of Neurology, Osaka, Japan
[2]National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Osaka, Japan
[3]National Cerebral and Cardiovascular Center, Department of Neurology and Clinical laboratory department, Osaka, Japan

Background and Aims: Post-stroke epilepsy (PSE) is a severe sequelae in stroke survivors. Stroke survivors have high rates of incidence (approximately 7%) and recurrence of PSE. However, few studies have

determined a role of electroencephalogram (EEG) in predicting seizure recurrence.

Method: Between November 2014 and June 2016, we enrolled stroke survivors admitted to our hospital due to seizure. Individuals were screened for confirmation of the diagnosis of PSE with MRI, EEG, and SPECT and followed prospectively to evaluate seizure recurrence.

Results: We enrolled 53 patients with PSE (35 male; median age, 76 years), including 25 with past history of ischemic stroke, 25 with intracerebral or subarachnoid hemorrhage, and 3 with both. Cortical lesions were shown in 44 patients. EEG was evaluated within 4 days after admission. Among the total 53 cases, 12 patients showed sharp waves (SW), 16 rhythmic delta activity, and 13 periodic discharge. At least one anti-epileptic drug (AED) was given to 47 patients and seizure recurrence was observed in 12 patients during average observation period of 280 days. The presence of SW on admission was significantly related to seizure recurrence ($p < 0.0001$), and that of periodic discharge showed a weak trend toward an increased risk of recurrence ($p = 0.13$), while rhythmic delta activity and slow waves were not significantly related to seizure recurrence.

Conclusion: Stroke survivors with a manifestation of seizure showing SW on EEG have significantly increased rates of seizure recurrence. For such high-risk patients with PSE, AED administration and frequent follow-up may be considered.

AS17-031

STROKE PROGNOSIS

USING CHADS2 AND CHA2DS2 - VASC SCORES TO PREDICT MIDDLE-TERM STROKE OUTCOMES INDEPENDENTLY OF HAVING AF

B. Kusznir Vitturi[1], G. Pinheiro Modolo[2] and R. José Gagliardi[3]
[1]Faculdade de Ciências Médicas da Santa Casa de São Paulo, Neurology, São Paulo, Brazil
[2]Santa Casa de São Paulo, Neurology, São Paulo, Brazil
[3]Brazilian Academy of Neurology, Neurology, São Paulo, Brazil

Background and Aims: $CHADS_2$ and CHA_2DS_2-VASc were created to assess stroke risk in patients with atrial fibrillation (AF). We investigated whether these tools can be useful to predict stroke prognosis independently of having AF.

Method: We retrospectively included patients admitted to the clinic of vascular neurology of a reference hospital with confirmed diagnosis of ischemic stroke. Patients were classified according to their pre-stroke $CHADS_2$ and CHA_2DS_2-VASc scores (low risk = 0, intermediate risk = 1, high risk $\geq$ 2) and compared with their 1,5 - 2,5 year impairment, that was assessed by the modified Rankin Scale (mRS) (bad outcome >2, good outcome $\leq$2). The outcomes also included stroke recurrence and major cardiovascular events (myocardial infarction or unstable angina, aneurysm and thromboembolism).

Results: Among 754 patients (aged 56.4 ± 15.9), there were 184 (24.4%), 275 (36.5%) and 295 (39,1%) patients with low, intermediate and high $CHADS_2$, respectively. The corresponding figures for CHA_2DS_2-VASc subgroups were 68 (9.0%), 216 (28.7%) and 470 (62.3%). A good outcome in mRS (>2) was observed in 444(58,9%) patients. Increasing pre-stroke $CHADS_2$ and CHA_2DS_2-VASc scores were significantly associated with increased middle-term mRS ($\chi^2 = 261.139$, $p < 0.001$; $\chi^2 = 241.827$, $p < 0.001$, respectively). Compared with the low- and intermediate-risk groups, patients in high-risk both $CHADS_2$ and CHA_2DS_2-VASc subgroups had a higher frequency of stroke recurrence and cardiovascular events ($CHADS_2$: $z = 8.428$, $p < 0.001$; $z = 5.407$, $p < 0.001$, respectively; CHA_2DS_2-VASc: $z = 5.520$, $p < 0.001$; $z = 7.626$, $p < 0.001$, respectively).

Conclusion: Pre-stroke $CHADS_2$ and CHA_2DS_2-VASc are associated with middle-term stroke prognosis of any patient. These scores can be extremely useful in providing a risk stratification in stroke patients.

AS17-032

STROKE PROGNOSIS

PROGNOSIS OF FASTING ON CEREBRAL VENOUS THROMBOSIS PATIENTS USING ORAL CONTRACEPTIVES

M. Mansour[1] and G. Masoud[1]
[1]Farshchian Sina Hospital, Neurology, Hamadan, Iran

Background and Aims: There have been studies that showed a higher incidence of cerebral venous thrombosis (CVT) in Ramadan, a month in which people fast in muslim countries, which was associated with use of oral contraceptives. Our objective was to evaluate the effect and prognosis of fasting in CVT patients using oral contraceptives, one of the most common causes of CVT.

Method: Consecutive patients with diagnosis of CVT in Sina hospital, West of Iran, from May of 2009 to June of 2015 were evaluated and women using oral contraceptives were included in this study. Other risk factors except fasting were excluded. Fasting was considered as the act of refraining from food or drinks of any kind during hours of daylight. Clinical presentation and outcome of CVT was assessed. Patients were followed up for 12 months.

Results: Fifty eight patients were included in this study. Thirty one of these patients had fasting simultaneously.

Fasting in patients using oral contraceptives caused significantly higher focal neurological deficit (64.5%, p-value 0.018), higher hemorrhagia (66.7%, p-value 0.042) and significantly less papilledema (p-value 0.010). At discharge, 51.6% and after three months 25.8% of patients with fasting had disability ($6 > mRS > 1$). In patients who had oral contraceptives as sole risk factor, 25.9% at discharge and 11.1% after three months had disability.

Conclusion: Fasting in CVT patients using oral contraceptives, causes significant increase in focal neurological deficit and hemorrhagia, which also increases the hospital stay and lengthens recovery. However long term prognosis and mortality of CVT between the two groups is similar.

AS17-034

STROKE PROGNOSIS

RECURRENCE RATE OF ISCHEMIC STROKE: A SINGLE CENTER EXPERIENCE

F.G. Buenaflor[1], J. Navarro[1] and K.J. Lara[1]
[1]Dr. Jose R. Reyes Memorial Medical Center, Neurology, Manila, Philippines

Background and Aims: Stroke is a key public health problem worldwide, with the majority of patients suffering from ischemic strokes. Recurrent ischemic stroke, with its concordant high morbidity and mortality, is therefore a principal target of secondary prevention. This study aims to present the rates of ischemic stroke recurrence and its possible determinants.

Method: This is a hospital-based retrospective cohort study of patients seen at our center diagnosed with ischemic stroke from 2010 to 2012. Consecutive patients who had a follow-up of at least three years were collected. The annual incidence of stroke recurrence was determined during the 1st, 2nd and 3rd year of consultation. Multivariable logistic regression was employed to determine the factors that are predictors of ischemic stroke recurrence.

Results: The study comprised 1155 first-onset ischemic stroke patients with a total of 280 recurrences recorded. The incidence of recurrence was highest during the first year after index stroke (i.e.12.8%), with a declining annual rate during the succeeding years, 6.3% (95%CI,5.0–7.9) during the second year and 5.1% (95%CI,4.0–6.5) during the third year after the index stroke. Multivariate logistic regression of the different risk factors for recurrence showed that none of the included risk factors showed significant association with ischemic stroke recurrence.
Conclusion: Of the 1155 first onset ischemic stroke patients, 12.8% had a second ischemic event within the next year, with an average of 8% annual risk for stroke recurrence. Urgent initiation and consistent monitoring of secondary preventive measures are extremely important to prevent stroke recurrence and improve the long-term outcome after an ischemic stroke.

AS17-038

STROKE PROGNOSIS

LACUNAR SYNDROMES: ARE THEY ALL EQUALLY BENIGN?

K. Narasimhalu[1], R. Ng[1], F.P. Woon[1] and D.A. De Silva[1]
[1]National Neuroscience Institute, Department of Neurology SGH Campus, Singapore, Singapore

Background and Aims: There is a paucity of prognostic data following clinical lacunar syndromes due to ischemic stroke, particularly for comparisons between clinical lacunar subtypes. We studied the burden of disability at discharge, 1 and 3 months after stroke in patients with clinical lacunar syndromes, and compared the disability profile between clinical lacunar subtypes.
Method: Ischemic stroke patients with clinical lacunar syndromes were prospectively recruited. Functional outcomes by the modified Rankin score (mRS) was determined at discharge, 1 and 3 months after stroke. Logistic regression analyses were performed to determine predictors of poor outcome (mRS $>$ 1).
Results: Of the 192 patients (age 62 ± 11, 75% Chinese) with clinical lacunar syndromes, 72(37%) patients had ataxic hemiparesis, 53(28%) patients had pure motor, 41(21%) had sensorimotor, 17(9%) had pure sensory, and 9(5%) had clumsy hand dysarthria syndromes. The incidence of poor outcome was 55% at discharge, 36% at 1 month and 30% at 3 months. Compared to pure sensory, patients with pure motor (OR 7.77 CI 1.5–38), sensorimotor (OR 6.06, CI 1.18–31) and ataxic hemiparesis (OR 18.1 CI 3.79–91) were more likely to have poor outcome. When compared to pure motor syndrome, patients with ataxic hemiparesis were more likely to have poor functional outcome (OR 3.05, CI 1.35–6.9).
Conclusion: Prognosis after clinical lacunar syndromes due to ischemic stroke is not always benign, with more than 1/2 having poor functional outcome at discharge and 30% at 3 months. We found differences in the incidence of poor functional outcomes between the various subtypes of clinical lacunar syndromes, with ataxic hemiparesis having worst prognosis.

AS17-039

STROKE PROGNOSIS

INFLUNCE OF EARLY NEUROLOGIGAL IMPROVEMENT ON LONG – TERM OUTCOME IN ISCHEMIC STROKE PATIENTS TREATED WITH INTRAVENOUS THROMBOLYSIS

M. Stefanovic Budimkic[1], T. Pekmezovic[2], L. Beslac-Bumbasirevic[3], M. Ercegovac[3], I. Berisavac[3], P. Stanarcevic[3], V. Padjen[1] and D. Jovanovic[3]
[1]Neurology Clinic - Clinical Centre of Serbia, Department of Emergency Neurology, Belgrade, Serbia
[2]Institute of Epidemiology Medical Faculty University of Belgrade, Institute of Epidemiology, Belgrade, Serbia
[3]Medical Faculty University of Belgrade, Neurology Clinic Clinical Center of Serbia, Belgrade, Serbia

Background and Aims: Early changes of neurological status within the first 24 hours of the occurrence of acute ischemic stroke (AIS) are useful surrogate of direct activity of intravenous thrombolysis (IVT) and play an important role in the prediction of the three-month outcome. The aim of this study was to evaluate whether the impact of early neurological improvement stays over the longer period of follow-up, more than one year after the stroke.
Method: This matched cohort study included 259 patients with AIS treated with thrombolytic treatment and 259 patients who were matched by age, sex and stroke severity and were treated with standard care alone in the Stroke Unit in period from February 2006 to January 2013. Early neurological improvement was defined as an improvement of 8 or more points on NIHSS scale (compared with baseline) or NIHSS 0 24 hours after treatment. The main outcome measure was excellent functional outcome (mRS 0–1).
Results: Sixty- seven (25.9%) patients in IVT- group and 14 (5.4%) patients in non-IVT group had early neurological improvement (ORadj 6.11; 95%CI 3.33–11.17). The median follow-up period was 3 years (range 1 to 7 years). After follow- up period, 144 (55.6%) patients in IVT treated group versus 112 (43.2%) patients in control group had an excellent outcome (HR 1.39, 95%CI 1.16–2.32). In multivariate Cox proportional-hazards regression model early neurological improvement was the only predictor of an excellent stroke outcome (HR 1.50; 95%CI 1.10–2.05).
Conclusion: Early neurological improvement has an important role in predicting long-term outcome after stroke.

AS17-041

STROKE PROGNOSIS

BLOOD PRESSURE VARIABILITY ASSESSMENT IN PATIENTS WITH ACUTE ISCHEMIC STROKE USING CONTINUOUS BEAT-TO-BEAT PLETHYSMOGRAPHY DURING THE HEAD-UP TILT

H.Y. Seok[1], M.Y. Eun[2], K.H. Cho[1], B.J. Kim[1] and S. Yu[1]
[1]Korea University College of Medicine, Neurology, Seoul, Republic of Korea
[2]Hanil General Hospital, Neurology, Seoul, Republic of Korea

Background and Aims: We performed this study to evaluate the effects of supine and tilt beat-to-beat blood pressure variability (BPV) on functional outcome in patients with acute ischemic stroke (AIS).
Method: We included patients with AIS and transient ischemic attack (TIA) who underwent the head-up tilt (HUT) test during the acute stage. Using the Finometer, we measured systolic and diastolic BP for 5 minutes in supine position and for 10 minutes in tilt position after HUT. BPV

parameters, such as maximum – minimum, standard deviation (SD), and coefficient of variation of each systolic and diastolic BP were calculated. Analyses were performed to determine the association between beat-to-beat BPV measured at supine and tilt position and functional outcome at discharge and 3 months. Differences of BPV parameters among the stroke subtypes were also analyzed.

Results: Among 169 patients, 151 were AIS. The beat-to-beat BPV at supine or response to tilt were not associated with the functional outcomes, although BPV parameters tended to increase during tilt. BPV parameters were different among the stroke subtypes. BPV parameters at supine or tilt were higher in patients with cardioembolism (CE) than in those with other stroke subtypes.

Conclusion: In patients with AIS, beat-to-beat BPV increased during tilt and higher BPV was found in patietns with CE. However, beat-to-beat BPV at supine and tilt and BPV response to tilt did not affect short-term functional outcomes.

AS17-047

STROKE PROGNOSIS

HIGH RESOLUTION THORAX COMPUTED TOMOGRAPHY AS A GOLD STANDARD FOR STROKE ASSOCIATED RESPIRATORY INFECTIONS: VALIDATIO OF CLINICAL CRITERIA AND PREDICTIVE SCALES

E. Zapata-Arriaza[1], B. Pardo-Galiana[1], P. Serrano-Gotarredona[2], S. Navarro-Herrero[2], I. Escudero-Martínez[1], F. Moniche[1], Á. Vega-Salvatierra[1], J.A. Cabezas[1], F. Mancha-Molina[1], A. González[2] and J. Montaner[3]

[1]Hospital Universitario Virgen del Rocío/Instituto de Biomedicina de Sevilla IBI, Neurology, Seville, Spain

[2]Hospital Universitario Virgen del Rocío, Radiology, Sevilla, Spain

[3]Hospital Universitario Virgen del Rocío y Macarena/Instituto de Biomedicina de Sevilla IBI, Neurology, Seville, Spain

Background and Aims: Clinical criteria for post-stroke respiratory infections and stroke associated pneumonia (SAP) are unclear and have never been validated against a gold standard. Our aim is to describe chest infection findings in thorax Computed tomography (thorax-CT) and evaluate diagnostic value of clinical criteria and predictive scales for SAP.

Method: Patients with ischemic stroke and NIHSS $\geq$ 10 on admission were prospectively enrolled. A High Resolution Thorax-CT between 5th and 7th day after stroke symptoms onset and predictive scales for SAP were obtained (A2DS2, ISAN and AIS-APS)

Results: Thirty-one included patients (3 died before thorax-CT performance). More relevant thorax-CT findings among remaining 28 patients were: 46.4% airway dynamic obstruction, 39.3% COPD radiological pattern, 35.7% emphysema, 28.6% endoluminal secretions, 25% residual tuberculosis, 21.4% bronchi/bronchiolectasis, 7.1% ground glass pattern, 7.1% peripheral bronchi mucoid impaction and 3.6% consolidations. Clinical SAP was suspected in 5 patients (17.9%). Among those, throrax-CT showed pneumonia in two (7.1%), a chronic obstructive pulmonary disease (COPD) exacerbation pattern in two (7.1%) and thorax-CT was normal in the remaining patient (3.6%). Thorax-CT was positive in 2 patients without clinical suspicion of SAP. Therefore, Sensitivity/Specificity of clinical criteria was 66.6% and 95.4 % with 4.6% (1) of false positive and 33.3% (2) of false negative results. Sensitivity/Specificity of predictive scales was: A2DS2 100%/25%, ISAN 83.3%/31.8%, and AIS-APS 50%/63.6%.

Conclusion: Thorax-CT radiological patterns of stroke associated respiratory infections has been defined for the first time. Clinical criteria to define SAP and the predictive clinical scales have low performance and might need further revision.

AS17-048

STROKE PROGNOSIS

QUALITY OF LIFE OF ISCHEMIC AND HEMORRHAGIC STROKE SURVIVORS IN KYRGYZSTAN

S. Zhumakeeva[1] and I. Lutsenko[2]

[1]Bishkek, Kyrgyzstan

[2]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan

Background and Aims: To evaluate overall and domain-specific quality of life (QOL) in stroke survivors and to identify variables that predict quality of life after stroke.

Method: A cross-sectional,with nested case-control study. Subjects were 70 stroke survivors who were interviewed 1, 2 and 3 years after stroke. Quality of life was measured with WHOQOL-BREF for four domains (health and functioning, socioeconomic, family, and psychological-spiritual). We used Barthel index (ADL), Zung depression scale, MCANS scale for clinical condition. Independent variables were age, social class, aphasia, functional status, motor impairment, depression, comorbidity, and perceived social support.

Results: 115 patients underwent our testing, 60 with IS (53,91 $\pm$ 15,32 years) and 50 with HS (46,11 $\pm$ 8,32). According to ADL, 74,29% with IS are dependent from others, and only 25.71% are independent ($p = 0.001$). The was a negative correlation between ADL and Zung scale in IS patients ($p = 0.01$). Moderate depression was more expressed in patients with IS (65%) while high anxiety in HS patients. OR for stroke in depressive patients were 2.8 (95% 1.8–2.1). OR for motor disturbances were 1.8 (95% 2.1 -3.2) in depressive patients with IS. Depression, perceived social support, and functional status predicted quality of life (adjusted $R2 = .27$) and contributed to prediction of domain quality of life. Social support and three additional variables, social class, age, and cardiovascular disease, predicted socioeconomic quality of life.

Conclusion: Higher depression scores and low ADL was more expressed in patients with motor disturbances. IS was an independent predictor of depression and high dependency from relatives in Kyrgyzstan.

AS17-049

STROKE PROGNOSIS

PULSE PRESSURE IS AN INDEPENDENT PREDICTOR OF HEMORRHAGIC TRANSFORMATION IN ACUTE ISCHEMIC STROKE

A.M. Novo[1], J. Sargento-Freitas[1], F. Silva[1], J. Beato-Coelho[1], A.R. Gomes[2], A.R. Sanches[3], A.I. Martins[1], A. Gouveia[1], P. Nobre[1], G. Fernandes[1], C. Machado[1], B. Rodrigues[1], G. Santo[1] and L. Cunha[1]

[1]Centro Hospitalar e Universitário de Coimbra, Neurology, Coimbra, Portugal

[2]University of Coimbra, Faculty of Medicine, Coimbra, Portugal

[3]Centro Hospitalar do Médio Tejo, Department of Internal Medicine, Abrantes, Portugal

Background and Aims: Pulse Pressure (PP) has been demonstrated to be an independent predictor of stroke. However, its impact on patients submitted to recanalization treatment is currently not clear. We aimed to investigate the relation between PP in acute stroke and functional outcome, hemorrhagic transformation (HT) and symptomatic intracranial hemorrhage (sICH) in patients submitted to reperfusion therapies.

Method: We included consecutive patients with acute stroke treated with intravenous and/or intra-arterial therapies. The mean PP during the

first 6 (PP-6 h) and 24 hours (PP-24 h) post-stroke was obtained by calculating the difference between the mean systolic blood pressure and mean diastolic blood pressure for the corresponding time intervals. Linear and ordinal multivariate regression models were performed to determine associations between PP and modified Rankin scale at three months (mRS), HT and sICH.

Results: 781 patients were included; median age 76 (IQR,15) years. In multivariate analysis, PP-24 h was not associated with mRS. HT was observed in 5.76% of our sample. Lower values of PP-6 h (OR 0.974; CI 0.955–0.993, $p = 0.007$) and higher values of PP-24 h (OR 1.029, CI 1.008–1.051, $p = 0.007$) were associated with occurrence of HT. sICH was also associated with PP-6 h (OR 0.997, CI 0.955–0.999, $p = 0.042$) and PP-24 h (OR 1.021, CI 0.997–1.046, $p = 0.039$).

Conclusion: High PP in the first 24 hours after recanalization treatment is an independent predictor of HT and sICH in ischemic stroke. We did not found an independent relation between PP and the clinical outcome at 3 months, which might be dependent on the success of the reperfusion therapies.

AS17-050

STROKE PROGNOSIS

CARDIOEMBOLIC STROKE LONG-TERM OUTCOME AND MORTALITY IN LATVIAN POPULATION 2014 AND 2015 COMPARED

K. Jurjāns[1], B. Lurina[2], E. Miglane[3], Z. Priede[3], O. Kalejs[2] and A. Millers[3]

[1]Riga, Latvia

[2]P. Stradins Clinical university hospital, Cardiology, Riga, Latvia

[3]P. Stradins Clinical university hospital, Neurology, Riga, Latvia

Background and Aims: Cardioembolic stroke is the most severe ischemic stroke subtype, associated with severe neurological deficit, unfavourable functional outcome and high mortality.

Method: In a prospective study were included all patients diagnosed with cardioembolic stroke admitted and discharged from P. Stradins Clinical University Hospital, Riga, Latvia in 2014 and 2015. Only contacted stroke survivors ($n = 348$ in 2014 and $n = 359$ in 2015) were included in further study. All patients were evaluated by modified Rankin scale (mRs) on discharge were score of 0–3 considered a satisfactory functional outcome. Patients were interviewed by phone in 30–90-180-365 days after leaving the hospital. Standardized questions were asked about patient's abilities. The results from 2014 and 2015 were compared accordingly.

Results:

Year	2014 (n=348)			2015 (n=359)		
	mRs 0-3	mRs 4-5	mRs 6	mRs 0-3	mRs 4-5	mRs 6
On discharge	48.21%	36.91%	14.88%	47.92%	43.78%	8.30%
30d	57.75%	24.43%	17.82%	55.43%	24.46%	18.11%
90d	58.33%	19.25%	22.42%	63.23%	11.98%	24.79%
180d	58.06%	6.31%	35.63%	64.35%	6.69%	28.97%
365d	56.05%	3.73%	40.22%	62.67%	5.01%	32.03%

Conclusion: In Latvia cardioembolic stroke one-year mortality rates are very high, although it is significantly lower in 2015 than in the same time period in 2014. In hospital mortality in also lower in 2015 than in 2014. Most of the patients that are severely disabled at the time of discharge die in first year since leaving the hospital. Mortality rates are significantly lower in patient groups with satisfactory stroke outcome at time of discharge.

AS17-056

STROKE PROGNOSIS

THE POSTERIOR NATIONAL INSTITUTES OF HEALTH STROKE SCALE (P-NIHSS): A MODIFIED VERSION OF NIHSS IMPROVES PROGNOSTIC ACCURACY IN POSTERIOR CIRCULATION STROKE

F. Alemseged[1,2], M. Diomedi[1], F. Sallustio[1], A. Davoli[1], N. Yassi[2], P.J. Mitchell[3], C. Caltagirone[1,4], R.J. Dowling[3], S.J. Bush[3], B. Yan[2], P. Stanzione[1], G.A. Donnan[5], S.M. Davis[2] and B. Campbell[2]

[1]University of Rome Tor Vergata, Department of Neurology, Rome, Italy

[2]Royal Melbourne Hospital, Department of Medicine and Neurology, Parkville, Australia

[3]Royal Melbourne Hospital, Department of Radiology, Parkville, Australia

[4]I.R.C.C.S.- Santa Lucia Foundation, University of Rome Tor Vergata, Rome, Italy

[5]The Florey Institute of Neuroscience and Mental Health, University of Melbourne, Parkville, Australia

Background and Aims: The National Institutes of Health Stroke Scale (NIHSS) may underestimate clinical severity in posterior circulation stroke. We assessed the prognostic value of additional clinical features and derived a revised "posterior NIHSS" (p-NIHSS).

Method: Consecutive patients from 2 stroke centers with posterior circulation ischemic stroke were retrospectively analysed. Clinical deficits not included in the NIHSS were extracted from a prospectively collected database: diplopia, ptosis, nystagmus, gait ataxia and palatal paralysis. Vertical gaze palsy, Horner's syndrome, tongue deviation and dysphonia were evaluated in a subgroup of 56 patients. Good outcome was defined as modified Rankin Scale (mRS) ≤ 3 at discharge. Good outcome at 3 months ($mRS \leq 2$) and early neurological deterioration within 48hours (END) was assessed in a subgroup of patients.

Results: There were 265 patients, mean age 65 (± 14), median NIHSS 4 (IQR 2–8). In logistic regression including all clinical signs adjusted for age and NIHSS, only nystagmus (OR = 4.3, 95%CI 1.4–12.7; $p = 0.009$) and palatal paralysis (OR = 8.1, 95%CI 3.2–20.3; $p < 0.001$) were independently associated with poor outcome at discharge. Palatal paralysis was associated with END (OR = 4.2, 95%CI 1.1–16.8; $p = 0.04$) and 3 month mRS 0–2 (OR = 4.3, 95%CI 1.2–15.5; $p = 0.02$). The p-NIHSS was calculated as NIHSS score $+4$ points for nystagmus and $+8$ points for palatal palsy. In receiver-operating-characteristic analysis, p-NIHSS had an area-under-curve (AUC) of 0.81 (95%CI 0.75–0.87) versus 0.75 (95%CI 0.68–0.83) for NIHSS. p-NIHSS outperformed NIHSS in minor strokes (NIHSS < 4, AUC 0.70 95%CI 0.53–0.87 versus 0.4 95%CI 0.23–0.58; $p = 0.005$).

Conclusion: Additional posterior circulation signs may improve NIHSS prognostic accuracy. We will perform prospective validation of p-NIHSS.

AS17-057

STROKE PROGNOSIS

SIMPLE SCORE TO PREDICT DISABILITY AT THIRD MONTH WITH A WEB-TOOL TO PERFORM A USEFUL CLINICAL IMPLEMENTATION

E. Muiño[1], A. Bustamante[2], A. Rodríguez-Campello[3], C. Gallego-Fábrega[1], Á. Ois[3], C. Carrera[2], N. Cullell[1], M. Rubiera[4], C. Molina[4], E. Cuadrado[3], E. Giralt-Steinhauer[3], J. Jiménez-Conde[3], J. Montaner[2], I. Fernández-Cadenas[5] and J. Roquer[3]

[1]Fundació Docència i Recerca MútuaTerrassa, Stroke Pharmacogenomics and Genetics, Terrassa, Spain
[2]Vall d'Hebron Institute of Research- Hospital Vall d'Hebron, Neurovascular Research Laboratory, Barcelona, Spain
[3]IMIM-Hospital del Mar, Neurology Service, Barcelona, Spain
[4]Hospital Vall d'Hebron, Neurology Service, Barcelona, Spain
[5]Stroke Pharmacogenomics and Genetics, Fundació Docència i Recerca MútuaTerrassa, Terrassa, Spain

Background and Aims: There is not any friendly tool to predict neither disability nor the modified Rankin scale (mRS) three months after a stroke. We aimed to create an easy tool where implement our own score.

Method: 658 patients, with an ischemic stroke were prospectively recorded (discovery cohort, H. del Mar), discarding patients with revascularization treatment. mRS was used to assess disability at third month. Seventeen clinical variables obtained during the first 24 h were analyzed. Ordinal multivariate logistic regression was used to generate the score using the regression coefficients of the significant associated variables.

The results were replicated in another independent cohort constituted by 525 patients with the same inclusion/exclusion criteria (replication cohort, H. Vall d'Hebron).

A web-tool application to use the score was generated through R language and Shiny software. R was used to perform the statistical analyses.

Results: A score was generated with the following variables: mRS previous to stroke, age, baseline glycaemia and baseline NIHSS. This score predicts disability at third month (p-value $<$2.2e-16), with an accuracy of 83–77%and mRS (p-value $<$2.2e-16) with an accuracy of 38–39% (discovery-replication cohorts). Regarding mortality, the accuracy of the score was 83–79% (p-value $<$2.2e-16).

The area under the curve (AUC) to predict disability was 0.89–0.86 (discovery-replication cohorts) (p-values$<$2.2e-16). Likewise, AUC for mortality was 0.86–0.82 (discovery-replication cohorts) (p-values$<$ 2.2 e-16).

Conclusion: This score predicts disability and mortality at third month after stroke with a high accuracy and was replicated in an independent cohort. The web-tool app will facilitate the clinical implementation of the score.

AS17-060

STROKE PROGNOSIS

STRATIFY RISK OF RECURRENT STROKE: A FIVE YEARS OBSERVATION FROM A TERTIARY CARE HOSPITAL IN THAILAND

K. Angkoon[1], J. Suwanno[2], J. Suwanno[1] and K. Ratborirak[3]

[1]Hat Yai Hospital, Nursing, Songkhla, Thailand
[2]Walailak University, School of Nursing, Thasala, Thailand
[3]Hat Yai Hospital, Internal Medicine, Songkhla, Thailand

Background and Aims: Approximately one out of fourth ischemic strokes are recurrences. In Thailand, there is currently lack of evidence stratification risk of recurrent stroke. In this study, we used the Essen Stroke Risk Score (ESRS) to (1) stratify risk level, and (2) to examine whether individual risk factors association with the risk level of recurrent stroke.

Method: We included 3,135 patients with a qualifying ischemic stroke, who were admitted to a tertiary care unit in Southern Thailand during October 2011 to February 2016. Two-fifth (40.2%) were women (n = 1260), aged 16–101 years old (63.67 $\pm$ 14.19). Low risk was defined as ESRS 0–2, and $\geq$3 was high risk. Categorical logistic regression and odds (OR) with 95% confidential interval (95%CI) was used to explain the association.

Results: ESRS was ranged from 0–6 (2.16 $\pm$ 1.19), approximately two-fifth (38.9%) of the patients was at the high risk group. Six of the 8 risk factors of ESRS were significantly associated with the risk level. Increment risk was more likely found in those aged $\geq$75 years old (30.67, 95%CI 24.15–38.96), 65–75 years old (6.45, 95%CI 5.28–7.87), hypertension (9.71, 95%CI 8.02–11.76), diabetes (4.94, 95%CI 4.14–5.89), peripheral vascular disease (3.83, 95%CI 1.82–8.03), previous stroke or TIA (7.77, 95%CI 5.89–10.25), and smoking (1.57, 95%CI 1.36–1.82). The ESRS model explain 61% in risk level ($p = 0.000$).

Conclusion: Our study shows a significantly higher risk level for developing recurrent stroke in those patients who had common cardiovascular risk factors. Patients with a high risk level on ESRS should be candidates for optimal secondary prevention strategies to reduce stroke event.

AS17-061

STROKE PROGNOSIS

LONG-TERM CARDIO-VASCULAR RISK AFTER TRANSIENT ISCHEMIC ATTACK

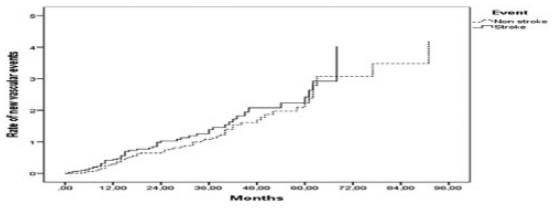
A. Ois[1], E. Cuadrado[1], A. Zabalza[1], A. Moreira[1], S. Sotorra[2], P. De Ceballos[1] and J. Roquer[1]

[1]IMIM-Hospital del Mar Research Institute., Neurology, Barcelona 08003, Spain
[2]Universidad de Barcelona, Student university, Barcelona, Spain

Background and Aims: Long-term cardiovascular risk (including stroke and other vascular events) after transient ischemic attack (TIA) has not been well described. The aim of our study was to determinate the long-term risk after TIA and to identify the factors associated with an increased risk.

Method: We designed a prospective, observational registry of patients with TIA admitted in our tertiary hospital from June 2006 to June 2015. A new vascular event (NVE) according to the REACH study criteria was recorded from three months after the TIA onset to January 2016. We investigated the association of stroke etiology, demographics, vascular risk, clinical and radiological factors and the risk of NVE.

Results: 621 patients with a mean follow-up of 42.98 $\pm$ 29.1 months were included in the analysis. A NVE was detected in 121 patients (19.5%), with an incidence of 0.0045 events per patient/year. The cumulative NVE risk remained constant during follow up with similar incidence of stroke and non stroke vascular events. We detected an independent association between NVE and previous vascular diseases, duration of symptoms, large artery atherosclerosis and cardioaortic embolism.



Conclusion: Cardiovascular risk within the following yerars after a TIA is relatively low and remains constant during follow up. Patients with previous vascular diseases, longer duration of symptoms and atherosclerotic or cardioembolic etiologies have an increased risk.

AS17-062

STROKE PROGNOSIS

IDENTIFICATION OF A NOVEL BLOOD BIOMARKER PANEL FOR IMPROVED MORTALITY PREDICITION IN ACUTE ISCHEMIC STROKE

A. Bicvic[1], N. Scherrer[2], A. Luft[2], J. Schneider[2] and M. Katan[2]
[1]Zumikon, Switzerland
[2]University Hospital of Zurich, Neurology, Zurich, Switzerland

Background and Aims: We investigated 92 blood biomarkers that have been implicated in the pathogenesis of cardiovascular diseases to predict post-stroke mortality. Based on the most promising markers we aimed to create a novel biomarker panel for risk stratification.
Method: In this prospective cohort study, we simultaneously measured 92 biomarkers within 24 hours of symptom onset in 320 stroke patients by a novel proximity extension assay technique (Proseek Multiplex CVD III, Olink Proteomics, Uppsala, Sweden). The primary outcome was mortality within 90 days. To identify the most promising biomarkers we first estimated the association of each biomarker by using logistic regression models adjusting for multiple testing. The remaining markers were then used to create a panel. Each biomarker was weighted according to the sum of the differences from the median. We fitted regression models to estimate odds-ratios and 95% confidence intervals (OR, 95% CI) for the association of the panel with mortality. The discriminatory accuracy was assessed with the area under the receiver-operating-characteristic curve (AUC).
Results: 11.6% patients died within 90 days after stroke. After correction for multiple testing 16 biomarkers were selected to create the panel. After adjustment for demographic and vascular risk factors the panel remained independently associated with mortality (OR 1.13, 1.05–1.23 95% CI) and improved the discriminatory accuracy to predict mortality (AUC of 0.91, 0.87–0.95 95% CI, to 0.93, 0.89–0.97 95% CI), as compared to the clinical prediction model alone.
Conclusion: We identified a novel blood biomarker panel which improved risk stratification after ischemic stroke beyond established demographic and vascular risk factors.

AS17-064

STROKE PROGNOSIS

PLATELET REACTIVITY WITH CLOPIDOGREL AND EARLY NEUROLOGICAL OUTCOMES IN PATIENTS WITH ACUTE ISCHEMIC STROKE

J. Lee[1], K. Jungim[1] and M. Kim[1]
[1]Yeungnam University Medical Center, Neurology, Daegu, Republic of Korea

Background and Aims: Although platelet reactivity on clopidogrel is related to outcomes in patients with acute coronary syndromes, research into outcomes in ischemic stroke patients is sparse. This study evaluated the association between clopidogrel resistance and early neurological outcomes in patients diagnosed with acute ischemic stroke.
Method: Consecutive patients with acute ischemic stroke from Jul 2013 to Feb 2016 were reviewed. Patients with onset within 7 days and stroke classification of large-artery atherosclerosis were included. Their baseline characteristics, time points, and laboratory results including platelet reactivity tests were recorded. Imaging and clinical outcomes were assessed by neurologists. An increment of motor NIHSS score ≥ 1 at the time of neurological worsening was the primary endpoint of this study.
Results: Two hundred and thirty-five patients out of 1067 potential study subjects reviewed met the inclusion and exclusion criteria. Median initial dose of clopidogrel was 300 mg, and their median P2Y12 % inhibition was 26.3. After setting a cutoff of P2Y12 % inhibition 29, multivariate analysis was performed to assess the association of clopidogrel resistance, defined as P2Y12 % inhibition <29, with the primary outcome [OR 2.77 (1.09–7.04), $P = 0.033$]. An additional multivariate analysis revealed that clopidogrel resistance is an independent risk factor even after adjustment for the factors that may affect the outcome [OR 2.75 (1.11–6.83), $P = 0.029$].
Conclusion: The present study showed that high platelet reactivity with clopidogrel is an independent risk factor of early clinical outcome. P2Y12 assay may help identify on-clopidogrel ischemic stroke patients who are at high risk of adverse outcomes.

AS17-067

STROKE PROGNOSIS

IMPACT OF IMPLEMENTATION OF SINGLE CALL ACTIVATION SYSTEM "CODE STROKE" ON REDUCTION OF DOOR TO NEEDLE TIME

S. Pawar[1], N. Ichaporia[1], G. Patil[1] and A. Bavishi[1]
[1]Jehangir Hospital Pune, Neurology, Pune, India

Background and Aims: Ischemic stroke symptoms manifest within seconds due to interrupted blood flow to brain tissue which culminates in rapid death of brain tissue. Thus, timely intravenous thrombolysis for acute ischemic stroke is preferred and is associated with favorable clinical outcomes[1]. "Stroke code" (SC) is thought to improve the timeline in delivery of intravenous tPA
Method: The aim of the study was to assess the impact of Code Stroke on Door-to-needle (DTN) time at a tertiary care center from February 2014 to December 2016. The patients were divided into two groups: Pre Code Stroke (February 2014 to July 2015 $n = 59$) and Post Code Stroke (August 2015 to December 2016 $n = 63$). Data collected included time of arrival of the patient in the Hospital, Door to Needle Time of the Patient, NIHSS on admission and on discharge, and causes behind delay in thrombolysis. Unpaired t-test was performed for calculating statistical significance of DTN time Pre Code and Post Code implementation
Results: Of the 122 patients presenting with acute ischemic stroke in window period, 59 patients fell into Pre Code category while 63 patients fell into Post Code Category. The Mean DTN time in Pre Code category was 37 minutes as compared to 20.96 minutes in Post Code Category (95% CI = 13.04–18.76). This finding of reduction in DTN time after "Stroke Code" implementation was statistically significant ($p < 0.0001$).
Conclusion: The implementation of Code Stroke in a tertiary care center resulted in a significant reduction in DTN time.

AS17-068

STROKE PROGNOSIS

ELEVATED PLASMA D-DIMER LEVEL IS RELATED TO STROKE SEVERITY AND CARDIOEMBOLIC STROKE

M.K. Kim[1], J.H. Lee[1] and S.K. Kwon[2]
[1]Kosin University College of Medicine, Neurology, Busan, Republic of Korea
[2]Kosin University College of Medicine, Endocrinology and Metabolism, Busan, Republic of Korea

Background and Aims: There has been little research on the relationship between D-dimer level and acute ischemic stroke. The objective of this study was to evaluate the association between plasma D-dimer level on admission and stroke subtype and severity in patients with acute ischemic stroke.
Method: We measured fasting plasma D-dimer in consecutive 178 patients (60.1% men, mean age 67.2 ± 12.2 years) within 3 days after the onset of acute ischemic stroke. Stroke subtype was classified according to TOAST criteria. Stroke severity was measured as NIHSS score on admission and modified Rankin Scale (mRS) at 3 months.
Results: Plasma D-dimer levels increased with increasing NIHSS score ($r = 0.221$, $p = 0.003$) and mRS ($r = 0.300$, $p < 0.001$). These correlations were still remained after adjustment of possible confounding factors such as age, erythrocyte sedimentation rate, the level of high sensitive C-reactive protein and total cholesterol ($p < 0.05$). D-dimer levels were significantly different between stroke subtype (analysis of variance: $p = 0.006$). D-dimer levels in patients with cardioembolic stroke were significantly higher than levels in patients with small vessel occlusive stroke ($p = 0.007$).
Conclusion: Plasma D-dimer level on admission is related to stroke severity in acute ischemic stroke. In addition, plasma D-dimer level is increased in cardioembolic stroke.

AS17-069

STROKE PROGNOSIS

THE INFLUENCE OF AGE ON LONG TERM PROGNOSES OVER 9 YEARS AFTER ISCHEMIC STROKE

R. R[1], J. Carson Allen[2], W.F. Peng[1] and D. Anne De Silva[3]
[1]Singapore General Hospital, Neurology, Singapore, Singapore
[2]DUKE NUS Medical school, Centre for Quantitative Medicine, Singapore, Singapore
[3]National Neuroscience Institute, Neurology SGH Campus, Singapore, Singapore

Background and Aims: Objective:There are limited data on the influence of age on long-term prognoses after stroke. We compared by age groups the serial incidences of various vascular outcomes (recurrent stroke, coronary events, overall death) over a 9-year period for a cohort of ischemic stroke patients.
Method: Methods:This is a prospective longitudinal observational study of 807 ischemic stroke patients admitted to a single centre and who were followed up serially at 1 year, 2 years and 9 years. Age categories were defined as young (≤50 years), middle-aged (51 to 75 years) and old (>75 years). Statisticial analyses conducted compared the survival from outcomes over the 9-year period.
Results: For recurrent stroke, there was a poorer prognosis for the old subgroup compared to the young subgroup ($p = 0.029$) but there were no differences between the middle-aged group with either the old or young subgroups. For coronary artery disease, there were no statistically significant differences between the 3 age subgroups. There was a higher incidence of mortality in the old subgroup compared to the middle-age subgroup ($p < 0.001$) and compared to the young subgroup ($p < 0.001$).
Conclusion: Age influenced the outcomes of recurrent stroke and overall death over the 9-year follow-up after ischaemic stroke, however did not influence the prognosis of coronary events

AS17-071

STROKE PROGNOSIS

CLOPIDOGREL RESISTANCE IS ASSOCIATED WITH SHORT TERM NEUROLOGICAL PROGNOSIS IN ACUTE ISCHEMIC STROKE

J. Hwang[1] and K. Jihoon[1]
[1]Samsung Changwon Hospital, Neurology, Changwon, Republic of Korea

Background and Aims: To investigate whether asprin and clopidogrel resistance are associated with short term neurological prognosis in patients with acute ischemic stroke who treated with dual antiplatelet treatment.
Method: We included a total of 206 patients who were admitted within 72 hours of acute ischemic stroke onset (August 2015 to December 2016). Aspirin 300 mg and clopidogrel 300 mg were initially administered if they are not treated with those antiplatelets. The aspirin and clopidogrel reaction units were measured after at least 6 hours of antiplatelet loading. Aspirin resistance and clopidogrel resistance were defined as ARU value >550 IU and <20% inhibition of ADP induced platelet aggregation respectively. Short term neurological prognosis was assessed using the difference of NIH Stroke Scale between admission and 7 days after admission.
Results: Aspirin resistance and clopidogrel resistance were occurred in 41 (19.9%) and 121 patients (58.7%) respectively. Twenty-seven patients (13.1%) showed increased 7 days NIHSS compared with admission score (poor short term prognosis). In multivariable regression analysis, Clopidogrel resistance was significantly associated with poor short term neurological prognosis (95% confidence interval 1.095 – 8.204, $p = 0.033$). Aspirin resistance did not show the statistically significance.
Conclusion: Clopidogrel resistance is associated with an increased risk of poor short term neurological outcome in acute ischemic stroke patients.

AS17-073

STROKE PROGNOSIS

STROKE OUTCOME OF ANTERIOR AND POSTERIOR CIRCULATION STROKE AND INFLUENCE OF LARGE VESSEL INVOLVEMENT: REPORT FROM A TERTIARY CARE CENTRE, NORTH INDIA

A. Garg[1], B. Das[2], A.R. Bansal[1], G. Goel[2], J. Sehgal[1], J. Jayavelu[3] and A.N. Jha[4]
[1]Medanta The Medicity Hospital- Gurgaon, Department of Neurology, Gurgaon, India
[2]Medanta The Medicity Hospital- Gurgaon, Department of Neurointervention, Gurgaon, India
[3]Medanta The Medicity Hospital- Gurgaon, Department of Physiotherapy, Gurgaon, India
[4]Medanta The Medicity Hospital- Gurgaon, Department of Neuroscience, Gurgaon, India

Background and Aims: Patient outcome differs depending on severity of stroke, site of artery involvement and treatment modalities. There is limited data from Indian subcontinent comparing stroke outcome of

anterior circulation infarction (ACI) and posterior circulation infarct (PCI) in Asian population.
Method: From January 2014 to December 2016, we retrospectively reviewed our prospective acute ischemic stroke database and compared baseline characteristics and outcome (Modified Rankin Scale, mRS) of ACI and PCI in Indian population. National Institutes of Health Stroke Scale (NIHSS) at presentation was classified as ≤4 (minor stroke), 5–15 (moderate stroke), 16–20 (moderate to severe stroke) and >20 (very severe stroke). Also we compared influence of large vessel disease on outcomes. Outcome (mRS) was noted at discharge and 90 days follow up.
Results: We analysed a total of 1182 patients (median age 52 year) during this period. Good outcome (mRS 0–2) at 90 days was noted in 568 patients (48.05%). Eight out of twelve in-hospital mortality was due to posterior circulation stroke. In multivariable logistic regression analysis, minor PCI had higher disability (28.8%) compared to minor ACI (28.1%), but it was insignificant ($p = 0.08$) whereas moderate to severe stroke in posterior circulation had significantly poor outcome ($p = 0.002$). Vertebrobasilar large vessel involvement was associated with higher disability in at 90 days follow up.
Conclusion: We observed high disability and mortality in PCI stroke compared to ACI. Large Vertebrobasilar artery disease had worse disability. But minor stroke disability did not differ significantly in PCI and ACI groups.

AS17-074

STROKE PROGNOSIS

THE STRATEGIC STUDY: FACTORS AFFECTING MEMORY ABILITY AFTER RECENT ISCHAEMIC STROKE

P. Wright[1] and M. O'Sullivan[1]
[1]Institute of Psychiatry- Psychology & Neuroscience, Basic & Clinical Neuroscience, London, United Kingdom

Background and Aims: Memory impairment is common and a cause of unmet need after stroke. STRATEGIC is a prospective, longitudinal study of memory prognosis after stroke. This initial cross-sectional analysis sought to identify predictors of early memory deficits after stroke in patients enrolled to date.
Method: We recruited 95 patients with recent, mild-moderate, ischaemic stroke. Patients with previous large artery infarction or other conditions affecting cognition were excluded. Cognitive testing was performed at 22–109 days (median 43) with a set of tests including the Free and Cued Selective Reminding Test, the main outcome measure of episodic memory. We recorded age, years of education, lesion class (a combination of subtype (e.g. lacunar) and territory), Fazekas score and binary variables for hypertension, diabetes, ischaemic heart disease, current smoking, atrial fibrillation and carotid stenosis.
Results: Episodic memory was strongly influenced by lesion class (ANOVA $p = 0.00027$) even when controlling for other variables (ANCOVA $p = 0.0005$). Verbal recall was lower in patients with left thalamic and left posterior cerebral artery lesions. There was a trend for an effect of AF. Scores in other cognitive domains were predicted by hypertension, diabetes and increasing age but not lesion class.
Conclusion: Memory impairment in the first 4 months after stroke is mostly a function of subtype and lesion location. Lesions in the posterior cerebral artery territory affect memory, despite most lesions sparing the hippocampus, implicating damage to medial temporal connections. Future analyses will identify factors that influence recovery from these early deficits.

AS17-075

STROKE PROGNOSIS

THROMBECTOMY AND AGE – IS THE OUTCOME DIFFERENT IN OLDER PATIENTS?

A. Figueiredo[1], A. Carvalho[1], M. Ribeiro[2], S. Castro[2], P. Barros[1], T. Gregório[3] and M. Veloso[1]
[1]Centro Hospitalar Vila Nova de Gaia Espinho, Neurology, Vila Nova de Gaia, Portugal
[2]Centro Hospitalar Vila Nova de Gaia Espinho, Radiology, Vila Nova de Gaia, Portugal
[3]Centro Hospitalar Vila Nova de Gaia Espinho, Internal Medicine, Vila Nova de Gaia, Portugal

Background and Aims: Current evidence supports the use of mechanical thrombectomy in acute ischemic stroke with great vessel occlusion regardless of age. However, previous studies have suggested that the clinical outcome after ischemic stroke tends to be worse in elder patients. Our aim was to compare thrombectomy outcomes between patients younger and older than 80 years old.
Method: We retrospectively analysed data from all patients submitted to thrombectomy for anterior circulation acute ischemic stroke since January 2015 until September 2016 at our centre and compared outcomes between both age groups.
Results: A total of 141 patients were included: 35 patients older than 80 were compared with 106 patients aged 80 or less. Gender, NIHSS at admission, ASPECTS and thrombolysis did not differ between both age groups. Crude OR for an excellent outcome (mRs 0–1 at 90 days) was 0,452 ($p = 0,067$). Crude OR for a good outcome (mRs 0–2 at 90 days) was 0,804 ($p = 0,587$). After adjusting for gender, NIHSS at admission, ASPECTS and thrombolysis, the OR was 0,450 ($p = 0,100$) and 1,217 ($p = 0,686$) for excellent and good outcome, respectively.
Conclusion: Our results suggest that if the aimed outcome of thrombectomy is an excellent outcome, the success of thrombectomy might be worse for patients older than 80. However, if the aimed outcome is less ambitious (mRs 0 - 2), the differences between the two groups are at least less obvious. This allows us to infer that age might be a prognostic factor for outcome without refuting thrombectomy's benefit.

AS17-080

STROKE PROGNOSIS

MORTALITY IN STROKE PATIENTS SECONDARY TO ATRIAL FIBRILLATION - AN OBSERVATIONAL STUDY

M. Ramjee[1], R. Burneikaite-Younas[1], H.M. Cross[1], A. Singh[1], N. Goorah[1] and N. Roberts[1]
[1]East Lancashire Hospitals NHS Trust, Stroke and Medicine For Older People, Blackburn, United Kingdom

Background and Aims: Among the elderly population, atrial fibrillation (AF) is the most prevalent chronic arrhythmia. The overall lifetime-risk of AF is 23%. This cohort of patients are 4–5 times more susceptible to strokes which are likely to be fatal or associated with poorer neurological outcomes.
Method: Patients presenting with strokes to East-Lancashire-NHS-Hospital-Trust (ELHT) are admitted directly to the Acute-Stroke-Unit (ASU) and their data are recorded on The Sentinel Stroke National Audit Programme (SSNAP). AF-related stroke cases were audited and included in this study.
Results: 613 patients with strokes were investigated in this observational study, 110 of them were secondary to AF. 93% (102) were known-AF while 7% (8) had new-onset AF. 16%(18) of them, did not survive. Their

mean age was 83. 89%(16)had a history of AF. 50% (9) were not anti-coagulated, 33.3% (6) were on Warfarin while 11% (2) were on Dabigatran. One third of those who weren't anti-coagulated, had a HASBLED ≥ 3.

Of the 110 with AF-related strokes, 37%(41) were not anti-coagulated on presentation. 22%(9) of them died during their admissions. In the cohort of 32 who were not anti-coagulated but survived, 12 had a high-risk of bleeding (i.e HASBLED ≥ 3).

Conclusion: Despite the high mortality associated with AF-related strokes, significant number of patients are still not on anti-coagulation. Predicting bleeding events among patients remains a clinical challenge. Many clinicians are using the HASBLED score as means to justify not anti-coagulating rather than using the calculator to highlight patients in whom caution with therapy and regular review is required.

AS17-081

STROKE PROGNOSIS

ABCD2 SCORE AND PREDICTORS OF STROKE RECURRENCE IN PATIENTS WITH ISCHAEMIC MONOCULAR VISUAL LOSS

S.F. Cheng[1], A. Zarkali[2], T. Richards[1], A. Dados[3], R.J. Simister[2] and A. Chandratheva[2]

[1]UCL, Division of Surgery and Interventional Science, London, United Kingdom

[2]UCL, Institute of Neurology, London, United Kingdom

[3]University College London Hospitals, Stroke Research Team, London, United Kingdom

Background and Aims: We aimed to describe risk factors, predictors and recurrences in patients with ischaemic transient or permanent monocular visual loss.

Method: Setting: University College London Hospitals daily TIA clinic, main referral centre for North-Central London region and Moorfields Eye Hospital, London. We reviewed consecutive records for all patients with ocular ischaemia from 1st January 2014–30th September 2016. Recurrent ischaemic stroke/TIA/monocular ischaemia within 90days were recorded.

Results: 395 patients presented with visual loss, 220(55.7%) male, mean age 64.4(SD15.1). 292 had complete data to calculate the ABCD2 score at presentation, mainly due to incomplete recording of blood pressure at initial ophthalmology assessment. Median ABCD2 score in patients with ischaemic ocular events was 2. Transient visual loss was associated with lower median ABCD2 score than permanent visual loss of 2 versus 3,($p < 0.0001$). Hypertension, diabetes and history of smoking were more common in patients with permanent visual loss. Median vascular risk factors were greater in those with permanent events, 1 versus 2($p = 0.005$).

Overall 39(9.9%) had recurrences (1.0% stroke, 7.9% TIA or transient monocular ischaemia, and 1.0% permanent monocular ischaemia). Median ABCD2 score and rate of ABCD2 score ≥ 4 did not predict recurrence. 90-day recurrence rate of stroke/TIA/monocular ischaemia were more common after transient rather than permanent ocular ischaemia 13.8% versus 2.2%,($p < 0.001$).

Conclusion: Approximately 10% of patients presenting with monocular ischaemia have further stroke, TIA or ocular ischaemia. High ABCD2 score was not predictive. Further studies are required to identify predictors of permanent visual loss and recurrent stroke in these patients.

AS17-082

STROKE PROGNOSIS

IMPACT OF SEIZURES AND STATUS EPILEPTICUS ON HOSPITAL UTILIZATION, IN-HOSPITAL MORTALITY, PALLIATIVE CARE, HOSPITAL CHARGES AND LENGTH OF STAY AMONG ISCHEMIC STROKE PATIENTS

M.A. Qureshi[1], M.R. Afzal[1], R. khatri[1], A. Maud[1], G. Rodriguez[1] and S. Cruz-Flores[1]

[1]Texas Tech University Health Sciences Center, neurology, El Paso, USA

Background and Aims: To determine the effect of in-hospital seizures/status epilepticus in ischemic stroke (IS) patients on hospital resource utilization and in-hospital mortality

Method: We identified ischemic stroke (IS) patient from Nationwide Inpatient Sample database for years 2011–2014 using codes (DX1 = 433.01, 433.11, 433.21, 433.31, 433.81, 433.91, 434.01, 434.11, and 434.91) from the International Classification of Diseases, 9th edition. IS patients with seizures (DX = 345 or 780.3) or status epilepticus (DX = 345.3) were determined by using secondary (Dx2. … Dx25) ICD-9 codes. Baseline variables were compared among the groups of IS patients without and with seizures/status epilepticus. Adjustments were made for age, gender, race and comorbities

Results: Of 1,855,297 hospitalized patients with IS, 1, 746, 239 (94.1%), 105,276 (5.6%), and 3,783 (0.2%) did not have seizures, had seizures or status epilepticus, respectively. IS with seizures/status epilepticus had higher rate of in-hospital complications (MI, sepsis, pneumonia, DVT, PE and UTI), in-hospital procedures (mechanical ventilation (MV), gastrostomy and transfusions). Mean LOS and hospital charges were also higher for IS with seizures/status epilepticus and higher rate of in-hospital mortality and palliative care (PC) and do not resuscitate (DNR).

Conclusion: Seizures and status epilepticus affect only 5.7% and 0.2% of cases with ischemic stroke and they increase the rate of in-hospital complications/procedures, length of stay, in-hospital charges, and in-hospital mortality.

AS17-086

STROKE PROGNOSIS

ALKALINE PHOSPHATASE AND FUNCTIONAL OUTCOME IN STROKE PATIENTS SUBMITTED TO INTRAVENOUS FIBRINOLYSIS

J. Durães[1], J. Beato-Coelho[1], D. Oliveira[2], P. Verão[3], C. Machado[1], B. Rodrigues[1], C. Cecília[1], M.C. Macário[1], F. Silva[1], G.C. Santo[1], J. Sargento-Freitas[1], L. Cunha[1] and A. Freire[1]

[1]Centro Hospitalar e Universitário de Coimbra, Neurology, Coimbra, Portugal

[2]Centro Hospitalar e Universitário de Coimbra, Internal Medicine, Coimbra, Portugal

[3]Unidade Local de Saúde do Litoral Alentejano, Internal Medicine, Santiago do Cacém, Portugal

Background and Aims: Although alkaline phosphatase (ALP) is mainly used as a marker for hepatic or bone disease, its expression in the epithelial cells of vascular capillaries and a possible association with blood-brain barrier dysfunction are also recognised. Its biological ubiquity made it a documented and developing therapeutic target for several pathologies. However, its role in the acute phase of ischemic stroke (IS) and relation with fibrinolytic therapy (rtPA) are still unknown. Our objective is to evaluate the role of ALP in patients with IS treated with rtPA.

Method: Historical cohort study including consecutive patients, from July 2010 to June 2015, with IS treated with intravenous rtPA. The levels of ALP were evaluated in the acute phase, previously to rtPA. Functional outcome was defined by modified Rankin scale at 90 days. We applied univariate linear and multivariate ordinal regression models to predict outcome.
Results: We included 546 patients, 54.30% men, mean age 73.69 ± 11.69 years and mean NIHSS at admission 15.28 ± 6.85. The mean ALP value was 81.44 mg/dL ± 36.03 mg/dL. In multivariate analysis, ALP was associated with age, gender, atrial fibrillation, heart failure, liver transaminases, gamma-glutamyl transferase and C-reactive protein values, NIHSS at admission and recanalization at six hours from onset. After adjusting for those variables, ALP value was an independent predictor of functional outcome at 90 days (OR: 1.01, IC95%: 1.00–1.01, p = 0.004).
Conclusion: ALP may be involved in the acute phase of IS pathophysiology. Higher ALP values in the acute phase of IS are associated with a worst functional outcome at 90 days.

AS17-088

STROKE PROGNOSIS

THE COST OF LOW EDUCATION: LOWER EDUCATIONAL LEVEL BUT NOT SOCIOECONOMIC STATUS IS AN INDEPEPENDENT RISK FACTOR FOR BAD FUNCTIONAL PROGNOSIS IN STROKE

J. Calleja[1], I. Gutierrez[1] and C. Cruz[2]
[1]Instituto Nacional de Neurología y Neurocirugía Mexico, Neurology, Mexico City, Mexico
[2]Instituto Nacional de Salud Publica, Epidemiology, Mexico City, Mexico

Background and Aims: Low socioeconomic status and educational level is related to increased stroke incidence, morbidity and mortality. We aim to determine if educational level or income are risk factors for worst prognosis in stroke patients.
Method: We analyzed patients with ischemic or hemorrhagic stroke who had at least 3 years of follow-up. Educational level was classified according to years of education (none, primary, secondary or higher) and socioeconomic status according to monthly income. Presence of risk factors, outcome, mortality, recurrence and frequency of rehabilitation after hospitalization were analyzed. Significant factors were included in a logistic regression analysis. Good prognosis was defined as a Modified Rankin Scale value lower than 3.
Results: Five hundred forty-four patients were studied, 45% ischemic, 55% hemorrhagic. Good outcome was present in 317 patients (58%). Educational levels distributed as follows: 8% none, 61% primary, 30% further. Lower educational level was significantly associated with a higher frequency of diabetes, hypertension, AF.
On bivariate analysis, presence of diabetes, hypertension, AF, and none or primary educational levels were associated with worst outcome. On a model of multivariate logistic binary regression, none (p = 0.47)or only primary education (p = .015) were independently associated with worse outcome. Monthly income and other variables were not associated with a worse prognosis.
Conclusion: Lower educational status appeared to be the main independent risk factor for bad prognosis after a stroke in our population. Further studies on risk factor control, rehabilitation, acute treatment and secondary prevention may determine which factors are relevant and modifiable when treating patients with lower educational levels.

AS17-091

STROKE PROGNOSIS

LONG-TERM CHANGES IN FUNCTIONAL OUTCOME AFTER ISCHEMIC STROKE: RESULTS FROM THE SAHLGRENSKA ACADEMY STUDY ON ISCHEMIC STROKE

C. Lagging[1], J. Viken[2], H. Samuelsson[2], C. Blomstrand[2], K. Jood[2] and C. Jern[1]
[1]Institute of Biomedicine, Department of Pathology and Genetics, Gothenburg, Sweden
[2]Institute of Neuroscience and Physiology, Department of Clinical Neuroscience, Gothenburg, Sweden

Background and Aims: Studies on functional outcome beyond the first year after stroke are scarce. We sought to investigate long-term change in functional status after ischemic stroke.
Method: Consecutive patients with ischemic stroke at ages 18–69 years were followed prospectively. Functional outcome was assessed with the modified Rankin Scale (mRS) at 3 months, 2 years and 7 years after index stroke. After 7 years, cognitive function was assessed by Mini-Mental State Examination, Barrow Neurological Institute Screen for Higher Cerebral Functions, and Star Cancellation Test, and symptoms of depression by Hospital Anxiety and Depression Scale. Participations who had survived free of recurrent stroke at 7 years and underwent all three mRS assessments (n = 328) were included.
Results: Sixteen per cent shifted to a higher and 30% to a lower mRS score from 3-month to 2-year follow-up, and the corresponding proportions were 25% and 18% from 2-year to 7-year follow-up. Among the baseline characteristics evaluated (i.e. vascular risk factors, personal and family history of cardiovascular diseases, socioeconomic status, medication, stroke severity and subtype), increasing age and pre-stroke sedentary leisure time were independent predictors of deterioration in functional status. The group that deteriorated in functional status performed less well in cognitive tests and was more likely to express symptoms of depression compared to participants who were stable/improved.
Conclusion: Functional outcome is not stable beyond 3 months after ischemic stroke. Transition to higher mRS scores were observed in a high proportion of participants even 2 years after index stroke, and deterioration was associated with age and pre-stroke sedentary leisure time.

AS17-006

Stroke Prognosis

ESTIMATED GLOMERULAR FILTRATION RATE PREDICTS SEVERITY OF HAEMORRHAGIC TRANSFORMATION AFTER THROMBOLYSIS FOR ACUTE ISCHAEMIC STROKE

D. Gill[1], A. Aravind[1], K. Arindam[1], P. Sivakumaran[1] and R. Veltkamp[1]
[1]Imperial College Healthcare NHS Trust, School of Medicine, London, United Kingdom

Background and Aims: Background: Although thrombolysis can be an effective therapy for acute ischaemic stroke (AIS), haemorrhagic complications remain a risk. Renal impairment is associated with increased risk of thrombosis and haemorrhage.
Aims: To explore whether estimated glomerular filtration rate, a measure of renal function, predicts the incidence and severity of haemorrhagic transformation (HT) after thrombolysis for AIS.
Method: Retrospective analysis of a single-centre database of consecutive thrombolysis cases for AIS. Ordinal logistic regression was used to explore whether eGFR predicts incidence and severity of HT, as

described by the European Cooperative Acute Stroke Study, after adjusting for the time to thrombolysis from symptom onset, systolic blood pressure, blood glucose, and neurological impairment (as measured by the National Institutes of Health Stroke Scale) on thrombolysis.
Results: Of the 360 patients included in analysis, there were 317 patients that suffered no HT, with 24, 8, 3 and 8 suffering the HI1, HI2, PH1 and PH2 subtypes respectively. Lower eGFR independently predicted HT and its severity (coefficient -0.03, $p = 0.001$). Thus, every 44 mL/min/1.73m^2 fall in eGFR was associated with HT of increasing severity.
Conclusion: Renal function predicts HT severity after thrombolysis for AIS. Further work is required to risk stratify patients with renal impairment being considered for thrombolysis.

AS17-017

Stroke Prognosis

WHITE MATTER HYPERINTENSITIES DO NOT IMPACT SHORT-TERM OUTCOME IN MINOR CEREBROVASCULAR EVENTS

C. Zerna[1], A. Yu[2], J. Modi[3], E.E. Smith[2] and S.B. Coutts[4]
[1]The University of Calgary, Clinical Neurosciences, Calgary, Canada
[2]Hotchkiss Brain Insitute, Clinical Neurosciences, Calgary, Canada
[3]Radiology and Nuclear Medicine, Medanta - The Medicitiy Hospital, Gurgaon, India
[4]Hotchkiss Brain Institute, Clinical Neurosciences, Calgary, Canada

Background and Aims: White matter lesions (WML) are associated with cognitive decline, increased stroke risk and disability in old age. We sought to assess correlation between qualitative (Fazekas scale) and quantitative (volumetric) WML assessment in TIA/minor stroke patients and their impact on outcome in absence and presence of intracranial occlusion/stenosis.
Method: WML volume assessment was performed in 425 patients with high-risk TIA (motor/speech deficits > 5 minutes) or minor stroke in the previously reported CATCH (CT and MRI in the triage of TIA and minor cerebrovascular events to identify high risk patients) study. Complete baseline characteristics and outcome assessment were available in 412 (96.9%) patients. Analysis was performed using t-test, correlation and logistic regression (including interaction terms).
Results: Median age was 69 years. Sixty-two patients (15%) had unfavorable outcome (mRS > 1). Higher Fazekas scores were correlated with higher WML volume ($r = 0.78$). Both higher Fazekas score and higher WMH volume were predictive of disability at 90 days in univariate regression (OR 1.22, 95%CI 1.04–1.43 and OR 1.25, 95%CI 1.02–1.54, respectively). When tested with multivariate logistic regression adjusted for significant baseline characteristics, the association ceased to exist ($P = 0.41$ and $P = 0.65$, respectively). After further adjustment for intracranial occlusion/stenosis and interaction term, only presence of intracranial occlusion/stenosis was associated with disability (OR 3.43, 95%CI 1.63–7.04 and OR 2.47, 95%CI 1.10–5.54, respectively).
Conclusion: Our data suggest that quantitative and qualitative WML assessments are highly correlated and comparable in TIA/minor stroke patients. However, WML burden does not impact short-term outcome of patients, even in the presence of intracranial stenosis/occlusion.

AS17-029

Stroke Prognosis

BETWEEN CENTRE VARIATION IN THE DIAGNOSIS AND TREATMENT OF STROKE ASSOCIATED PNEUMONIA

B. Bray[1], C. Smith[2], L. Paley[3], A. Hoffman[3], P. Tyrrell[2], M. James[4] and A. Rudd[5]
[1]Univeristy College London, Farr Institute of Health Informatics Research, LONDON, United Kingdom
[2]University of Manchester, Centre for Stroke and Vascular Research, Manchester, United Kingdom
[3]Royal College of Physicians, SSNAP, London, United Kingdom
[4]Royal Devon and Exeter NHS Foundation Trust, Royal Devon and Exeter NHS Foundation Trust, Exeter, United Kingdom
[5]Guy's and St Thomas NHS Foundation Trust, Guy's and St Thomas NHS Foundation Trust, London, United Kingdom

Background and Aims: Stroke associated pneumonia (SAP) is one of the major causes of death in acute stroke but there is a lack of standardised approaches to its diagnosis and treatment.
Method: Data of patients admitted with acute stroke from June 2013-July 2016 were extracted from the Sentinel Stroke National Audit Programme, the stroke register of England, Wales and Northern Ireland. Antibiotic prescription for SAP in the first 7 days of admission were compared across stroke units, adjusting for age, sex, stroke type, pre-stroke functioning, location of stroke onset, atrial fibrillation, and stroke severity (NIHSS or level of consciousness).
Results: 186 stroke units were included in the analysis, providing a cohort of 230838 patients. The median age was 77 years (IQR 76–85) and 204078 (88%) had ischaemic stroke. The overall rate of SAP was 8.7%. The incidence of SAP in the 20 units with the lowest incidence was 2.3% (95% CI 1.7–2.9%), and was 18.8% (17.2–20.4%) in the 20 units with the highest incidence. After adjustment, there was a similar magnitude of variation, with the standardised incidence rate ratio varying from 0.27 (0.02–0.34; adjusted 2.3%) in the 20 lowest incidence units to 2.1 (1.97, 2.29; adjusted 18.5%) in the 20 units with the highest rates of SAP.
Conclusion: Stroke units in England and Wales show very wide variation in the diagnosis and treatment of stroke associated pneumonia, even after accounting for differences in patient casemix. Variation in how SAP is diagnosed may be contributing to over-, and under-use of antibiotics in stroke patients.

AS17-035

Stroke Prognosis

DESCRIPTION OF OUTCOMES 3–4 YEARS POST MINOR ISCHAEMIC STROKE

C. McHutchison[1], V. Cvoro[1], S. Makin[1], F.M. Chappell[1], K. Shuler[1], D. Martin[1] and J.M. Wardlaw[1]
[1]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Patients with minor ischaemic stroke are expected to have good functional outcomes with low rates of dependency, cognitive or physical problems. Many studies report short-term outcomes (3–12 months) but long term data are sparse. We aimed to document physical and cognitive functioning, and dependency 3–4 years post minor ischaemic stroke.
Method: Participants recruited with lacunar or minor cortical ischaemic stroke (NIHSS ≤ 7) were followed up at 3–4 years post stroke. We assessed cognitive functioning (Addenbrooke's Cognitive Examination–Revised (ACE-R), Montreal Cognitive Assessment (MoCA)), physical

functioning (Timed Get Up and Go (TUG), 9-Hole Peg Test (9HPT)) and dependency (Modified Rankin Scale (mRS)).
Results: At 3–4 years post-stroke, 223/264 participants were followed-up (26 were non-contactable, 15 declined) of whom 202 (mean age = 66, SD = 12, range 34–96 at index stroke) completed questionnaires and/or in person assessment, and 21 were deceased. Modified Rankin scores > 2 were reported by 47 (22%) participants. Scores on the ACE-R (n = 151) ranged from 54–100/100, mean = 88, SD = 9 (MoCA, n = 153, range 10–30/30, mean = 25, SD = 4), including 25 (17%) with mild (ACE-R = 83–88) and 31 (21%) with severe (ACE-R < 82) cognitive impairment. Poorer ACE-R scores were associated with poorer scores on the TUG (n = 141, $\beta = -0.28$) and 9HPT (n = 149, left $\beta = -0.26$, right $\beta = -0.32$, hands) all $p < 0.05$ when controlling for age.
Conclusion: Impairment in cognition, physical functioning and dependency affects about a fifth, of patients at 3–4 years after initially minor ischaemic stroke. Poorer physical functioning is associated with poor cognition which may help to identify patients requiring cognitive assessment and intervention.

AS17-043

Stroke Prognosis

CLINICAL AND THERAPEUTIC DETERMINANTS OF SEIZURE RECURRENCE IN POST-STROKE EPILEPSY: A PROSPECTIVE COHORT STUDY

T. Tanaka[1], S. Abe[1], Y. Yamaguchi[2], F. Nakamura[3], H. Ishiyama[1], Y. Nakamura[2], T. Nakamura[1], T. Arimizu[2], S. Matsubara[2], K. Nagatsuka[1], K. Toyoda[2] and M. Ihara[1]
[1]Research Institute National Cerebral and Cardiovascular Center, Department of Neurology, Osaka, Japan
[2]Research Institute National Cerebral and Cardiovascular Center, Department of Cerebrovascular Medicine, Osaka, Japan
[3]Research Institute National Cerebral and Cardiovascular Center, Center for Cerebral and Cardiovascular Disease Information, Osaka, Japan

Background and Aims: Post-stroke epilepsy (PSE) is a common complication of stroke. We reported in a retrospective study that younger age, presence of convulsions and valproic acid monotherapy were associated with PSE recurrence (PLoSONE, 2015). Then, we planned a prospective cohort study to determine clinical features and antiepileptic drug (AED) treatment regimens that are related to seizure recurrence.
Method: Between November 2014 and June 2016, we recruited PSE patients admitted to our hospital and prospectively observed seizure recurrence.
Results: We enrolled 51 patients of PSE receiving one or more AED prescription (33 male; median age, 76 years), including 23 with past history of ischemic stroke (including 10 cardiogenic embolism), 24 with intracerebral or subarachnoid hemorrhage, and 4 with both. Cortical involvement of stroke was observed in 43 patients (84.3%) and prior history of seizures in 24 patients (48.0%). The details of AED therapy were levetiracetam monotherapy in 35 patients, valproic acid monotherapy in 2, carbamazepine monotherapy in 3, zonisamide monotherapy in 1, and polytherapy in 10. After discharge, 12 (24.1%) patients had seizure recurrences during a follow-up period of 280 ± 128 days. In multivariate analysis, independent related factors of recurrent seizure were Levetiracetam-containing regimen (HR, 0.20; 95%CI, 0.06–0.72; p = 0.014), AED polytherapy (HR, 4.2; 95%CI, 1.01–17.59; p = 0.049), and female gender (HR, 6.93; 95%CI, 1.58–30.48; p = 0.010).
Conclusion: About a quarter of patients with PSE had seizure recurrence within 280 days. Levetiracetam may be an appropriate AED to decrease recurrence of PSE but analysis of a larger cohort is required to validate the results.

AS17-058

Stroke Prognosis

DOES LINKING THE AUSTRALIAN STROKE CLINICAL REGISTRY WITH ADMISSIONS DATA PROVIDE A BETTER EXPLANATION OF VARIABILITY IN STROKE RISK-ADJUSTED MORTALITY RATES?

M. Kilkenny[1], N. Andrew[1], R. Grimley[2], V. Sundararajan[3], T. Johnston[4], N. Lannin[5], L. Churilov[6], S. Middleton[7], C. Anderson[8] and D. Cadilhac[1]
[1]Monash University, Stroke & Ageing Research- School of Clinical Sciences at Monash Health, Clayton, Australia
[2]University of Queensland, Sunshine Coast Clinical School, Nambour, Australia
[3]St. Vincent's Hospital- Melbourne University, Medicine, Melbourne, Australia
[4]Queensland Department of Health, Health Statistics Branch, Brisbane, Australia
[5]La Trobe University, Faculty of Health Sciences, Bundoora, Australia
[6]Florey Institute of Neuroscience and Mental Health, Statistics and Decision Analysis Academic Platform, Heidelberg, Australia
[7]Australian Catholic University, Nursing Research Institute- St Vincent's Health, Sydney, Australia
[8]The University of Sydney, The George Institute for Global Health, Sydney, Australia

Background and Aims: Stroke risk-adjusted mortality rates (RAMR) are influenced by the methods used to adjust for potential confounders. To determine whether linking data from Admissions and Registry datasets provides a better explanation of variability in 30-day RAMR than using admission data alone.
Method: Cohort design linking Australian Stroke Clinical Registry (AuSCR) data for patients from 2009 to 2013 in Queensland with hospital admissions and national death registrations. The Elixhauser Index, a validated method for measuring patient comorbidity, was derived from hospital admissions ICD-10 codes. Model A contained data including variables available in hospital admissions datasets (i.e. demographics, stroke type and the Elixhauser index). Model B included the variables contained in model A plus additional information from the AuSCR such as stroke severity and recurrent stroke. Generalised linear latent and mixed models were used to calculate 30-day RAMR. Models were compared using Bayesian information criterion (BIC) and the C-statistic: 95% confidence intervals (CI).
Results: Of 2986 episodes of care, 363 patients (12%) died within 30 days of admission. RAMRs for hospitals ranged from 6% to 16%. According to the model fit statistics, Model B (BIC: 1581; C-statistic: 0.842; 95%CI: 0.82, 0.86) provided better explanation than Model A (BIC: 1900; C-statistic: 0.790; 95%CI: 0.77, 0.81). Both the magnitude of difference in BIC and statistically significantly different c-statistics indicate that Model B was strongly superior in explaining variability in 30-day RAMR.
Conclusion: The addition of severity and recurrent stroke to mortality models provides a better explanation of variability in RAMR than risk adjustment available from administrative data alone.

AS06-003

SYSTEMATIC REVIEW AND META-ANALYSIS

GLUCAGON-LIKE PEPTIDE-1 AGONISTS AND PROTECTION AGAINST STROKE: A SYSTEMATIC REVIEW AND META-ANALYSIS

H. Milionis[1], F. Barkas[1] and M. Elisaf[1]
[1]School of Medicine - University of Ioannina, Internal Medicine, Ioannina, Greece

Background and Aims: Type 2 diabetes is associated with an increased risk of stroke and a worse outcome following stroke. Among glucose-lowering modalities only pioglitazone (a thiazolinedione) has been shown to protect against stroke. Nonetheless, evidence from experimental with novel antidiabetic agents, such as glucagon-like peptide-1 (GLP-1) agonists, suggests potential neuroprotective effects, especially if treatment starts before stroke. Thus, we aimed to meta-analyze available evidence regarding the risk of stroke in individuals receiving GLP-1 agonists.
Method: We conducted a meta-analysis of randomized, placebo-controlled trials (RCTs) involving GLP-1 agonists with cardiovascular safety as an endpoint.
Results: Three multicenter (n = 18,143), prospective double-blinded placebo-controlled randomized, clinical trials (RCTs) were published up to November 2016 and assessed cardiovascular outcomes as a primary endpoint. The analysis did not show any difference in the risk of stroke compared with placebo (odds ratio OR: 0.89, 95% CI: 0.74–1.06, p = 0.187). However, a significant trial heterogeneity was detected (Q value = 3.562, p = 0.168, I2 = 43.859 %).
Conclusion: The promising data from experimental studies regarding gliptin-associated protective effects against stroke are not supported by available data from RCTs dedicated to cardiovascular safety. Due to the noticed trial heterogeneity, however, future studies using stroke as an endpoint/outcome are needed to evaluate any neuroprotective effects associated with treatment with GLP-1 agonists.

AS06-007

SYSTEMATIC REVIEW AND META-ANALYSIS

TRANSCRANIAL DIRECT CURRENT STIMULATION AFTER STROKE

B. Elsner[1,2], G. Kwakkel[3,4,5,6], J. Kugler[2] and J. Mehrholz[2,7,8]
[1]SRH Hochschule für Gesundheit Gera, Physiotherapy, Gera, Germany
[2]TU Dresden, Professorship of Public Health, Dresden, Germany
[3]VU University Medical Center, Department of Rehabilitation Medicine-MOVE Research Institute, Amsterdam, The Netherlands
[4]Northwestern University, Department of Physical Therapy and Human Movement Sciences, Evanston- IL, USA
[5]VU University Amsterdam, Neuroscience Campus Amsterdam, Amsterdam, Germany
[6]Amsterdam Rehabilitation Research Center Reade, Neurorehabilitation, Amsterdam, The Netherlands
[7]Private Europäische Medizinische Akademie der Klinik Bavaria in Kreischa GmbH, Wissenschaftliches Institut, Kreischa, Germany
[8]SRH Hochschule für Gesundheit Gera, Neurorehabilitation, Gera, Germany

Background and Aims: Transcranial Direct Current Stimulation (tDCS) is an emerging approach for improving capacity in activities of daily living (ADL) and upper limb function after stroke. However, it remains unclear what type of tDCS stimulation is most effective.
Our aim was to give an overview of the evidence network regarding the efficacy and safety of tDCS and to estimate the effectiveness of the different stimulation types.
Method: We performed a systematic review of randomised trials using network meta-analysis (NMA), searching the following databases until 5 July 2016: Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, EMBASE, CINAHL, AMED, Web of Science, and four other databases. We included studies with adult people with stroke. We compared any kind of active tDCS (anodal, cathodal, or dual, that is applying anodal and cathodal tDCS concurrently) regarding improvement of our primary outcome of ADL capacity, versus control, after stroke. PROSPERO ID: CRD42016042055
Results: We included 26 studies with 754 participants. Our NMA showed evidence of an effect of cathodal tDCS in improving our primary outcome, that of ADL capacity (standardized mean difference, SMD = 0.42; 95% CI 0.14 to 0.70). tDCS did not improve our secondary outcome, that of arm function, measured by the Fugl-Meyer upper extremity assessment (FM-UE). There was no difference in safety between tDCS and its control interventions, measured by the number of dropouts and adverse events.
Conclusion: Comparing different forms of tDCS shows cathodal tDCS is the most promising treatment option to improve ADL capacity in people with stroke.

AS06-008

SYSTEMATIC REVIEW AND META-ANALYSIS

HEMODYNAMIC IMPAIRMENT AND COGNITIVE FUNCTION IN PATIENTS WITH CAROTID ARTERY OCCLUSION; A SYSTEMATIC REVIEW

E.A. Oudeman[1], L.J. Kappelle[1], R. van den Berg-Vos[2], H. Weinstein[2], E. van den Berg[3] and C.J. Klijn[4]
[1]UMC Utrecht, Neurology and Neurosurgery, Utrecht, The Netherlands
[2]OLVG West, Neurology, Amsterdam, The Netherlands
[3]Erasmus MC, Neurology and Medical Psychology, Rotterdam, The Netherlands
[4]Radboud UMC, Neurology, Nijmegen, The Netherlands

Background and Aims: Patients with carotid artery occlusion (CAO) have an increased risk of cognitive impairment. We aimed to assess the presence, severity, nature and course of cognitive impairment in patients with CAO and to explore the relation between cognitive function and both systemic and cerebral hemodynamic impairment.
Method: We systematically searched Medline and EMBASE for studies including patients with symptomatic and asymptomatic CAO subjected to cognitive tests published between 1980 and 2016. We obtained data on type of study, patient characteristics, cerebral imaging and neuropsychological testing. In addition, we extracted data on potential causes of systemic hemodynamic impairment and the presence and stage of cerebral hemodynamic impairment. We assessed methodological quality with the Newcastle-Ottawa Scale.
Results: We found eight eligible studies comprising 244 patients (mean age 61 years, 76% male, 93% symptomatic CAO). The proportion of patients with cognitive impairment ranged from 54 to 71% in four studies; in the other four studies cognitive test performances were not quantified, but were worse for patients with CAO compared to controls or normative data. Cognitive impairment was found in all domains. No studies reported on the association between systemic hemodynamic impairment and cognitive function. Studies that assessed whether cerebral hemodynamic impairment was associated with cognitive function showed conflicting results.
Conclusion: In patients with CAO, cognitive impairment is present in about half to two-thirds of patients and is not restricted to specific cognitive domains. The effect of systemic and cerebral hemodynamic impairment on cognitive function in patients with CAO deserves further study.

AS06-010

SYSTEMATIC REVIEW AND META-ANALYSIS

RETROSPECTIVE ANALYSIS OF THE USE OF NEW ANTICOAGULANTS IN A SPANISH HEALTH AREA

P. Sanchez Lozano[1], M.R. Juana[2], G.C.F. Carmen[2], P.A. Angel Ignacio[2], M.R. Laura[2] and C.P. Sergio[2]
[1]Hospital Universitario de Cabueñes, Nerurology, Gijon, Spain
[2]Hospital universitario central de Asturias, Neurology, Oviedo, Spain

Background and Aims: With the advent of the new oral anticoagulants (NACO) there has been a revolution in the prevention of ischemic stroke. Each time its use has been implemented in recent years. Our goal was to see how patients evolved with these treatments.
Method: We realized a retrospective, observational and descriptive study of 237 patients with non-valvular AF of a health area (population 342,336 inhabitants), among the more than 800 patients who started treatment with NACO since November 2011. We analyzed their demographic characteristics, Comorbidity, Medication and Complications.
Results: Average age 76.45 years. By sex: 54% male and 46% female. Distribution by drugs: Dabigatran 75%, Ribaroxaban 24.6% and Apixaban 0.4%. Mean follow-up time: 32,61 months. The most frequent associated comorbidity was hypertension, diabetes and ischemic heart disease. Only 23.2% had a history of neurological pathology and only 8% had previous major bleeding. Most commonly associated drugs were proton pump inhibitors and their combination with antidepressants. At the beginning of the treatment, only initial analysis was performed in 38.5%. Hemorrhagic complications 10.55% (52% higher, mainly gastrointestinal) and thrombotic complications 2.10%, all of them stroke. The mean HAS-BLED was 2.88. Global mortality 3.90%, vascular mortality 0.84%, intracranial hemorrhage 0.38%, stroke 0.63%,
Conclusion: - Proper safety controls are not being used to ensure a minimum of risk.
- The results regarding morbidity and mortality are close to those obtained in the pivotal tests.

AS06-011

SYSTEMATIC REVIEW AND META-ANALYSIS

EARLY VERSUS DELAYED MOBILIZATION TO IMPROVE STROKE RECOVERY AFTER ISCHEMIC STROKE: A META-ANALYSIS

S. Bhushan[1]
[1]New Delhi, India

Background and Aims: Availability of limited therapeutic options clearly indicates need for potential rehabilitation interventions to diminish the increasing burden of disability associated with stroke. Very early mobilization is recommended in acute stroke management guidelines, however, it is unclear whether very early mobilization improves outcome after the stroke as compared to delayed mobilization. The objective of the present meta-analysis is to compare early versus delayed physical rehabilitation approach in recovery of mobility and function in patients with stroke
Method: Search was carried out in the electronic databases including PubMed, EMBASE, MedLine, Central, Cochrane Library, Cochrane Central Register of Controlled trial. Last search was made up to December, 2016. Pooled risk difference and 95% CI was calculated using statistical software RevMan Version 5.3. Fixed effect model was used if heterogeneity if less than 50%, otherwise random effect model was used.
Results: Two studies involving 4304 subjects in early mobilization group and 1920 subjects in delayed mobilization group were included in the meta-analysis. No statistically significant difference was observed between early vs delayed mobilization group in outcome death at the end of last follow up (RD 0.03, 95% CI -0.07 to 0.14, P = 0.52). Significant improvement in early mobilization group as compared to delayed mobilization group in favorable outcome defined by mRS (modified Rankin scale) score of 0–2 at the end of follow up was observed (RD 0.05, 95% CI 0.02 to 0.07, P value 0.0007).
Conclusion: Patients who receive very early mobilization in acute stroke are more likely to achieve good outcome as compared to delayed mobilization

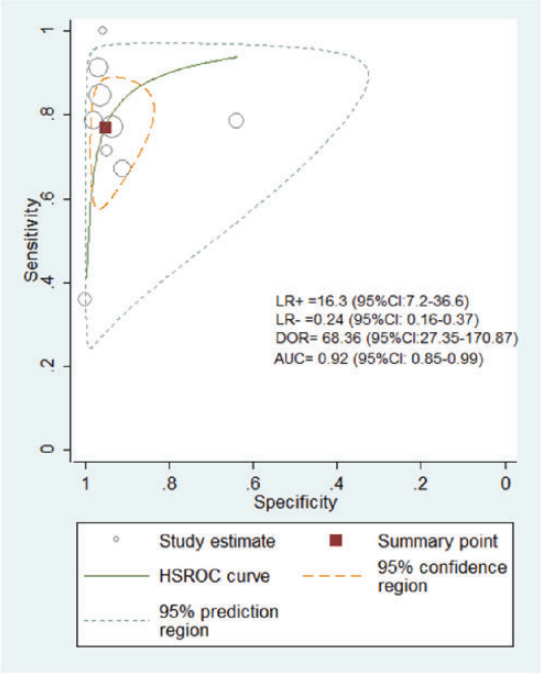
AS06-014

SYSTEMATIC REVIEW AND META-ANALYSIS

SERUM GLIAL FIBRILLARY ACIDIC PROTEIN IN THE DIFFERENTIAL DIAGNOSIS OF INTRACEREBRAL HEMORRHAGE AND ACUTE ISCHEMIC STROKE: A SYSTEMATIC REVIEW AND DIAGNOSTIC TEST ACCURACY META-ANALYSIS

A. Katsanos[1,2], K. Makris[3], D. Stefani[4], M. Lelekis[4], M. Chondrogianni[1], C. Liantinioti[1], C. Zompola[1], M. Ioakeimidis[1], A. Roussopoulou[1], S. Triantafyllou[1], K. Voumvourakis[1] and G. Tsivgoulis[1,5]
[1]National and Kapodistrian University of Athens School of Medicine, Second Department of Neurology, Athens, Greece
[2]University of Ioannina School of Medicine, Department of Neurology, Ioannina, Greece
[3]KAT General Hospital, Clinical Biochemistry Department, Athens, Greece
[4]KAT General Hospital, Department of Internal Medicine, Athens, Greece
[5]University of Tennessee Health Science Center, Department of Neurology, Memphis- TN, USA

Background and Aims: Literature data highlight serum glial fibrillary acidic protein (GFAP) as an emerging biomarker for the differentiation of intracerebral hemorrhage (ICH) from acute ischemic stroke (AIS).
Method: We performed a prospective observational study on the diagnostic accuracy of GFAP on stroke differentiation in consecutive patients presenting within 6 hours from symptom onset and a systematic review and diagnostic test accuracy meta-analysis (DTA), using bivariate mixed-model approach, to evaluate the overall diagnostic yield of GFAP on stroke differentiation.
Results: We prospectively measured GFAP from 155 patients (mean age 76.6 ± 9.3years, 51% men, mean time from stroke onset to blood sampling 177 ± 87 min). A cut-off value of 0.43 ng/ml provided the optimal diagnostic accuracy [sensitivity = 91.2%, specificity = 96.7%, area under the curve (AUC): 0.97] for the differentiation between ICH (n = 34) and AIS (n = 121). A comprehensive literature search on MEDLINE and EMBASE identified 8 similar study protocols, which together with our study provided pooled sensitivity and specificity of 0.77 (95%CI:0.65–0.85) and 0.95 (95%CI:0.89–0.98), respectively. The pooled overall diagnostics odds ratio was 68.36 (95%CI:27.35–170.87) with an AUC of 0.92 (95%CI: 0.85–0.99) and a positive likelihood ratio of 16.3 (95%CI:7.2–36.6).



Conclusion: Serum GFAP appears to be highly specific but moderate sensitive in the differential diagnosis of ICH from AIS. Multivariable modeling approach incorporating potential confounders may be needed for the calculation of an optimal GFAP threshold for a given setting.

AS06-017

SYSTEMATIC REVIEW AND META-ANALYSIS

NON-THROMBOTIC, EMBOLIC STROKE: EMBOLI OF NON-TISSUE ORIGIN

C. Judge[1], S. Mello[1] and J. Harbison[1]
[1]St James's Hospital- Dublin- Ireland, Department of Stroke and Medicine for the Elderly, Dublin, Ireland

Background and Aims: Emboli causing ischaemic stroke are generally thrombotic in origin, however they can also develop from non-thrombotic material. Non-thrombotic, non-tissue emboli may be iatrogenic in nature, but can also arise from a variety of other sources. There is a paucity of available data on the optimal management of these conditions. We aimed to create a review of the various types of non-thrombotic, embolic stroke of non-tissue origin, and to conduct a systematic review of the available literature.
Method: We performed an initial literature review on the various causes of non-thrombotic, embolic stroke (NTES) of non-tissue origin; followed by a systematic review of the available references. We used PUBMED and EMBASE to search for case reports and series published in English with no restriction on publication date.
Results: 1874 articles were screened by title and abstract, and potentially suitable articles read in full. 233 full-text articles were assessed for eligibility with 204 case series and reports included in the final review. Pathology of the emboli were documented and categorised as air; pressure-related; missile and foreign body. Incidence of iatrogenic cases increased 8-fold over 30 years. We reviewed the available literature to summarise the pathophysiology, incidence, and management of these conditions.
Conclusion: Non-thrombotic, embolic stroke of non-tissue origin is an uncommon but important diagnosis which should be considered in certain clinical settings, particularly in stroke affecting younger patients. The frequency of iatrogenic cases has increased in recent times, but management is often based on anecdotal evidence. More data are needed to ensure optimal treatment of these cases.

AS06-018

SYSTEMATIC REVIEW AND META-ANALYSIS

TOTAL, RED, PROCESSED, AND WHITE MEAT INTAKE AND STROKE INCIDENCE AND MORTALITY: A SYSTEMATIC REVIEW AND META-ANALYSIS OF COHORT STUDIES

K. Kim[1], J. Hyeon[2], S.A. Lee[3], S.O. Kwon[3], H. Lee[2], N. Keum[4], J.K. Lee[5] and S.M. Park[2]
[1]Seoul National University, Department of Biomedical Sciences, Seoul, Republic of Korea
[2]Seoul National University Hospital, Department of Family Medicine, Seoul, Republic of Korea
[3]Kangwon National University School of Medicine, Department of Preventive Medicine, Chuncheon, Republic of Korea
[4]Harvard T.H Chan School of Public Health, Department of Nutrition, Boston, USA
[5]Seoul National University, JW Lee Center for Global Medicine, Seoul, Republic of Korea

Background and Aims: The relationship between types of dietary protein consumption and risk of stroke has been controversial and previous meta-analyses contain methodological issues. This study aimed to evaluate the association between total, red, processed, and white meat consumption and risk of stroke incidence and mortality through a meta-analysis of cohort studies.
Method: Literature search was conducted on 3 databases (PubMed, EMBASE, and Cochrane Library) to identify relevant studies of total, red, processed, and white meat consumption and risk of stroke incidence and mortality through October 2016. Random effects model was used to compute the pooled relative risks (RRs) and 95% Confidence Intervals (95% CI). Egger's test was used to check for publication bias.
Results: 7 studies with 9,522 cases of stroke and 254,742 participants and 8 studies with 12,999 cases of stroke-related deaths and 487,150 participants were selected for this meta-analysis. Comparing the highest and lowest category of meat consumption, the RR (95% CI) for total, red, processed, and white meat consumption and total stroke incidence were 1.18 (1.09–1.28), 1.16 (1.08–1.25), 1.11 (1.03–1.20), and 0.87 (0.78–0.97), respectively. Total meat consumption 0.97 (0.85–1.11) and red meat consumption 0.87 (0.64–1.18) were not significantly associated with stroke-related death. Neither heterogeneity nor publication bias were found among the studies.
Conclusion: The results from this meta-analysis suggest that consumption of total, red, and processed meat is associated with an increased risk of total stroke, but not stroke mortality. Intake of white meat might be linked to a reduced risk of stroke.

AS06-020

SYSTEMATIC REVIEW AND META-ANALYSIS

EMBOLIC STROKE OF UNDETERMINED SOURCE: A SYSTEMATIC REVIEW AND CLINICAL UPDATE

L. Catanese[1], R.G. Hart[2], K.S. Perera[2], G. Ntaios[3] and S.J. Connolly[4]
[1]Hamilton Health Sciences, Neurology, Hamilton, Canada
[2]Population Health Research Institute, Neurology, Hamilton, Canada
[3]Larissa University Hospital, Medicine, Larissa, Greece

[4]Population Health Research Institute, Cardiology, Hamilton, Canada

Background and Aims: Embolic stroke of undetermined source (ESUS) designates patients with non-lacunar cryptogenic ischemic strokes in whom embolism is the likely stroke mechanism. It has been hypothesized that anticoagulation is more efficacious than antiplatelet therapy for secondary stroke prevention in ESUS patients. We review available information about ESUS.
Method: Systematic literature review to assess the frequency of ESUS, patient features, and prognosis using PUBMED from 2014 to present, unrestricted by language.
Results: Based on nine studies, the reported frequency of ESUS ranged from 9% to 25% of ischemic strokes, averaging 17%. From eight studies involving 2045 ESUS patients, the mean age was 65 years and 42% were women; the mean NIH stroke score was five at stroke onset (four studies, 1772 ESUS patients). Most (86%) ESUS patients were treated with antiplatelet therapy during follow-up, with the annualized recurrent stroke rate averaging 4.5% per year during a mean follow-up of 2.7 years (five studies, 1605 ESUS patients).
Conclusion: ESUS comprises about one ischemic stroke in six. Ischemic stroke patients meeting criteria for ESUS were relatively young compared with other ischemic stroke subtypes and had, on average, minor strokes, consistent with small emboli. Retrospective methods of available studies limit confidence in stroke recurrence rates but support a substantial (>4% per year) rate of stroke recurrence during (mostly) antiplatelet therapy. There is an important need to define better antithrombotic prophylaxis for this frequently occurring subtype of ischemic stroke.

AS06-022

SYSTEMATIC REVIEW AND META-ANALYSIS

STROKE REHABILITAION AND COMORBIDITIES: A SYSTEMATIC SCOPING REVIEW OF RANDOMIZED CONTROLLED TRIALS

M. Nelson[1]
[1]Bridgepoint Collaboratory for Research and Innovation, Toronto, Canada

Background and Aims: Most strokes occur in the context of other medical diagnoses. Currently, stroke rehabilitation evidence reviews have not synthesized or presented the evidence with a focus on comorbidities, and correspondingly may not align with current patient population. This review determined the extent and nature of randomized controlled trial stroke rehabilitation evidence that included patients with multimorbidity.
Method: Electronic databases were searched using a combination of terms related to 'stroke' and 'rehabilitation'. Selection criteria captured studies with stroke patients in inpatient rehabilitation. Methods were modified to account for the amount of literature, classified by study design, and RCTs were abstracted.
Results: The database search yielded 10771 unique articles. Screening resulted in 428 RCTs included in the study. Three studies explicitly included patients with a comorbid condition. Fifteen percent of articles did not specify conditions that were excluded. Impaired cognition was the most commonly excluded condition. Approximately 37% of articles excluded patients who had experienced a previous stroke. 24% of articles excluded patients one or more Charlson Index condition, and 83% excluded patients with at least one other medical condition.
Conclusion: This review represents the first attempt to map literature on stroke rehabilitation related to co/multimorbidity, and identify gaps in existing research. This study shows that the existing evidence on stroke rehabilitation often excludes individuals with comorbidities. This is problematic as the evidence that is used to generate clinical guidelines does not match the patient typically seen in practice. The use of alternate research methods are needed for studying care of individuals with stroke.

AS06-023

SYSTEMATIC REVIEW AND META-ANALYSIS

PATIENT AND ANEURYSM CHARACTERISTICS IN FAMILIAL INTRACRANIAL ANEURYSMS. A SYSTEMATIC REVIEW AND META-ANALYSIS

E. Slot[1], **G. Rinkel**[1], **A. Algra**[1,2] **and Y. Ruigrok**[1]
[1]Brain Center Rudolf Magnus - UMC Utrecht, Neurology and Neurosurgery, Utrecht, The Netherlands
[2]Julius Center for Health Sciences and Primary Care, Epidemiology, Utrecht, The Netherlands

Background and Aims: Patient and aneurysm characteristics have been reported to differ between patients with familial and non-familial intracranial aneurysms (IAs) although results are inconsistent. We systematically reviewed and meta-analysed the literature to identify and quantify patient- and aneurysm characteristics associated with familial IAs.
Method: We searched PubMed and EMBASE for case-control and cohort studies comparing patient- and aneurysm characteristics between familial and non-familial IAs. Two observers independently assessed study eligibility and appraised quality with the Newcastle Ottowa Scale. Using univariable weighted linear regression analysis we calculated β-coefficients with corresponding 95% confidence intervals (CIs) for ruptured and unruptured IAs combined and for ruptured IAs only. Heterogeneity was assessed with Higgins I^2.
Results: For ruptured and unruptured IAs combined, multiple IAs were more prevalent in familial (28.5%) than in non-familial IAs (20.4%; $\beta = 0.10$, 95% CI, 0.04 <-> 0.16). For ruptured IAs only, in familial patients IAs were more prevalent on the middle cerebral artery (41.1% versus 29.5%; $\beta = 0.12$, 95% CI, 0.01 <-> 0.24) and ruptured at a younger age (46.5 years versus 50.8 years; $\beta = -5.00$, 95% CI, -9.31<-> -0.69) than in non-familial patients. However, results for age at rupture showed considerable heterogeneity. No significant differences were found for the proportion of women, size of the aneurysm at time of rupture, smoking or hypertension.

Table 1: Patient and aneurysm-specific characteristics of familial intracranial aneurysms as compared to non-familial intracranial aneurysms for analysis of ruptured and unruptured aneurysms together

Characteristic	Familial IAs	Non-familial IAs	β	95% CI	P-value	Heterogeneity I^2 (%)
Women (%)	62.9	60.6	0.03	-0.07 <-> 0.14	0.54	70
Smoking (%)	55.7	52.6	-0.06	-0.88 <-> 0.78	0.80	72
Hypertension (%)	47.5	54.9	0.01	-0.46 <-> 0.48	0.96	95
Multiplicity (%)	28.5	20.4	0.10	0.04 <-> 0.16	0.001	0
ACA (%)	24.3	33.7	-0.06	-0.22 <-> 0.10	0.48	60
ICA (%)	36.1	24.5	-0.031	-0.14 <-> 0.08	0.57	11
MCA (%)	38.1	27.9	0.047	-0.05 <-> 0.15	0.35	35
VBA (%)	5.5	7.2	-0.0.35	-0.04 <-> 0.04	0.89	0

IA=intracranial aneurysm, 95% CI=95% confidence interval, ACA= anterior cerebral artery, including the anterior communicating artery and pericallosal artery, MCA= medial cerebral artery, ICA= internal carotid artery, VBA= vertebrobasilar artery

Table 2: Patient and aneurysm-specific characteristics of familial intracranial aneurysms as compared to non-familial intracranial aneurysms for analysis of ruptured aneurysms only

Characteristic	Familial IAs	Non-familial IAs	β	95% CI	P-value	Heterogeneity I^2 (%)
Women (%)	62.3	59.0	-0.00	-0.12 <-> 0.11	0.96	66
Mean age at rupture (yrs.)	46.5	50.8	-5.00	-9.31<-> -0.69	0.03	98
Multiplicity (%)	27.4	19.4	0.07	-0.01 <-> 0.15	0.07	0
Mean size at rupture (mm)	12.9	14.7	-5.52	-19.17 <-> 8.13	0.32	99
ACA (%)	27.7	35.9	-0.01	-0.18 <-> 0.16	0.93	58
ICA (%)	24.3	22.8	-0.05	-0.18 <-> 0.08	0.45	0
MCA (%)	41.1	29.5	0.12	0.01 <-> 0.24	0.03	12
VBA (%)	5.3	7.5	-0.01	-0.06 <-> 0.04	0.62	0

IA=intracranial aneurysm, 95% CI=95% confidence interval, ACA= anterior cerebral artery, including the anterior communicating artery and pericallosal artery, MCA= medial cerebral artery, ICA= internal carotid artery, VBA= vertebrobasilar artery

Conclusion: These results suggest that characteristics of familial and non-familial IAs show considerable overlap, yet differ on specific aspects. This should be taken into consideration for future etiological research into IAs.

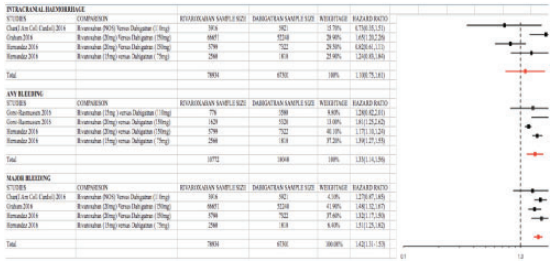
AS06-025

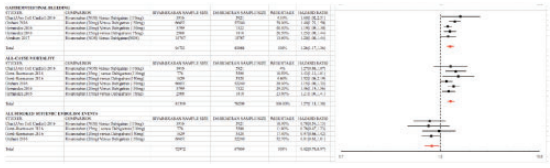
SYSTEMATIC REVIEW AND META-ANALYSIS

DIRECT COMPARISON OF RIVAROXABAN AND DABIGATRAN FOR NON VALVULAR ATRIAL FIBRILLATION A META-ANALYSIS OF REAL WORLD DATA

W.Y. Kong[1], F.S. Tseng[2], N.L.X. Syn[2], V.K. Sharma[1] and B.P.L. Chan[1]
[1]National University Hospital, Neurology, Singapore 119228, Singapore
[2]National University Of Singapore, Medicine, Singapore, Singapore

Background and Aims: Safety and efficacy amongst novel anticoagulants has been well studied in randomized controlled trials. However, real world data on direct comparisons of different novel anticoagulants is still lacking as published studies mainly compared individual agents against Vitamin K Antagonists. We performed a meta-analysis on real world studies directly comparing rivaroxaban versus dabigatran of various dosages.
Method: We searched PUBMED from January 2005 to January 2017. We conducted citation searches and screened reference lists of included studies. All cohort and case control studies which directly compare rivaroxaban and dabigatran are included. Two authors independently screened titles and abstracts. One author screen for inclusion criteria and conduct data extractions, which are then checked by a second author. Methodological quality of each studies are assessed using QUADAS. Pooled hazard ratios of rivaroxaban versus dabigatran are obtained using the random effects model.
Results: In pooled analyses, rivaroxaban is superior to dabigatran (HR: 0.82; 95 % CI 0.70–0.97) in preventing stroke and systemic embolism. However, rivaroxaban is associated with significant increased hazard of all cause mortality (HR 1.27, 95 % CI 1.18–1.38) ; gastrointestinal bleeding (HR 1.26, 95 % CI 1.17–1.36) ; major bleeding (HR 1.42, 95 % CI 1.31–1.53); any bleeding (HR 1.33, 95 % CI 1.14–1.56) and a non significant increased hazard of intracranial hemorrhage (HR 1.10 95 % CI 0.75–1.61).





Conclusion: Rivaroxaban is superior to Dabigatran in real world setting to prevent stroke and systemic embolism. However, with higher mortality, gastrointestinal bleeding and major bleeding.

AS06-026

SYSTEMATIC REVIEW AND META-ANALYSIS

PREVALENCE OF COGNITIVE IMPAIRMENT NO DEMENTIA (CIND) POST-STROKE: SYSTEMATIC REVIEW AND PRELIMINARY META-ANALYSIS

E. Sexton[1], N.A. Merriman[1], N.A. Donnelly[2], D. Rohde[1], A. Hickey[1], D. Williams[3] and K.E. Bennett[1]
[1]Royal College of Surgeons in Ireland, Division of Population Health Sciences, Dublin, Ireland
[2]Economic and Social Research Institute, Social Research, Dublin, Ireland
[3]Royal College of Surgeons in Ireland and Beaumont Hospital, Geriatric and Stroke Medicine, Dublin, Ireland

Background and Aims: Meta-analysis of available studies indicates that 10% of individuals develop dementia after first stroke [1]. However, many stroke patients experience cognitive impairment that does not meet the criteria for dementia (cognitive impairment no dementia or CIND). The aim was to systematically review studies of the prevalence of CIND up to one year post-stroke, and conduct a preliminary meta-analysis.
Method: Pubmed, EMBASE and PsychInfo were searched for papers published in English in 1995–2016. Included studies were based on consecutive acute inpatient admissions for first-ever/recurrent ischaemic stroke, and assessed CIND using standardised criteria at 1–12 months post-stroke. Studies were excluded if they excluded patients with a specific stroke type (e.g. non-lacunar infarction) or if patients were selected based on having a specific deficit. Studies with mixed stroke-type were excluded unless they included $>=75\%$ ischaemic stroke. A pooled prevalence of CIND was estimated using random-effects meta-analysis. The I^2 statistic was used to quantify heterogeneity across studies.
Results: 6,235 abstracts were screened and 808 full text articles were examined. 15 articles met the inclusion criteria. Follow-up times were 3 months ($n=6$), 3–6 months ($n=3$), 6 months ($n=1$), 6–9 months ($n=2$), and 12 months ($n=3$). Preliminary meta-analysis indicated a pooled prevalence of 41% [95% CI = 35%-46%]. There was considerable heterogeneity across studies ($I^2=88.9\%$, $p<0.01$).
Conclusion: Preliminary meta-analysis of available studies indicates that 40% of patients have CIND one year post-stroke. Further work will examine sources of variation across study estimates, including casemix (first-ever or recurrent stroke) and definition of CIND.

1. Pendlebury ST, Rothwell PM. PMID: 19782001

AS06-027

SYSTEMATIC REVIEW AND META-ANALYSIS

MULTIDOMAIN INTERVENTION FOR THE PREVENTION OF COGNITIVE DECLINE AFTER STROKE – A INDIVIDUAL PATIENT DATA META-ANALYSIS

Y. Teuschl[1], H. Ihle-Hansen[2], K. Matz[1,3], B. Firlinger[1], A. Dachenhausen[1], P. Ratajczak[1], J. Tuomilehto[1], M.H. Ursin[2], G. Hagberg[2], B. Fure[2], B. Thommessen[4], A.R. Øksengård[2] and M. Brainin[1,3]
[1]Danube University Krems, Department for Clinical Medicine and Preventive Medicine, Krems, Austria
[2]Vestre Viken Hospital Trust- Bærum Hospital, Department of Medicine-, Oslo, Norway
[3]University Hospital Tulln, Department of Neurlogy, Tulln, Austria
[4]Akershus University Hospital, Department of Neurology, Lørenskog, Norway

Background and Aims: The aim of this meta-analysis was to test if multidomain interventions, addressing several modifiable vascular risk factors simultaneously, is more effective than usual post-stroke care for the prevention of cognitive decline after stroke.
Method: This individual patient data one-stage meta-analysis includes two randomised controlled trials using a multidomain approach to target vascular risk factors in stroke patients and cognition as primary outcome. Changes from baseline to 12 months in trail making test (TMT) A, B and the 10-word test were analysed using step-wise backward linear mixed models with study as random factor. Two analyses were based on the intention-to-treat (ITT) principal using different imputation approaches, and one on complete cases. Electronic literature was searched (as update of a previous systematic search until March 2011) in Pubmed from April 2011 to May 2016.
Results: Data from 322 patients (157 assigned to multidomain intervention, 165 to standard care) were analysed. Differences between randomisation groups for TMT-A scores were found in one ITT model ($p = 0.014$) and approached significance in the second ITT model ($p = 0.087$) and for complete cases ($p = 0.091$). No significant intervention effects were found for any of the other cognitive variables.
Conclusion: We found indications that multidomain interventions compared with standard care can improve the scores in TMT-A one year after stroke but not those for TMT-B or the 10-word test. These results have to be interpreted with caution due to the small number of patients.

AS06-028

SYSTEMATIC REVIEW AND META-ANALYSIS

ANTITHROMBOTIC TREATMENT AFTER STROKE DUE TO INTRACEREBRAL HAEMORRHAGE: A COCHRANE REVIEW

L.A. Perry[1], E. Berge[2], J. Bowditch[3], E. Forfang[2], O.M. Rønning[4], G.J. Hankey[5], E. Villanueva[6] and R.A.S. Salman[7]
[1]Royal Melbourne Hospital, Melbourne Brain Centre, Melbourne, Australia
[2]Oslo University Hospital, Department of Internal Medicine, Oslo, Norway
[3]Monash University, School of Medicine, Melbourne, Australia
[4]Akershus University Hospital, Department of Neurology, Lørenskog, Norway
[5]Sir Charles Gairdner Hospital Unit- The University of Western Australia, School of Medicine and Pharmacology, Perth, Australia
[6]Xi'an Jiaotong-Liverpool University, Department of Public Health, Suzhou, China
[7]University of Edinburgh, Centre for Clinical Brain Sciences, Edinburgh, United Kingdom

Background and Aims: Antithrombotic treatments may lower the risk of thromboembolism after ICH, but they may increase the risks of bleeding. This Cochrane review investigated the overall effectiveness and safety of antithrombotic drugs for survivors of ICH.
Method: We searched the Cochrane Central Register of Controlled Trials, Medline, Embase, DORIS, and online registries of clinical trials from inception to August 2016. We selected all randomised controlled trials (RCTs) of any antithrombotic treatment after ICH and screened references of included studies. Three investigators independently extracted data and appraised risk of bias. We divided our analyses into short- and long-term treatment, and used fixed-effect modeling for meta-analysis.
Results: We included two RCTs ($n = 121$) on short-term anticoagulation after ICH: one tested subcutaneous unfractionated heparin and the other enoxaparin. The risk of bias in the included RCTs was generally unclear or low, with the exception of blinding of participants and personnel which was not done. Treatment was not associated with a statistically significant difference in case fatality (RR 1.25, 95% CI 0.38–4.07), growth of ICH (RR 1.64, 95% CI 0.51–5.29), or major ischaemic events (RR 0.54, 95% CI 0.23 to 1.28). There were no new ICH or major extracerebral haemorrhages reported.
We identified seven ongoing RCTs on long-term treatment with oral anticoagulants/antiplatelets.
Conclusion: There is insufficient evidence from RCTs to support or discourage the use of antithrombotic treatment after ICH. RCTs comparing starting vs. avoiding antiplatelet or anticoagulant drugs after ICH seem justified and are needed in clinical practice.

AS06-029

SYSTEMATIC REVIEW AND META-ANALYSIS

KEY PERFORMANCE INDICATORS OF QUALITY STROKE CARE AND THEIR ASSOCIATION WITH PATIENT OUTCOMES: A SYSTEMATIC LITERATURE REVIEW

G. Urimubenshi[1], P. Langhorne[2] and D. Cadilhac[3]
[1]College of Medicine and Health Sciences- University of Rwanda, Physiotherapy, Kigali, Rwanda
[2]Institute of Cardiovascular and Medical Sciences- University of Glasgow, Geriatric Medicine, Glasgow, United Kingdom
[3]The Florey Institute of Neuroscience and Mental Health, Public Health-Stroke Division, Heidelberg, Australia

Background and Aims: The translation of research evidence into clinical practice often uses key performance indicators (KPIs) to monitor quality of care. We conducted a systematic review to identify which stroke KPIs have been used most often, and to estimate their association with patient outcomes.
Method: We sought recent publications (2000–2016) of national or large regional stroke registers that reported the association of KPIs with patient outcome (after adjusting for age and stroke severity). We searched Medline, EMBASE and PubMed and screened references from bibliographies identified. The association of KPIs with patient outcomes were analysed using an inverse variance random effects meta-analysis (RevMan 5.3 Version).
Results: We identified 20 eligible studies. The most frequently used KPIs were stroke unit admission, swallowing and/or nutritional risk assessment, antiplatelet therapy, brain imaging, anticoagulant therapy, early physiotherapy mobilization, and deep vein thrombosis prophylaxis. A lower case fatality (Odds Ratio; 95% Confidence Interval) was associated with anticoagulant therapy (0.55; 0.46–0.66), antiplatelet therapy (0.62; 0.50–0.77), swallowing/nutritional risk assessment (0.75; 0.68–0.82), stroke unit admission (0.84; 0.76–0.93), lipid management (0.78; 0.68–0.90), early nursing/rehabilitation assessment (0.86; 0.74–0.99), early physiotherapy/mobilization (0.84; 0.73–0.97). A lower risk for poor outcome (death or disability) was found to be associated with adherence to swallowing and/or nutritional risk assessment ($OR = 0.57$; 0.34–0.96) and stroke unit admission ($OR = 0.82$; 0.74–0.91).
Conclusion: Adhering to one of several common KPIs was consistently associated with a reduced risk of death or disability after stroke. Policy makers and health care professionals should aim to implement those KPIs that are reliable and meaningful.

AS06-030

SYSTEMATIC REVIEW AND META-ANALYSIS

OUTCOMES OF THROMBOLYSIS IN PATIENTS WITH MALIGNANCY: A SYSTEMATIC REVIEW

A. Ulhaque[1], K. Kilner[2], J. Redgrave[3], A. Majid[3] and A. Ali[1]
[1]Sheffield Teaching Hospitals Foundation NHS Trust, Geriatrics and Stroke, Sheffield, United Kingdom
[2]Sheffield Hallam University, Medical Statistics- Centre for Health and Social Care Research, Sheffield, United Kingdom
[3]University of Sheffield, Neuroscience, Sheffield, United Kingdom

Background and Aims: Up to 15% of patients with malignancy suffer from cerebrovascular disease. These patients are at high risk of stroke for a number of reasons e.g. coexistent atheromatous disease, hypercoaguable state, chemotherapy etc. Thrombolysis and thrombectomy improve outcomes in ischaemic stroke, but use in patients with malignancy may be sub-optimal due to concerns regarding risk of bleeding. These patients were excluded from prior clinical trials. We systematically reviewed outcomes of thrombolysis and thrombectomy in patients with malignancy.
Method: We searched studies reporting outcomes following thrombolysis or thrombectomy in patients with and without malignancy among 16 medical databases including OVID and MEDLINE. Data was extracted and tabulated for descriptive analysis, concentrating mainly on intracranial haemorrhage (ICH) and inpatient mortality. Case reports and case series were excluded.
Results: Six studies were finally included in the review reporting on outcomes in 157,776 patients; 1339 with malignancy (table 1). Four out of five studies reporting any ICH after thrombolysis revealed no increased risk with malignancy. One study (Kolb et al 2013) reported increased ICH in patients with malignancy, but was based on an analysis of only 9 such patients. Malignancy was not associated with higher rates of symptomatic ICH in 2 studies reporting this outcome. None of the 3 studies reporting on inpatient mortality clearly demonstrated higher mortality in patients with malignancy. No studies reported isolated outcomes of intra-arterial treatments/thrombectomy in those with and without malignancy.

Study	Study design	Patients thrombolysed	Any ICH		sICH (%)		Inpatient Mortality		Cancer types
		Malignancy / no malignancy (N)	Malignancy vs no malignancy (%)	Adjusted p	Malignancy vs no malignancy (%)	Adjusted p	Malignancy vs no malignancy (%)	Adjusted p	
Mistry et al 2013, USA	Retrospective single centre	44/908 (14,956)	20.5 vs 28.8	0.16	5.6 vs 2.7	0.47	38.6 vs 13.7	0.05	Solid organ and haematological
Murthy et al 2013, USA Kolb et al 2013, Israel	Retrospective multicentre Retrospective single centre	607/147576 (0.7%) 9/127 (7.1%)	6.4 vs 6.4 55 vs 18.8	0.037 0.003	-	-	19.1 vs 10.7	0.15	Solid organ and haematological Solid organ and haematological
Perrillat et al 2014, Spain	Retrospective single centre	20/157 (14.6%)	8.7 vs 13.6	0.49	-	-	-	-	Solid organ only
Sobieraj et al 2015, Poland	Retrospective single centre	48/546 (7.9%)	-	-	2.5 vs 4.2	0.56	17.5 vs 18.4	0.88	Solid organ and haematological
Murthy et al 2015, USA	Retrospective multicentre	410/129083 (0.4%)	5.7 vs 3.5	0.16	-	-	31.6 vs 33.3	0.33	Intracranial only

sICH = symptomatic intracranial haemorrhage

Conclusion: Thrombolysis for acute ischaemic stroke in patients with malignancy appears safe and should not deter clinicians from its use.

AS06-031

SYSTEMATIC REVIEW AND META-ANALYSIS

TRIPLE AND QUADRUPLE CERVICAL ARTERY DISSECTIONS: A SYSTEMATIC REVIEW OF INDIVIDUAL PATIENT DATA

V. Guglielmi[1], J. Visser[1], M. Arnold[2], H. Sarikaya[2], P. Nederkoorn[3] and J.M. Coutinho[3]
[1]Onze Lieve Vrouwe Gasthuis- locatie Oost, Neurology, Amsterdam, The Netherlands
[2]INSELSPITAL- University Hospital Bern, Neurology, Bern, Switzerland
[3]Academic Medical Center, Neurology, Amsterdam, The Netherlands

Background and Aims: Simultaneous occurrence of three or four cervical artery dissections (CAD) is rare. We performed a first systematic review of the literature on triple and quadruple CAD.
Method: We searched Medline and EMBASE databases for publications on triple or quadruple CAD from which individual patient data could be extracted. CAD had to have been diagnosed by MRI, MRA, CT-angiography, catheter angiography, or autopsy. Selection was done independently by two authors.
Results: Of 134 potentially relevant studies, 45 were included in the analysis, with data from 56 patients. 39 studies were case reports or case series. Mean age was 41 years and 39/56 (70%) were women. 30/56 (54%) had triple and 26/56 (46%) had quadruple CAD. The most commonly reported manifestations were headache (37/54, 69%), paresis (21/53, 40%), Horner syndrome (18/54, 33%), and neck pain (17/54, 32%). 32/48 (67%) had an ischemic stroke. Information on risk factors and potential triggering events was reported for 52 patients, including: infection (8/52, 15%), motor vehicle accident (5/52, 10%), cervical manipulative therapy (5/52, 10%), sports activities (5/52, 10%), fibromuscular dysplasia (4/52, 8%), and hereditary connective tissue disorder (3/52, 6%). In 16/52 (31%) no risk factor/triggering event could be identified. 36/45 (80%) were managed conservatively (antiplatelets or anticoagulation) and 8/45 (18%) underwent endovascular stent placement. Favorable outcome at follow-up (mRS 0–1) was reported in 26/33 (79%).
Conclusion: In this systematic review, two-thirds of patients with triple or quadruple CAD had an underlying risk factor or triggering event. Most patients were managed conservatively and the majority had a favorable outcome.

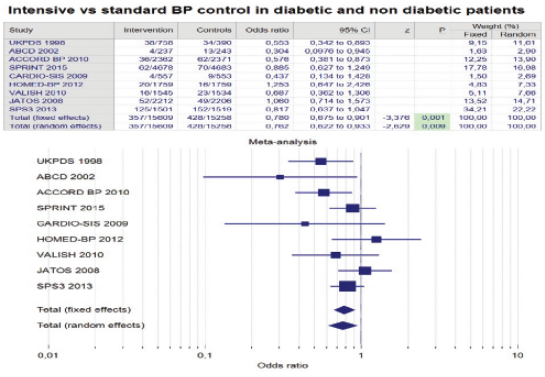
AS06-032

SYSTEMATIC REVIEW AND META-ANALYSIS

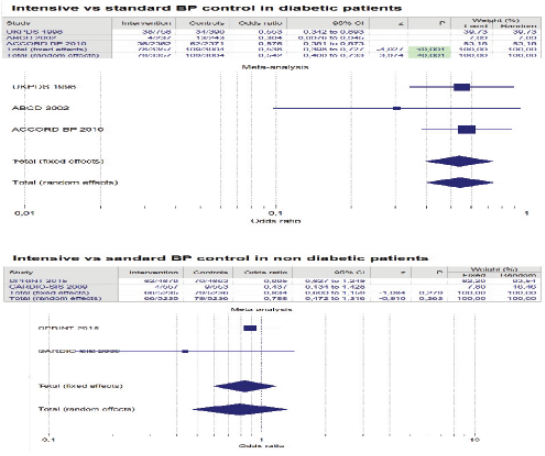
INTENSIVE BLOOD PRESSURE CONTROL PREVENTS CEREBROVASCULAR EVENTS ONLY IN DIABETIC PATIENTS AN UPDATED META-ANALYSIS

F. Fortuni[1] and F. Angelini[2]
[1]University of Pavia, Division of Cardiology- Fondazione IRCCS Policlinico San Matteo, Pavia, Italy
[2]University of Perugia, Medical school, Perugia, Italy

Background and Aims: Lowering blood pressure is one of the milestone for cerebrovascular events (CVE) prophylaxis, however optimal target levels of blood pressure (BP) are lacking. In particular, it is still unclear whether an intensive approach is superior to a standard one in preventing CVE.
Aim: to detect if an intensive BP control has an impact on the prevention of CVE (intended as ischemic and non-ischemic stroke plus transient ischemic attack) in diabetic and non-diabetic patients .
Method: We systematically searched PubMed for randomized controlled trial (RCT) that had compared standard versus intensive BP control on occurrence of CVE as primary or secondary objective. To be included, these studies had to report on event rates related to the different BP target.
Results: 9 studies fully met our inclusion criteria. Globally, intensive BP control was more effective in preventing CVE (OR = 0.76; 95% CI 0.67 – 0.90).



However, in the RCT that considered only non-diabetic patients the two approaches were equivalent (OR = 0.79; 95% CI 0.47 – 1.32) whereas the effect of intensive BP control was superior in the RCT which considered only diabetic patients (OR = 0.54; CI 95% 0.40 -0.73).



Conclusion: based on this meta-analysis, an intensive BP treatment reduces the CVE risk. Nevertheless, this effect can be due only to the notorious positive consequences of BP reduction in diabetic patients. In fact, in the analysis where diabetic patients were solely considered the superiority was more evident, moreover, there was no difference in the one where only non-diabetic patients were taken into account.

AS06-034

SYSTEMATIC REVIEW AND META-ANALYSIS

INVESTIGATING POST-STROKE FATIGUE: AN INDIVIDUAL PARTICIPANT DATA META-ANALYSIS

T. Cumming[1], A.B. Yeo[2], J. Marquez[2], L. Churilov[3], G. Mead[4] and C. English[2]

[1]Florey Institute of Neuroscience and Mental Health, Stroke, Melbourne, Australia

[2]University of Newcastle, School of Health Sciences, Newcastle, Australia

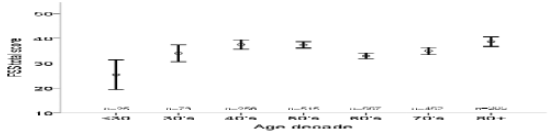
[3]Florey Institute of Neuroscience and Mental Health, Statistics and Decision Support, Melbourne, Australia

[4]University of Edinburgh, Division of Clinical Neurosciences, Edinburgh, United Kingdom

Background and Aims: Post-stroke fatigue is a common problem that has a major impact on stroke survivors' quality of life. There remains much uncertainty about the factors that are associated with fatigue after stroke.

Method: We conducted an Individual Participant Data (IPD) meta-analysis on post-stroke fatigue and its associated factors. The starting point was our recent systematic review and meta-analysis of post-stroke fatigue prevalence, which included 24 studies that used the Fatigue Severity Scale (FSS). Study authors were asked to provide anonymised raw data on core variables: (i) FSS score, (ii) age, (iii) sex, (iv) time post-stroke, (v) depression, (vi) stroke severity, (vii) disability, and (viii) stroke type. Linear regression analyses with FSS score as the dependent variable, clustered by study, were conducted.

Results: We obtained data from 14 of the 24 studies, and 12 datasets could be included in analysis (total n = 2,102). Higher levels of fatigue were independently associated with female sex ($p = 0.023$), depression ($p = 0.021$), longer time since stroke ($p = 0.007$) and disability ($p = 0.010$). While there was no significant linear association between fatigue and age, a cubic relationship was identified ($p < 0.001$; Figure 1). Figure 1. Mean FSS scores (95% CIs) by age.



Conclusion: Use of IPD meta-analysis gave us the power to explore novel factors associated with fatigue, such as longer time since stroke, as well as a complex relationship with age.

AS06-035

SYSTEMATIC REVIEW AND META-ANALYSIS

POST-STROKE COGNITIVE IMPAIRMENT CONSENSUS REPORT – A COMPREHENSIVE UPDATE

M. Mijajlovic[1], N. Bornstein[2], M. Brainin[3] and A. Korczyn[2]

[1]Neurology Clinic, Depatment for Cerenrovascular Disorders and Headaches, Belgrade, Serbia

[2]Tel Aviv Sourasky Medical Center- Tel-Aviv- Israel, Department of Neurology, Tel Aviv, Israel

[3]Danube University Krems, 2 Department of Clinical Neurosciences and Preventive Medicine, Krems, Austria

Background and Aims: Post-stroke cognitive impairment (PSCI) may affect up to one third of stroke survivors. Various definitions have been described. We propose post-stroke dementia (PSD) as a label for any dementia following stroke in temporal relation.

Method: Using a focused literature search from January 1995 until August 2016, the relevant literature on PSCI/PSD was critically reviewed.

Results: Evaluation should include assessment of pre-stroke cognition, mood and functional consequences of cognitive impairments. A large number of biomarkers for PSD, including indicators for genetic polymorphisms, biomarkers in the cerebrospinal fluid and in the serum, inflammatory mediators, and peripheral microRNA profiles have been proposed. No specific biomarkers have been proven to robustly discriminate vulnerable patients or to discriminate Alzheimer's dementia from PSD. Neuroimaging is an important diagnostic tool in PSD. The role of computerized tomography is limited to demonstrating type and location of the underlying primary lesion and indicating atrophy and severe white matter changes. Magnetic resonance imaging is the key neuroimaging modality and has high sensitivity and specificity for detecting pathological changes, Advanced multi-modal imaging includes diffusion tensor imaging by which changes in neural networks can be detected. Prevention of PSD

can be achieved by prevention of stroke. As treatment strategies to inhibit the development and mitigate the course of PSD, lowering of blood pressure, statins, neuroprotective drugs, and anti-inflammatory agents have all been studied without convincing evidence of efficacy. Lifestyle interventions, physical activity, and cognitive training have been recently tested.

Conclusion: Multi-center studies on long-term cognitive outcomes in stroke patients should be given high priority.

AS06-040

SYSTEMATIC REVIEW AND META-ANALYSIS

PREDICTION MODELS FOR SHORT- AND LONG-TERM OUTCOME AFTER CAROTID REVASCULARIZATION: SYSTEMATIC LITERATURE REVIEW AND INDEPENDENT EXTERNAL VALIDATION

E. Volkers[1,2], J. Greving[2], L.J. Kappelle[1], G. Roubin[3], O. Jansen[4], G. Howard[5], A. Halliday[6], J. Gregson[7], G. Fraedrich[8], H.H. Eckstein[9], D. Calvet[10], R. Bulbulia[11], L. Bonati[12,13], J.P. Becquemin[14], P. Ringleb[15], J.L. Mas[10], M.M. Brown[13], T. Brott[16], A. Algra[1,2] , O.B.O.T.C. on behalf of the CSTC[1]

[1]University Medical Centre Utrecht, Department of Neurology and Neurosurgery- Brain Centre Rudolf Magnus, Utrecht, The Netherlands

[2]University Medical Centre Utrecht, Julius Centre for Health Sciences and Primary Care, Utrecht, The Netherlands

[3]Cardiovascular Associates of the Southeast, Cardiovascular Associates of the Southeast, Birmingham- AL, USA

[4]UKSH Campus Kiel, Clinic for Radiology and Neuroradiology, Kiel, Germany

[5]UAB School of Public Health, Department of Biostatistics, Birmingham-AL, USA

[6]John Radcliffe Hospital, Nuffield Department of Surgical Sciences, Oxford, United Kingdom

[7]London School for Hygiene and Tropical Medicine, London School for Hygiene and Tropical Medicine, London, United Kingdom

[8]Medical University of Innsbruck, Department of Vascular Surgery, Innsbruck, Austria

[9]Klinikum rechts der Isar- Technical University Munich, Department of Vascular and Endovascular Surgery/Vascular Center, Munich, Germany

[10]Hôpital Sainte-Anne- Université Paris-Descartes- DHU Neurovasc Sorbonne Paris Cité- INSERM U894, Department of Neurology, Paris, France

[11]Oxford University, Clinical Trial Service Unit and Epidemiological Studies Unit, Oxford, United Kingdom

[12]University Hospital Basel, Department of Neurology and Stroke Centre, Basel, Switzerland

[13]UCL Institute of Neurology- University College London, Department of Brain Repair and Rehabilitation, London, United Kingdom

[14]Hopital Privé Paul D'Egine, IVPE, Champigny, France

[15]University of Heidelberg Medical School, Department of Neurology, Heidelberg, Germany

[16]Mayo Clinic, Department of Neurology, Jacksonville- FL, USA

Background and Aims: Prediction of outcome after carotid artery stenting (CAS) or endarterectomy (CEA) could aid in choosing the appropriate treatment in individual patients. We identified existing prediction models for short- and long-term outcome after CAS or CEA and externally validated three models for short-term outcome.

Method: We searched PubMed for studies that developed a multivariable prediction model or risk score with ≥1 baseline patient characteristic until December 2016.

We selected three prediction models for stroke or death risk ≤30 days after CEA from our systematic search, and applied them to CEA patients in EVA-3S, SPACE, ICSS, and CREST. We assessed discrimination (c-statistic) and calibration (observed/expected ratio) of each model.

Results: We identified 41 studies containing 50 prediction models for CAS or CEA of which 21 (42%) models were internally and 10 (20%) externally validated. Most models predicted short-term (≤30 days) risk after CEA (n = 27; 54%), and most models were developed in CEA patients (n = 34; 68%). Most commonly predicted outcome was stroke or death (n = 14; 28%). Most frequent predictors were age, diabetes mellitus, and procedural characteristics.

In our external validation, c-statistic for the three models was 0.57 (95% confidence interval (CI) 0.50–0.64), 0.56 (95% CI 0.50–0.62), and 0.57 (95% CI 0.48–0.66). Most prediction models overestimated the actual stroke or death risk, particularly at higher observed risks.

Conclusion: Many prediction models for clinical outcome after carotid revascularization have been developed. Usefulness of most models remains unclear because of methodological shortcomings, incomplete presentation, and lack of external validation.

Predictive performance of three externally validated models was poor.

AS06-041

SYSTEMATIC REVIEW AND META-ANALYSIS

SYSTEMATIC ANALYSIS OF SAFETY OF STEM CELL TRANSPLANT IN STROKE PATIENTS

T. Phan[1], B. Clissold[1] and H. Ma[1]

[1]Monash Health, Neurosciences, Clayton, Australia

Background and Aims: Stroke is a leading cause of disability worldwide and results in significant economic and societal cost. Despite the recent advances, only a small proportion of patients are eligible for intravenous thrombolytics and endovascular clot retrieval. Stem cell therapy has become an area of growing interest as it may provide a different avenues for treating patients who have missed out on the new therapies. The aim of this study is to assess the safety of stem cell transplants using a systematic review approach.

Method: We searched the medical literature using PubMed, MEDLINE, Cochrane library, and clinicaltrial.gov (January 2000 till December 2016) for reports in English using the search terms "stroke", "stem cell", and/or "transplant". In order to examine the safety data, we used the Freeman-Tukey double arcsine transformation to pool the proportion of death, seizure, recurrent stroke, infection. Analyses were performed in R Statistical Foundation for Computing (version 3.2.3).

Results: Trial registration was performed in 10 of the total 21 trials (303 patients). Nine of these trials involved either intracerebral or intra-arterial injection of stem cells. Eight trials report no serious adverse effect (death, seizure, stroke, infection). The pooled proportion of mortality was 1.1% (95% CI 0–4.2%), seizure 2.8% (95% CI 0.4–6.6%), stroke 1.9% (95% CI 0.1–5.3%), infection 1.7% (95% CI 0–5.3%)

Conclusion: This systematic review finds low prevalence of serious adverse events with stem cell trials. The caveat is that some trials reported no serious adverse events

AS06-042

SYSTEMATIC REVIEW AND META-ANALYSIS

NATRIURETIC PEPTIDES AND INTEGRATED RISK ASSESSMENT FOR CARDIOVASCULAR DISEASE: AN INDIVIDUAL-PARTICIPANT-DATA META-ANALYSIS BASED ON 40 STUDIES INVOLVING 95617 PARTICIPANTS

P. Willeit[1] , for the Natriuretic Peptides Studies Collaboration[2]
[1]Medical University of Innsbruck, Department of Neurology, Innsbruck, Austria
[2]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: Measurement of N-terminal-pro-B-type natriuretic peptide (NT-proBNP) concentration may help improve the prediction of cardiovascular diseases in asymptomatic adults.
Method: We used individual-participant data to calculate risk ratios and measures of risk discrimination and reclassification across predicted 10-year risk categories (ie, <5%, 5% to <7·5%, and ≥7·5%), adding NT-proBNP assessment to that of conventional risk factors (ie, age, sex, smoking status, systolic blood pressure, history of diabetes, and total and HDL cholesterol). Primary outcomes were the combination of coronary heart disease and stroke, and the combination of coronary heart disease, stroke, and heart failure.
Results: We recorded 5500 coronary heart disease, 4002 stroke, and 2212 heart failure outcomes among 95617 participants without a history of cardiovascular disease in 40 prospective studies. Adjusted risk ratios comparing the top vs bottom third of NT-proBNP concentration were 1.76 (95% CI 1.56–1.98) for the combination of coronary heart disease and stroke, and 2.00 (1.77–2.26) for the combination of coronary heart disease, stroke, and heart failure. Addition of information about NT-proBNP concentration to a model containing conventional risk factors was associated with a C-index increase of 0.012 (0.010–0.014) and a net reclassification improvement of 0.027 (0.019–0.036) for the combination of coronary heart disease and stroke, and a C-index increase of 0.019 (0.016–0.022) and a net reclassification improvement of 0.028 (0.019–0.038) for the combination of coronary heart disease, stroke, and heart failure.
Conclusion: In people without baseline cardiovascular disease, NT-proBNP concentration augmented the prediction of first-onset coronary heart disease, stroke and heart failure.

AS06-044

SYSTEMATIC REVIEW AND META-ANALYSIS

IMPACT OF EARLY TRIAL TERMINATION ON EFFECT SIZE: THE CASE OF THROMBECTOMY TRIALS IN ACUTE ISCHEMIC STROKE

S. Cruz-Flores[1], M.A. Qureshi[2], M.R. Afzal[1], A.K. Dwivedi[3], C. Doodoo[4], I.A. Qureshi[1] and G.J. Rodriguez[1]
[1]Texas Tech Hospital, Neurology, El Paso, USA
[2]Texas Tech University Health Sciences Center, neurology, El Paso, USA
[3]exas Tech University Health Sciences Center TTUHSC, Department of Biomedical Sciences, El Paso, USA
[4]Texas Tech University oh Health Sciences, Biostatistics and Epidemiology Consulting Lab BECL, El Paso, USA

Background and Aims: Background:
Sample size calculation requires an estimated and clinically reasonable effect size; it also depends on set power and alpha level. RCT early termination leads to effect size overestimation.
Aim: To examine the effect of randomized clinical trial (RCT) early termination on effect size.
Method: Ten recent RCT of mechanical thrombectomy were selected. We extracted data on the primary outcome of functional independence defined as modified Rankin Score (mRS) 0–2. The adjusted odds ratio (OR) and 95% confidence interval (CI) were calculated for each study. Heterogeneity was tested using I2 statistic. Fixed effect model was used to estimate the pooled effect of intervention. Sensitivity analyses were carried out for studies done before 2014 and for early termination.
Results: Favorable outcome functional independence MRS 0–2

	OR	95% CI	Risk difference	95%CI	NNT	95%CI
All studies	1.63	1.38-1.94	9.9%	6.4-13.3%	9	6-13
Completed	1.42	1.10-1.83	6.1%	1.3-10.8%	13	7-49
Terminated early	1.84	1.46-2.32	14.1%	9.1-19.1%	7	5-11
Studies 2014–2016						
All studies	2.1	1.73-2.59	17%	12.6-21.4%	6	4-8
Completed	1.79	1.34-2.36	12.6%	6.6-18.5%	8	5-16
Terminated early	2.52	1.90-3.35	22.1%	15.7-28.5%	4	3-6

Conclusion: Effect size was larger among early terminated thrombectomy trials as demonstrated by greater OR, risk difference, and number needed to treat. In clinical practice, care must be exercised when estimating beneficial effects based on results of trials stopped early. Despite of these concerns, the cumulated evidence to date indicates substantial benefit.

AS06-045

SYSTEMATIC REVIEW AND META-ANALYSIS

THERAPEUTIC HYPOTHERMIA FOR ACUTE ISCHAEMIC STROKE – A SYSTEMATIC REVIEW AND META-ANALYSIS OF RANDOMISED CLINICAL TRIALS

H. Reinink[1], M. Geurts[1], P.M. Bath[2] and H.B. Worp[1]
[1]Brain Center Rudolf Magnus - UMC Utrecht, Neurology, Utrecht, The Netherlands
[2]University of Nottingham, Division of Clinical Neuroscience, Nottingham, United Kingdom

Background and Aims: Several small clinical trials have assessed the feasibility, safety, or efficacy of hypothermia in patients with acute ischaemic stroke, but these were underpowered to draw clinically relevant conclusions. We performed a systematic review and meta-analysis to estimate the safety and efficacy of therapeutic hypothermia for acute ischaemic stroke.
Method: PubMed, Embase, and the Cochrane Central Register of Controlled Trials were systematically searched for eligible studies up to December 28, 2016. Randomised controlled clinical trials comparing physical (non-pharmacological) therapeutic hypothermia with standard care in adults with acute ischaemic stroke were included and information on cooling strategy, adverse events, and functional outcome at 3 months was collected. The last was our primary outcome.
Results: Seven studies were included, involving 330 patients of whom 182 were randomised to hypothermia. In patients treated with hypothermia, the risk of pneumonia was increased (OR, 3.12; 95%CI: 1.65–5.91), whereas the risk of other serious adverse events was similar to that in controls. In the three studies for which this could be analysed, there was no statistically significant difference in the risk of death or dependency at 90 days (OR, 1.08; 95% CI, 0.59–1.98).

Conclusion: In this small patient sample, there is no evidence that hypothermia reduces the risk of death or dependency after stroke, but considerable benefit (or harm) cannot be excluded. The effect on functional outcome is currently assessed in the pivotal phase III trial EuroHYP-1. The increased risk of pneumonia in patients treated with hypothermia requires attention.

AS06-046

SYSTEMATIC REVIEW AND META-ANALYSIS

PRIMARY CARE INTERVENTIONS FOR LONG-TERM OUTCOMES AFTER STROKE: A SCOPING REVIEW OF REVIEWS AND RECENT TRIALS

D. Pindus[1], R. Mullis[1], I. Wellwood[1], E. Kreit[1], L. Lim[1] and J. Mant[1]
[1]University of Cambridge, Department of Public Health and Primary Care, Cambridge, United Kingdom

Background and Aims: An integrative account of the scope and focus of primary care interventions to address long-term outcomes after stroke is lacking. We aimed to provide an overview of generalist-delivered interventions to improve functional, physical and psycho-social outcomes in stroke survivors living in the community and their informal caregivers.
Method: Established scoping review methodology (Arksey and O' Malley, 2005) was adopted. Inclusion criteria: (1) systematic reviews and meta-analyses of randomised controlled (RCTs) and/or controlled trials, supplemented with most recent (2011–2015) trials, (2) interventions delivered in primary care and/or community, (3) by generalist healthcare professionals. Exclusions: drug efficacy reviews/trials. Six databases were searched: Medline, Embase, PsycINFO, CINAHL, COCHRANE Reviews and Clinicaltrials.gov. Data were extracted by two independent reviewers, collated and summarised.
Results: 21 systematic reviews (including 14 meta-analyses), and 10 RCTs were identified (35,188 total participants). Interventions were mapped on to International Classification of Functioning, Disability and Health based on primary outcomes. Often reviews focused on global functioning (activities of daily living, disability; 43%) and neuromuscular/movement related function (mobility, balance, upper limb function; 29%). Only 2 reviews (9%) assessed specific mental functions in stroke survivors (depression, anxiety and aphasia). Continued focus on physical (54%) and global functioning (27%) was observed in most recent trials. Three studies included informal caregiver primary outcomes.
Conclusion: Although stroke survivors report many unmet long-term psychological needs, primary care interventions focus on their physical health and global function. Since psychological outcomes are related to functional recovery after stroke, interventions aimed at improving survivors' long-term mental health are also needed.

AS06-054

SYSTEMATIC REVIEW AND META-ANALYSIS

INTRA-ARTERIAL MECHANICAL THROMBECTOMY STENT RETRIEVERS AND MODERN DEVICES IN THE TREATMENT OF ACUTE ISCHAEMIC STROKE: A SYSTEMATIC REVIEW AND META-ANALYSIS WITH TRIAL SEQUENTIAL ANALYSIS

D. Flynn[1], R. Francis[2], K. Halvorsrud[1], E. Gonzalo-Almorox[3], D. Craig[1], S. Robalino[1], P. McMeekin[4], A. Cora[2], J. Balami[5], G. Ford[6] and P. White[2]
[1]Institute of Health and Society, Newcastle University, Newcastle upon Tyne, United Kingdom
[2]Institute of Neuroscience Stroke Research Group, Newcastle University, Newcastle Upon Tyne, United Kingdom
[3]Newcastle University Business School, Newcastle University, Newcastle upon Tyne, United Kingdom
[4]School of Health- Community and Education Studies, Northumbria University, Newcastle Upon Tyne, United Kingdom
[5]Centre for Evidence Based Medicine, University of Oxford, Oxford, United Kingdom
[6]Oxford University Hospitals NHS Trust, Oxford University, Oxford, United Kingdom

Background and Aims: Eight recent trials of mechanical thrombectomy (MT) for acute ischaemic stroke due to large vessel occlusion demonstrate improved clinical outcomes. We conducted a meta-analysis, supplemented with trial sequential analysis (TSA) to understand the impact on clinical effectiveness and safety of MT of the three most recent trials reporting in 2016 (THERAPY, THRACE and PISTE).
Method: Random effects meta-analytic models were conducted of trials comparing MT (stent retriever or modern aspiration devices with or without adjuvant intravenous thrombolysis (IVT) with IVT in the treatment of acute ischaemic stroke. Study inclusion and risk of bias were assessed independently by two reviewers; mRS 0 to 2 90 day mortality, and symptomatic intracranial haemorrhage (SICH) were extracted. TSA was undertaken to establish the strength of the evidence.
Results: Eight trials of MT involving 916 patients of MT fulfilled the review criteria. The impact of the three most recent MT trials was increased certainty of the mid-point estimate for effectiveness (mRS 0 to 2; OR = 2.07, 95% CI = 1.70 to 2.51 versus OR = 2.39, 95% CI = 1.88 to 3.04 based on data from five trials). Meta-analyses showed no effect on mortality (OR = 0.81, 95% CI = 0.61 to 1.07) or SICH (OR = 1.22, 95% CI = 0.80 to 1.85) as found in analysis of first 5 trials.
Conclusion: No further trials of MT are indicated to establish clinical effectiveness. Uncertainty remains as to whether MT reduces mortality or is associated with increased risk of SICH.

AS06-055

SYSTEMATIC REVIEW AND META-ANALYSIS

THE ASSOCIATION BETWEEN CEREBRAL SMALL VESSEL DISEASE, GAIT DISTURBANCE AND FALLS. SYSTEMATIC REVIEW AND META-ANALYSIS

A.V. Simpson[1], A. MacLullich[1] and S. Makin[2]
[1]Edinburgh University, Department of Geriatric Medicine, Edinburgh, United Kingdom
[2]University of Glasgow, Department of Stroke Medicine, Glasgow, United Kingdom

Background and Aims: Cerebral Small Vessel Disease (SVD) is often thought to be an innocuous finding. We carried out a systematic review and meta-analysis of the literature on potential associations between cerebral SVD and gait disturbance and falls.
Method: We searched Medline and EMBASE electronic databases and hand-searched the references of review articles for studies assessing gait and falls in relation to cerebral SVD (as ascertained by neuroimaging). We rated study quality on a modified Newcastle-Ottawa Scale. We performed two meta-analyses (using a random effects model), to calculate the odds ratio (OR) of gait disturbance and falls in in those with and without SVD. We used the Newcastle-Ottawa scale to assess study quality.
Results: We screened 956 titles, and included 55 papers reporting 27 studies. Sixteen were longitudinal, the remainder cross-sectional. 50% of studies were 'good' quality, and 45% 'fair'. 47/50 found an association between WMH and gait disturbance, 10/15 studies found a significant association between SVD and falls. Ten studies were included in the meta-analysis, which found a significant association between SVD and gait disturbance (standardised mean difference -6.36 (95 CI -7.42,-5.31)), and falls (OR 3.36 (95%CI 2.00,-5.62)). 14/23 papers found an association between lacunar infarcts and gait disturbance/falls, and 3/4 papers found an association between microbleeds and gait disturbance.
Conclusion: Cerebral SVD is strongly associated with falls and gait disturbance. Future treatments of SVD and lacunar stroke may be effective at slowing the rate of gait decline and disability.

AS06-058

SYSTEMATIC REVIEW AND META-ANALYSIS

PROGNOSIS OF TRANSIENT ISCHAEMIC ATTACK IN MODERN HEALTH CARE SETTINGS- A SYSTEMATIC REVIEW AND META-ANALYSIS

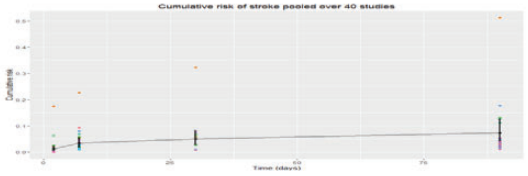
N. Najib[1], P. Magin[1], D. Lasserson[2], D. Quain[3], J. Attia[4], C. Oldmeadow[5], C. Garcia-Esperon[6] and C. Levi[7]
[1]University of Newcastle, Faculty of Health and Medicine, Newcastle, Australia
[2]University of Oxford, Nuffield Department of Medicine, Oxford, United Kingdom
[3]University of Newcastle, School of Medicine and Public Health, Newcastle, Australia
[4]University of Newcastle, Clinical Research Design- IT and Statistical Support CReDITSS Unit, Newcastle, Australia
[5]Hunter Medical Research Institute, Public Health Stream, Newcastle, Australia
[6]John Hunter Hospital, Acute Stroke Service, Newcastle, Australia
[7]University of Newcastle- Faculty of Health and Medicine, John Hunter Hospital- Department of Neurology, Newcastle, Australia

Background and Aims: Transient ischaemic attacks (TIAs) are common and place patients at risk of subsequent stroke. Following the EXPRESS and SOS-TIA studies, demonstrating the efficacy of rapid initiation of treatment, we hypothesised the prognosis of TIA in contemporary patient cohorts would be more favourable than in historical cohorts.
Method: A systematic review and meta-analysis was conducted of cohort studies of TIA (2005–2015). The last database search was conducted on 2nd June, 2015. For statistical analysis, the pooled cumulative risks of stroke recurrence are estimated from study specific estimates at 2, 7, 30 and 90 days post-TIA, using a multivariate Bayesian model and are presented as the mean posterior distribution with 95% credible intervals given as the 2.5 and 97.5 percentiles. Bayesian inference was implemented using the WinBUGS software. Convergence was assessed using the Gelman-Rubin diagnostics.
Results: We included 40 cohort studies (33 prospective and 7 retrospective) in the meta-analysis, which recruited 68,563 patients in total. The meta-analysis showed a cumulative risk of stroke of 1.2% (95% Credible Interval (CI) 0.6–2.2), of 3.4% (95% CI 2.0–5.5), of 5.0% (95% CI 2.9–8.9) and of 7.4% (95% CI 4.3–12.4) at 2, 7, 30 and 90 days post-TIA, respectively.

Table 1

Time point	Cumulative risk of stroke	95% credible interval
2 days	0.012	0.006,0.022
7 days	0.034	0.02,0.055
30days	0.05	0.029,0.082
90 days	0.074	0.043,0.124

Figure 1



Conclusion: In modern health care settings, the prognosis of TIA patients is more favourable than in historical cohorts.

AS06-059

SYSTEMATIC REVIEW AND META-ANALYSIS

EFFECTIVENESS OF REHABILITATION SERVICES AT UNIVERSITY OUTPATIENT CLINIC

M. Ciyiltepe[1], M. Budak[2] and K. Balıkcı[2]
[1]Eskisehir, Turkey
[2]Anadolu University, Health Sciences Faculty- Speech language Therapy Department, Eskisehir, Turkey

Background and Aims: Rehabilitation services is getting harder to implement due to the cuts in health care systems. With the focus is being on "to walk" in many places, "communication" is lacking adequate attention from both physicians and families perspective. Wait until the patient "stabilize", "there are X number of PT,OT sessions, lets think about SLP intervention later", or "just put a spoon of thickener, no problem" type attitudes are interfering with patients' full rehabilitation potential.
Method: Our attempt was to put together a profile of what has been done, how well it was implemented, physicians, nurses, families, patients, dietitians, therapists (PT/OT and SLP) caregivers and hospital administrators perspective on those that we questioned. The date was collected from January 2013 to January 2017. 1585 patient and their family members were examined for this study.
Results: Problems mostly associated with lack of knowledge and not knowing where to start the system. Use of thickener is the least known topic, role of SLP is not well understood as well. Nursing is taking over "doing exercises from fallowing videos through the internet downloads. From the family side, the socking to see was the older patients' own approach to rehabilitation. They were just in need of all their needs to be taken care of by their family members (because they helped their elderly themselves).
Conclusion: There were 30 items examined closely. Results will be shared by the perspectives of all the care giver team members. Needs assessment as well as what has worked and needs improvement will be shared.

AS08-006

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

RISK OF INTRACRANIAL HEMORRHAGE AND CLINICAL OUTCOME AFTER INTRAVENOUS THROMBOLYSIS IN POSTERIOR CIRCULATION STROKE: RESULTS FROM THE SITS-EAST REGISTRY

R. Herzig[1], J. Waishaupt[1], S. Belaskova[2], E. Vitkova[1], K. Blejcharova[1], P. Geier[1], A. Tomek[3], M. Bar[4], D. Vaclavik[5], R. Mikulik[6] and M. Valis[1]

[1]Charles University Faculty of Medicine and University Hospital, Department of Neurology- Comprehensive Stroke Center, Hradec Kralove, Czech Republic

[2]St. Anne's University Hospital, International Clinical Research Center, Brno, Czech Republic

[3]Charles University 2nd Faculty of Medicine and Motol University Hospital, Department of Neurology- Comprehensive Stroke Center, Prague, Czech Republic

[4]University of Ostrava Faculty of Medicine and University Hospital, Department of Neurology- Comprehensive Stroke Center, Ostrava, Czech Republic

[5]Vitkovice Hospital, Stroke Center- Department of Neurology, Ostrava, Czech Republic

[6]St. Anne's University Hospital, Department of Neurology- Comprehensive Stroke Center, Brno, Czech Republic

Background and Aims: In patients treated with IVT, previous studies demonstrated lower SICH risk in posterior (PCS) versus anterior circulation strokes (ACS). However, data regarding clinical outcomes in these groups of patients are controversial. The aim was to assess the SICH risk and clinical outcome in PCS versus ACS patients treated with IVT.

Method: Prospectively collected data in the Safe Implementation of Treatments in Stroke – Eastern Europe (SITS-EAST) registry between 2010 and 2015 were analyzed. NINDS criteria were used for SICH definition. 90-day outcome was assessed using mRS with good clinical outcome defined as 0–2 points. The method of generalized linear mixed models estimates was used for statistical analysis.

Results: Set consisted of 2738 patients – 363 (13.3%) with PCS, 2375 (86.7%) with ACS. SICH occurred in 0.55% of PCS and 5.51% of ACS patients ($P > 0.05$). The following independent predictors of SICH were: age (OR 1.025; $P = 0.004$), baseline diastolic blood pressure (OR 1.016; $P = 0.02$), intravenous antihypertensive therapy before/during IVT (OR 1.632; $P = 0.01$). Good 90-day clinical outcome was achieved in 68.6% of PCS and 58.9% of ACS patients ($P = 0.02$). The following independent predictors of good 90-day clinical outcome were: age (OR 0.953; $P < 0.0001$), pre-stroke mRS (OR 0.611; $P < 0.0001$), baseline glycemia (OR 0.927; $P = 0.0005$), intravenous antihypertensive therapy before/during IVT (OR 0.526; $P < 0.0001$), SICH occurrence (OR 0.096; $P < 0.0001$), PCS (OR 1.413; $P = 0.03$).

Conclusion: In patients treated with IVT, data from SITS-EAST registry showed that localization of stroke in the posterior circulation was associated with better 90-day clinical outcome than in the anterior circulation. Nevertheless, the SICH risk was only statistically insignificantly lower in PCS versus ACS patients.

AS08-027

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

REVERSAL OF DABIGATRAN BY IDARUCIZUMAB IN ISCHAEMIC STROKE PRIOR TO THROMBOLYSIS – GERMAN NATIONAL CASE COLLECTION

H.C. Diener[1], P. Kermer[2], C. Eschenfelder[3] and M. Grond[4]

[1]University Hospital Essen, Department of Neurology, Essen, Germany

[2]Nordwestkrankenhaus Sanderbusch, Neurologische Klinik, Sande, Germany

[3]Boehringer Ingelheim Pharma GmbH & Co. KG, Medical Affairs Germany, Ingelheim am Rhein, Germany

[4]Kreisklinikum Siegen, Department of Neurology, Siegen, Germany

Background and Aims: Idarucizumab rapidly reverses the anticoagulant effects of dabigatran. One of the indications for idarucizumab is for dabigatran-treated patients in need of urgent surgery or intervention. Thus idarucizumab has potential for use in patients receiving dabigatran who experience ischaemic stroke and who require adequate haemostasis to allow thrombolysis with recombinant tissue plasminogen activator (rt-PA). We summarize the German national experience with idarucizumab in this setting.

Method: Retrospective data were collected from German stroke units that administered idarucizumab from January 2016 following product launch.

Results: In the first 8 months 19 patients treated with dabigatran presented with ischaemic stroke. All received idarucizumab according to the prescribing information. Activated partial thromboplastin time was normalized post-idarucizumab (where measured). Fifteen out of 19 individuals benefitted from rt-PA thrombolysis with a median improvement at discharge of 5 points on the National Institutes of Health Stroke Scale (NIHSS). One patient had no change in NIHSS and two had unfavourable outcomes. No intracranial bleeding complications occurred. One patient died from pulmonary embolism (PE) 5 days after idarucizumab application, rt-PA thrombolysis and additional endovascular thrombectomy. This patient's PE most likely occurred because effective anticoagulation was not restarted. Results for an updated set of approximately 40 ischaemic stroke patients will be presented at the meeting.

Conclusion: Administration of rt-PA after reversing dabigatran activity with idarucizumab in cases of ischaemic stroke is feasible, easy to manage, effective and appears to be safe. Experience from further case series and registries will help to optimize recommendations for this therapeutic option.

AS08-036

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

INTRAVENOUS THROMBOLYSIS IN MILD ISCHEMIC STROKE PATIENTS: ANALYSIS OF SITS REGISTRY DATA

J. Neumann[1], A. Tomek[2], O. Škoda[3], M. Bar[4], R. Herzig[5], D. Šaňák[6], P. Ševčík[7], D. Školoudík[8], D. Václavík[9], R. Mikulík- on behalf of the and SITS Investigators[10]

[1]County Hospital, Department of Neurology and Stroke center, Chomutov, Czech Republic

[2]Charles University 2nd Faculty of Medicine and Motol University in Prague, Department of Neurology, Prague, Czech Republic

[3]Charles University 3rd Faculty of Medicine and University Hospital Kralovske Vinohrady in Prague and Hospital of Jihlava, Department of Neurology, Jihlava, Czech Republic
[4]University Hospital Ostrava and Faculty of Medicine Ostrava University, Department of Neurology, Ostrava, Czech Republic
[5]Charles University Faculty of Medicine and University Hospital, Department of Neurology and Comprehensive Stroke Center, Hradec Králové, Czech Republic
[6]Palacký Medical School and University Hospital, Department of Neurology and Comprehensive Stroke Center, Olomouc, Czech Republic
[7]University Hospital and Faculty of Medicine in Pilsen, Department of Neurology, Plzeň, Czech Republic
[8]Palacký University Olomouc Faculty of Health Sciences, Center for Research and Science, Olomouc, Czech Republic
[9]Ostrava Vítkovice Hospital, Agel Research and Training Institute, Vítkovice, Czech Republic
[10]St. Anne's University Hospital and Medical Faculty of Masaryk University, International Clinical Research Centre and Department of Neurology, Brno, Czech Republic

Background and Aims: Whether patients presenting with mild stroke should or should not be treated with intravenous rtPA is still controversial. Study aim was to evaluate safety and effectiveness of intravenous thrombolysis (IVT) in mild stroke patients with a baseline NIHSS less than 5.
Method: We analyzed patients registered in SITS-Czech Republic between January 2003 and August 2015. NIHSS < 5 and NIHSS > 5 groups of patients were compared with respect to safety (death and symptomatic intracerebral hemorrhage [sICH]), and efficacy (modified Rankin scale [mRS]). Adjustment for baseline difference was performed with logistic regression.
Results: Of 8533 patients treated with IVT < 4.5 hours from stroke onset, 644 (7.5%) had a mild stroke (NIHSS < 5). NIHSS < 5 compared to NIHSS > 5 patients had significantly higher adjusted odds to achieve favorable outcome at 3 months (mRS 0–1, OR $= 4.12$; 95% CI: 3.10–5.47). Only 4 out of 644 NIHSS < 5 patients had sICH (0.6 %) vs. 141 out of 7245 (2.0 %) NIHSS > 5 patients ($P = 0.056$). Mortality was 1.2 % vs. 7.3% ($P < 0{,}001$) in NIHSS < 5 and NIHSS > 5, respectively. No association between sICH and NIHSS $<5/>5$ patients was found (e.g. for MOST definition of sICH, OR $= 0.54$; 95% CI: 0.88–3.39).
Conclusion: Thrombolysis of patients with mild stroke symptoms (NIHSS < 5) carries very low risk. Patients with mild ischemic stroke should not be excluded from thrombolytic treatment based on perception of risky thrombolytic treatment.

AS08-043

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

ANALYSIS OF THE INTERNATIONAL SITS REGISTRY REGARDING PREDICTORS OF FAVOURABLE OUTCOME IN OFF-LABEL THROMBOLYSIS

S. Mundiyanapurath[1], H. Katharina[2], N. Ahmed[3], N. Wahlgren[3], L. Uhlmann[2], M. Kieser[2], P. Ringleb[1], W. Hacke[1] and S. Nagel[1]
[1]University Hospital Heidelberg, Department of Neurology, Heidelberg, Germany
[2]Ruprechts-Karls-Universität Heidelberg, Institute of Medical Biometry and Informatics, Heidelberg, Germany
[3]Karolinska Institutet and Department of Neurology, Department of Clinical Neuroscience, Stockholm, Sweden

Background and Aims: Because of strict license regulations for alteplase, off-label thrombolysis for patients with ischemic stroke is common.
Method: The Safe Implementation of Treatments in Stroke (SITS) thrombolysis registry was analysed retrospectively regarding 11 pre-specified off-label criteria according to the European license. Favourable outcome, defined as modified Rankin Scale score of 0–2 at three months after thrombolysis was used as primary endpoint. Excellent outcome (modified Rankin Scale score of 0–1) was defined as secondary endpoint. Patients with a premorbid Rankin Scale score of greater 2 or greater 1 were excluded of the analysis of the primary and secondary endpoint, respectively. Missing values were replaced using multiple imputations by chained equations.
Results: 43539 patients were available for analysis. While favourable outcome was achieved in 24834 patients (54.5%), excellent outcome was found in 17893 patients (39.3%). Minor stroke (NIHSS ≤ 3) (OR 5.94, CI [5.09–6.93]; $p < 0.001$), very severe stroke (NIHSS ≥ 25; OR 0.19, CI [0.16–0.22]; $p < 0.001$), previous stroke and diabetes (OR 0.68, CI [0.59–0.78]; $p < 0.001$), high age (> 80years; OR 0.53, CI [0.50–0.57]; $p < 0.001$), and OL blood pressure (systolic blood pressure >185 mmHg or diastolic blood pressure >110 mmHg; OR 0.83, CI [0.74–0.92]; $p < 0.001$) were independent predictors of favourable outcome in the multivariable analysis. Interestingly, inclusion of SICH according to the ECASS II definition in the multivariable analysis did not change the OR of these off-label criteria.
Conclusion: Thrombolysis appears to be efficient for most of the off-label criteria. Individual risk-benefit evaluation should be performed before off-label thrombolysis, especially in patients with combinations of these off-label criteria.

AS08-053

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

HIGH VALUES OF BASELINE AND 24-HOUR MEAN ARTERIAL PRESSURE ARE ASSOCIATED WITH LOWER CHANCE OF EARLY NEUROLOGICAL IMPROVEMENT IN ACUTE STROKE PATIENTS TREATED WITH THROMBOLYSIS

S. Lorenzano[1], M.C. Caselli[1], A. Zingaro[1], F. Orlando[1] and D. Toni[1]
[1]Sapienza University of Rome, Department of Neurology and Psychiatry-Unità di Trattamento Neurovascolare- Policlinico Umberto I Hospital, Rome, Italy

Background and Aims: Studies on the relation between blood pressure (BP) in the hyperacute phase of an ischemic stroke and stroke outcome have shown contradictory results. Aim of the study was to evaluate whether mean arterial pressure (MAP), as marker of brain perfusion, is associated with early neurological improvement (ENI) in patients with acute ischemic stroke (AIS) treated with IV thrombolysis.
Method: We analyzed data of patients treated with IV rt-PA at the Sapienza University of Rome and included in the SITS-ISTR. ENI was defined as a decrease of 4 or more points at 24-hr NIHSS from baseline or 24-hr NIHSS equals to 0 regardless the baseline NIHSS values.
Results: Overall, 440 patients were included, 183/423(43.3%) had ENI. Patients with ENI were more likely to have cardioembolic stroke ($p < 0.001$), lower SBP at baseline ($p = 0.005$) and 24 hours ($p < 0.001$), lower absolute values of MAP at baseline ($p = 0.008$) and 24 hours ($p = 0.005$), a lower proportion of symptomatic intracerebral hemorrhage (SICH) per NINDS definition. MAP at baseline and at 24 hours resulted as independent predictors of ENI in the multivariate analysis models including the antihypertensive treatment prior to (baseline

MAP:OR 0.98, 95%CI 0.96–0.99; p = 0.026) or after the index stroke (24-hr MAP:OR 0.97, 95%CI 0.95–0.99; p = 0.015). Higher MAP values at baseline and 24 hours were significantly associated with poor outcome (mRS 3–6) at discharge (p = 0.030) and SICH per ECASS definition (p = 0.024), respectively.
Conclusion: High baseline and 24-hr MAP values are associated with lower chance of achieving ENI after IV thrombolysis. Further studies are needed to better understand whether acute BP dysregulation can influence different clinical courses in the early phase of IV thrombolysis.

AS08-001

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

SEVEN YEAR EXPERIENCE OF THE FIRST TELESTROKE PROGRAM IN HONG KONG BY TELEPHONE CONSULTATION AND TELE-RADIOLOGY

W.C. Fong[1], W.T.J. Lo[1], M. Ismail[1], V.C.O. Luk[1], S.C.H. Chan[1], F.C.C. Chan[1], J.T.C. Li[1], A.L.T. Chan[1], G.H.F. Chan[1], K.W. Fong[1], N.Y.F. Cheung[1], A.K.H. Leung[1], C.S. Fong[1], S.T. Chan[1], V.W.Y. Kwok[1] and B.M.K. Yuen[1]
[1]Queen Elizabeth Hospital, Medicine, Kowlooon, Hong Kong S.A.R.

Background and Aims: Intravenous thrombolysis by tissue plasminogen activator had been shown to be beneficial to acute ischaemic stroke patients, presented within 4.5 hours window. However, previous studies had shown that it is under-utilized. One of the main reasons is the lack of stroke specialists to provide careful assessment and make the decision to treat the patients after risk and benefit analysis. The first telestroke program was introduced in Hong Kong since 2009, in order to provide 24-hr intravenous stroke thrombolysis, and its outcome was reviewed.
Method: The telestroke model is in form of telephone consultation to the onsite internist with training in stroke management, tele-radiology and onsite stroke nursing support. All patients' data were prospectively recruited over 7 years period from 2009 till 2015. Time intervals during the diagnostic process preceding thrombolysis were recorded. Prespecified outcome parameters were the National Institutes of Health Stroke Scale (NIHSS) score before treatment, occurrence of symptomatic intracerebral haemorrhage (SICH) and modified Rankin Scale at three months after stroke.
Results: 409 patients were treated by intravenous thrombolysis. The median door-to CT time was 22 minutes and the door-to-needle time was 72 minutes. The baseline median NIHSS is 13. Mean age was 68. SICH developed in 3.5% according to SITS-MOST definition. And 47.7% of patients had excellent functional outcome at 3-month as defined by modified Rankin scale 0–1, which was comparable with overseas studies.
Conclusion: The implementation of telestroke can overcome the barrier of limited neurologist workforce and make 24-hour stroke thrombolysis feasible, safe and effective in Hong Kong

AS08-002

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

SUBACUTE BLOOD-BRAIN BARRIER DISRUPTION PREDICTS FUNCTIONAL OUTCOME IN THROMBOLYSED STROKE PATIENTS

R. Leigh[1], E. Hitomi[1], A. Simpkins[1], D. Reyes[1], J. Lynch[1], M. Luby[1] and Z. Nadareishvili[1]
[1]National Institute of Neurological Disorders and Stroke, Intramural Stroke Branch, Bethesda, USA

Background and Aims: While enhancement of subacute strokes on MRI is commonly observed, its relevance to functional outcome has not been determined.
Method: Patients treated with tPA using our MRI protocol during 2013–2014 were considered for this study. Patients need to have had a unilateral supratentorial stroke and a perfusion MRI scan approximately 24 hours and/or approximately 5 days after treatment, and a modified Rankin score (mRS) at 30 or 90 days. BBB permeability was calculated from the perfusion weighted imaging as a percent change in signal compared to normal due to gadolinium leak. Average permeability was calculated in the affected hemisphere from voxels that demonstrated elevated BBB permeability above the noise threshold of 1%. Good functional outcome, defined as a mRS of 0 or 1, was compared with average permeability using logistic regression.
Results: 76 patients had the necessary data to perform the analysis at 24 hours and 58 patients had data for the 5 day assessment. There was a trend toward worse functional outcome in patients with higher BBB permeability at 24 hours (p = 0.067; OR 0.58 [CI 0.33,1.00]). However, 5 days after the stroke, elevated BBB permeability was strongly associated with poor outcome (p = 0.006; OR 0.24 [CI 0.09,0.67]). The odds ratio indicates that for every percent increase in BBB disruption there is a 75% decrease in the chance of a good functional outcome. Multivariate analysis found this to be independent of age, stroke volume or NIHSS.
Conclusion: BBB disruption measured 5 days after treatment for acute stroke appears to be predictive of functional outcome.

AS08-013

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

BIGGER, FASTER IN TELESTROKE? ASSOCIATION BETWEEN HOSPITAL THROMBOLYSIS VOLUME AND SPEED OF ADMINISTRATION IN STROKE PATIENTS IN A TELEMEDICAL SETTING

C. Laitenberger[1], G.J. Hubert[1], N. Hubert[1], R. Backhaus[2] and R.L. Haberl[1]
[1]Städtisches Klinikum München GmbH, Neurology, München, Germany
[2]University of Regensburg, Neurology, Regensburg, Germany

Background and Aims: Benefits of intravenous thrombolysis (IVT) with tissue plasminogen activator are time dependent. There is an association between higher thrombolysis volume and shorter door-to-needle times (DNT).
Aim: To investigate the effect of teleconsultation on DNT in low and high performing spoke hospitals.
Method: The telemedical project for integrative stroke care TEMPiS has set up a thrombolysis registry that includes all consecutive patients receiving IVT. Data from 15 participating hospitals from 01/2013 to 12/

2015 were analysed regarding IVT volume and all patients with telemedical support were included in time delay analysis. Hospitals were categorized into two groups with <30 and >30 tPA-treatments per year.
Results: A total of 1318 patients received tPA. Number of thrombolysis treatments in each hospital ranged between 13 and 57 per year. Of all 1004 were treated with telemedical support. Median DNT was 45 min (IQR 27) in hospitals with <30 treatments and 50 min (IQR 30) in hospitals with >30 treatments per year.
Conclusion: Frequency of thrombolysis treatment had no effect on DNT in spoke hospitals assisted by teleconsultation.

AS08-014

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

INTRAVENOUS THROMBOLYSIS IN MINOR ISCHAEMIC STROKE – ROLE OF NEUROIMAGING ABNORMALITY

S. Ostry[1], M. Nevšímalová[1] and M. Reiser[1]
[1]Hospital České Budějovice- a.s., Neurology- Comprehensive cerebrovascular centre, České Budějovice, Czech Republic

Background and Aims: Minor ischaemic stroke (MIS) is not unanimously defined yet.
Acute MIS treatment benefit, especially Intravenous thrombolysis (IVT) is not clear, in general.
However, persistent intracranial vessel occlusion is predictor of early deterioration.
There are suggestions for subgroup definition suitable for treatment.
Aim of the study: How neuroimaging abnormality influence the outcome after MIS.
Method: Prospectively and consecutively enrolled cohort in period 1/2015 to 9/2016.
Inclusion criteria: MIS (defined as NIHSS 0–4), onset ≤4,5 h or unknown, prestroke performance modified Rankin scale (mRS) 0–2.
Exclusion criteria: haemorrhagic stroke.
Obligatory neuroimaging: nonenhanced CT, CT angio (CTAG), perfusion CT (pCT)
Cohort was split into two subgroups.
Group A: all neuroimages normal.
Group B: CTAG and/or pCT abnormity relevant to stroke.
Outcome: 3 month after stroke per mRS; symptomatic intracranial haemorrhage (sICH).
Results: Cohort contained 140 patients.
Group A: 68 patients, 40 males (58.8%), mean age 67.8 years (35–90); mean OTT: 122.2 ± 55.9 min, unknown onset: 5 (7.4%), mean DNT 33.4 ± 17.1 min.
Group B: 72 patients, 38 males (52.8%), mean age 69.9 years (38–89); mean OTT: 132.7 ± 65.2 min, unknown onset: 12 (16.7%), mean DNT: 42.3 ± 21.9 min.

NIHSS	Admission clinical finding			
	Group A		Group B	
0	0	0,0%	7	9,7%
1	4	5,9%	8	11,1%
2	15	22,1%	20	27,8%
3	25	36,8%	20	27,8%
4	24	35,3%	17	23,6%
total	**68**	**100,0%**	**72**	**100,0%**

mRS	3 month clinical outcome			
	Group A		Group B	
0	41	60,3%	44	61,1%
1	12	17,6%	5	6,9%
2	5	7,4%	10	13,9%
3-5	7	10,3%	10	13,9%
6	3	4,4%	3	4,2%
total	**68**	**100,0%**	**72**	**100,0%**

Excellent clinical outcome (mRS 0–1) in group A and B were 77.9% and 68.0% respectively, and sICH: 1 (1.5%) and 2 (2.8%) respectively.
Conclusion: Neuroimaging abnormality seems to be possible predictor of worse outcome with similar low symptomatic bleeding risk.

AS08-016

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

EMERGENT MRI FOR DIFFERENTIATING ACUTE ISCHEMIC STROKE VERSUS STROKE MIMICS DURING A STROKE ALERT

E. Sidorov[1], C. Iser[1], N. Kapoor[1] and D. Thompson[1]
[1]University of Oklahoma Health Sciences Center, Neurology, Oklahoma City, USA

Background and Aims: Patients who present to emergency department (ED) with acute neurological deficit need timely evaluation to make decision about IV tPA administration. This includes differentiation acute ischemic strokes (AIS) from stroke mimics. Although administering IV tPA to stroke mimic patients is thought to be safe, it still can carry small risk of bleeding. We aimed retrospectively evaluate challenging stroke alert patients with emergent brain MRI to make decision about IV tPA.
Method: Retrospective chart review of patients who presented to OU Medical Center as stroke alert and underwent emergent MRI (within 45 mins) to differentiate AIS from stroke mimics in 2013–2015.
Results: Ninety-seven patients presented to OUMC as a stroke alert and underwent an emergent MRI. MRI confirmed AIS in 17 patients (17.5%). Of these only five (24.9%), subsequently received IV tPA while eleven (64.7%) did not due to either being outside of the time window or having other contraindications on further history clarification. Average door-to-needle time was 80.8 minutes. NIHSS scores were significantly lower in patients with stroke mimics than in those with AIS ($p = 0.051$). Headache was more common in stroke mimics than in AIS (33% vs 13%) and atrial fibrillation was more common in AIS than in stroke mimics (18% vs 4%).
Conclusion: Emergent MRI is useful rule out test for AIS in patients with acute onset of neurological deficit. It helps to prevent unnecessary IV tPA administration. If acute neurological deficit patient presents with no headache, higher NIHSS, and AF no emergent MRI is necessary to decide about IV tPA administration.

AS08-017

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

IDENTITY THEFT AND REPEATED THROMBOLYSIS SEEKING, A CRIMINAL DEATH WISH BUT WHY?

O. david[1]
[1]telford, United Kingdom

Background and Aims: A man apparently younger than his years presented to hospital with what was felt to be a new focal leg weakness and he was about to receive thrombolysis. Miraculously his urgent brain showed none of the cerebrovascular disease evidenced on his last brain scan. Thrombolysing him was no longer felt to be safe, and an urgent investigation into the improvement on his brain scan was undertaken.
Method: His stroke records revealed that he had been thrombolysed by us previously but increasingly suspicious of this man we repeatedly checked his identity and found he even knew his hospital number. On telephoning his home number a different vulnerable older man answered to his name.
On challenging him he admitted stealing details the details of the man in the bed next to him from the nursing folder on his last admission. With this new identity he had presented to other neighbouring hospitals and received stroke thrombolysis luckily without ill effect.
Results: A psychiatry review of his identity theft and behaviour felt he had Munchausen's with the secondary gain of wishing to receive care, unnecessary treatments and accommodation.
His bag was searched, finding a few items belonging to other patients. The UK police and NHS fraud were informed and his picture was passed to neighbouring hospitals. He collected his bag, made a sudden 'recovery' and walked out followed by security. He planned to catch a train for another region.
Conclusion: This is the first published case of Stroke Identity Theft and repeated 'functional' (nonorganic) stroke thrombolysis.

AS08-018

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

CLINICAL PREDICTORS OF STROKE MIMICS IN PATIENTS TREATED WITH RT-PA ACCORDING TO A NORMAL MULTIMODAL CT IMAGING

S. Olindo[1], **M. Chardonnet**[1], **S. Debruxelles**[1], **C. Coignon**[1], **M. Poli**[1], **P. Renou**[1], **F. Rouanet**[1] **and I. Sibon**[1]
[1]University Hospital of Bordeaux, Stroke Unit, Bordeaux, France

Background and Aims: Multimodal CT Imaging (MCTI) is increasingly used for rapid assessment of acute stroke. We investigated characteristics and final diagnoses of patients treated by rt-PA while admission imaging was unremarkable.
Method: From our prospectively collected stroke database (2013–2016), we identified consecutive patients treated by rt-PA on the basis of an unremarkable brain MCTI and assessed with a 24-hour follow-up brain MRI. Demographic data, medical history, 15-item NIH Stroke Scale and final diagnosis were considered. Absence of MRI infarction and alternate diagnosis defined stroke mimics (SMs). Univariable and multivariable logistic regression analyses identified factors predictive of SMs.
Results: Sixty-eight (47.9%) SMs, 63 (44.4%) strokes and 11 (7.7%) aborted strokes were found. Commonest SM diagnoses were functional (26.5%), seizure (22%) and migraine (20.6%). Infarctions were located in subcortical (54%), restricted cortical (25.4%) and cerebellar or brainstem (20.6%) areas. SMs had more often aphasia ($p = 0.003$) and hemianopia ($p = 0.0008$) while upper limb weakness (ULW) ($p = 0.03$) and limb ataxia ($p = 0.002$) were less prevalent than in strokes. Headache (Adjusted Odds Ratio, 3.89 [95%CI, 1.44–10.47]), relevant history of epilepsy, migraine, dementia or depression (3.66 [1.31–10.18]), unilateral sensory loss (2.60 [1.05–6.45]) and hemianopia (4.94 [1.46–16.77]) were independent predictors of SMs while ULW (3.16 [1.28–7.82]) and ataxia (3.81 [1.43–10.13]) predicted stroke.
Conclusion: Normal MCTI in patients with headache, relevant history, sensory loss or cortical symptoms such as aphasia/hemianopia is suggestive of SMs particularly in absence of ataxia or ULW. Complementary emergency MRI to rule out SMs might be discussed in patients with such clinical presentations and unremarkable MCTI.

AS08-021

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

ALTEPLASE NON-RESPONDERS

G. Krastev[1], **M. Mako**[1], **J. Haring**[1], **M. Cabúková**[1] **and J. Cisár**[1]
[1]Faculty Hospital Trnava, Neurology, Trnava, Slovak Republic

Background and Aims: Approximately half of the patients treated with rtPA are so-called alteplase nonresponders. Factors that contribute to worse response or nonresponse to alteplase are more, and autors are focused on rate of decline of fibrinogen as a response to fibrinolytic effect of rtPA.
Method: We analysed 124 patients treated with rtPA for acute stroke. We monitored the drop of fibrinogen level after 3 and 6 hours, defined three groups: 0–25%, 25–50% and more than 50% decline of initial level of fibrinogen. Out of guidelines secondary prevention with monotherapy or dual antithrombotic therapy was started according to result of brain CT and drop of fibrinogen after 6 hours. Clinical outcome, risk of stroke reccurence, rate of intracranial haemorrhage were analysed.
Results: In the non-responder group with the decrement of fibrinogen within 25% the good clinical outcome was achieved in 55%, intracranial haemorrhage was present in 6.9 %. In 68% of patients early secondary stroke prevention was initiated within 24 hours, only 1 patient developed intracranial hameorrhage. In the group with 25–50% decrement the good clinical outcome was achieved in 78%, intracranial haemorrhage was 6%, none in the early secondary stroke prevention. In the group over 50% decrement good clinical outcome was achieved in 45%, the rate of intracranial haemorrhages was 25% but none within the first 24 hours.
Conclusion: We suggest that administration of secondary prevention within 24 hours is safe, does not increase risk of intracranial hemorrhage and is not worsening outcome.

AS08-022

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

USE OF A DECISION SUPPORT TOOL FOR ISCHEMIC STROKE TREATMENT IN A TELEHEALTH SYSTEM

D. Summers[1], **E. Gialde**[1], **C. Decker**[1] **and J. Spertus**[1]
[1]Saint Luke's Hospital, CV Outcomes Research, Kansas City, USA

Background and Aims: American Cardiology of Emergency Physicians guidelines call for shared decision-making between patient/surrogate and physician prior to Alteplase administration for Acute Ischemic Stroke (AIS). The RESOLVE tool was developed to estimate personalized benefits/risks based on clinical variables. This qualitative study surveyed Emergency Department (ED) physicians in community and rural hospitals

within a large network to quantify satisfaction and confidence treating AIS after reviewing RESOLVE.
Method: To provide ED physicians access to the RESOLVE tool prior to administration of Alteplase for AIS, nurses in a centralized Telehealth were trained to run the RESOLVE model and fax the tool to the hospital immediately. We conducted semi-structured interviews of 14/28 physicians at 7 critical access hospitals that used RESOLVE in decision making during a 6-month pilot.
Results: Two themes emerged from the qualitative analyses of the ED physician interviews: having the individualized patient risk of hemorrhage; and being able to inform the patient/family.
"*Knowing the risk of hemorrhage was only 3% made me more comfortable giving IV tPA*"
"*. . .used it to discuss the benefits and risks, having it helped me to know what to discuss with the patient/family.*"
Study limitations included difficulty interviewing physicians due to 12-hour work shift and those practicing as a locum tenens. Additionally, the timing and fax location limited some physicians from seeing the tool prior to treatment.
Conclusion: Preliminary results show the rural providers found value in RESOLVE while discussing the risks and benefits with patient/family. Future strategies would include process changes to expedite receiving RESOLVE.

AS08-024

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTORS OF HEMORRHAGIC TRANSFORMATION AFTER INTRAVENOUS THROMBOLYSIS FOR ACUTE ISCHAEMIC STROKE

Z. Zivanovic[1], D. Vlahovic[1], S. Ruzicka-Kaloci[1], A. Jovanovic[1], M. Jovicevic[1], T. Rabi-Zikic[1], I. Divjak[1], M. Zarkov[1], A. Lucic[1], N. Popovic[1] and P. Slankaemenac[1]
[1]Faculty of Medicine - University of Novi Sad - Serbia, Department of neurology, Novi Sad, Serbia

Background and Aims: Hemorrhagic transformation (HT) is one of the most feared complications after administration of intravenous thrombolysis (IVT). The occurrence of HT could result in an unfavorable outcome. This study aimed to identify factors associated with HT after administration of IVT for acute ischemic stroke (AIS).
Method: We analyzed 232 patients with AIS which were treated with IVT in Clinical Center of Vojvodina in period from 2008–2016. HT was confirmed by computed tomography (CT) within 48 hours after IVT. Patient groups were classified by with HT and without HT.
Results: There were 42 (18.1%) patients with HT. Neurological improvement after IVT was less frequent in patients with HT (21.4% vs. 43.7%, $p = 0.01$), as well as favorable outcome (mRS 0–2) three months after stroke (38.1% vs. 58.4%, $p = 0.03$). The occurrence of HT was associated with higher NIHSS score at admittance (15.2 vs. 12.8, $p = 0.002$), lower ASPECT score (8.9 vs. 9.3, $p = 0.03$), lower platelet count (211.524 vs. 227.068, $p = 0.028$), hyperdense artery sign on CT (66.7% vs. 35.8%, $p < 0.0001$), atrial fibrillation (54.8% vs. 27.4%, $p = 0.001$), chronic cardiomyopathy (26.2% vs. 12.6%, $p = 0.047$), anterior circulation infarction (95.2% vs. 68.4%, $p = 0.001$), and cardioembolic stroke (64.3% vs. 25.8%, $p < 0.0001$). Binary logistic regression analysis showed that independent predictors of HT were hyperdense artery sign (OR 3.7, 95%CI 1.7–8.1; $p = 0.001$), atrial fibrillation (OR 2.8, 95%CI 1.3–5.9; $p = 0.006$) and diabetes mellitus as risk factor (OR 3.1, 95%CI 1.2–7.9; $p = 0.015$).
Conclusion: HT complicates the outcome after IVT. AIS patients with atrial fibrillation, hyperdense artery sign or diabetes should be carefully monitored during and after IVT.

AS08-026

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

IV- THROMBOLYSIS FOR ACUTE ISCHAEMIC STROKE IN EARLY PREGNANCY

P. Ylikotila[1], J. Ruuskanen[2] and S. Roine[2]
[1]Turku University Hospital, Turku, Finland
[2]Turku University Hospital, Division of Clinical Neurosciences, Turku, Finland

Background and Aims: Acute ischaemic stroke during pregnancy is an extremely rare condition. There are no established guidelines regarding thrombolysis treatment during pregnancy. The experience on IV- thrombolysis is very limited especially in early pregnancy. Based on limited data on thrombolytic therapy during pregnancy, the complication rates do not exceed those seen in large randomised controlled trials.
Method: We describe a pregnant woman with a history of hemiplegic migraine who presented in our hospital at gestational week 16 due to sudden onset right-sided sensorimotor hemiparesis and right sided hemianopia but no headache.
Results: MRI showed diffusion restriction compatible with acute infarction on the left side covering hippocampus, thalamus, lateral splenium and occipital lobe. There was a slightly reduced flow in the left PCA P1 segment but no clear target for endovascular treatment. An almost complete resolution of the symptoms followed administration of standard alteplase dose, although control MRI showed infarction in the above mentioned areas. Etiological workup has revealed PFO but other tests, including hemiplegic migraine gene panel and thrombophilia tests, showed no abnormal findings. Small dose of ASA and LMWH were started and are to be continued throughout pregnancy and post-partum period. Repeated ultrasounds have showed normal development of the fetus.
Conclusion: The patient recovered well from her stroke after thrombolysis, and the pregnancy is ongoing normally. Pregnancy outcome will be reported later. Given that alteplase does not cross the placenta, thrombolytic therapy should not be withheld in pregnant patients.

AS08-033

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

ACUTE STROKE ASSESSMENT WITH TELEMEDICINE: DOES IT AFFECT TIME TO TREATMENT AND OUTCOME COMPARED WITH FACE-TO-FACE ASSESSMENT?

M. Bangee[1], C.E. Lightbody[1], B. Chesworth[1], V. Benedetto[1], M.J. Leathley[1], C. Price[2], C.J. Sutton[1] and C.L. Watkins[1]
[1]University of Central Lancashire, Faculty of Health and Wellbeing, Preston, United Kingdom
[2]Newcastle University, Neuroscience, Newcastle, United Kingdom

Background and Aims: Outcomes for stroke patients are improved by reducing time to, and increasing accessibility of, stroke-specialist consultation and treatments (e.g. delivery of thrombolysis). Telemedicine is a way that this can be facilitated, especially outside routine working hours. This study compared the timeliness of treatment and short-term patient outcomes when telemedicine or face-to-face assessment was used as part of the decision process of administering thrombolysis to patients affected by stroke.
Method: Stroke data from SINAP and DASH databases between July 2011 and March 2013 was provided from six trusts in Lancashire and Cumbria which used telemedicine for the assessment of acute stroke, and eleven trusts within the North East of England which assessed patients

face-to-face. Data was analysed from 220 stroke patients who received thrombolysis; this was restricted to those admitted out-of-hours as this was when telemedicine would normally be used.
Results: The results showed that stroke patients assessed via telemedicine had a subsequent longer door-to needle time in comparison to those assessed via traditional face-to-face methods (95%CI: -32.43 to -11.15 minutes). Also, no significant differences were found between telemedicine and face-to-face assessments on patient outcomes such as length of stay in hospital (95%CI: -10.29 to 3.23 days), stay in stroke unit (95%CI: -10.42 to 3.01 days), rate of complications (OR 95%CI: 0.33 to 1.82) or discharge destination (OR 95%CI: 0.30 to 1.11).
Conclusion: Patients assessed by telemedicine have a longer door-to-needle time than those assessed face-to-face. However, whether assessment was via telemedicine or face-to-face does not appear to affect short-term patient outcomes.

AS08-034

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

TELESTROKE MIMICS: A NEW CHALLANGE FOR THE STROKE NEUROLOGIST

M. Guillan[1], J. Fernandez-Ferro[1], M.A. Aranda[2], N. Barbero[1], B. Venegas[1], R. Cazorla[3], L. Martin[2], S. Bellido[1] and J. Pardo[4]
[1]Hospital Universitario Rey Juan Carlos, Stroke Unit, MADRID, Spain
[2]Hospital Universitario Infanta Elena, Neurology, MADRID, Spain
[3]Hospital General Collado Villalba, Neurology, Madrid, Spain
[4]Hospital Universitario Rey Juan Carlos, Neurology, MADRID, Spain

Background and Aims: Telestroke is one of the most successful applications of telemedicine. A critical measure of telestroke consultation quality is diagnostic accuracy, which is not routinely assessed in telestroke networks. The need for rapid administration of intravenous thrombolysis (IV-tPA) in acute ischemic stroke may lead to treatment of patients with conditions mimicking stroke (stroke mimics, SM). We aimed to determine the frequency, clinical features, and prognosis of SM treated in-person versus by telestroke (telestroke mimics, TSM) in our stroke unit.
Method: Cases from our consecutive registry of thrombolysis were reviewed from January-2015 to October-2016, separately considering in-person treatments at the hub hospital vs telestroke treatments with 2-spokes hospitals. We compared clinical characteristics as well as efficacy and safety endpoints.
Results: 227 calls were received with suspect cerebrovascular disease (CVD)(56 as a code stroke). The neurologist, via telestroke, diagnosed 202(89%) CVD-cases and 25(11%) non-CVD-cases. Of the CVD-cases 27(48% of the code strokes) were treated with IV-tPA, 7(26%) of which were finally diagnosed with TSM (3-seizures, 1-somatoform disorder, 1-hypertensive encephalopathy, 1-venous thrombosis, 1-MS relapse). In the same period 71 in-person thrombolysis were performed in the hub hospital, of which 4(5.5%) were SM. The TSM were younger and 4 of them presented with aphasia. There were no treatment related complications.
Conclusion: In our series there is a higher percentage of IV-tPA-TSM than in-person IV-tPA-SM. IV-tPA-TSM were younger, had aphasia as the most common presentation and seizures were the main cause. Telestroke is a treatment opportunity for patients, but involves a more complex diagnosis which requires specific training.

AS08-035

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

SAFETY IN WITHHOLDING INTRAVENOUS THROMBOLYSIS IN PATIENTS WITH LIMITED DISABILITY DUE TO CEREBRAL INFARCTION

L. Kuhrij[1], M.W.J.M. Wouters[2], R.M. van den Berg-Vos[3], H.F. Lingsma[4], F.E. de Leeuw[5] and P.J. Nederkoorn[6]
[1]Oegstgeest, The Netherlands
[2]DICA, DICA, Leiden, The Netherlands
[3]OLVG, Neurology, Amsterdam, The Netherlands
[4]Erasmus MC, Public Health, Rotterdam, The Netherlands
[5]Radboud UMC, Neurology, Nijmegen, The Netherlands
[6]AMC, Neurology, Amsterdam, The Netherlands

Background and Aims: Intravenous thrombolysis (IVT) within 4.5 hours given after start of stroke symptoms reduces the risk of functional disability and mortality. In patients with limited disability it is not yet established whether IVT prevents a worse outcome.
Method: All patients with cerebral infarction registered in the Cerebrovascular Accident Benchmark (CVAB) in the Netherlands from 2014 to 2017 were included. In this registry, hospitals were asked to provide the reason for each patient that was not treated with IVT. The options were: limited disability, improvement of neurological status or a combination, arrival past IVT-window, unknown start of symptoms or combination, high blood pressure, anti-thrombolytic medications and a rest group. Modified Rankin Scale (mRS) after three months was used to determine functional status.
Results: 61.994 patients with cerebral infarction were included. IVT percentage was 20%. In the remaining patients, reason for withholding IVT was given in 24.214 patients. In these patients limited disability and improvement (or both) occurred in 11,5%. As seen in Figure 1, no difference in outcome was found between patients receiving thrombolysis and patients that are withheld from treatment. Furthermore, there is a wide variety between hospitals in number of patients not receiving IVT due to limited disability or improvement.
Conclusion: No difference was found in functional status after three months in patients with cerebral infarction when comparing patients with limited disability or neurological improvement who did not receive IVT to patients that did. However, the wide variety in the Netherlands show that there is a lack of consensus.

AS08-037

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

CAN THE PRESENCE OF HEADACHE HELP RULE OUT STROKE MIMICS DURING STROKE ALERTS?

E. Sidorov[1]
[1]University of Oklahoma Health Sciences Center, Neurology, Oklahoma City, USA

Background and Aims: Patients with acute neurological deficit require timely evaluation in emergency department to make decision about IV tPA. Although administering IV tPA to stroke mimic patients is thought to be safe, it still carries risk of bleeding. We aimed retrospectively evaluate if presence of headache helps to differentiate patients with AIS from stroke mimics during stroke alert.
Method: Retrospective chart review of patients who presented to OU Medical Center (OUMC) as a stroke alert in 2012.

Results: Out of 326 patients, 175 were eligible for IV tPA administration. Sixty two of these 175 reported headache, but none of them had AIS on follow-up brain MRI. AIS was confirmed on follow up MRI in 40 of the 113 patients with no headache (35.4%), significantly more often ($p < 0.0001$) than in those with HA. Among patients without AIS, the percentage who nevertheless received IV tPA did not differ between those with HA (7/62; 11.3%) and those without HA (9/73; 12.3%). This suggests that clinicians did not use HA in making clinical decisions. Had clinicians categorically decided against providing IV tPA in patients with headache, that would have reduced the number of patients with stroke mimics ($n = 135$) who were treated with IV tPA from 16 to 9.
Conclusion: Presence of HA helps to eliminate patients with stroke mimics and prevent provision of unnecessary IV tPA. Future studies which address HA in combination with NIHSS and blood pressure may further help clinically differentiate AIS from stroke mimics during stroke alert when time for patient evaluation is limited.

AS08-038

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

VON WILLEBRAND FACTOR MAY PREDICT RESPONSE TO THROMBOLYSIS IN ACUTE STROKE PATIENTS

B. Piccardi[1], S. Biagini[1], F. Arba[1], A. Giannini[1], A.M. Gori[2], M. Nesi[3], B. Giusti[2], V. Palumbo[3], P. Nencini[3], G. Pracucci[1], A. Sereni[2], R. Abbate[2] and D. Inzitari[1,4]
[1]University of Florence- Careggi University Hospital, Department of Neurosciences- Psychology- Drug Research and Child Health, Florence, Italy
[2]University of Florence- Careggi University Hospital, Department of Experimental and Clinical Medicine, Florence, Italy
[3]Careggi University Hospital, Emergency Department- Stroke Unit, Florence, Italy
[4]Institute of Neuroscience, Italian National Research Council, Florence, Italy

Background and Aims: Endothelium plays a crucial role in maintaining the haemostatic balance between pro- and anti-thrombotic factors in the setting of acute cerebral ischemia. We aimed to investigate whether selective biomarkers of endothelial dysfunction taken before recombinant tissue plasminogen activator (rt-PA) administration, including von Willebrand Factor:Antigen (VWF:Ag), predict response to thrombolysis itself or other clinical/imaging outcomes.
Method: Blood samples were taken before and 24-h after rt-PA from 327 patients (mean age 68 years, median NIHSS 11). Pre-rt-PA values and delta median values [(24-h biomarker - pre-rt-PA biomarker)/(pre-rt-PA biomarker)] of VWF, Vascular Cell Adhesion Molecule-1, Intercellular Adhesion Molecule-1 and Vascular Endothelial Growth Factor were analyzed related to: 1) clinical response to systemic thrombolysis ($\geq$4 point decrease on 24-h NIHSS), 2) symptomatic hemorrhagic transformation 3) modified Rankin Scale at 90 days (dichotomized in 0–2 and 3–6), and 4) presence of cerebral edema (CE) on 24-h computed tomography (CT) images. The net effect of each biomarker was estimated by a logistic regression model including major clinical determinants of outcomes.
Results: Elevated pre-rt-PA circulating VWF levels were the only factor that remained a significant determinant of poor response to systemic thrombolysis (non responders: 176.7 % [119.3–214.5]; responders:142.6 % [99.7–208.1] $p = 0.031$; after adjustment for major clinical determinants: $p = 0.034$). Pre-rtPA VWF was also independently associated with presence of CE on 24-h CT scan ($p = 0.018$).
Conclusion: In patients with acute ischemic stroke treated with thrombolysis increased pre-rt-PA levels of VWF may independently predict poor clinical response to thrombolysis, as well as imaging markers of unfavorable outcome.

AS08-039

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

PREDICTIVE FACTORS OF LEPTOMENINGEAL COLLATERALS IN ACUTE ISCHEMIC STROKE PATIENTS SUBMITTED TO REPERFUSION TREATMENT

J. Beato-Coelho[1], Á. Garcia-Tornel[1], S. Boned[1], M. Ribó[1], N. Rodríguez-Villatoro[1], J. Juega[1], A. Tomasello[2], P. Coscojuela[2], D. Rodríguez-Luna[1], J. Pagola[1], C. Molina[1] and M. Rubiera[1]
[1]Hospital Universitari Vall d'Hebron, Stroke unit, Barcelona, Spain
[2]Hospital Universitari Vall d'Hebron, Neuroradiology and Neurovascular Intervention Department, Barcelona, Spain

Background and Aims: Predictors for good outcome in patients with acute ischemic stroke (AIS) due to proximal thrombus are already described. One of those is a good leptomeningeal collateral flow (LCF). Yet the predictors of good LCF are not stablished.
Determine the factors that influence the LCF in patients with AIS submitted to reperfusion treatment.
Method: Retrospective study (April 2013 to May 2016) of patients with AIS and proximal occlusion, evaluated with multiphase cerebral angio-CT, and submitted to endovascular reperfusion treatment. We defined good and poor LC (Collateral scoring on mCTA University of Calgary) and evaluated which factors influenced its existence. Binary regression models for predictors of good LCF were applied.
Results: We included 146 patients, 83 (56.8%) female, with a median age of 71.86 ± 12.39 years. Good collaterals were found in 113 patients (77.4%). Lower plasmatic glycaemia were associated with good collaterals ($p = 0.027$). On the other hand, internal carotid artery (ICA) occlusion was associated with worse collaterals ($p = 0.018$). Binary logistic regression model adjusted to occluded vessel, glycaemia, systolic arterial pressure and age, verified that both glycaemia levels and occluded vessel were independent predictors of collaterals (OR:1.011;IC95%:1.001 to 1.021; $p = 0.027$) and (OR:3.668;IC95%:1.256 to 10.710; $p = 0.017$) respectively. When evaluating modified Ranking scale at 3 months, we verified that glycaemia as well as the CLF were independent predictors (OR:0.988;IC95%:0.977 to 1.000; $p = 0.045$) and (OR:0.110;IC95%:0.023 to 0.523; $p = 0.006$) respectively of good outcome.
Conclusion: In this population, low glycaemia levels in AIS are predictors of good LCF while ICA occlusion is a predictor of worse LCF.

AS08-040

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

COMPARISON BETWEEN MEASURED VERSUS STATED WEIGHT IN ALTEPLASE TREATMENT

D.H. Shin[1] and E.Y. Kim[2]
[1]Gachon University Gil Medical Center, Department of Neurology, Incheon, Republic of Korea
[2]Gachon University Gil Medical Center, Department of Radiology, Incheon, Republic of Korea

Background and Aims: As the dose for intravenous alteplase is dependent on patient's weight, accurate measurement of weight is important. In most emergency room, however, weight is not measured. We

investigated the difference of stated weight and measured one, and the effect of its difference on hemorrhagic transformation and clinical outcomes.
Method: We enrolled consecutive 128 patients who had hyperacute stroke and were treated by alteplase. Weight stated by patient or guardians was used to determine dose of alteplase, and actual weight was measured after treatment. Patients were classified into overused group (Group I) and underused group (Group II). Prevalence of hemorrhagic transformation was compared between two groups. The predictors for hemorrhage with progression, which was defined as one or more increase in NIHSS scale accompanied by hemorrhage, was determined using multivariable logistic regression analysis.
Results: Alteplase were underused in 66 (51.6%) and were overused in 62 (48.4%) of 128 patients. The median difference between the stated and measured weights was 1.5 (0.56–3.81)kg with the largest difference being 25.6 kg. Group II showed significantly higher prevalence of hemorrhagic transformation ($P = 0.012$) and hemorrhage with progression ($P = 0.025$). In multivariable logistic regression analysis, overused alteplase (OR 7.26; 95% CI1.24–42.45;$P = 0.028$), baseline glucose (>144 mg/dL) (OR 5.03; 95% CI1.00–25.26;$P = 0.050$), and initial NIHSS (OR 1.13 per 1-point NIHSS increase; 95% CI1.00–1.27;$P = 0.047$) were the significant predictors for hemorrhage with progression.
Conclusion: As patients with overused alteplase showed significantly more hemorrhagic transformation and clinical deterioration, it is important to measure weight accurately prior to administration of alteplase.

AS08-042

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

EPILEPTIC MANIFESTATIONS IN STROKE PATIENTS TREATED WITH INTRAVENOUS ALTEPLASE

C. Bentes[1,2], H. Martins[3], A.R. Peralta[1,2], C. Morgado[2,4], C. Casimiro[4], A.C. Franco[1], G. Ruth[1,2], A.C. Fonseca[1,2], P. Canhão[1,2], T. Pinho e Melo[1,2], T. Paiva[5] and F. José M[1,2]
[1]Centro Hospitalar Lisboa Norte - Hospital de Santa Maria, Department of Neurosciences and Mental Health Neurology, Lisboa, Portugal
[2]University of Lisbon, Faculty of Medicine, Lisboa, Portugal
[3]Centro Hospitalar Lisboa Central - Hospital de São José, Department of Medicine, Lisboa, Portugal
[4]Centro Hospitalar Lisboa Norte - Hospital de Santa Maria, Department of Neuroradiology, Lisboa, Portugal
[5]Eletroencefalography and Clinic Neurophysiology Centre, CENC, Lisboa, Portugal

Background and Aims: It has been suggested that acute stroke patients treated with intravenous alteplase (IV-rtPA) more often have clinical seizures and EEG epileptiform activity. We aimed to compare seizures and EEG abnormalities frequency between stroke patients treated and non-treated with IV-rtPA.
Method: Prospective study of consecutive acute anterior circulation ischemic stroke patients admitted to a Stroke Unit of a University Hospital, between October 2011 and October 2013, and followed for 12 months. Patients were previously independent, had an admission NIHSS ≥ 4, an acute ischemic lesion and no previous seizures. They received standardised diagnostic and medical care. Video-EEG was performed in 72 h of stroke (1st EEG); during admission (daily until the day 7 and after that if neurological worsening); at discharge and one year after stroke.
Results: 151 patients (101 treated with IV-rtPA) were included. Acute and remote symptomatic seizures frequency was not significantly different between IV-rtPA treated and non-treated patients (13.9% vs. 16%, $p = 0.726$ and 16.7% vs. 14.6%, $p = 0.748$, respectively). Clinical paroxysmal phenomena during IV-rtPA perfusion were observed in 5 (5%) patients.
In the 1st EEG, IV-rtPA treated patients had more often background diffuse slowing [43.6% vs. 26.0%, $p = 0.036$]. This difference was no longer observed at discharge [24.0% vs. 19.1%, $p = 0.517$] nor one year after [11.8% vs. 10.0%, $p = 0.765$]. No differences were found in interictal epileptiform (19.8% vs. 14%, $p = 0.867$) or periodic discharges (28.9% vs. 14.2%, $p = 0.381$) frequency.
Conclusion: Intravenous alteplase treatment for acute anterior circulation ischemic stroke is not associated with an increased risk of clinical or EEG epileptic phenomena.

AS08-044

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

SAFETY OF INTRAVENOUS ALTEPLASE ADMINISTRATION VIA TELE-STROKE CONSULTATION

S. Al Kasab[1], E. Debenham[1], D.J. Jones[1] and C.A. Holmstedt[2]
[1]MUSC, Neurology, Charleston, USA
[2]Medical University of South Carolina, Neurology, Charleston- SC, USA

Background and Aims: Intravenous thrombolysis (IVT) has been a major treatment for acute ischemic stroke since the NINDS study on tissue plasminogen activator (tPA) was published. The actual use of IVT for acute ischemic stroke remains low in the United States and other countries mainly due to inability to obtain urgent access to Neurology consultation. Remote Neurology consultation via tele-stroke has improved access to expert stroke care and increased the rate of IVT administration, however, little is known about safety of IVT over tele-stroke.
Method: Data for the records of all patients evaluated with the MUSC Tele Stroke consultation network from May 2008 through December 2016 were reviewed. Data included; initial diagnosis, administration of IVT, rate of symptomatic hemorrhagic transformation (sICH) defined as parenchymal hemorrhage 2 (PH2) using ECASII criteria.
Results: 9695 stroke consults were performed during the study period. 4699 (48.4%) patients were diagnosed with acute ischemic stroke (AIS) and of these 1650 (35.1%) received Alteplase. Of the 1650 patients that received Alteplase, 841 (50.9%) were transferred to MUSC for further care. sICH occurred in 36 of 841 patients (4.2%).
Conclusion: The establishment of the MUSC tele-stroke has improved access to expert stroke care in South Carolina leading to increased administration of IVT administration. IVT administration via tele-stroke is safe and the rate of complications falls within the expected rate.

AS08-045

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

DOOR TO NEEDLE TIME OVER TELE STROKE, A COMPREHENSIVE STROKE CENTER EXPERIENCE

S. Al kasab[1], E. Debenham[1], D.J. Jones[1] and C.A. Holmstedt[2]
[1]MUSC, Neurology, Charleston, USA
[2]Medical University of South Carolina, Neurology, Charleston- SC, USA

Background and Aims: At the Medical University of South Carolina (MUSC) a web-based tele stroke program was established in 2008 that allows patients presenting with acute ischemic stroke at rural hospitals to receive expert stroke consultation within minutes. Average door to needle time has been reported to be prolonged when tPA is administered

over tele stroke versus in house. We provide our experience in improving DTN over tele stroke

Method: Data for the records of all patients evaluated with the MUSC Tele Stroke consultation network from May 2008 through April December 2016 were reviewed. Data include average door to needle times. Average times were divided into less than 45 minutes and less than 60 minutes

Results: Average door to needle time percentage below 60 minutes and below 45 minutes was achieved in 13 % and in none respectively when the program was first established in 2008. Average door to needle time percentage below 60 minutes and below 45 minutes increased to 59% and 32% respectively in 2016.

Conclusion: Our data shows that average door to needle time had significantly improved since the establishment of our tele-stroke program. We believe that this reduction is due to the increased level of comfort and improved efficiency of our partner sites in tPA administration over the years.

AS08-048

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

NATIONWIDE TRENDS IN HOSPITAL ARRIVAL, URGENT CT AND THROMBOLYSIS RATES: THE NATIONAL ACUTE STROKE ISRAELI (NASIS) REGISTRY 2004 TO 2016

D. Tanne[1], S. Koton[2], E. Grossman[3], L. Shopin[4], E. Dorodnicov[5], A. Eilam[6] and N. Bornstein[7]

[1]Israel

[2]Tel Aviv university, Stanley Steyer School of Health Professions, Ramat Aviv, Israel

[3]Tel Aviv University, Sackler Faculty of Medicine, Ramat Aviv, Israel

[4]Sourasky Medical Center, Neurology, Tel Aviv, Israel

[5]Barzilai Medical Center, Neurology, Ashkelon, Israel

[6]Kaplan Medical Center, Neurology, Rehovot, Israel

[7]Shaare Zedek Medical Center, Neurology, Jerusalem, Israel

Background and Aims: Improving the quality and efficiency of acute stroke management is a global priority, but most data are from selected centers or stroke networks. Our aim was to examine nationwide trends in mode of arrival to hospital, urgent CT and thrombolysis rates from 2004 till 2016.

Method: Data are based on the triennial, two-month period, National Acute Stroke ISraeli registry (NASIS; 2004, 2007, 2010, 2013, 2016). The registry includes unselected patients admitted to all hospitals nationwide, thus avoiding institution and patient selection bias. Admission policies did not change between periods.

Results: Over 12-years, rates of hospital arrival by emergency medical services (EMS) remained unchanged (39% in 2004, 38% in 2007, 40% in 2010 and 2013 to 38% in 2016). Rates of door-to-CT time <25 minutes among early arrivers (onset-to-door <3.5 hours) increased from 3% in 2004, 6% in 2007, 10% in 2010, 13% in 2013 and up-to 26% in 2016 (p for trend<0.001). Similarly, rates of utilization of intravenous t-PA therapy for acute ischemic stroke increased from <1% in 2004, 2% in 2007, 6% in 2010, 7% in 2013 and up to 12% in 2016 (p for trend < 0.0001) with growing rates of endovascular therapy in the latter years.

Conclusion: Based on a nationwide stroke registry, over 12-years, hospital mode of arrival remained unchanged yet urgent CT within <25 minutes and the use of reperfusion therapy increased substantially, particularly in recent years, attesting to more efficient in-hospital stroke management protocols.

AS08-049

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

DIFFERENCES IN INDIVIDUAL INTRAVENOUS THROMBOLYSIS RATE IN EQUALLY TRAINED TELECONSULTANTS

N. Voelkel[1], N. Hubert[1], G.J. Hubert[1] and R.L. Haberl[1]

[1]Staedtisches Klinikum München, Neurology, Munich, Germany

Background and Aims: Intravenous thrombolysis (IVT) is beneficial for selected ischemic stroke patients. Many formerly strict contraindications have lately been acknowledged as only relative contraindications, making decision on IVT more variable and more dependent on expert's training and experience.

Aims: To analyze difference in decision on IVT in a cohort of teleconsultants with equal training background and similar duration of experience.

Method: The Telemedical Project for integrative Stroke care (TEMPiS) is a network with 19 mostly rural spoke hospitals. The TEMPiS registry includes all consecutive patients receiving teleconsultation. Data from 2015 were analyzed regarding individual IVT rate of teleconsultants. Individual IVT rate was defined as number of IVT recommendations of all patients diagnosed with suspected ischemic stroke at end of teleconsultation by each teleconsultant. Consultants having performed <30 consultations in 2015 were excluded. Standard operating procedures and regular case discussions were established to reduce variability in decision making.

Results: A total of 1158 teleconsultations for patients with acute ischemic stroke were performed by 9 consultants. All consultants received professional training at the same center (Klinikum Harlaching), experience ranged between 54 and 96 months before study period. Overall IVT rate was 17.7% (205/1158). Individual IVT rate varied from 10.75% (20/186) to 25.0% (16/64).

Conclusion: Differences in individual intravenous thrombolysis rate was high in teleconsultants with equivalent professional background. Further research is warranted to detect parameters that influence decision making beyond training, experience and guidelines.

AS08-051

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

EFFECTS OF SSRI EXPOSURE ON HAEMORRHAGIC COMPLICATIONS AND OUTCOME FOLLOWING THROMBOLYSIS IN ISCHAEMIC STROKE

C. Schellen[1], J. Ferrari[1], W. Lang[1] and M. Sykora[1]

[1]St. Johns Hospital Vienna, Dept. of Neurology, Vienna, Austria

Background and Aims: Pre-stroke treatment with selective serotonin reuptake inhibitors (SSRI) has been linked to increased haematoma volumes and mortality in haemorrhagic stroke patients. The effects of SSRI on the risk of haemorrhagic complications after thrombolysis are unclear. We aimed to examine the effects of pre-stroke SSRI exposure on bleeding complications, functional outcome and mortality following thrombolysis in ischaemic stroke.

Method: Data including standard demographic and clinical variables as well as baseline stroke severity (NIHSS), functional outcome (mRS) at 3 months, and mortality at 7 and 90 days were extracted from the Virtual International Stroke Trials Archive (VISTA). Multivariable binary logistic regression was used for statistical analyses.

Results: 3059 ischaemic stroke patients were analysed. 1114 patients (36.4%) received thrombolytic treatment. A total of 367 (12.0%) patients had previous SSRI. Symptomatic intracranial bleeding (SICH) occurred in 30 (3.1%) of the thrombolysed patients. Of those, 2 (1.7%) were in the SSRI pre-treatment group and 28 (3.3%) were SSRI naive patients ($p = 0.58$). Regardless the thrombolysis treatment, pre-stroke SSRI exposure showed no association with bleeding complications and functional outcome. (adjusted OR 0.55, CI 0.06–4.71 for SICH and adjusted OR 0.75, CI 0.41–1.39 for favourable outcome). Among thrombolysis-ineligible patients, SSRI pre-treatment was associated with lower 90 day mortality (adjusted OR 0.47, CI 0.25–0.88; $p = 0.02$).
Conclusion: Pre-stroke SSRI exposure was not associated with bleeding complications and functional outcome in ischaemic stroke patients receiving thrombolysis. Unexpectedly, SSRI pre-treatment was associated with lower mortality among thrombolysis-ineligible patients.

AS08-054

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

PATIENTS' ACCEPTABILITY FOR THROMBOLYSIS RISK IN WAKE UP STROKE

D. Manawadu[1] and L. Kalra[2]
[1]King's College Hospital, Neurosciences, London, United Kingdom
[2]King's College London, Department of Basic and Clinical Neuroscience, London, United Kingdom

Background and Aims: Patients with wake up stroke (WUS) remain ineligible for thrombolysis despite potential to benefit. This study estimates the acceptable risk of intracerebral haemorrhage (ICH) in WUS patients compared with standard (0–4.5hour) presentation.
Method: We presented patients on a stroke unit with the same hypothetical scenario: standard presentation with known risks/benefits of thrombolysis and WUS with unknown thrombolysis risks and asked them whether they would accept or decline treatment with 1%, 5% 10% and 20% ICH risk when presented with mild, moderate or severe stroke (states described). We asked whether treatment decisions should be made by them or their doctor or jointly.
Results: Altogether 75 patients were approached, 41% female; average age 67 years. Patients' current modified Rankin scale score (mRS) ranged 0–4; median 3 and 25 were in paid employment before admission. In the standard thrombolysis scenario 28% with mild, 40% with moderate and 80% with severe stroke would accept up to a 20% ICH risk; these figures were 28%, 39% and 79% respectively for thrombolysis in WUS. Although more patients (23% v 16%, $p = 0.58$) preferred doctors to make this decision in the WUS scenario, 20% preferred patient-only decisions in both thrombolysis scenarios presented.
Conclusion: Patients are prepared to accept higher bleed risks with greater stroke severity, comparable for standard and WUS presentations and wish to make their own decisions. Patient preference based on clear discussion of acceptable health states and ICH risk should inform thrombolysis decisions.

AS08-055

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

IS INTRAVENOUS THROMBOLYSIS SAFE IN PATIENTS WITH ISCHAEMIC STROKE AND INTRACRANIAL TUMOR?

C. Anciones[1], A. de Felipe[1], A. de Albóniga-Chindurza Barroeta[1], F. Acebrón[1], P. Pérez[1], C. Matute[1], R. Vera[1], A. Cruz[1] and J. Masjuán[1]
[1]Hospital Universitario Ramón y Cajal, Neurology, Madrid, Spain

Background and Aims: Intracranial neoplasms have been classically considered a formal contraindication for intravenous thrombolysis (IVT) in acute ischemic stroke (AIS) due to the possible risk of tumoral bleeding. However, recent studies indicate that IVT may be safe in patients with extra-axial intracranial tumors, being controversial its use in intra-axial ones. We present our clinical experience.
Method: Prospective registry of patients with AIS treated with IVT admitted to our specialized stroke center between 2004–2015. We included those patients with an intracranial neoplasm detected previously to the administration of IVT. We studied the type of tumor, medium age, severity of stroke (NIHSS scale), stroke etiology, time to treatment, type of hemorrhagic transformation (SITS classification) and 3 month mortality rate.
Results: Six patients were included. Mean age was 85 years old (range 71–95) and median NIHSS at admission was 22 points. Mean time to treatment was 200 ± 60 minutes. 80% of strokes had a cardioembolic origin and 20% were atherothrombotic. Five patients had calcified meningiomas in previous cranial CT. One patient had 2 meningiomas. The sixth patient had a microcytic carcinoma of the paranasal sinuses with intracranial extension, which was already known.
Only one patient of our series presented an asymptomatic hemorrhagic transformation within the infarct area (type 1 parenchymal hemorrhage). No intratumoral bleeding was detected. Three month mortality rate was 33%.
Conclusion: IVT did not produce hemorrhagic complications of intracranial tumors in our series.

AS08-056

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

HEALTH STATES AND PREFERENCES FOR THROMBOLYSIS IN ACUTE STROKE

D. Manawadu[1] and L. Kalra[2]
[1]King's College Hospital, Neurosciences, London, United Kingdom
[2]King's College London, Department of Basic and Clinical Neuroscience, London, United Kingdom

Background and Aims: Stroke patients presenting with unknown time of onset or wake up stroke (WUS) may still be candidates for thrombolysis depending upon imaging characteristics and in consenting patients. We evaluated patients' desirable health states to guide these decisions in patients admitted with stroke and non-stroke controls.
Method: Patients admitted to a hyperacute stroke unit were interviewed for health utilities (0 is worst and1 best health state) using 'standard gamble' for thrombolysis resulting in mild, moderate and severe stroke against acceptable risk for intracerebral haemorrhage (ICH). The scenarios included stroke within 4.5 hours (standard) and WUS presentations.
Results: The study included 59 cases (median age 68) and 16 controls (median age 61) with at least 1 risk factor. Median current health state using the visual scale was 70 in cases, 68 in controls. There were no

differences in median utilities for mild, moderate and severe stroke between cases (0.8, 0.5, 0.08 respectively) and controls (0.75, 0.51, 0 respectively). A 20% risk of ICH after thrombolysis was acceptable to 50% controls and 17% of cases after mild stroke in both standard and WUS. In contrast, 94% of controls and 60% of cases would accept this risk for standard and WUS presentations after severe stroke.
Conclusion: Health utilities were comparable between stroke patients and controls, decreasing with worsening stroke severity. Control patients were more likely to accept higher ICH risk with thrombolysis compared to stroke patients for both standard and WUS presentations. The study highlights the importance of stroke patients' preferences for thrombolysis compared with surrogate decisions.

AS08-064

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

COLLATERAL CIRCULATION CAN ACCELERATE RT-PA INDUCED THROMBOLYSIS IN IN VITRO MODEL

A. ViteckovaWunschova[1], O. Volny[2], J. Vitecek[3], L. Supolikova[1], L. Kubala[3] and R. Mikulik[2]
[1]ICRC - St. Annés University Hospital, Stroke Research Program, Brno, Czech Republic
[2]ICRC - St. Annés University Hospital/Department of Neurology- St. Annés University Hospital and Faculty of Medicine- Masaryk University, Stroke Research Program, Brno, Czech Republic
[3]ICRC - St. Annés University Hospital, Center of Biomolecular and Cell Engineering, Brno, Czech Republic

Background and Aims: Ischemic stroke patients with more developed collateral circulation have better clinical outcome irrespective of the treatment modality likely because leptomeningeal collaterals partially compensate blood flow reduction or improve thrombolysis. The aim of the study was to study a real-time thrombolysis *in vitro* using different types of human clots in a model with collateral vessel.
Method: We have developed an *in vitro* circulatory middle cerebral artery model with and without collateral. The model enables a real-time observation of thrombolysis using tissue plasminogen activator (rt-PA). Occlusion was achieved by two different types of clots (red blood cell dominant and fibrin-dominant) prepared from healthy volunteers full blood samples. Clinically relevant concentration of rt-PA (1.3 mg/l) was applied to simulate thrombolysis. Recanalization of the occluded vessel was assessed visually and by spectrophotometry.
Results: The presence of collateral circulation in the *in vitro* model resulted in significantly higher recanalization rates 66% ($p = 0.0007$) compared to the model without collateral vessel 33%. Further, the recanalization was significantly faster in models with collateral vessel. The time difference was 113/64 min for red blood cell dominant/fibrin dominant clots ($p = 0.001$).
Conclusion: Collateral circulation improves recanalization in *in vitro* model which explains at least partially clinical observations of the effect of collateral circulation on the thrombolytic outcome.

AS08-065

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

INCREASING FREQUENCY OF INTRAVENOUS THROMBOLYSIS UTILIZATION IN ACUTE ISCHEMIC STROKE OVER 18 YEARS OF EXPERIENCE IN AN ACADEMIC MEDICAL CENTER IN CHILE: THE RECCA REGISTRY

A. Brunser[1], P. Lavados[2], P. Muñoz-Venturelli[1] and V. Olavarría[1]
[1]Clínica Alemana- Universidad del Desarrollo, Departamento de Neurología y Psiquiatría, Santiago, Chile
[2]Clínica Alemana- Universidad del Desarrollo- Universidad de Chile, Departamento de Neurología y Psiquiatría, Santiago, Chile

Background and Aims: Intravenous thrombolysis improves clinical outcome at three months of ischemic stroke. Recent studies suggest that in order to have a real population impact, at least 11% of patients should be thrombolysed. Our aims was to determine the frequency of use of intravenous thrombolysis in acute ischemic stroke over the last 18 years in Clínica Alemana, Santiago, Chile.
Method: This is an observational study with data collected from RECCA, a prospective single center registry that includes all patients admitted to Clínica Alemana with acute strokes. Frequency of intravenous thrombolysis was determined for all patients with acute ischemic stroke between 1998 and 2016. This study is approved by the appropriate ethical committee.
Results: The study included 1.964 patients of whom 319 (16.2%) received intravenous thrombolysis. Among those thrombolysed the mean age was 68.6 (16.7) and 54.2% were males. Thrombolysis utilization increased from 6.7% in 1998 to 22.1% in 2016. This increase was independent of age and NIHSS in logistic regression analysis.
Conclusion: The increasing frequency of intravenous thrombolysis use could be partially explained by extended time for treatment to 4,5 hours from onset of stroke in 2008, and the incorporation of a stroke code in 2010 that accomplished a faster identification and triage in the emergency department.

AS08-067

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

FAVORABLE THROMBOLYSIS OUTCOME IN DIABETIC STROKE PATIENTS TREATED WITH METFORMIN

L. Westphal[1], C. Hametner[2], S. Curtze[3], C. Nolte[4], A. Polymeris[5], P. Michel[6], M.R. Heldner[7], A. Zini[8], A.E. Groot[9], V. Padjen[10], G. Turc[11], A. Pezzini[12], D. Leys[13], M.J. Scherrer[14], S.T. Engelter[5] and S. Wegener[1]
[1]University Hospital Zurich, Neurology, Zurich, Switzerland
[2]University Hospital- Heidelberg, Neurology, Heidelberg, Germany
[3]University Central Hospital- Helsinki, Neurology, Helsinki, Finland
[4]Charité-Universitätsmedizin Berlin, Neurology and Center for Stroke Research, Berlin, Germany
[5]University Hospital Basel and University Basel, Stroke Center and Neurology, Basel, Switzerland
[6]University Hospital Lausanne, Neurology, Lausanne, Switzerland
[7]University Hospital Bern-, Stroke Center and Neurology, Bern, Switzerland
[8]S'Agostino-Estense Hospital- AUSL Modena, Stroke Unit- Department of Neuroscience, Modena, Italy

[9]Academic Medical Center- Amsterdam, Neurology, Amsterdam, The Netherlands
[10]Clinical Centre of Serbia, Neurology Clinic Belgrade, Belgrade, Serbia
[11]Sainte-Anne Hospital- Paris, Neurology, Paris, France
[12]Neurology Clinic- University of Brescia, Clinical and Experimental Sciences, Brescia, Italy
[13]University Lille North de France, Neurology, Lille, France
[14]Kantonsspital St. Gallen, Neurology, St. Gallen, Switzerland

Background and Aims: Preliminary data suggests that the antidiabetic drug metformin (MT) is associated with better outcome in ischemic and hemorrhagic stroke. In this multicenter exploratory data analysis, we tested if pretreatment with MT positively affects outcome of thrombolysis in acute ischemic stroke patients.
Method: Data were collected within the European Thrombolysis in Stroke Patients (TRISP) collaboration. MT-treatment groups were compared. Statistical analysis was performed using nonparametric tests for continuous and chi-square test for nominal parameters.
Results: Of 1874 thrombolyzed stroke patients with diabetes, 727 (39%) received MT (MT+), and 1147 (61%) received other or no antidiabetic treatment (MT-). In unadjusted analyses, patients in the MT+ group had a significantly lower admission NIHSS compared to MT- patients: median (IQR) 8 (8) versus 11 (11); $p < 0.01$ and a lower 3-months mRS: 2 (3) versus 3 (4); $p < 0.01$. Furthermore, there were fewer fatal ICH in the MT + group (1.1% vs. 3% for MT+ and MT-, respectively, $p = 0.034$). Some patient characteristics were different between groups. MT+ patients were younger with a male preponderance. Dyslipidemia and pretreatment with statins were more common in the MT+ group, whereas atrial fibrillation and pretreatment with anticoagulants were more common in the MT- group. In univariate regression analysis, younger age and metformin-treatment were predictive of favorable outcome after 3 months.
Conclusion: Stroke patients pretreated with MT receiving thrombolysis had less severe strokes on admission and better functional outcome at 3 months. If confirmed in adjusted analysis, metformin could be evaluated as a neuroprotective agent for acute stroke.

AS08-070

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

SYMPTOMATIC INTRACRANIAL HEMORRHAGE AFTER THROMBOLYSIS AND ADJUNCT ANTICOAGULATION IN BASILAR ARTERY OCCLUSION

J. Ritvonen[1,2], D. Strbian[1,3], P.J. Lindsberg[1,3], H. Silvennoinen[4], P. Virtanen[4] and T. Sairanen[3]
[1]University of Helsinki, Molecular Neurology Research Program, Helsinki, Finland
[2]University of Helsinki, Faculty of Medicine, Helsinki, Finland
[3]University of Helsinki and Helsinki University Central Hospital, Department of Neurology, Helsinki, Finland
[4]University of Helsinki and Helsinki University Central Hospital, Helsinki Medical Imaging Center, Helsinki, Finland

Background and Aims: In many centers adjuvant anticoagulation (AC) therapy is still used in basilar artery occlusion (BAO) patients to prevent re-occlusion after recanalization therapy. We set out to examine the rate of symptomatic ICH (sICH) in IV thrombolysis- (IVT) and adjunct AC-treated BAO patients comparing low-molecular weight heparin (LMWH) and unfractionated heparin (UFH) administration.
Method: We evaluated 210 consecutive patients with angiography-proven BAO who received IVT and adjuvant AC with either UFH (n = 183) or LMWH (n = 27). sICH on the follow-up scan was evaluated according to European Cooperative Acute Stroke Study II (ECASS II) criteria. Poor 3-month outcome was defined as modified Rankin Scale (mRS) of 3 to 6.
Results: Patients in the UFH group were younger (Median 66, [IQR 58–76] vs. 73, [IQR 64–80], p = 0.02) and needed more often ventilator support on admission (47.5% vs. 25.9%, p = 0.04) compared to LMWH group. Prior antiplatelet treatment was more common in LMWH group (44.4% vs. 28.4%, p = 0.12). Admission NIHSS in LMWH and UFH groups were 12 (median, IQR 6–29) and 22 (median IQR 10–30) (p = 0.14), respectively. None of the patients in the LMWH group developed sICH. In UFH group, the rate of sICH was 13.2% (24/182). Outcome was poor in 58.3% and 71.0% in LMWH and UFH groups, respectively (p = 0.24).
Conclusion: Rate of sICH was smaller in LMWH group compared to UFH. Outcome was less often poor in this group. IV thrombolysis of BAO with concominant LMWH seems to be more favorable compared to UFH. Factors associated with outcome will be analyzed in further analyses including radiological data.

AS08-072

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

REPERFUSION THERAPIES FOR ACUTE ISCHAEMIC STROKE IN HOSPITAL IN-PATIENTS

C. Mc Carthy[1], L. Higgins[2], H. Smyth[1], S. Coveney[1], L. Kyne[3], M. Marnane[2], P. Kelly[2] and S. Murphy[2]
[1]Mater Misercordiae University Hospital/University College Dublin, Stroke/School of Medicine, Dublin, Ireland
[2]Mater Misercordiae University Hospital, Stroke, Dublin, Ireland
[3]Mater Misercordiae University Hospital, Geriatrics, Dublin, Ireland

Background and Aims: Information on reperfusion therapy in Irish hospital in-patients who sustain an acute ischemic stroke is limited. In Ireland, the 2015 National Stroke Audit showed a thrombolysis rate of 11%. However, in-patient strokes were excluded. We reviewed acute ischemic strokes occurring in hospital in-patients in our centre, to determine rates of thrombolysis and thrombectomy.
Method: A review of prospectively collected data on consecutive in-patients who suffered an acute ischemic stroke at a tertiary centre with a 24-hour stroke alert ("FAST") service was performed (Feb 2015-Oct 2016).
Results: Of 42 in-patient "FAST" calls, 22(52%) were deemed to be ischaemic, 3(7%) haemorrhagic and 16(38%) stroke mimics. 1 patient had ischaemic and haemorrhagic findings. Of the ischaemic stroke cases the thrombolysis rate was 23%. 2 patients did not receive thrombolysis due to a high bleeding risk, but proceeded to thrombectomy, giving a thrombectomy rate of 9%. For those who did not receive reperfusion therapy, the reasons cited included: resolving symptoms (40%); outside therapy window and recent major surgery (13%); oral anticoagulant therapy (13%); poor functional baseline (13%); equivocal symptoms with diagnosis established at MRI(6%); medically unstable for unrelated reasons (13%).
Conclusion: Our in-patient thrombolysis rate is comparable to our centre's previously described overall thrombolysis rate (23vs25% respectively). Acute stroke in in-patients occurred in diverse settings within the hospital, emphasising the need for awareness of acute stroke symptoms/how to trigger hyper-acute assessment amongst all healthcare staff. While many in-patients may have contraindications to thrombolysis, rapid review and consideration for reperfusion therapy is essential, especially with the advent of interventional thrombectomy.

AS08-073

THROMBOLYSIS – EXCLUDING CLINICAL TRIAL RESULTS

RELIABILITY OF POINT-OF-CARE COAGUMETER MEASUREMENTS FOR EMERGENCY MANAGEMENT IN ACUTE ISCHEMIC STROKE

D. Guisado-Alonso[1], P. Camps-Renom[1], F. Fayos-Vidal[1], L. Prats-Sánchez[1], R. Marín-Bueno[1], A. Martínez-Domeño[1], R. Delgado-Mederos[1] and J. Martí-Fàbregas[1]
[1]Biomedical Research Institute Sant Pau IIB Sant Pau, Neurology, Barcelona, Spain

Background and Aims: Coagulation tests have a key role in the management of acute ischemic stroke (AIS). There are limited data concerning accuracy of Point-of-Care coagumeters in emergency setting in patients with AIS. The objective of this study was to evaluate the reliability, validity and impact on clinical decision-making of international normalized ratio Point-of-Care coagumeter CoaguChek XS measurements (POC/INR) compared to the central laboratory (CL/INR).
Method: We conducted a retrospective single-center study of consecutive patients with AIS within four years. All of the patients were treated with intravenous thrombolysis. We recorded the POC/INR and the CL/INR at the emergency room. We compared both methods with a paired Student t-test. Considering the CL/INR as reference, we designed a receiver operating characteristic (ROC) curve to estimate the most sensitive and specific cutoff POC/INR.
Results: We included 210 patients with a mean age of 74.3 ± 11.5 years and 50.5% were men. We found that 18 (8.6%) patients were taking antivitamin K anticoagulants. We did not find any statistical difference between the POC/INR and CL/INR in the whole sample (1.01 [1.00–1.11] vs 1.02 [0.96–1.08], $p = 0.82$). Similarly, we did not find differences between both methods in the subgroup of patients who were taking antivitamin K anticoagulants ($p = 0.42$). The most sensitive (100%) and specific (98.9%) cutoff of the POC/INR method was <1.6.
Conclusion: In our study a POC/INR < 1.6 had a good correlation with LC/INR. Thus, POC/INR is a fast and reliable method for selecting patients with AIS who are candidates for intravenous thrombolysis. Internal validation studies should be considered in treating centers.

AS33-001

WOMEN AND STROKE

DO SEX DIFFERENCES IN CLINICAL PRESENTATION OF PATIENT WITH TRANSIENT ISCHEMIC ATTACK (TIA)? RESULT FROM ONE TIA REGISTRY OF A DEVELOPING COUNTRY

J. Suwanno[1], J. Suwanno[2], K. Angkoon[3] and K. Ratborirak[4]
[1]Hat Yai Hospital, Stroke Care Unit, Hatyai, Thailand
[2]Walailak University, School of Nursing, Nakhon Si Thammarat, Thailand
[3]Hat Yai Hospital, Division of Nursing, Songkhla, Thailand
[4]Hat Yai Hospital, Internal Medicine, Songkhla, Thailand

Background and Aims: Women with transient ischemic attack (TIA) were less likely received diagnostic procedure and medication treatment compared to men. Possibility, it is a lack of clinical identification the differences of clinical presentation. Moreover, there were few studies in developing country. The purpose of this study was to analyze possible sex differences in risk of stroke event, comorbidity, and clinical severity.
Method: Data from TIA registry of a tertiary care, referral, and teaching hospital in Thailand during December 2011 to September 2015, 157 TIA were analyzed. Risk of stroke and comorbidity were taking into an account of $ABCD^2$ risk score, diabetes, hypertension, dyslipidemia, atrial fibrillation, and smoking. Illness severity was assessed by the indexes of Glasgow Coma Scale (GCS), Barthel Index, modified Rankin Scale (mRS), and NIHSS.
Results: Compared with men, women were significantly older ($p = 0.015$), had higher score on $ABCD^2$ ($p = 0.047$), and had more amount number of comobidity when excluded smoking and alcohol used ($p = 0.014$). Women had more frequently dyslipidemia ($p = 0.008$), where as hypertension and diabetes mellitus were not significantly different. Smoking ($p = 0.000$), and alcohol drinking ($p = 0.000$) were significantly more frequently in men than women. Women had illness severity as similar to men, as quantified by GCS, Barthel Index, mRS, and NIHSS.
Conclusion: Sex-specific differences existed in a clinical presentation of TIA. Women had higher score for developing stroke event, had some similar or less or higher risk factors, and had similar illness severity as compared to men. Acute and long-term treatment by concerning these sex-differences may positively reduced stroke event.

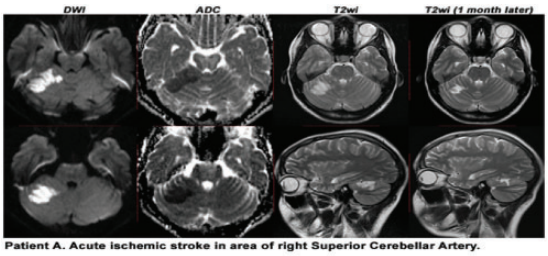
AS33-010

WOMEN AND STROKE

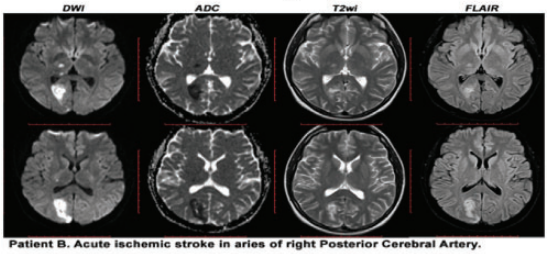
TIA AND STROKE IN PREGNANCY AND PUERPERIUM: CASE CHARACTERISTICS, ACUTE TREATMENT AND OUTCOME

D. Namestnikova[1], I. Gubskiy[2], E. Larina[3], L. Krasilnikova[3], M. Shamanova[3], M. Rodkevich[3], N. Agaronyan[3], E. Zaitseva[3], I. Platitsin[3], N. Myasnikov[3], N. Shamalov[1] and L. Gubsky[1]
[1]Pirogov Russian National Research Medical University, Fundamental and clinical neurology and neurosurgery, Moscow, Russia
[2]Pirogov Russian National Research Medical University, Research Institute of Cerebrovascular Pathology and Stroke, Moscow, Russia
[3]Perinatal Medical Center, -, Moscow, Russia

Background and Aims: The adaptive changes in woman during pregnancy and puerperium period impact cerebrovascular homeostasis and can increase risk of strokes and TIA. Moreover, other causes of stroke in young should be considered during this period. Thus their etiology varied greatly and become challenging diagnostic problem. The aim of this study was to characterize pregnancy-related strokes and TIA in obstetric hospital on the basis of 2-years of observation.
Method: A retrospective analysis of 6100 women who gave birth between 2015–2016 in obstetric hospital in Russia was conducted. Etiology, risk factors, treatment and outcome for cases of stroke and TIA were characterized.
Results: Ischemic strokes were observed in 2 and TIA in 3 cases. Clinical data presented at the table and MRI of patients with stroke in the figure. Antiplatelets (aspirin) and anticoagulants (LMWH), lowering blood pressure, magnesium sulfate and infusion therapy were used. After strokes women had mild neurological deficit.



Patient A. Acute ischemic stroke in area of right Superior Cerebellar Artery.



Patient B. Acute ischemic stroke in aries of right Posterior Cerebral Artery.

Patient	A	B	C	D	E
Age y.o./parity	28/1	29/1	33/2	40/1	35/1
Stroke/TIA	Stroke	Stroke	TIA	TIA	TIA
Arterial system	Vertebrobasilar, right SCA	Vertebrobasilar, right PCA distal branches	Carotid, right MCA	Carotid, left and right MCA	Carotid, right MCA
Time of onset	35w of gestation	Puerperium ~2h normal delivery	Puerperium ~12h cesarean section	36w of gestation	37w of gestation
Preeclampsia	New-onset hypertension >140/100 mmHg Mild proteinuria	Hypertension Proteinuria HELP syndrome	no	no	New-onset hypertension >160/100 mmHg
Other risk factors	Not found	Anti-cardiolipin antibodies	Sickle cell disease	Inherited thrombophilia (MTHFR homozygous C677T, MTHR heterozygous A660, FAI 4G/5G)	Inherited thrombophilia (MTHR homozygous A660, FAI 4G/5G)

Conclusion: All cases occurred in the last trimester or early puerperium. Strokes were in the vertebrobasilar arterial system and associated with preeclampsia. All cases of TIA were in carotid artery system and patients had hematological disorders, such as sickle cell disease and inherited thrombophilias.

AS33-012

WOMEN AND STROKE

CEREBRAL VENOUS THROMBOSIS: A REVIEW OF A SERIES OF CLINICAL CASES, CLINICAL AND IMAGING CORRELATION

I. Lutsenko[1], S. Zhumakeeva[1] and A. Shapovalova[1]
[1]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan

Background and Aims: A review of 12 clinical cases of thrombosis of the cerebral veins and sinuses (CVT) is presented in our study. Given the lack of opportunities of venography in Kyrgyzstan, we discuss the neuroimaging findings on brain MRI in different regimes in isolated thrombosis sinus thrombosis, or a combination of several sinuses and veins thrombosis

Method: In the period from 2009 - 2015 12 patients with CVT sinuses were examined in Kyrgyzstan. All of them were women, the average age was 34.3 years (range 22 to 57 years). 10 women were examined during acute cerebral accident in acute stroke department of City Clinical Hospital 1 in Bishkek, and in two brain pathology was found in maternity hospitals.

Results: Important neurological symptoms included headache (7 patients), nausea and vomiting (6), loss of consciousness (6), focal neurological deficit (9), epileptic seizures (4). The most common sites of thrombosis were: lower sagittal sinus (5 patients), the left transverse sinus (5), thrombosis of two or more sinuses (7). Frequent etiologies were: pregnancy (4), the early postpartum period (2), the late postpartum period (1), sinuses infections (4). A CVT had a different outcome from a dramatic recovery from a coma to a normal state, as well as death in the early hours of pathology.

Conclusion: We discuss management tactics of these patients according to the etiology, which caused CVT. Early administration of heparin in combination with antibiotics and corticosteroids showed a significant improvement in our sample of patients in the acute phase of this rare type of brain pathology.

AS33-013

WOMEN AND STROKE

A COMPARISON STUDY OF BALANCE AND FUNCTIONAL CAPACITY BETWEEN FEMALE AND MALE PATIENTS WITH STROKE

E. Goz[1], V. Ozturk[2] and A. Genc[1]
[1]Dokuz Eylul University, School of Physical Therapy and Rehabilitation, İZMİR, Turkey
[2]Dokuz Eylul University, Faculty of Medicine- Department of Neurology, İZMİR, Turkey

Background and Aims: Stroke is emerging as a major public health problem for women, as it is for men. The aim of this study was to investigate the effect of gender difference on balance and functional capacity in stroke patients.

Method: Sixty eight patients with stoke (28 female, 40 male) were included in this cross-sectional study. Balance was evaluated with Activity Specific Balance and Confidence Scale (ABC) and functional capacity was evaluated with Six Minute Walk Test (6MWT). Demographic and clinical characteristics, such as age, body weight, time after stroke were also investigated.

Results: Age, body weight and time after stroke were similar in female and male patients ($p > 0.05$). This indicates that the groups were similar in terms of demographic and clinical characteristics. There were significant differences in balance and functional capacity between female and male patients (Mann Whitney U Test, respectively, $p = 0{,}044$ and $p = 0{,}038$).

Conclusion: This study indicates balance and functional capacity were more affected in female stroke patients. Therefore, strategies to improve balance and functional capacity should be much more focused on female patients in the management of stroke.

AS33-014

WOMEN AND STROKE

IS THE EFFICACY OF ENDOVASCULAR TREATMENT FOR ACUTE ISCHEMIC STROKE SEX-RELATED?

A. Carvalho[1], A. Cunha[2], T. Gregório[3], L. Paredes[3], M. Veloso[4], S. Castro[2], M. Ribeiro[2] and P. Barros[4]
[1]Centro Hospitalar Vila Nova de Gaia Espinho, Neurology Department, Vila Nova de Gaia, Portugal
[2]Centro Hospitalar Vila Nova de Gaia Espinho, Imagiology Department - Neuroradiology Unit, Vila Nova de Gaia, Portugal
[3]Centro Hospitalar Vila Nova de Gaia Espinho, Stroke Unit, Vila Nova de Gaia, Portugal
[4]Centro Hospitalar Vila Nova de Gaia Espinho, Neurology Department-Stroke Unit, Vila Nova de Gaia, Portugal

Background and Aims: There are many reports referring to the difference between sexes in stroke, namely in severity, treatments response and post-stroke disability. The evidence is somewhat contradictory, some attributing to females a worse prognosis. Driven by a recent analysis of MR CLEAN trial, that showed a higher benefit from endovascular treatment (EVT) in males, we intended to determine if clinical outcomes after EVT differ between sexes.

Method: We analyzed 145 consecutive patients submitted to EVT for anterior circulation large-vessel occlusion, and compared the two sexes.
Results: Our population was represented by 81 (55.9%) females, with similar baseline characteristics (pre-stroke disability, baseline NIHSS and ASPECTS), rate of previous intravenous thrombolysis, time onset-to-recanalization and rate of revascularization, compared to males. Women were on average 4 years older and had more hypertension; men had more tandem occlusions and atherosclerotic etiology (all $p < 0.05$). Even after adjusting for these statistically significant variables and for intravenous thrombolysis, there were no differences in intracranial hemorrhage, functional independence (mRS ≤ 2 in 60,9% males versus 66,7% females, $p = 0,48$; adjusted $p = 0,36$) or mortality at 3 months.
Conclusion: Although females were older and had more hypertension, in accordance with previous reports, we found no sex differences in clinical and safety outcomes after EVT. Similar results were obtained in SWIFT-PRIME and ESCAPE trials, including 98 and 165 patients, respectively. However, our study may be underpowered to detect sex differences (145 versus 233 patients in MR CLEAN). Few studies investigated this question, but current evidence does not show a reason to treat differently men and women.

AS33-015

WOMEN AND STROKE

SEX DISPARITIES IN STROKE CARE AND RECOVERY IN LEBANON

R. Abdo[1], H. Hosseini[2], P. Salameh[3] and H. Abboud[4]
[1]Lebanese University, Doctoral School of Sciences and Technology, Beirut, Lebanon
[2]Henri Mondor Hospital AP-HP, Department of Neurology, Creteil, France
[3]Lebanese University, Faculty of Medicine, Beirut, Lebanon
[4]Hotel Dieu de France Hospital- Saint Joseph University, Department of Neurology, Beirut, Lebanon

Background and Aims: Differences between women and men in relation to stroke are increasingly being recognized.
Method: From August 1, 2015 to July 31, stroke patients treated in 8 different Lebanese hospitals were included in this study. Baseline characteristics, etiology, diagnostic studies, clinical outcome, complications, and quality of life of women were compared to those of men.
Results: Of 203 strokes patients, 111 (42.4%) were women. As compared with men, women were older (W: 73.2 ± 12.3 vs. M: 67.8 ± 12.0 $P = 0.004$), had more atrial fibrillation (W: 49.1% vs. M:22.1% $P = 0.001$) and a lower rate of diabetes (W:31.8% vs. M:51.5% $P = 0.012$). Embolic stroke was more frequent in women (W: 48.4% vs. M: 22.9%), and men are more likely to have lacunar strokes (W:6.5% vs. M:25.0%). Females had higher National Institutes of Health Stroke Scale scores at admission (W:12.4 ± 9.8 vs. M:8.5 ± 8.6 $P = 0.005$) and higher modified Rankin Scale scores (W:4.0 ± 1.7 vs. M:2.9 ± 2.0 $P < 0.001$) and lower Barthel Index (W:40.3 ± 38.4 vs. M:66.1 ± 35.9 $P < 0.001$) at discharge as compared with males. Mortality rate was higher in women compared to men (W:16.2% vs. M:10.6%) but a significant difference couldn't be detected ($P = 0.26$). Complications occurred in women more than men (W:40.5% vs. M:21.4% $P = 0.005$). Women's stroke specific quality of life was lower than that of men (W:140.6 ± 50.1 vs. M:163.5 ± 54.8 $P = 0.009$).
Conclusion: In Lebanese population, stroke affects women and men differently. Women are older, affected more severely, and are more likely to be disabled after stroke than men.

AS33-017

WOMEN AND STROKE

DO OLDER WOMEN HAVE A WORSE OUTCOME AFTER THROMBECTOMY? A COMPARISON BETWEEN FEMALE STROKE PATIENTS YOUNGER OR OLDER THAN 80 YEARS

O. Wigelius[1], B. Ramgren[2], I. Dragancea[2] and C. Kremer[3]
[1]Limhamn, Sweden
[2]Lund University, Department of Clinical Sciences, Lund, Sweden
[3]Lund University, Department of Cinical Sciences, Lund, Sweden

Background and Aims: Due to growing life expectancy, more female stroke patients ≥80 will be eligible for mechanical thrombectomy in the future. Little is known about the outcome and complications in this group. This study's aim was to compare outcome and complications in older (≥80 years) to younger (age 60–79) female stroke patients.
Method: Retrospective analysis of all female stroke patients treated with thrombectomy during two years was performed. Two groups (≥80 and <80 years) were compared regarding recanalization (TICI), time to recanalization, and symptomatic intracranial bleeding. Clinical outcome and was assessed according to NIHSS before and at 24 hours.
Results: 86 patients could be included, 29 over 80 years and 57 under. An improvement (>4 NIHSS) after 24 h occurred in 55% (older) and 56% (younger), while 17% (older) vs. 25% (younger) were impaired. 24 h mortality was 1/29 (older) and 2/57 (younger); 90-day mortality was 21% (older) and 14% (younger). A successful recanalization (TICI score post-procedure ≥2A, pre-procedure <2A) was achieved in 83% (older) vs 79% (younger). Mean time ictus to recanalization was 308 minutes (older, n = 16) and 233 minutes (younger, n = 34); mean time ictus to groin puncture was 237 minutes (older) and 182 minutes (younger). 1/29 (older) vs. 2/57 (younger) had a symptomatic bleeding.
Conclusion: In our study, no significant differences in clinical outcome, successful recanalization and percentage of intracranial bleedings at the acute stage were found. This study strengthens the need for a pro-active treatment with thrombectomy in older female stroke patients and questions an age limit in this group.

AS33-018

WOMEN AND STROKE

GENDER DIFFERENCES IN QUALITY OF LIFE AFTER A 1-YEAR FOLLOW-UP IN STROKE AND HIGH-RISK TIA PATIENTS

C. Boehme[1], T. Toell[1], L. Mayer[1], B. Prantl[1], M. Knoflach[1], J. Willeit[1] and S. Kiechl[1]
[1]Med. Universität Innsbruck, Department of Neurology, Innsbruck, Austria

Background and Aims: There is compelling evidence that women with stroke or TIA have a worse quality of life (QoL) than men three months after the event but long-term data are scarce. In this study we analysed gender differences in QoL after one year in a large representative cohort of stroke and high-risk TIA patients (Stroke Card Cohort) in relation to age, initial stroke severity (NIHSS), and 1-year functional outcome (mRS).
Method: In 744 patients, QoL was assessed using individual EQ-5D-3L items and the EQ-5D-3L index during a comprehensive 1-year visit at the outpatient department.
Results: In women, QoL was significantly worse than in men regarding the overall EQ-5D-3L index (median, 0.887 versus 0.906) and the items mobility (impairment, 37.8% versus 28.7%), activity (37.1% versus 27.5%), and anxiety (32.0% versus 18.1%) but not for self-care and pain. As expected, women

were older, had more severe strokes and a worse functional outcome after one year. After adjustment for these variables the gender difference in QoL disappeared for the overall EQ-5D-3L index but was maintained for the items activity ($p = 0.048$) and anxiety ($p < 0.001$). Findings equally applied to stroke and TIA patients.
Conclusion: Long-term QoL in female stroke and TIA patients is worse than that of males. Therefore, women require special attention to their life situation, especially concerning activity and anxiety, after stroke and TIA.

AS33-020

WOMEN AND STROKE

GENDER-RELATED DIFFERENCES IN POLISH ACUTE STROKE PATIENTS TREATED WITH INTRAVENOUS THROMBOLYSIS

M. Wiszniewska[1], W. Fryze[2], A. Wiśniewska[2], M. Karliński[3], P. Sobolewski[4] and A. Czlonkowska[5]
[1]PILA, 64–920, tel. +48 605564391, Poland
[2]Copernicus PL-M. Kopernik Hospital Gdańsk, Department of Neurology and Stroke Unit, Gdańsk, Poland
[3]Institute of Psychiatry and Neurology- Warsaw, 2nd Department of Neurology, Warsaw, Poland
[4]Holy Spirit Specialist Hospital Sandomierz, Department of Neurology and Stroke Unit, Sandomierz, Poland
[5]Institute of Psychiatry and Neurology- Warsaw and Medical University of Warsaw, 2nd Department of Neurology- Department of Clinical and Experimental Pharmacology, Warsaw, Poland

Background and Aims: Background and purpose: Gender-dependent differences are observed in many epidemiological studies concerning stroke. It has been also suggested that women may benefit less from intravenous thrombolysis.
We aimed to investigate gender differences Polish ischaemic stroke patients treated with intravenous alteplase.
Method: This is a retrospective multicentre analysis of 1830 consecutive ischaemic stroke patients treated with alteplase from 2004 to 2012 in Poland, whose data were prospectively recorded in the Safe Implementation of Treatments in Stroke - International Stroke Thrombolysis Registry. Main outcome measures were functional independence (modified Rankin Scale score 0–2) at 3 months, symptomatic intracerebral haemorrhage by SITS definition within 36 hours after treatment and 3-month mortality.
Results: Studied population included 819 (44.8%) women. They were older than men (median age 74 vs 67; $p < 0.01$) and more often suffered from hypertension (78.3% vs 70.1%; $p < 0.01$). Women more often suffered from cardio-embolic strokes (34.7% vs 27.1%; $p < 0.01$) and had more severe baseline neurological deficit (median National Institutes of Health Stroke Scale score 13 vs 11; $p < 0.01$). We found that women less often achieved functional independence (46.5% vs 53.3%; $p < 0.01$) and had higher 3-month mortality (26.0% vs 19.7%; $p < 0.01$). However, there were no differences in occurrence of symptomatic intracerebral haemorrhage (2.0% vs 1.5%; $p = 0.36$).
Conclusion: Our data suggest that long-term outcome after ischaemic stroke treated with alteplase may be less favourable in Polish women than in Polish men. Therefore, closer evaluation of this problem is needed.

AS29-001

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

A COHORT STUDY OF TRANSIENT ISCHEMIC ATTACK/ISCHEMIC STROKE RISK WITH CAROTID ARTERY STENOSIS IN THE HIGH-CARDIOVASCULAR-RISK POPULATION

X. Wang[1], Y. Liu[2], Y. Jie[2], H. shi[2], J. Zhou[2], Y. Zhang[2] and C. Anderson[3]
[1]The George Institute for Global Health, Sydney, Australia
[2]Nanjing First Hospital- Nanjing Medical University, Department of Neurology, Nanjing, China
[3]The George Institute for Global Health, Neurological and Mental Health, Sydney, Australia

Background and Aims: Severity of carotid artery stenosis (CAS) is known to be an important predictor of transient ischemic attack (TIA) and ischemic stroke (IS). It has been established that carotid endarterectomy was the best medical therapy for patients with severe (70%-99%) internal CAS in 1990s. However, patients now receive multimodal treatment with antiplatelet agents, statins, blood pressure control, and lifestyle modification which turned out to be effective therapy. Given these randomized trial data, intensive medical therapy rather than intracranial stenting is recommended for patients with recently symptomatic intracranial large artery stenosis of 70% to 99%. Therefore, stroke risk with CAS might be not what it used to be. More epidemiological studies are needed to investigate CAS prevalence, disease progression, and associated risk factors in Asians where CAS is more common.
Method: Study design: A multi-centre cohort study with 6-monthly follow-up for 2 years.
Patients: Adults (≥ 60 years) are free of a history of TIA/IS but under at least one of the following conditions: overweight, hypertension, hyperglycemia or hyperlipidemia. Patients who are at high risk of embolic stroke, eg. mitral valve stenosis, atrial fibrillation, will be excluded.
Statistical power: The sample size of 1358 provides at least 80% power (alpha = 0.05) to detect the difference of TIA/IS incidence between participants with CAS $\geq$ 50% and <50%. We assume that the prevalence of CAS $\geq$ 50% in the targeted population is 30%, the incidence of TIA/IS in participants with CAS $\geq$ 50% in two years is 5% and 1% in participants with CAS < 50%.
Outcome: Any TIA/IS occurrence.
Results: N/A
Conclusion: N/A

AS29-002

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

DETERMINATION OF BLOOD BASED PROTEIN BIOMARKERS FOR THE DIAGNOSIS OF STROKE FROM STROKE MIMICS USING PROTEOMICS APPROACH: A STUDY PROTOCOL

S. Misra[1], A. Kumar[1], D. Vibha[1], D. Mohania[2] and K. Prasad[1]
[1]All India institute of Medical sciences, Department of Neurology, New Delhi, India
[2]All India institute of Medical sciences, RP Centre, New Delhi, India

Background and Aims: Background: The diagnosis of stroke is largely clinical but treatment differs according to the type of stroke which at present can be determined with confidence only by neuroimaging. Sometimes clinically it is difficult to distinguish stroke from stroke mimics. **Aim:** To determine blood based protein biomarkers for differentiating acute stroke from stroke mimics and controls with $\geq$2 matched risk factors for stroke within 48 hours using high-throughput proteomics approach.
Method: In a diagnostic test study, 5 ml blood samples would be taken from stroke patients, mimics and risk factor matched control subjects and serum will be separated and stored at -80°C until analysis. All the statistical analysis will be performed in STATA software (Version 13.1).
Results: In the discovery phase, 20 serum samples will be obtained each from ischemic stroke (IS) & hemorrhagic stroke (HS) patients, stroke mimics, risk factor matched controls and healthy control subjects. High-throughput proteomics approach such as Liquid Chromatography-Mass Spectrometry (LC-MS) will be used for protein profiling. Significantly differentially expressed proteins between both groups would further be validated by ELISA in 300 stroke patients (150:IS, 150: HS) & 300 control subjects (150: stroke mimics, 150: high risk controls) to test their diagnostic performance and clinical significance.
Conclusion: The study will identify novel protein biomarkers which could help in differentiation of stroke from stroke mimics for a better and early diagnosis of stroke. A point-of-care diagnostic biomarker platform would be extremely valuable for use in pre-hospital settings and for the patients coming to the Emergency Departments.

AS29-003

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

POST-PROCEDURAL STROKE AFTER ANEURYSMAL SUBARACHNOID HEMORRHAGE SURGERY: A CASE - CONTROL STUDY OF CAUSES AND DETERMINANTS

N. Soultanian[1], Z. Alireza[2] and M. Brainin[3]
[1]Shahid Beheshti University of Medical Sciences, Functional Neurosurgery Research Center, Tehran, Iran
[2]Functional Neurosurgery Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3]Danube University Krems, Clinical Neurosciences and Preventive Medicine, Krems, Austria

Background and Aims: Post-procedural stroke is a known cause of disability after aneurysmal subarachnoid hemorrhage (aSAH) surgery. However, its incidence, causes and risk factors, are not well described. The goal of this study is to determine the causes and predictors of post-operative stroke in surgery of aSAH.
Method: In a retrospective case-control study, the causes as well as the role of technical and patient-related risk factors in occurrence of post-operative stroke will be identified. The cases are all subjects who were treated surgically for aSAH between January 2008 and April 2016 in a tertiary university hospital and experienced one or more episodes of post-operative stroke. The control group is recruited twice as the number of cases from patients who underwent aSAH surgery in the same center but did not develop any post-operative cerebrovascular event.
Results: To be able to link a specific risk factor to the outcome with higher likelihood, the outcome (post-operative stroke) is classified into four subgroups: procedural ischemic, non-procedural ischemic, procedural hemorrhagic and non-procedural hemorrhagic stroke. Different putative set of risk factors are assessed for association with each outcome subgroup. The odds ratios of predictors are reported at statistical significance of $p < .05$. The effect of exposures on the outcomes will be examined in a univariate as well as multivariate logistic regression analysis after controlling for baseline confounding factors to identify independent variables associated with post-operative stroke.
Conclusion: The identification of modifiable risk factors and development of a predictive model for post-procedural stroke in aSAH surgery are the cornerstones of this study.

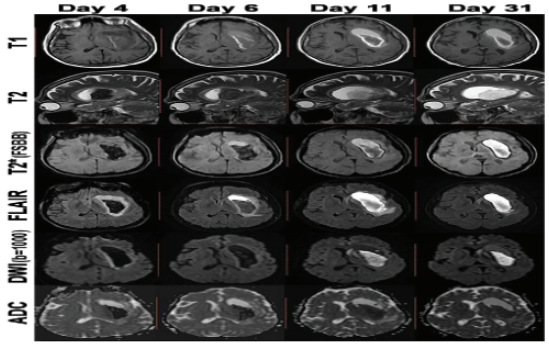
AS29-004

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

MATHEMATICAL DETERMINATION OF HEMOGLOBIN SPECIES IN INTRACRANIAL HEMORRHAGE ON MRI

I. Gubskiy[1], D. Namestnikova[2], L. Gubsky[2], V. Lelyuk[1] and A. Osipov[3]
[1]Pirogov Russian National Research Medical University, Research Institute of Cerebrovascular Pathology and Stroke, Moscow, Russia
[2]Pirogov Russian National Research Medical University, Department of Fundamental and Clinical Neurology and Neurosurgery, Moscow, Russia
[3]Pirogov Russian National Research Medical University, Department of General and Medical Biophysics, Moscow, Russia

Background and Aims: Detection of intracranial hemorrhage on MRI is important and complicated problem. Such factors as time, hemoglobin species (oxy-Hb/deoxy-Hb/met-Hb), erythrocyte membrane status, pulse sequences, and etc. influence on MR visualization of hemorrhage greatly. The aim of this study is creating mathematical model for definition of hemoglobin species using quantitative MRI parameters.



Stage	Time	Hemoglobin species and location	Signal intensity			
			T1	T2	T2*	DWI
Hyperacute	< 12 h	Oxyhemoglobin, intracellular	↔	↑	↓	↑
Acute	12 h - 2 days	Deoxyhemoglobin, intracellular	↔	↓	↓	↓
Early subacute	2 - 7 days	Methemoglobin, intracellular	↑	↓	↓	↓
Late subacute	1 week - 2 month	Methemoglobin, extracellular	↑	↑	↑	↑
Chronic	> 2 week > 2 month	Hemosiderin, hemichromes	↓	↓	↓	↓

Method: Special phantom with fixed temperature (37C), three different levels of hematocrit and minimum two different magnetic field strength (1,5T and 7T) will be used. T1, T2, T2* relaxation time and apparent diffusion coefficient will be measured with standard MRI pulse sequences. For validation of outcome variables (blood with different hemoglobin species and different erythrocyte membrane status) spectrophotometry will be used.
Results: Mathematical model will be created using ordinal regression or multinomial logistic regression for two different magnetic field strength. Training of the model will be performed on experimental data sets from MRI quantitative measurements and spectrophotometry of blood. After

that, the model will be tested in the clinic data from patients with intracranial hemorrhages.
Conclusion: Mathematical determination of hemoglobin species without fear or favor can help in differential diagnosis of intracranial hemorrhage and can be very useful in case of determination of age of hemorrhage.

AS29-005

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

STROKE AFTER RUPTURED INTRACRANIAL ANEURYSM SURGERY: A CASE - CONTROL STUDY OF OUTCOMES AND OUTCOME PREDICTORS

N. Soultanian[1], Z. Alireza[2] and M. Brainin[3]
[1]Shahid Beheshti University of Medical Sciences, Functional Neurosurgery Research Center, Tehran, Iran
[2]Functional Neurosurgery Research Center, Shahid Beheshti University of Medical Sciences, Tehran, Iran
[3]Danube University Krems, Clinical Neurosciences and Preventive Medicine, Krems, Austria

Background and Aims: Cerebrovascular misadventures after ruptured intracranial aneurysm (RIA) surgery are significant determinants for duration of hospital stay and discharge destination.
The primary objective of this study is to compare the short- and long-term outcomes of patients who developed post-operative stroke after RIA surgery with a group of controls. Further, the outcome predictors will be identified as secondary objective.
Method: The data of patients who have consecutively referred to a tertiary teaching center from January 2008 to April 2016 for surgical repair of RIAs and developed a new post-operative symptomatic cerebrovascular event, are retrospectively collected. The control subjects are a random sample of patients who underwent surgery for RIA in the same care setting but did not experience any post-operative cerebrovascular accident. The modified Rankin Scale (mRS) is used to compare the short- and long-term outcomes of the two groups at discharge and 6–12 months thereafter.
Results: A stratified analysis will be performed to compare the outcomes in the case and control groups after adjustment for baseline confounding factors and post-operative non-cerebrovascular events. A change of one or greater points in the mRS compared to pre-operation or before the new post-operative cerebrovascular event is considered to be clinically significant. Multiple regression analyses will be used to identify independent variables associated with unfavorable outcome (mRS 3–6). To prevent the effect modification of exposures, the outcome (post-operative stroke) is categorized into four subgroups: procedural ischemic, non-procedural ischemic, procedural hemorrhagic and non-procedural hemorrhagic stroke.
Conclusion: The findings will help patients' safety and better management of RIAs.

AS29-007

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

CARDIAC MAGNETIC RESONANCE AS A NOVEL TOOL TO INVESTIGATE LEFT ATRIAL DYSFUNCTION IN CRYPTOGENIC STROKE PATIENTS

C. Motta[1], I. Carbone[2], G. Koch[1], M. Francone[2], N. Galea[2], F. Ciolina[2], M. Diomedi[1] and F. Sallustio[1]
[1]Policlinico Tor Vergata, Neuroscience-Stroke Center, Rome, Italy
[2]Policlinico Umberto I, Scienze Radiologiche- Oncologiche ed Anatomo-patologiche, Rome, Italy

Background and Aims: Cryptogenic ischemic strokes account for 20–40% of all ischemic strokes. Presumably they have cardioembolic origin. The majority of cardiac thrombi could be formed in the left atrial (LA) appendage rather than in the fibrillating atrium itself, introducing the novel concept of LA dysfunction (LAD). Using Cardiac Magnetic Resonance (CMR) it is possible to obtain functional parameters of atrial wall deformation and endoluminal blood dynamic. The aim of this study is to investigate LAD in cryptogenic stroke patients using CMR.
Method: LAD will be evaluated by measuring serum N-terminal pro-brain natriuretic peptide, increased P-wave terminal force velocity on ECG and moderate to severe LA enlargement on echocardiogram. Patients will undergo a CMR using a high field MR unit (3T), cineMR sequences, ECG-gated 3D cinePC and 2D cinePC sequences. The project will be carried out in 18 months.
Results: 50 patients will be enrolled within 6months after stroke (25 patients with cryptogenic stroke and 25 stroke patients with small vessel occlusion). Moreover 25 healthy subjects will be included as control group for a total of 75 subjects to reach statistical power of 90% and α error of 0.05. We expect to find significant difference between groups in terms of presence/absence of LAD and in terms of significant differences in strain rate parameters more associated to micro-embolic risk in cryptogenic stroke.
Conclusion: Development of useful biomarkers of LAD will provide adequate treatment for cryptogenic stroke and will also serve as surrogate markers to enable investigation of innovative treatments within clinical trials.

AS29-008

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

NITRIC OXIDE AND ENDOTHELIN-1 PLASMA LEVELS IN THE REGULATION OF LEPTOMENINGEAL COLLATERALS

A. Davoli[1], C. Motta[1], G. Koch[1], M. Diomedi[1] and F. Sallustio[1]
[1]Tor Vergata Hospital, Neuroscience- Stroke Center, Roma, Italy

Background and Aims: Plasma levels of nitric oxide (NO) and endothelin-1 (ET-1) as well as leptomeningeal collaterals (LMC) have been related to clinical outcome in ischemic stroke, possibly involving similar pathogenetic pathways. The aim of this project will be to evaluate correlations between these biomarkers levels and LMC pattern in acute ischemic stroke patients.
Method: In this single-center study, 80 patients candidate to mechanical thrombectomy preceded or not by i.v. thrombolysis for large artery anterior circulation stroke will be enrolled. Prior to any treatment,

blood samples will be collected for determination of NO-derived and ET-1 levels. LMC will be assessed on baseline CT-angiography by two blinded readers, adopting a leptomeningeal collateral score from 0 to 3 derived from the Prolyse in Acute Cerebral Thromboembolism (PROACT) II trial (0: no collaterals; 1: collaterals to the periphery of ischemia; 2: collaterals filling 50%-100% of ischemic area; 3: collaterals filling 100% of ischemic area). In order to confirm LMC presence and quality, extent of mismatch will be investigated by baseline CT-perfusion.

Results: Patients will be divided into two groups based on dichotomization of collateral score in poor (from 0 to 1) and good (from 2 to 3). Biomarker profile of each group will be analyzed. Our hypothesis is that NO and ET-1 levels are different in these two groups of LMC patients and responsible of the efficiency of LMC, possibly leading to different outcome.

Conclusion: This study will examine potential correlations between vasoactive biomarkers and collateral flow. The results could encourage further research aimed at modulate LMC.

AS29-009

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

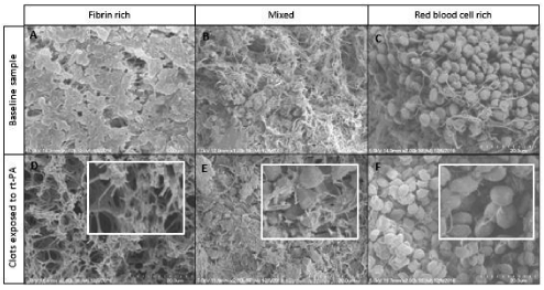
CHANGES IN CLOT PROPERTIES FROM EXPOSURE TO RECOMBINANT TISSUE PLASMINOGEN ACTIVATOR (RT-PA), AND POSSIBLE IMPLICATIONS FOR MECHANICAL THROMBECTOMY IN ACUTE ISCHEMIC STROKE (AIS)

S. Duffy[1,2], M. Gilvarry[1], L. Morris[2], E. Rainsford[2] and E. MacCarthy[2]
[1]Neuravi Ltd, Neuravi Thromboembolic Initiative, Galway, Ireland
[2]GMIT Galway, Galway Medical Technology Centre, Galway, Ireland

Background and Aims: The lytic efficacy of rt-PA in AIS is influenced by clot volume as well as clot composition. The action of rt-PA changes a clot's microstructure, which in turn can influence physical properties. These variations may have implications for clot integrity, and consequently events such as fragmentation during mechanical thrombectomy.

Method: 6 different clot analogue types with varying red blood cell (RBC) and fibrin compositions were formed using human whole blood. The clots were exposed to a rt-PA/human fresh-frozen plasma mixture at 37°C for up to 2 hours, and compared to baseline samples. The microstructure of all samples was examined using Scanning Electron Microscopy (SEM), and the fibrin fibre diameter was measured. The lytic efficacy of rt-PA was determined by measuring the percentage mass loss of clots after rt-PA exposure.

Results: Clots with the highest RBC content underwent the greatest mass degradation. Under SEM, fibrin fibre cleavage/rupture was evident in all rt-PA treated clots (Figure 1.) The fibrin fibre diameter decreased by approximately 50% in all clots exposed to rt-PA



Conclusion: rt-PA was more effective in reducing the mass of clots with a high RBC content. After rt-PA exposure the clots demonstrated fibrin fibre cleavage/rupture and a significant decrease in fibrin fibre diameter. These microstructural changes may alter the clot's stability and perhaps increase the clot's susceptibility to fragmentation and risk of distal embolization.

AS29-010

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

CLINICAL STUDY OF INTRAVENOUS THROMBOLYSIS WITH ACTILYSE EFFICACY FOR ACUTE ISCHEMIC STROKE IN AUSTRIA COMPARED TO BASIC TREATMENT OF ISCHEMIC STROKE IN KYRGYZSTAN

I. Lutsenko[1]
[1]Kyrgyz State Medical Academy, Neurology, Bishkek, Kyrgyzstan

Background and Aims: Stroke is a growing cause of mortality and morbidity in low-and middle-income countries. The leading cause of death in Kyrgyzstan is ischemic heart disease (31.7%), followed by stroke (13.8%). According the latest updates in SITS Stroke Registry in Kyrgyzstan, large artery atherosclerosis and cardioembolism take the most prevalent types. Thrombolysis in Kyrgyzstan is only implemented in treatment of acute myocardial infarction but not in ischemic stroke.

Method: To compare primary and late outcomes in ischemic stroke treated with actylise in Austria and with neuroprotectors and standard treatment in Kyrgyzstan. Design. — Randomized, prospective, multicenter, blind, clinical trial in 2 Kyrgyzstan and Austria. In Kyrgyzstan, Bishkek 2 hospitals will participate in this study: Bishkek City Civil Clinic 1, angioneurological department and Chui Regional Clinic, neurological department (both are put into SITS stroke registry, Kyrgyzstan). In Austria we can take data from Allgemeines Krankenhaus der Stadt Wien (AKH) and Barmherzige Brueder Krankenhaus Wien (BBKW).

Results: A total of 600 patients (300 from Kyrgyzstan and 300 from Austria) with acute ischemic hemispheric stroke and moderate to severe neurologic deficit (according to NIHSS and mRs) will be enrolled in study. Primary end points will include NIHSS scores, Barthel Index (BI), and modified Rankin Scale (RS) at 1, 7 and 90 days. Secondary end point will include 30-day mortality.

Conclusion: Since Kyrgyzstan is highly mountainous country with more prevalence of lowlands and midlands it will be interesting to see the outcome of ischemic stroke, treated with actylise in combination with neuroprotectors versus just neuroprotectors in this altitude.

AS29-011

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

COGNITIVE PERFORMANCE AND DEPRESSIVE SYMPTOMS IN SEVERE CAROTID ARTERY DISEASE PATIENTS

E. Pucite[1,2], E. Miglane[1,2], D. Krievins[3], A. Millers[1,2] and I. Krievina[1]
[1]Pauls Stradins Clinical University hospital, Neurology, Riga, Latvia
[2]Riga Stradins University, Department of Neurology and Neurosurgery, Riga, Latvia
[3]Pauls Stradins Clinical University hospital, Vascular Surgery Centre, Riga, Latvia

Background and Aims: The aim of study was to evaluate the discrepancy of cognitive performance and depressive symptoms between symptomatic and asymptomatic patients with severe carotid artery disease before and after carotid artery endarterectomy (CAE).
Method: Prospective single centre study included 57 asymptomatic and 41 symptomatic (TIA, minor stroke) patients with severe carotid artery disease who were referred for endarterectomy. Assessment of cognitive and depressive symptoms was performed 1 - 3 days before and 6 months after the surgery. Cognitive function was assessed using Montreal Cognitive Assessment Scale (MoCA). Three subgroups were created depending on MoCA scores (severe cognitive impairment (0–19); mild cognitive impairment (20–25);normal cognitive function ($\geq$26)). Depressive symptoms were assessed using PHQ-9 scale. Three subgroups were created depending on PHQ-9 scores (minimal depressive symptoms (1–4); mild depressive symptoms (5–9); moderate ($\geq$10)).
Results: Symptomatic or asymptomatic severe carotid artery stenosis did not have statistically significant ($p > 0,05$) effect on PHQ-9 and MoCA subgroups scores.
The scores of MoCA subgroups did change statistically significant in asymptomatic patients before and after surgery ($p = 0,02$; Cramer's $V = 0,44$), but did not change statistically significant in symptomatic ($p = 0,12$; Cramer's $V = 0,43$) patients.
The scores of PHQ-9 subgroups did not change statistically significant neither in asymptomatic patients before and after surgery ($p = 0,26$; Cramer's $V = 0,27$), nor in symptomatic ($p = 0,87$; Cramer's $V = 0,43$).
Conclusion: Statistical significant difference of depressive symptoms between symptomatic and asymptomatic patients with severe carotid artery disease was not observed. CAE seems to have beneficial effect on the course of cognitive function in asymptomatic patients after CAE.

AS29-012

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

LATIN-AMERICAN ACUTE STROKE CARE QUALITY REGISTER

J.C. Vargas-Gonzalez[1] and M. Muñoz[2]
[1]Universidad Nacional de Colombia, Instituto de Investigaciones Clinicas, Bogota, Colombia
[2]Clinica de Marly, Servicios Neurologicos, Bogota, Colombia

Background and Aims: Improved acute stroke outcome and better quality of care are the goals in cerebrovascular medicine. Currently in our region there is no measurement of this targets. Our objective is to evaluate an acute stroke quality of care and its trend over the time, using an index, in representative urban emergency departments (ED) in Latin-American.
Method: We plan to accomplish a transnational prospective and representative short term cohort register with a before and after methodology. We will assembly a double-cohort with an expected follow up of 3 months after the index event. Study cohorts: We attempt to include most Latin America countries with a representative selection of ED per each country social security distribution. Each ED will enroll all consecutive patients for 6 months. The after cohort will star 12 months after the initial cohort. Inclusion criteria: An adult patient with imaging confirmed ischemic or hemorrhagic stroke, and patients should be possible to follow up by phone. We will not include transitory ischemic attacks or subarachnoid hemorrhage. Main outcome: a composite index created by the average of 10 items. This index will face validation prior to use in the study. Sample size: Using McNemar method we estimate that at least 392 patients for each cohort to a power of 0.80 and significant level of 0.05. Statistical analysis: we will use Pair Student T for normal data or paired Wilcoxon test for non-normal data
Results: NA
Conclusion: We aim to evaluated acute stroke quality of care in Latin America.

AS29-013

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

THE IMPACT OF QUALITY IMPROVEMENT IN STROKE CARE AIMING TO REDUCE TREATMENT DELAYS IN REVASCULARIZATION TREATMENT AT LANDSPITALI UNIVERSITY HOSPITAL REYKJAVIK

A. Matthiasdottir[1], V. Vilmarsson[2], E. Olafsson[3] and B. Thorarinsson[3]
[1]University of Iceland- Reykjavik, Department of Medicine, Reykjavík, Iceland
[2]Landspitali University Hospital Reykjavik, Department of Radiology, Reykjavik, Iceland
[3]Landspitali University Hospital Reykjavik, Department of Neurology, Reykjavik, Iceland

Background and Aims: Efficacy of revascularization treatment for acute ischemic stroke (AIS) with thrombolysis and thrombectomy is highly time dependent. After quality improvement to reduce delays, several tertiary hospitals worldwide have reported shortened door-to-needle times. In the fall of 2016 such quality improvement was prepared and then implemented at Landspitali University Hospital Reykjavik. This was linked to the initiation of treatment with thrombectomy. The study aims to analyze the impact of this quality improvement on stroke care at our hospital.
Method: Key practices effective to shorten treatment delays were sought through systematic literature review. A small executive group prepared and organized several structured interdisciplinary workshops and meetings aimed at making new locally adapted protocols with all key practices for the whole chain of care. The protocols aimed to reduce treatment delays for revascularization as much as possible. These will be implemented from early 2017 along with starting endovascular treatment. Patients profile, quality indices for non-delay of treatment and the fraction of patients with AIS receiving revascularization treatment will be collected retrospectively for patients before and prospectively after the implementation.

Results: The data will be analyzed and illustrated to show the impact of the change in protocols.
Conclusion: This study, describing the quality improvement for acute stroke care at our hospital and its impact on quality indices and stroke care, has importance for continuous improvement of care at our and similar hospitals aiming to improve treatment of patients with AIS.

AS29-014

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

REVASCULARIZATION TREATMENT FOR ACUTE ISCHEMIC STROKE AT LANDSPITALI UNIVERSITY HOSPITAL REYKJAVIK

A. Matthiasdottir[1], V. Vilmarsson[2], E. Olafsson[3] and B. Thorarinsson[3]
[1]University of Iceland- Reykjavik, Department of Medicine, Reykjavík, Iceland
[2]Landspitali University Hospital Reykjavik, Department of Radiology, Reykjavik, Iceland
[3]Reykjavik, Iceland

Background and Aims: With the results of recent randomized clinical trials, trombectomy has become a standard of care for selected patients with acute ischemic stroke (AIS) caused by proximal occlusion. The efficacy of thrombectomy as with thrombolysis is highly time dependent. In the fall of 2016, a quality improvement to reduce treatment delays were prepared and then implemented at Landspitali University Hospital Reykjavik. This was linked to the initiation of treatment with thrombectomy. This study aims to analyze stroke revascularization and it's quality at our hospital after this change and to make comparisons to other tertiary hospitals in Nordic countries.
Method: Data will be collected prospectively according to protocol for all adult patients with AIS receiving revascularization treatment at our hospital. The study period is the first 18 months after the quality improvement and initiation of thrombectomy. Baseline information on patients, including stroke severity, the fraction of patients with AIS receiving revascularization treatment, quality indices and adverse effects of treatment and outcome will be collected.
Results: The results will be analyzed and illustrated in comparison with information from stroke registries in other Nordic countries.
Conclusion: This study will provide valuable information about revascularization treatment for AIS including thrombectomy at Landspitali University Hospital Reykjavik. It will compare revascularization treatment at our center to larger and more experienced centers in other Nordic countries, including quality, safety and outcome, giving valuable information for continuous improvement of care.

AS29-016

YOUNG STROKE PHYSICIANS AND RESEARCHERS: RESEARCH DESIGN WORKSHOP FOR STUDIES IN DEVELOPMENT

EMERGENCY MANAGEMENT OF SPONTANEOUS INTRACEREBRAL HEMORRHAGE – A PROSPECTIVE RCT INITIATED IN ROMANIAN EMERGENCY DEPARTMENTS

E.M. Muresan[1], A. Golea[1], S.M. Lacan[1], S. Bolboacă[2] and L. Perju-Dumbrava[3]
[1]Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Department of Emergency Medicine, Cluj-Napoca, Romania
[2]Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Department of Medical Informatics and Biostatistics, Cluj-Napoca, Romania
[3]Iuliu Hatieganu University of Medicine and Pharmacy Cluj-Napoca, Neuroscience Department, Cluj-Napoca, Romania

Background and Aims: Spontaneous intracerebral hemorrhage (ICH) continues generating overwhelming effects and little progress has been made in reducing its complications. Despite efforts invested in understanding risk factors, aetiology and progression of the condition, the 1-month case fatality and economic burden remain elevated. Tranexamic acid (TA) is an antifibrinolytic agent documented as effective in bleeding trauma (CRASH trials) or surgical patients. The aim of this study is to assess the impact of TA on the functional recovery of Romanian patients with ICH, as TA lessens hematoma expansion.
Method: Tranexamic acid and biomarkers in emergency management of spontaneous intracerebral hemorrhage (EsICH) is designed as a 4-centres double blind RCT investigating the effects of tranexamic acid on patients with a spontaneous ICH in the last 8 hours. The enrolment will be completed in the emergency department. A total of 2 g of TA or placebo (normal saline) will be given during a treatment course of 8 hours to patients meeting the inclusion/exclusion criteria of the study. The primary endpoint of EsICH is a favourable functional outcome on the modified Rankin Scale (score 0 to 3) at 90 days (assessed by telephone survey). As a secondary objective, biomarkers (including point-of-care troponin, D-dimer and C-reactive protein) will be determined for improving the predictive accuracy of prognosis for ICH (ClinicalTrials.gov-NCT02935985).
Results: At this moment, 2 patients have been enrolled in the biomarkers substudy.
Conclusion: Few data is available on the current dynamics of hemorrhagic stroke and ICH in Romania, this protocol being the first based in an ED to address this time sensitive pathology.