

# Comparative assessment of patients' admission to urology departments during and before the COVID-19 pandemic: a retrospective cohort study

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## ABSTRACT

**Aim:** To determine the diseases that presented to the urology department during the COVID-19 pandemic and for hospital-based comparison with the diseases that presented in the same period of the previous year.

**Material and Method:** In this retrospective follow-up study, patients who were admitted to the tertiary university hospital and secondary state hospital urology departments between April-July 2019 and April-July 2020 were included in the study. We searched the health administrative data using the International Classification of Diseases-10 codes. The number and variety of patients who were admitted to the urology departments in the same months of 2019 and 2020 were compared.

**Results:** In both hospitals, the total number of admissions decreased during the pandemic in 2020 compared to the pre-pandemic year. Also, elective admissions decreased in 2020 compared to the pre-pandemic year ( $p < 0.001$ ). In a significant part of the urological disease group, the decrease in the number of admissions was found to be higher for the second-level center than for the tertiary center hospital.

**Conclusion:** We documented that uro-oncology outpatient admissions could continue during the COVID-19 pandemic in a university hospital- not primarily served as a pandemic hospital- by taking preventive measures and prioritizing healthcare personnel and patient safety.

**Keywords:** COVID-19, urologic diseases, pandemics

## INTRODUCTION

Coronavirus disease (COVID-19) was first described by the World Health Organization (WHO) in the last months of 2019 (1). The first patients in Turkey were seen on March 11, 2020, when the World Health Organization declared the disease a pandemic.

The rapidly spreading epidemic creates an unprecedented burden on the effectiveness and sustainability of the health system. Especially because of this disease, emergency applications, and hospitalization rates are increasing. The rapid spread of COVID-19 has affected patient management in all countries, and non-emergency operations have begun to be reduced. At the same time, COVID-19 has caused significant changes in the form of outpatient care, which has an important place in health care. Providers postpone elective and preventive visits such as annual physical examinations to reduce the risk

of transmitting the virus to patients or healthcare workers during their practice. Whenever possible, they also turn face-to-face visits into telemedicine visits. Many patients also avoid visits because they do not want to leave their homes and be exposed to risk.

Various guidelines have been presented about which groups should be given priority in the diagnosis and treatment of urological patients during the pandemic process (2,3). In our country, elective surgeries were postponed in line with the recommendations of these guidelines in urology clinics, and only emergency surgeries and oncological diagnoses were given to cases requiring surgical intervention.

In this study, we aimed to present the effects of COVID-19 on urology practice by comparing the number of patient examinations, and ICD codes before and during the pandemic in secondary and tertiary-level hospitals.

## MATERIAL AND METHOD

The study was carried out with the permission of Firat University Non-interventional Researches Ethics Committee (Date: 26.05.2022, Decision No: 2022/07-41). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

In this retrospective cohort study, the data of Esenyurt State hospital and Firat University Hospital were used as secondary and tertiary care centers respectively.

We compared the number and variety of urological diseases coded during 2019 and 2020 in government hospitals and university hospital care facilities. The data was extracted from the hospital's electronic records. Age, gender, presentation date, and ICD-10 (International Classification of Diseases-10) diagnosis codes were obtained from the hospital data network. The presentation of the same patient within 10 days of the first presentation was regarded as a control visit. Patients with repetitive presentations for control or follow-up and their diseases were identified.

Since ICD-10 disease classification codes can't be assigned to some of the diseases experienced in the urology practice and the unique style of each urologist, standardization of the data was required. For this reason, the ICD-10 diagnosis codes of the patients recorded in the system were reconsidered. The diagnoses had been made based on the diagnostic classification of diseases indicated in the 12th edition of Campbell- Walsh Wein Urology (2020) to achieve standardization.

A single diagnostic code was used for separate diagnoses that attempted to designate the diseases. Acute cystitis and pyelonephritis merged under the name of infectious diseases of the urinary system. Renal stone, bladder stone, and ureteral stone merged under the name of urinary system stone diseases; epididymitis, orchitis, and anogenital (venereal) warts merged under the name

of inflammatory disorders of the scrotum (overactive bladder, urinary incontinence, and neurogenic bladder = urine storage, and emptying disorders, etc.). Both institutions are primarily pandemic hospitals but also serve as public hospitals, with only a delimited section being reserved for patients suspected of having a COVID-19 infection.

### Statistical analysis

Statistical Package for the Social Science (IBM SPSS version 20) was used to analyze the data in the study. Pearson's chi-square test was used in the analysis of categorical variables, and the Kruskal-Wallis H test or Mann-Whitney U test was used when independent samples were available for normally-distributed continuous variables.  $p < 0.05$  was considered statistically significant. Post-hoc analysis was used for correction after Kruskal-Wallis H and chi-square tests.

## RESULTS

27,286 patients who applied to the urology outpatient clinic were included in the study. 18,072 patients were from the pre-pandemic period and 9214 patients were from the post-covid period. The demographic characteristics of the patients included in the study are summarized in **Table 1**. Compared to the pre-pandemic period, the mean age of female and male patients applied to the urology outpatient clinics decreased significantly in the tertiary and secondary hospitals after the declaration of the pandemic ( $p = 0.028$  and  $p = 0.032$ , respectively).

Since the declaration of the pandemic, the number of applications to hospitals and urology outpatient clinics has decreased significantly. Also, emergency outpatient consultations decreased in both hospitals during the pandemic compared to the pre-pandemic period ( $p < 0.001$ ). The change in the number of applications to urology outpatient clinics before and after the declaration of the pandemic is shown in **Table 1**.

**Table 1.** Comparison of the secondary and tertiary level hospitals according to patient characteristics, the total number of outpatient clinics, and emergency admission.

Variables	2019			2020			Pc
	Secondary level hospital	Tertiary level hospital	Pa	Secondary level hospital	Tertiary level hospital	Pb	
Urology outpatients applications †	5035	13037	<b>0.024</b>	1180	8034	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Uro-oncological applications †	182	1179	<b>&lt;0.001</b>	65	685	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Emergency outpatient consultations	682	3080	<b>0.011</b>	117	1997	<b>0.008</b>	<b>&lt;0.001</b>
Age (year)							
Male	59 ± 17.3	58 ± 16.7	0.908	48.50 ± 7.7	48.1 ± 23.14	0.923	<b>0.028</b>
Female	57.8 ± 19.1	54 ± 14.7	0.876	43.6 ± 19.1	41 ± 17.3	0.854	<b>0.032</b>
Gender (n)							
Male	3556 (70.6)	8677 (66.55)	<b>&lt;0.001</b>	782 (66.27)	6432 (80.05)	<b>&lt;0.001</b>	<b>&lt;0.001</b>
Female	1479 (29.4)	4360 (33.44)	<b>&lt;0.001</b>	398 (33.72)	1602 (19.95)	<b>&lt;0.001</b>	<b>&lt;0.001</b>

Data are expressed as the number of applications to the outpatient clinic (percentage). †: Repeated applications within 10 days after the first application were excluded. P value- a: The adjusted p-value for the secondary level hospital difference between the "before COVID-19" and "after COVID-19". P value- b: The adjusted p-value for the tertiary level hospital difference between the "before COVID-19" and "after COVID-19". P value- c: The adjusted p-value for the comparison of secondary level and tertiary level hospitals between the "before COVID-19" and "after COVID-19". COVID-19: Coronavirus disease-2019

**Table 2** shows the distribution of patients admitted to hospitals before and after the pandemic, according to their diagnosis. There was no significant difference between admissions to both hospitals in terms of other inflammatory disorders of the penis, stress incontinence in both sexes, and undescended testicular diseases.

While there was no statistical difference in the number of patients diagnosed with ureteral stones, inflammatory diseases of the scrotum, other inflammatory diseases

of the penis, myalgia, orchitis and epididymitis, and undescended testicles before and after the pandemic in tertiary care hospitals, the same situation was observed in secondary care institutions for other inflammatory diseases of the penis, myalgia, epididymo-orchitis, and undescended testicular pathologies.

The drop in the total number of uro oncology was 1,74-fold more for the secondary level center than for the tertiary center hospital (**Table 3**).

**Table 2.** Comparison of the secondary and tertiary level hospitals according to diagnosis frequencies to the admission of urology outpatient clinics before and after the announcement of the pandemic.

Disease	Secondary-level hospital			Tertiary-level hospital			Pc
	Years		P value-a	Years		P value-b	
	2019 n (%)	2020 n (%)		2019 n (%)	2020 n (%)		
Neuromuscular dysfunction of the bladder, unspecified	754 (88.1)	102 (11.9)	<0.001	109 (65.2)	58 (34.8)	<0.001	<0.001
Benign prostatic hyperplasia	1157 (77.6)	334 (22.4)	<0.001	2.887 (60.9)	1.851 (39.1)	<0.001	<0.001
Male erectile disorder	144 (64.5)	79 (35.5)	<0.001	0 (0,0)	0 (0,0)	-	-
Premature ejaculation	67 (65.1)	36 (34.9)	<0.01	9 (64.3)	5 (35.7)	<0.001	<0.001
Calculus of kidney	377 (88.5)	49 (11.5)	<0.001	769 (53.6)	666 (46.4)	<0.01	<0.001
Calculus of ureter	386 (88.7)	49 (11.3)	<0.001	20 (66.7)	10 (33.3)	>0.05	<0.001
Urinary tract infection, site not specified	1044 (80)	261 (20)	<0.001	8.476 (63.1)	4.963 (36.9)	<0.001	<0.001
Cyst of kidney acquired	319 (93.5)	22 (6.5)	<0.001	148 (67)	73 (33)	<0.001	<0.001
Azoospermia	81 (83.5)	16 (16.5)	<0.001	47 (79.6)	12 (20.4)	<0.001	<0.01
Inflammatory disorders of the scrotum	190 (91)	19 (9)	<0.001	5 (83.4)	1 (16.6)	>0.05	<0.001
Other inflammatory disorders of penis	15 (45.5)	18 (54.5)	>0.05	16 (59.3)	11 (40.7)	>0.05	>0.05
Myalgia	133 (52.8)	119 (47.2)	>0.05	6 (33.4)	12 (66.6)	>0.05	<0.001
Anogenital (venereal) warts	60 (73.2)	22 (26.8)	<0.001	4 (21.1)	15 (78.9)	<0.05	<0.001
Orchitis and epididymitis	15 (60)	10 (40)	>0.05	1 (25)	3 (75)	>0.05	<0.001
Scrotal varices	57 (90.5)	6 (9.5)	<0.001	285 (62.1)	174 (37.9)	<0.001	<0.001
Urethral stricture, unspecified	76 (89.5)	9 (10.5)	<0.001	107 (58.2)	77 (41.8)	<0.05	<0.001
Enuresis not due to a substance or known physiological condition	106 (84.2)	20 (15.8)	<0.001	94 (58.4)	67 (41.6)	<0.05	<0.05
Stress incontinence (female) (male)	49 (94.2)	3 (5.8)	<0.001	45 (63.4)	26 (36.6)	<0.05	>0.05
Undescended testicle, bilateral	5 (45.5)	6 (54.5)	>0.05	9 (47.4)	10 (52.6)	>0.05	>0.05
<b>Total</b>	<b>5035 (81)</b>	<b>1180 (19)</b>	<b>&lt;0.001</b>	<b>13037 (61.9)</b>	<b>8034 (38.1)</b>	<b>21071 (100)</b>	<b>&lt;0.001</b>

Data are expressed as the number of applications to the outpatient clinic (percentage). Data are expressed as the number of applications to the outpatient clinic (percentage). †: Repeated applications within 10 days after the first application were excluded. P value- a: The adjusted p-value for the secondary level hospital difference between the "before COVID-19" and "after COVID-19". P value- b: The adjusted p-value for the tertiary level hospital difference between the "before COVID-19" and "after COVID-19". P value- c: The adjusted p-value for the comparison of secondary level and tertiary level hospitals between the "before COVID-19" and "after COVID-19". COVID-19: Coronavirus disease-2019

**Table 3.** Uro-oncological diseases showed changes in the diagnostic distribution in the urology outpatient clinic before and after COVID-19 in both secondary-level and tertiary-level hospitals.

Malignancy	Secondary-level hospital			Tertiary-level hospital			P value- Pc
	Years		P value-a	Years		P value-b	
	2019 n (%)	2020 n (%)		2019 n (%)	2020 n (%)		
Malignant bladder disease	89 (70.1)	38 (29.9)	<b>0.017</b>	454 (81.7)	102 (18.3)	<b>0.001</b>	<b>&lt;0.001</b>
Prostate cancer	37 (72.6)	14 (27.4)	<b>&lt;0.036</b>	307 (67)	151 (33)	<b>0.021</b>	<b>&lt;0.001</b>
Testicular cancer	11 (55)	9 (45)	0.058	90 (80)	23 (20)	<b>0.016</b>	<b>&lt;0.001</b>
Upper urothelial tract tumors	17 (89.5)	2 (10.5)	<b>0.018</b>	89 (83.1)	18 (16.9)	<b>0.003</b>	<b>&lt;0.001</b>
Kidney cancer	18 (90)	2 (10)	<b>&lt;0.001</b>	239 (83.3)	48 (16.7)	<b>0.007</b>	<b>&lt;0.001</b>
<b>TOTAL</b>	<b>182</b>	<b>65</b>		<b>1179</b>	<b>685</b>		

Data are expressed as the number of applications to the outpatient clinic (percentage). †: Repeated applications within 10 days after the first application were excluded. P value- a: The adjusted p-value for the secondary level hospital difference between the "before COVID-19" and "after COVID-19". P value- b: The adjusted p-value for the tertiary level hospital difference between the "before COVID-19" and "after COVID-19". P value- c: The adjusted p-value for the comparison of secondary level and tertiary level hospitals between the "before COVID-19" and "after COVID-19".

## DISCUSSION

The COVID-19 pandemic, which first emerged in China and affected the whole world, affected the majority of countries despite all quarantine measures (4). In line with the Covid-19 pandemic, healthcare centers needed planning that would properly manage all their capabilities, staff, and supplies, especially operating rooms, to provide optimum healthcare to their patients (5). The WHO and EAU guidelines have recommended that all non-emergency surgeries be canceled due to the risk of spreading the virus (3,6). Similarly, in the EAU Stone Working Group (EULIS) and EAU guidelines, it is recommended to delay the surgical and ESWL procedures as much as possible in urinary system stone patients and to provide urinary drainage with a double-J catheter or percutaneous nephrostomy in case of obstruction and/or serious infection (7,8). If the patient is suspected of having COVID-19, careful endoscopic procedures and urethral catheterization are recommended, and surgeons are fully protected against infection (9). The literature on urinary stone disease is clinically severe and when the literature is examined, we see that it is not much affected by the pandemic in terms of hospital admissions (10). When our study was evaluated, the number of cases in both hospitals in terms of kidney and ureteral stones decreased compared to the pre-pandemic period, but the decrease in the admissions to the tertiary hospital of the patients diagnosed with ureteral stones was not statistically significant. We think that this is the main reason for this situation to work as a treatment center of the hospital as a treatment center and to accept a referral from other centers.

It is claimed that cancer patients are at twice the risk of COVID disease than the normal population (11). Postponement of all elective surgeries or adjuvant chemotherapy is recommended for patients with stable cancer, and comprehensive treatment is recommended for patients with high-risk or COVID-19 cancer (12). Diagnosis and timely treatment of cancer patients are important during the pandemic process. Inadequate treatment and advanced age pose significant risks for these patients (13). The EAU guideline stated that the diagnosis and treatment of kidney masses smaller than 4 cm detected during the pandemic period may be delayed for up to six months, while the treatment of masses between 4-10 cm should be done within 3 months. It is recommended that patients with locally invasive vena cava thrombus and a mass larger than 10 cm should be operated on within 6 weeks. Similarly, advanced transitional cell cancer, renal cell cancers >6 cm in size, or adrenal carcinoma should be treated as a priority without delay (3,14).

Many publications have emphasized that prostate cancer surgeries can be postponed during the pandemic period, except for high-risk or locally advanced patients who cannot tolerate radiotherapy (2,15).

EAU guidelines recommend immediate cystoscopy and TUR-TM in patients presenting with macroscopic hematuria or bladder blood clot formation, or in whom a mass is detected in the bladder by imaging methods. Similarly, re-TUR-TM is recommended in cases where the initial TUR-TM pathology does not involve muscle tissue (16).

In patients with T3-4 and/or lymph node involvement, cisplatin-based adjuvant chemotherapy can be applied if neoadjuvant chemotherapy (NAC) is not given. Radiotherapy for hemostasis should be considered for MIBC with active bleeding who cannot undergo radical cystectomy (17,18).

Radical orchiectomy for testicular masses should be performed as soon as possible without delay. Radiotherapy is recommended in low-volume patients with Stage IIa and IIb seminomas, while chemotherapy containing cisplatin and Etoposide is recommended in high-volume cases (19). Chemotherapy should be discontinued until an active COVID-19 infection has been treated or until the diagnosis has been discontinued. Bleomycin should not be routinely omitted in the presence of COVID-19, as data on lung toxicity are unclear (20).

Since the beginning of the pandemic, there has been a remarkable reduction of up to 50% in uro-oncological cases in Europe. In a multicenter study conducted in our country during the pandemic period, a decrease of up to 80% in oncology cases was reported compared to the pre-pandemic period, which was parallel to Europe and the World (21). In this study, by the literature, significant decreases were observed in urooncological cases in both secondary and tertiary hospitals compared to the pandemic period. The decrease in the total number of urooncologic cases was 1.74 times greater for the second-level center than for the tertiary center hospital. This is an expected situation for a tertiary hospital.

According to the guidelines, operations such as urinary incontinence, reconstructive surgeries (urethral strictures), infertility, erectile dysfunction, and genitourinary prolapse, and especially BPH surgeries, should be postponed until the end of the pandemic (2,22).

The fact that the number of patients admitted due to prostate diseases is less than in the pre-pandemic period can probably be explained by the fact that patients continue to buy and use their current medication from pharmacies. Another reason for this decrease is that



chronic diseases can often accompany elderly men with lower urinary tract symptoms due to prostate enlargement. Due to the curfews during the pandemic, patients could spend time at home and reach the toilet from a close distance, so there were fewer urinary incontinence complaints and hospital admissions.

Although individuals spend more time with their partners during the pandemic period, there has been an increase in sexual problems such as erectile dysfunction and premature ejaculation. However, we saw that this situation was not reflected in hospital admissions (23). We can attribute this situation to the conditions of the pandemic and the fact that sexuality is still seen as a social taboo.

In considering the literature concerning urological patients during the COVID-19 pandemic, we observed that research and guideline recommendations have focused on urological emergencies. This study was carried out to better understand on what grounds patients with urological diseases in Turkey applied to the outpatient clinic during the pandemic period and which center was preferred for which disease.

The limitation of our study is its retrospective design and did not include all outpatients and outpatient procedures performed in our hospital during the above-mentioned period. Our results should be confirmed with multidisciplinary hospitals, some of which have recently been published during the pandemic.

## CONCLUSION

In our study, we documented that urology outpatient clinic distribution could continue during the COVID-19 pandemic in a tertiary and secondary level hospital—primarily serving as a pandemic hospital—by taking preventive measures and prioritizing healthcare personnel and patient safety. Further studies are needed for safe urologic practices during outbreaks, especially concerning branch hospitals.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was carried out with the permission of Firat University Non-interventional Researches Ethics Committee (Date: 26.05.2022, Decision No: 2022/07-41).

**Informed Consent:** Because the study was designed retrospectively, no written informed consent form was obtained from patients.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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