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Nation-wide analysis of the impact of Covid-19 pandemic on daily urology practice in Turkey

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Abstract

Objective: To present a nation-wide analysis of the workload of urology departments in Turkey week-by-week during Covid-19 pandemic.

Methodology: The centres participating in the study were divided into three groups as tertiary referral centres, state hospitals and private practice hospitals. The number of outpatients, inpatients, daily interventions and urological surgeries were recorded prospectively between 9-March-2020 and 31-May-2020. All these variables were recorded for the same time interval of 2019 as well. The weekly change of the workload of urology during pandemic period was evaluated, also the workload of urology and the distributions of certain urological surgeries were compared between the pandemic period and the same time interval of the year 2019.

Results: A total of 51 centres participated in the study. The number of outpatients, inpatients, urological surgeries and daily interventions were found to be dramatically decreased by the 3rd week of pandemics in state hospitals and tertiary referral centres; however, the daily urological practice were similar in private practice hospitals throughout the pandemic period. When the workload of urology in pandemic period and the same time interval of the year 2019 were compared, a huge decrease was observed in all variables during pandemic period. However, temporary measures like ureteral stenting, nephrostomy placement and percutaneous cystostomy have been found to increase during Covid-19 pandemic compared with normal life.

Conclusions: Covid-19 pandemic significantly affected the routine daily urological practice likewise other subspecialties and priority was given to emergent and non-deferrable surgeries by urologists in concordance with published clinical guidelines.

1 | INTRODUCTION

Coronaviruses (CoV) are a large family of RNA viruses which can lead to various infections from self-limiting mild upper respiratory infections to serious life-threatening infections like Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS).[1–3] At December 2019, cases of pneumonia with unknown aetiology were reported in Wuhan, Hubei province of China.[4] At the beginning of the January 2020, the 2019 novel coronavirus (2019-nCoV) was isolated and World Health Organisation (WHO) named this virus as Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) and the disease resulting with pneumonia as Coronavirus Disease 2019 (Covid-19).[2] Covid-19 spread rapidly from country to country and as a result WHO declared Covid-19 as a pandemic on the 11th March 2020.[5] Worldwide total cases and the number of deaths reached 14.348.858 and 603.691, respectively.[6] The first case in Turkey was reported at 11 March 2020 and the peak of daily cases and deaths were seen during the 4th week of the pandemic curve in our country.[6]

The workload of hospitals has increased considerably during the pandemic process and many healthcare measures were taken by governments and hospital systems. Most of the hospitals turned to pandemic or quarantine hospitals and had to serve only Covid-19 patients. Some detailed recommendations were published for the triage of urological surgeries during the Covid-19 pandemic.[7–10] Like other surgical subspecialties, cancellation of elective surgeries and utilisation of solely emergent surgeries and non-deferrable oncologic surgeries that delay may cause negative impact on survival have been performed in urology clinics according the triage recommendations.[11] Also, urological outpatient clinics have been adapted to new social distancing rules in Covid-19 pandemic, the number of appointments was limited and only emergent patients could be treated in most of the urology clinics in worldwide as in our country.[8,9,12]

In this report, we aimed to present a nation-wide analysis of the workload of urology departments in Turkey week-by-week during Covid-19 pandemic and to compare the outcomes with the same time interval of the year 2019.

What's known

- Covid-19 pandemic significantly affected the routine daily urological practice likewise other subspecialties and priority was given to emergent and non-deferrable surgeries by urologists.

What's new

- We believe that the results of the present study will help in organisation of human resources and triage of urology clinics for further possible mass casualty events.

2 | METHODS

The study was approved by the local ethics committee. An announcement of the study was sent to all Urology clinics across Turkey via e-mail and social media. All of the centres that agreed to participate in the study were included in the study. The number of outpatient and hospitalised patients, emergency service consultations, urological surgeries including transurethral resection of bladder tumour (TUR-BT), transurethral resection of prostate (TURP), endoscopic urethrotomy, ureterorenoscopy (URS), percutaneous nephrolithotomy (PNL), ureteral J stent insertion, radical nephrectomy, radical nephroureterectomy, radical prostatectomy (RP), radical cystectomy (RC), radical orchiectomy, surgery for Fournier's gangrene, acute scrotum, trauma (kidney, bladder and testicle) and penile fracture; daily interventions (prostate biopsy, shock wave lithotripsy, percutaneous nephrostomy and cystostomy, intravesical treatments), and the number of pandemic outpatient clinics were recorded week-by-week between the week that the first Covid-19 patient was reported in our country, 9-15 March 2020, and the week 25-31 May 2020 prospectively; as lockdown measures were gone and the "new normal-life" began in our country by 1st June 2020. All of these variables were also recorded week-by-week at the same time interval of the year 2019. Other surgical and diagnostic approaches were not analysed as guidelines regarding Covid-19 pandemic suggested the postponement of nearly all surgeries for female urology, andrology and some other elective surgical operations.[8,9,11,12] The centres were divided into three groups as tertiary referral centres, state hospitals and private practice hospitals. The weekly change of the workload of urology throughout the pandemic period was evaluated, also the workload of urology and the distributions of certain urological surgeries were compared between the pandemic period and the same time interval of the year 2019.

2.1 | Statistical analysis

All statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS, Inc, Chicago IL), version 22, software for Windows. Shapiro-Wilk test was used to determine whether the data were normally distributed, since *P* values were found to be greater than 0.05, it was decided that the data were normally

distributed. After the descriptive statistics were made, the data for the 2019 period and pandemic period were compared with the Paired-Samples *T* test. The results were given as mean ± standard deviation and n (%). $P < .05$ was considered statistically significant.

3 | RESULTS

A total of 51 centres from all geographical areas participated in the study. Of these centres, 30 (58.8%) were tertiary referral centres, 15 (29.4%) were state hospitals and 6 (11.8%) were private practice hospitals. The number of outpatients, inpatients, urological surgeries and daily interventions were found to be dramatically decreased by the 3rd week of pandemics in state hospitals and tertiary referral centres; however, the daily practice were similar in private practice hospitals throughout the pandemic period. Uro-oncological surgeries were decreased week by week in tertiary referral centres, a huge decrease was observed for the stone surgeries at the 3rd week of the pandemics in tertiary referral centres and state hospitals; however, the number of emergent/trauma surgeries was relatively similar in both centres during the pandemics. The weekly analysis of workload of urology and urological surgeries by categories are given in Figures 1 and 2.

When the workload of urology in pandemic period and the same time interval of the year 2019 were compared, a huge decrease was observed in all variables during pandemic period (Table 1). In a detailed analysis of the three groups of centres, a significant decrease was detected in outpatients, inpatients, daily interventions and urological surgeries in tertiary referral centres and state hospitals; however, the decrease was not statistically significant in private practice hospital in terms of inpatients and daily interventions (Figure 3). The numbers of uro-oncological, stone, BPH and emergent/trauma surgeries were significantly decreased in tertiary referral centres and state hospitals in pandemic period compared with the same time interval of the year 2019, but the numbers of uro-oncological and stone surgeries were similar in private practice hospitals (Figure 4). The distributions of the uro-oncological and stone surgeries in pandemic period and the same time interval of 2019 are given in Figure 5. While the numbers of uro-oncological surgeries decreased dramatically in pandemic period, the distribution of uro-oncological surgeries was similar between the pandemic period and the year 2019 (Figure 5). The highest decrease in uro-oncological surgeries was detected in nephroureterectomy (338 to 25; −92.7%); followed by radical-partial nephrectomy operations (606-121; −80.1%), orchiectomy (288-58; −79.9%), TURBT (3329-742; −77.8%), radical prostatectomy (440-103; −76.6%) and radical cystectomy (223-61; −62.7%). The number of percutaneous nephrolithotomy and ureterorenoscopy dropped with the rates of 81.1% (822-156) and

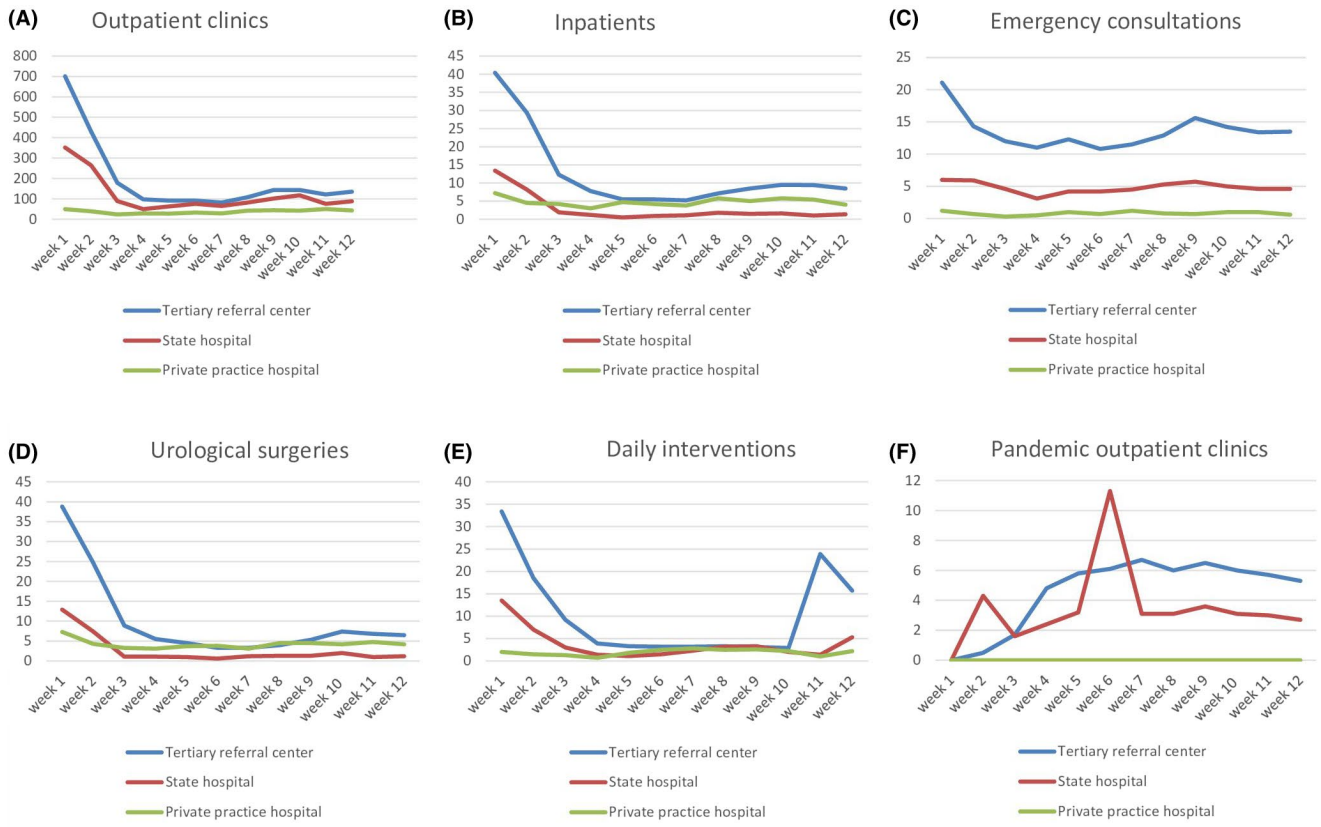


FIGURE 1 Week-by-week analysis of the workload of urology during Covid-19 pandemic. Mean number values were provided for tertiary referral centres, state hospitals and private practice hospitals. A, Outpatient clinics; B, Inpatients during the pandemic; C, Emergency service consultations; D, Total number of Urological Surgeries; E, All daily interventions including intravesical administrations, prostate biopsies, dilatations etc; F, Weekly mean working hour of Urologists for pandemic outpatient clinics

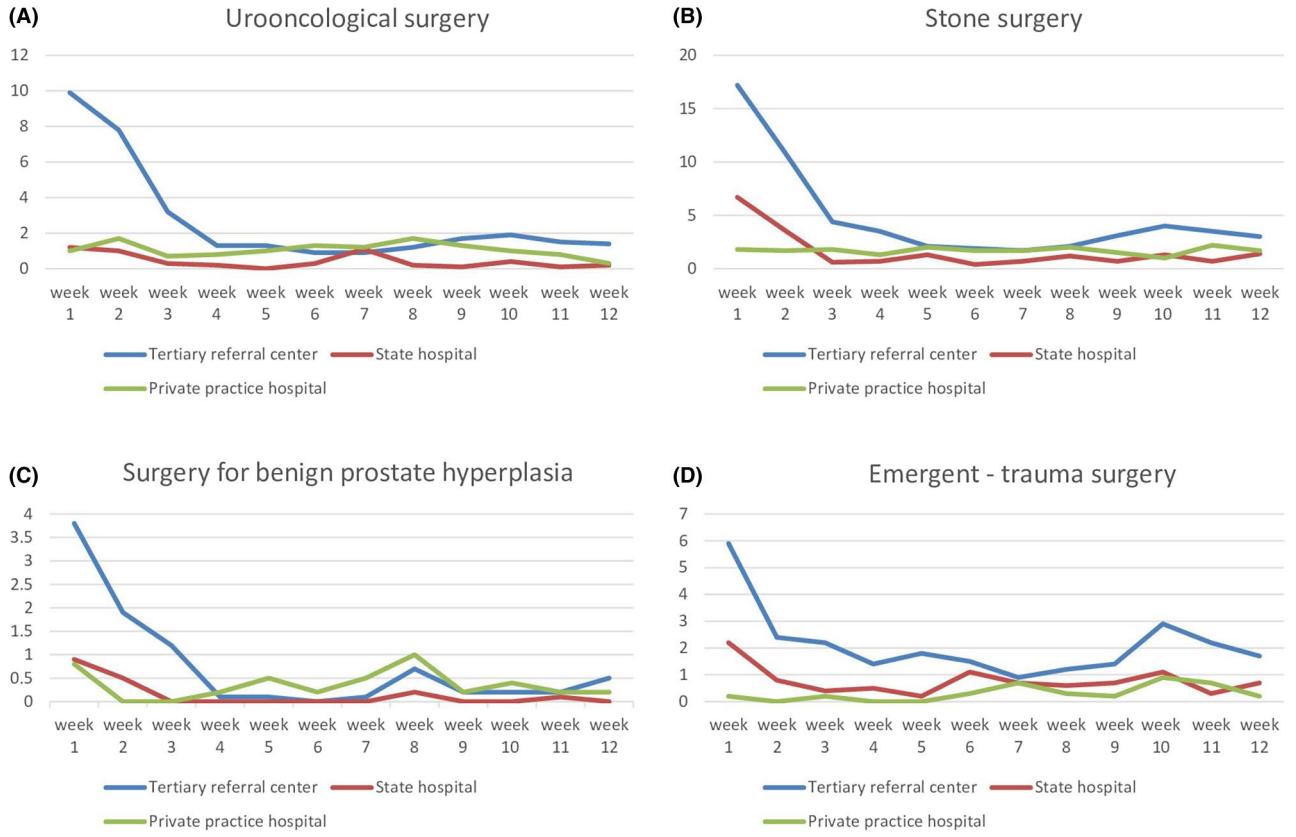


FIGURE 2 Weekly analysis of urological surgeries by categories. A, Average case numbers for Uro-oncological surgery dropped to 1.8 ± 1.4 cases from 8.5 ± 7.8 cases by the 4th week compared with the 1st week; B, Mean number of stone surgeries declining by 3rd week and a plateau during the pandemic; C, Surgery for benign prostate hyperplasia dramatically decreased by 4th week for tertiary referral centres and state hospitals; D, Emergent-trauma surgery also declined during this pandemic

TABLE 1 The huge decrease of the urology workload between the year 2019 and pandemic period. Despite this, it is obvious that the ratio of uro-oncological and stone surgeries constituted the majority of all urological surgeries during the pandemic with 26.3% and 50.7%

	9 March-31 May 2019	9 March-31 May 2020 (pandemic period)	Variation
Outpatients (n)	354 036	93 120	−73.7%
Inpatients (n)	18 418	5295	−71.3%
Daily interventions (n)	18 639	4027	−78.4%
Urological surgeries (Total) (n)	20 864	4292	−79.5%
Uro-oncological surgeries (n)	5326	1131	−78.8%
Stone surgeries (n)	7982	2179	−72.8%
BPH surgeries (n)	1661	254	−84.8%
Emergent surgeries (n)	3592	981	−72.7%

73.0% (3728-1010) in pandemic period. While the total count of ureteral J stent insertion decreased as 70.4% (3279-972 procedures), the rate of this procedure has increased with a rate of 4% (42%-46%) in pandemic period (Figure 5).

Although the total numbers of temporary measures like nephrostomy placement (539-223; −58.7%) and percutaneous cystostomy (661-253; −61.8%) for certain instances decreased, the rate of these procedures for emergent-trauma surgeries has been found to increase during pandemic period (15%-22.7% and 18.4%-25.7%, respectively).

Urologists took active role in fighting against Covid-19 with all of the centres participating in this study, 54.4 ± 100.7, 41.0 ± 34.6, 10.0 ± 24.5 pandemic outpatient clinics were performed by urologist in tertiary referral centres, state hospitals and private practice hospitals, respectively.

4 | DISCUSSION

Mass casualty events including natural disasters (earthquakes, floods and landslides), biological, chemical, nuclear and radiological disasters lead to increase the requirement for healthcare. Virus pandemics are a kind of biological disasters and the best known virus pandemics were

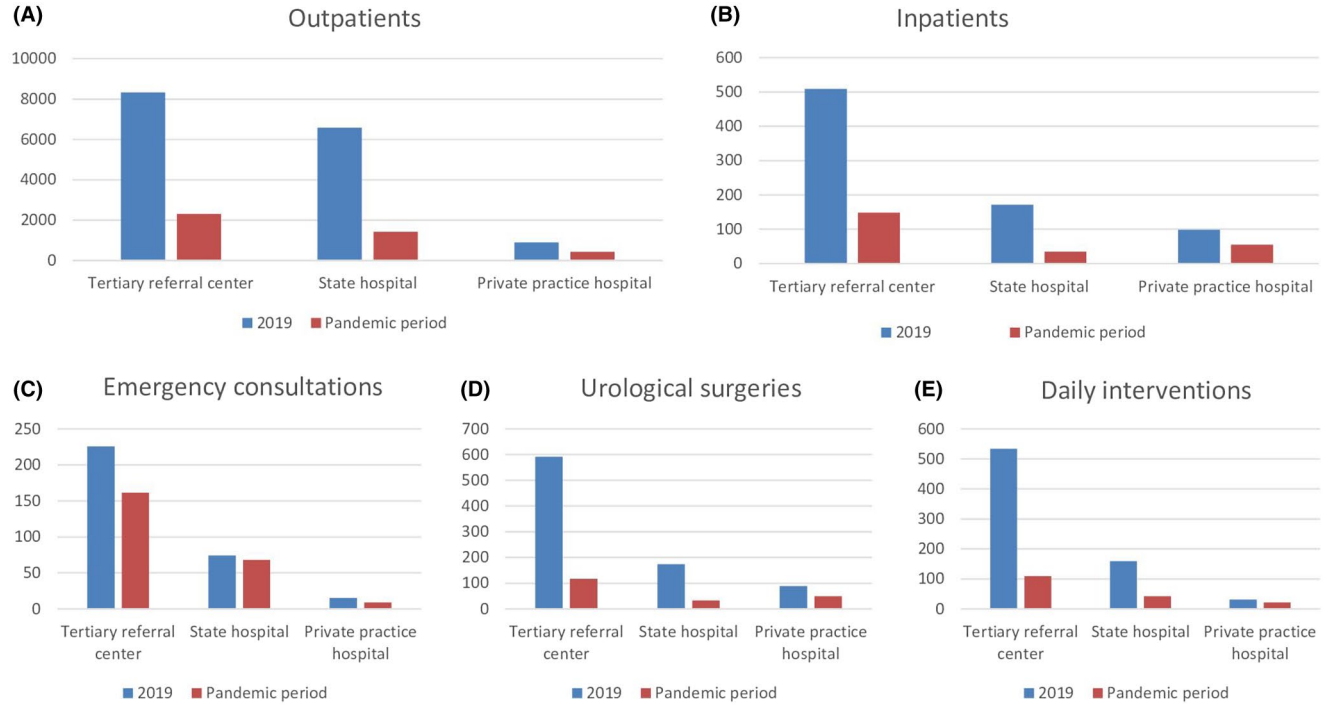


FIGURE 3 A, Average outpatient numbers significantly declined during the Covid-19 pandemic compared with 2019 (8330.7 ± 4727.3 to 2306.0 ± 1330 for tertiary referral centres (*P* < .001); 6580.9 ± 5408.3 to 1424.9 ± 874.5 for state hospitals (*P* = .001) and 900.3 ± 337.2 to 427.7 ± 303.0 for private practice hospitals (*P* = .012)). B, Hospitalised patients in Urology clinics significantly decreased for tertiary referral centres and state hospitals; 508.5 ± 402.8 to 148.3 ± 95. (*P* < .001) and 171.6 ± 149.7 to 34.5 ± 26.5 (*P* = .001), respectively. These numbers also decreased for private practice hospitals without statistical significance and 98.3 ± 28.6 to 55.0 ± 43.7 (*P* = .052). C, Emergency consultations were similar between the pandemic and 2019 period for state hospitals and private practice hospitals (74.3 ± 61.3 to 68.0 ± 67.1, (*P* = .721) and 15.3 ± 8.9 to 9.0 ± 13.1, (*P* = .128)), whereas significantly decreased in tertiary referral centres (225.8 ± 186.8 to 161.4 ± 158.4, *P* = .018). D, All urologic surgical activities significantly declined compared with previous year during the pandemic period for all centres. (591.2 ± 815.5 to 117.2 ± 64.4 for tertiary referral centres (*P* = .003); 173.2 ± 159.0 to 32.2 ± 27.9 for state (*P* = .001) and 88.3 ± 27.9 to 48.8 ± 35.2 for private practice hospitals (*P* = .043)). E, Daily interventions were significantly reduced in tertiary referral centres and state hospitals, but not for private practice hospitals (533.6 ± 956.2 to 108.9 ± 210.4, *P* = .005; 159.1 ± 140.1 to 41.9 ± 38.4, *P* = .007; and 30.7 ± 13,0 to 21.8 ± 13.8, *P* = .292)

Spanish Flu pandemics which killed over 20 million people from 1918 to 1919, SARS-CoV pandemics that affected approximately 8000 people with a mortality rate 10% and MERS-CoV pandemics which affected over 800 people with a mortality rate of 35%.[8,13] Therefore, it is essential to enhance the capabilities of healthcare institutions, for mitigation of disasters' effects. Governments and healthcare institutions must prepare their virus pandemic plans, to be able to intervene in time for pandemics. A sample of pandemic influenza planning of the state of Connecticut was reported by Duley MG at 2005.[14] Some of the recommendations of this report to assure healthcare facility were, suspending all of the elective outpatient and inpatient surgeries and procedures, developing strategies to increase bed availability for influenza patients and implementing triage to reduce non-influenza admissions.[15] Covid-19 first appeared in China and spread rapidly between the countries, and was declared as pandemics at 11-March-2020 by WHO. Similar with the recommendations of pandemics plan of the State Connecticut, many countries took measures stage by stage for the Covid-19 pandemic. Like in the other specialties, several guidelines and measures were published for urology practice during Covid-19 pandemic.[7–11,15] Wallis et al and Stensland et al published review and editorial articles about the triage and the management of genitourinary cancers and the risks of delaying in treatment.[7,15] Their recommendations for the treatment of urological cancers during Covid-19 era were as: transurethral resection of bladder tumour (TURBT) can be performed in high-grade non-muscle-invasive bladder cancer (NMIBC), however, cystoscopic surveillance and (TURBT) for recurrence in patients with known low-grade NMIBC can be deferred, the initial treatment of high-grade NMIBC should be the induction Bacillus Calmette-Guérin (BCG) and a single course of maintenance therapy (6 + 3), over than 12 weeks delay in radical cystectomy (RC) was found associated with decreased overall and progression-free survival[16] so RC should be prioritised; active surveillance should be the first option for low-risk prostate cancer; it was reported that delaying 3-6 months for the treatment of intermediate and high-risk prostate cancer patients was not associated with adverse biochemical recurrence, pathological and survival outcomes.[17] The radical prostatectomy and definitive therapies can be deferred, small renal masses can be safely observed with active surveillance, and the treatment of localised kidney cancers (cT1b and cT2 tumours) can be delayed to 3-6 months without adverse effects in outcomes; however, radical nephrectomy should be performed in

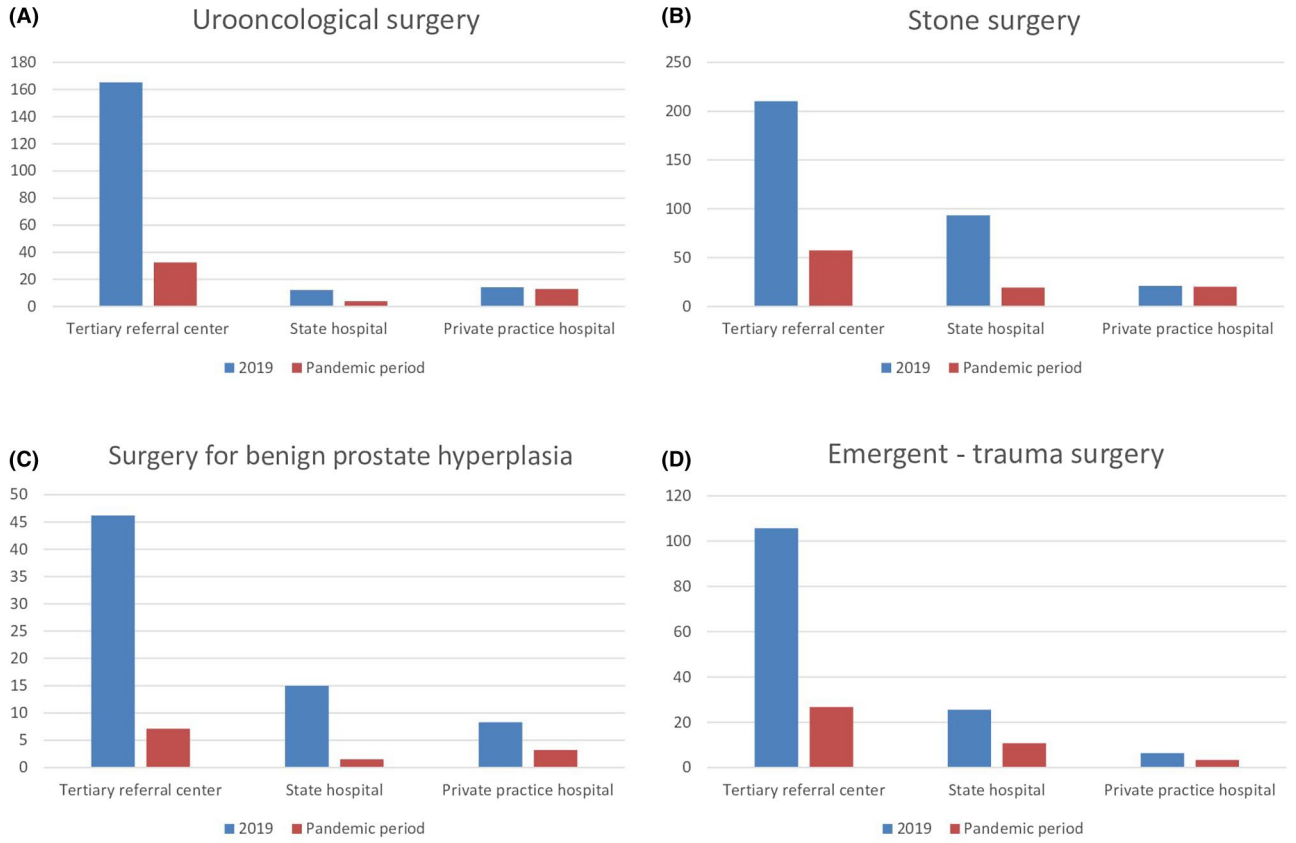


FIGURE 4 Comparison of certain urological surgeries between the pandemic period and the same time interval of 2019. A, Considering all uro-oncological surgical procedures, there was a decline compared with previous year where the difference did not reach statistical significance for tertiary referral centres and private practice hospitals. (165.2 ± 432.2 to 32.4 ± 30.0, $P = .085$; 12.2 ± 13.2 to 3.7 ± 2.9, $P = .022$ and 14.3 ± 11.1 to 12.8 ± 11.3, $P = .680$ for tertiary referral centres, state hospitals and private practice hospitals, respectively.) B, Surgery for stone disease was significantly reduced in tertiary referral centres (210.1 ± 181.5 to 57.5 ± 42.4, $P < .001$) and state hospitals (93.3 ± 122.2 to 19.5 ± 27.0, $P = .011$). Case load was similar for private practice hospitals (21.2 ± 2.0 to 20.3 ± 13.2, $P = .880$) regarding stone surgery. C, BPH surgery decreased significantly in all hospitals. (105.7 ± 210.1 to 26.6 ± 21.2, $P = .038$; 25.5 ± 28.6 to 10.7 ± 10.3, $P = .015$; 6.3 ± 3.0 to 3.3 ± 1.7, $P = .023$; for tertiary referral centres, state hospitals and private practice hospitals, respectively.) D, Emergent surgical procedures also declined in all centres compared with previous year (46.2 ± 46.3 to 7.1 ± 4.7, $P < .001$; 15.0 ± 15.9 to 1.5 ± 1.9, $P = .002$; 8.3 ± 3.4 to 3.2 ± 3.9, $P = .011$; for tertiary referral centres, state hospitals and private practice hospitals, respectively.)

priority in locally advanced kidney cancers (cT3+); the risk of a delay in the treatment of upper tract urothelial cancer (UTUC) is depended on the stage and grade of cancer, especially in high-grade UTUC a delay up-to 3 months was found associated with disease progression,[18] so keep in mind nephroureterectomy in these patients; avoid from delaying radical orchiectomy in testicular cancer patients; avoid from a delay in penile cancer treatments including surgeries.[15] Harmoniously with these recommendations, Pinar et al reported a decrease of 31% in the surgeries of genitor-urinary cancers in comparison with the same time interval of 2019 (12-27 March) and they performed un-deferrable oncological surgeries in eight academic urological departments of Paris, France.[19] Tinay et al evaluated the early impact of Covid-19 on surgical urologic oncology practice in several tertiary institutions of Turkey, and they compared the outcomes of early pandemic period (11 March to 11 April) with the same time interval of 2019.[11] They detected a decrease (from 200 to 90 cases) in the numbers of urothelial carcinoma, kidney cancer and prostate cancer surgeries, and they pointed that the centralisation of oncological surgeries is required during the disasters like this pandemic. A significant decrease was also detected in all of the oncologic surgical procedures during pandemic period in our study (–78.8%). As stated above, most of the uro-oncological surgeries are usually performed in tertiary referral centres in our country, so the highest decrease has been observed in these centres, whereas no significant change was observed in private practice hospitals in terms of uro-oncological surgery. The lowest decrease in uro-oncological surgeries was detected in radical cystectomy operations in the present study as most of the above-mentioned reports and guidelines offer prioritisation of radical cystectomy.[8,15] We detected a sharp decrease within 3rd and 4th week of the pandemic in our country for all urological as well as uro-oncological cases as government and healthcare authorities suggested lockdown measures for the spread of SARS-CoV-2; and those low case load continued until the end of our study period which reflects the end of lockdown measures in our country. An interesting finding of this study was that the ratio of almost all uro-oncological surgeries was similar between the pandemic period and routine daily practice despite a significant decrease in total numbers.

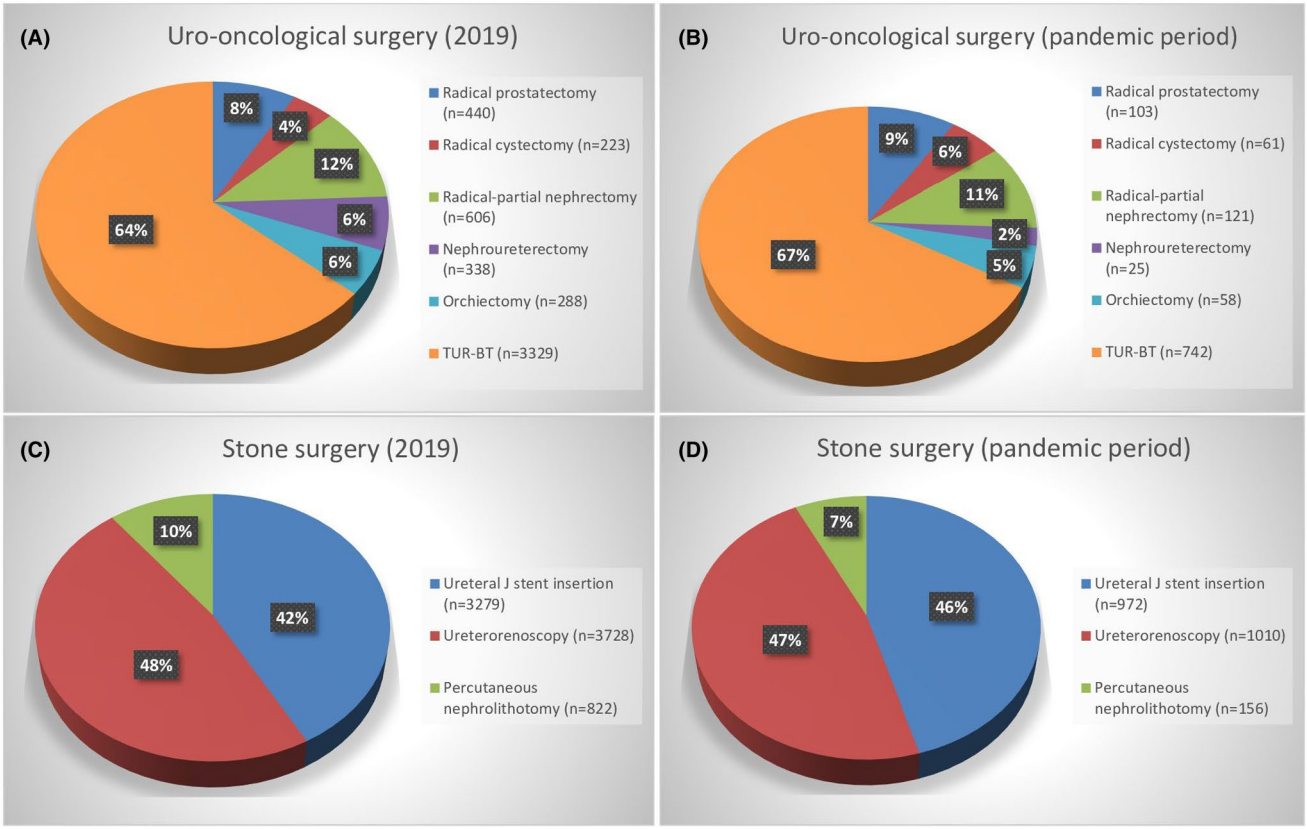


FIGURE 5 The distribution of the uro-oncological surgeries and stone surgeries in 2019 and during the pandemic period. A, Uro-oncological surgery (2019). B, Uro-oncological surgery (pandemic period): The highest decrease in uro-oncological surgeries was detected in nephroureterectomy (338-25; −92.7%); followed by radical-partial nephrectomy operations (606-121; −80.1%), orchiectomy (288-58; −79.9%), TURBT (3329-742; −77.8%), radical prostatectomy (440-103; −76.6%) and radical cystectomy (223-61; −62.7%). C, Stone surgery (2019). D, Stone surgery (pandemic period): While the number of ureteral J stent insertion 70.4% (3279-972) decreased; the percentage of it in stone surgeries has increased with a rate of 4% (42%-46%) in pandemic period

We did not deeply analyse the surgical indications, but surgery for higher risk cases for all cancer types might have been prioritised in most involved centres. TUR-BT was the mostly utilised uro-oncological surgical procedure for both the pandemic period and normal life conditions in our country in concordance with previous reports.[11]

Cancellation of elective surgeries for urolithiasis, benign prostatic hyperplasia and urethral strictures were recommended in pandemic period.[7] If there is an obstruction in upper urinary tract, the ureteral stenting or nephrostomy tube placement are recommended instead of definitive treatments.[7,20,21] The EULIS Collaborative Research Working Group published the results of a survey related with routine practice of endourologists in stone diseases during the Covid-19 pandemic.[22] They pointed that the majority of the participants (89.4%) have used to perform temporary interventions like JJ placement or percutaneous nephrostomy, rather than the stone removal operations.[22] Gul et al reported that complicated ureteral stone diseases have increased in pandemic period, consequently the rate of nephrostomy placement has also increased.[23] In accordance with the recommendations, the numbers of elective surgeries (URS and PNL) for urolithiasis, benign prostatic diseases and endoscopic urethrotomies have decreased and the rates of temporary measures such as ureteral stenting, nephrostomy placement and percutaneous cystostomy as emergent interventions have increased during pandemic period in our study. This reflects to the adaptation of urologic surgeons in our country to the published recommendations.[7,20,22]

The healthcare institutions have to prepare strategies to increase bed resources and availability for Covid-19 patients. The main measures for this process include, performing the triage in outpatient clinics to decrease other types of admissions and decreasing the number and length of hospital stay.[14] The healthcare institutions decreased their outpatient and inpatient clinics according to recommendations of the Ministry of Health of Turkey in our country. Due to the measures, the number of patients admitted to the outpatient clinics decreased with a rate of 73.7% and the number of the patients which were treated inpatient decreased with a rate of 71.3% during pandemic period in comparison with the same time interval of 2019 in urology departments participated in this study. Those measures should undoubtedly be taken by managers and chief executive officers. The difference adaptation of tertiary referral centres, state hospitals and private practice hospitals with regard to these measures may come from different management options. Pandemic patients were primarily treated by state hospitals and tertiary referral centres in our country, so the elective cases were cancelled by these hospital types, whereas most private practice hospitals did not treat Covid-19 patients.

Our findings demonstrated that workload for urological diseases dramatically decreased during Covid-19 pandemic. However, the workload of hospitals dramatically increased during the Covid-19 pandemic and most of the hospitals had to turn to pandemic or quarantine hospitals and serve only Covid-19 patients. A total of 2307 pandemic outpatient clinics by 8-hour shifts were done by urologists in our study. So, we detected that urologists also took active role in the front-line management of Covid-19 patients in our country.

Participation of mainly tertiary referral centres in comparison with state and private practice hospitals constitute one of the limitations of the present study. Most state hospitals also turned to pandemic hospitals and did not serve for routine practice. Participation of more state hospitals would better reflect daily practice. However, 2019 results demonstrated that most of the Urology workload was met by tertiary referral centres in our country.

5 | CONCLUSIONS

Covid-19 pandemic led to a serious challenge to healthcare systems. Like the worldwide results, the number of outpatients, inpatients and daily interventions have decreased, elective surgeries mostly deferred and a priority has given to emergent and high-grade malignancy surgeries in our country. We believe that the results of the present study will help in organisation of human resources and triage of urology clinics for further possible mass casualty events.

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DISCLOSURE

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