The European Research Journal 2022;8(6):755-761 Original Article

DOI: 10.18621/eurj.1020958 *Urology*

The impact of the COVID-19 pandemic on the urology practice in a large tertiary hospital

Gökçe Dündar, Anıl Erkan

Department of Urology, University of Health Sciences Turkey, Bursa Yüksek İhtisas Training and Research Hospital, Bursa, Turkey

ABSTRACT

Objectives: We aimed to reveal how four different areas that are important in the functioning of the urology clinic (outpatient clinic, inpatient clinic, operating room, and consultations) were affected during the COVID-19 pandemic.

Methods: Patients admitted to the surgical branches between March 11, 2018 and March 10, 2021 were retrospectively evaluated in terms of their demographic data. The data between these dates were analyzed by dividing the patients into three groups as Groups A, B, and C for the pandemic period, the year before the pandemic, and two years before the pandemic, respectively.

Results: A total of 1,222,967 patients were included in the study. During the pandemic period, the number of urology outpatient clinic admissions decreased by more than half compared to the previous years (37,471, 93,582, and 89,031 for Groups A, B, and C, respectively). Admissions to the urology inpatient clinic decreased both numerically and proportionally when compared to the other surgical branches (1,301 [5.1%] for Group A, 3,884 [7.7%] for Group B, and 3,761 [7.7%] for Group C]). While the mortality rate did not change proportionally in the urology clinic in all groups (0.3%), it increased both numerically and proportionally in all surgical branches (339 [1.3%], 304 [0.6%], and 256 [0.5%]).

Conclusions: Admissions to the urology clinic were determined to have decreased during the pandemic compared to the pre-pandemic period, especially due to restriction measures taken by countries and concerns about the unknowns of the disease. As a result of this decrease, the number of operations and the number of hospitalized patients were also reduced. Although the mortality rate was not affected in the short-term follow-up of patients, long-term outcomes remain uncertain.

Keywords: COVID-19, hospitalization, pandemic, surgery, urology

In December 2019, cases of pneumonia of unknown origin began to be reported in the People's Republic of China, and soon the virus causing the new coronavirus disease (COVID-19) was isolated [1]. The first individual who tested positive for COVID-19 in Turkey was reported in the capital Ankara on March 11, 2020. The COVID-19 pandemic has led to the need to take radical decisions that have had many important effects and results in Turkey, primarily in health, followed by social, economic, political, economic, administrative, legal, military, religious, and cultural areas [2].

University of Health Sciences Bursa Yuksek Ihtisas Training and Research Hospital is the largest and most equipped hospital in the southern Marmara region of the country, with 1,520 registered beds. The

Received: **November 9, 2021;** *Accepted:* **May 9, 2022;** *Published Online:* **August 4, 2022**

How to cite this article: *Dündar G, Erkan A. The impact of the COVID-19 pandemic on the urology practice in a large tertiary hospital. Eur Res J 2022;8(6):755-761. DOI: 10.18621/eurj.1020958*

Address for correspondence: *Gökçe Dündar, MD, FEBU. University of Health Sciences, Bursa Yüksek İhtisas Training and Research Hospital, Department of Urology, Bursa, Turkey. E-mail: dr@gokcedundar.com, GSM: +90 224 295 50 00 / 1808*

e-ISSN: 2149-3189

urology clinics of our hospital serve both a large and relatively urgent patient population, including those with oncological diseases, surgical priority diseases, life-threatening diseases, and diseases affecting the quality of life. Despite this, the observation that there has been a decrease in the number of admissions has made it essential to investigate how much urology clinics have been affected by the ongoing pandemic [3, 4].

In this study, the aim was to reveal how the urology clinic at a tertiary training and research hospital was affected by the pandemic in the light of concrete data. By analyzing the data obtained retrospectively, we aimed to have an idea about possible future pandemic waves and the effects of current or new pandemics on the urology clinic.

METHODS

For this study, permission was obtained from the Clinical Research Ethics Committee of Health Sciences University Bursa Yuksek Ihtisas Training and Research Hospital with the protocol number 2011-KAEK-25 2021/01-21. Data were obtained retrospectively from the hospital information management system following the first anniversary of the first reported case in Turkey. In this observational study, data were analyzed by dividing patients admissions into three groups: Group A, from March 11, 2020, to March 10, 2021 (one year after the first case was reported in Turkey); Group B, from March 11, 2019, to March 10, 2020 (the year before the first reported case in Turkey); and Group C, from March 11, 2018, to March 10, 2019 (two years before the first case in Turkey). These groups were further divided into 12 equal periods for monthly evaluations using graphs.

The number of admissions to outpatient clinics, mean age of patients, number of repeated admissions, number of appointments to outpatient clinics, time of arrival at outpatient clinics, time spent in outpatient clinics, number of hospitalized patients, mean age of hospitalized patients, mean number of hospitalization days, death status of hospitalized patients, consultations requested from the emergency department, mean age of the consulted patients, and number of patients who underwent surgery were evaluated. The surgery clinics included in the study were urology, orthopedics and traumatology, neurosurgery, general surgery, cardiovascular surgery, thoracic surgery, ear-nose-throat diseases, pediatric surgery, gynecology, and obstetrics, plastic and reconstructive surgery, ophthalmology, and pediatric urology.

Although the forms and scopes of restrictions vary in Turkey, they first started on March 21, 2020, and ended on June 1, 2020. Due to the increase in the number of cases in autumn, restrictions were started to be implemented for the second time starting from November 17, 2020. As of March 10, 2021, when the last data were included in the study, the second restriction period continued.

Statistical Analysis

The data were analyzed with the Shapiro-Wilk test to determine whether they showed a normal distribution. The results were presented as mean ± standard deviation or frequency and percentage values. Normally distributed data were compared with the independent-samples t-test or one-way analysis of variance. The Bonferroni test was used as a multiple comparison method. Categorical variables were compared between groups using Pearson's chi-square test and the Fisher-Freeman-Halton test. The level of statistical significance was set at $p < 0.05$. Statistical analyses were made using IBM SPSS ver. 23.0 (IBM Corp. Release 2015. IBM SPSS Statistics for Windows, Version 23.0. Armonk, NY: IBM Corp.).

RESULTS

The data on outpatient clinics, hospitalization, consultations, mortality, and surgery are summarized in Table 1 according to the groups. The data in each row are divided into two parts for the urology clinic and total data for all surgical clinics (except row E).

Outpatient Clinic Admissions

The number of admissions to urology outpatient clinics decreased with the beginning of the pandemic, but the ratio of urology admissions to all outpatient clinic admissions was higher in Group A than in the remaining groups (Table 1.A). The relationship between the number of outpatient clinic visits of the groups for the same periods are shown in Fig. 1. Due to the effect of the pandemic, repeated admissions to

Table 1. Data overview

		Group A	Group B	Group C
A	Urology	19,250 (12.9)[a]	44,094 (11.8)[b]	43,302 (11.4)[c]
	Total	149,534 (100.0)	374,730 (100.0)	378,808 (100.0)
B	Urology	3.10 ± 2.23 (2-35)[a]	3.26 ± 2.24 (2-34)[b]	3.21 ± 2.21 (2-33)[c]
	Total	3.36 ± 2.47 (2-40)[a]	3.32 ± 2.32 (2-39)[b]	3.32 ± 2.29 (2-45)[b]
C	Urology	46.83 ± 17.86[a]	50.08 ± 19.00[b]	50.02 ± 19.27[b]
	Total	39.51 ± 19.48[a]	41.70 ± 20.52[b]	41.37 ± 20.69[c]
D	Urology	16,772 (14.6)[a]	56,796 (14.7)[a]	57,654 (14.3)[b]
	Total	114,934 (100.0)	386,856 (100.0)	403,893 (100.0)
E	Urology	-0:11:47 ± 1:03:30[a]	-0:20:14 ± 1:24:43[b]	-0:15:39 ± 1:29:19[c]
F	Urology	0:20 ± 0:55[a]	0:18 ± 1:11[b]	0:13 ± 0:47[c]
	Total	0:30 ± 0:56[a]	0:24 ± 1:02[b]	0:19 ± 0:49[c]
G	Urology	1,301 (5.1)[a]	3,884(7.7)[b]	3,761(7.7)[b]
	Total	25,714 (100.0)	50,719 (100.0)	49,004 (100.0)
H	Urology	57.45 ± 17.45[a]	56.14 ± 19.13[b]	56.59 ± 19.18[b]
	Total	39.59 ± 20.99[a]	43.46 ± 21.19[b]	41.47 ± 20.75[c]
I	Urology	4.21 ± 4.6 (0-62)[a]	3.91 ± 4.20 (0-62)[b]	3.81 ± 3.57 (0-43)[b]
	Total	3.12 ± 4.66[a]	3.11 ± 5.05[b]	3.25 ± 4.94[c]
J	Urology	4 (0.3)[a]	11 (0.3)[a]	12 (0.3)[a]
	Total	339 (1.3)[a]	304 (0.6)[b]	256 (0.5)[b]
K	Urology	1,061 (3.9)[a]	1,658 (4.1)[a]	1,575 (3.5)[b]
	Total	27,058 (100.0)	40,613 (100.0)	44,455 (100.0)
L	Urology	52.72 ± 22.79[a]	52.70 ± 22.73[a]	50.18 ± 23.81[b]
	Total	35.09 ± 24.49[a]	35.21 ± 24.10[a,b]	34.74 ± 23.20[a,c]
M	Urology	998 (6.6)[a]	3,030 (9.3)[b]	2,965 (9.6)[b]
	Total	15,181 (100.0)	32,500 (100.0)	30,798 (100.0)

A. Number of outpatient clinic admissions (repeated applications not included), n (%) **B**. Repeated admissions to the outpatient clinic, mean ± SD (min-max) **C**. Age of patients admitted to the outpatient clinic, mean ± SD **D**. Number of appointments made for the outpatient clinic, n (%) **E.** Patients' arrival times at outpatient clinics with an appointment, mean ± SD (hh:mm:ss) **F.** Outpatient clinic procedure times, mean ± SD, **G.** Number of patients admitted to the inpatient clinic, n (%) **H.** Age of hospitalized patients, mean ± SD **I.** Number of days of hospitalization, mean ± SD (min-max) **J.** Mortality status of patients admitted to the inpatient clinic, n (%) **K.** Consultations requested from emergency services to the branches, n (%) **L.** Age of patients for whom consultation was received, mean±SD **M.** Number of patients who underwent surgery, n (%)

[a, b, c] : There is no statistically significant difference between the groups marked with the same letters in each row. In other words, different letters indicate that the difference between the groups in that row is statistically significant ($p < 0.05$)

the urology outpatient clinics decreased in Group A (Table 1.B). It was observed that the mean age was significantly lower in Group A than in the remaining groups (Table 1.C). Fig. 2 presents the age weights of the patients who were admitted to the outpatient clinics according to the monthly periods.

Admissions to outpatient clinics were in two forms: with and without an appointment. The ratio of appointments did not significantly change in the first year of the pandemic compared to the year before the

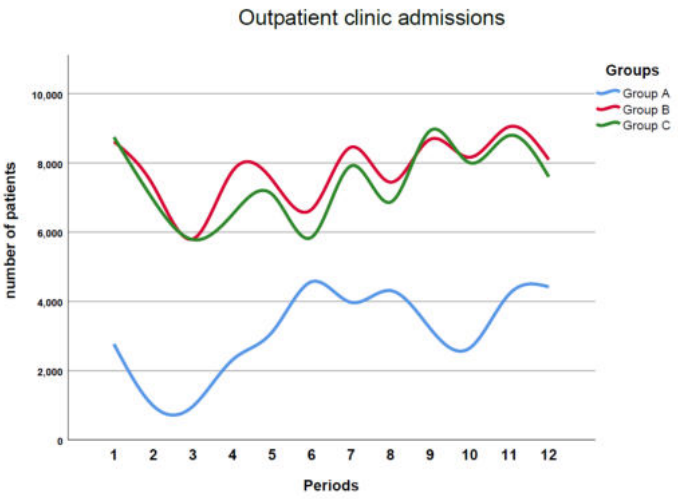

Fig. 1. Relationship between the number of outpatient clinic visits of the groups according to the monthly evaluation.

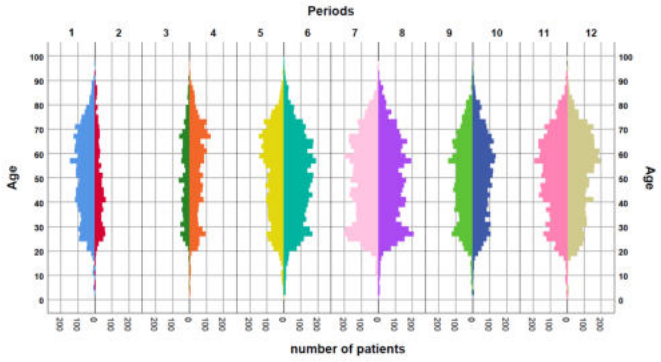

Fig. 2. Age weights of patients admitted to outpatient clinics according to the monthly evaluation.

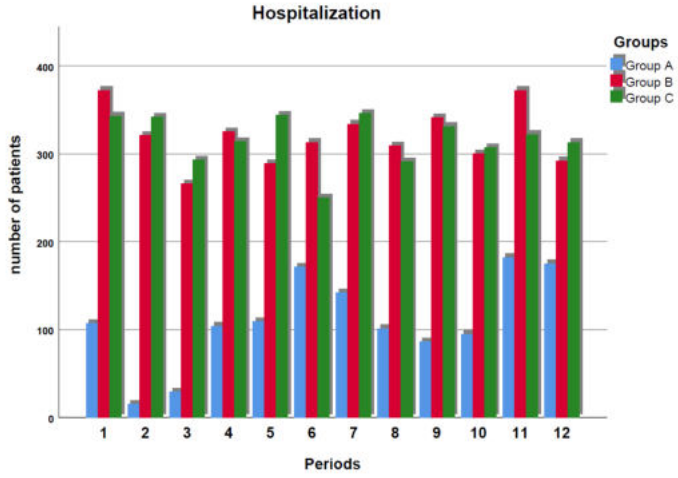

Fig. 3. Comparison of the number of hospitalized patients between the groups according to the monthly evaluation.

pandemic (Table 1.D). It was observed that the patients mostly presented to outpatient clinics before the appointment time, and during the pandemic period, they arrived at the hospital closer to their appointment times for urology outpatient clinics (Table 1.E). It was seen that the duration of procedures in urology outpatient clinics increased during the pandemic (Table 1.F).

Hospitalization

With the effect of the pandemic, as in all surgical clinics, there was a decrease in the number of patients admitted to the inpatient urology clinic (Table 1.G). The comparison of the number of hospitalized patients between the groups for the same periods are shown in Fig. 3. It was observed that the mean age of the patients who were hospitalized and their hospitalization time were significantly higher during the pandemic year (Table 1.H, 1.I).

Inpatient Clinic Mortality

No statistically significant difference was found between the three groups in relation to the mortality rate among patients admitted to inpatient clinics ($p = 0.959$) (Table 1.J). Similarly, the in-hospital mortality rate of urology patients was not affected by the pandemic.

Consultation from Emergency Department

In terms of emergency department consultations with the urology clinic, the difference between Groups A and B was not statistically significant while there was a statistically significant difference between Groups A and C (Table 1.K). The mean age of the consulted patients did not statistically significantly differ between Groups A and B ($p = 1$) but it was significantly higher during the pandemic compared to second years before the pandemic (Table 1.L).

Number of Operations

With the effect of the pandemic, the number and rate of patients that underwent surgery in the urology clinic significantly decreased (Table 1.M).

DISCUSSION

At the time of writing this paper, the COVID-19 pan-

demic had become the third largest pandemic causing the highest number of deaths after the Spanish flu and human immunodeficiency virus pandemics seen in the 20th and 21st centuries, respectively [5,6]. Due to the sudden increase in the number of patients, the health system in many countries has had difficulties coping with the pandemic and has been forced to compensate for the rapidly increasing need for personal protective equipment, inpatient clinics, and intensive care beds, and ventilator devices, in addition to providing standard healthcare services [7]. The usual service delivery of the healthcare system has had to be transformed in order to meet different demands. This has caused radical changes in standard health parameters.

With the demonstration that the virus causing COVID-19 can spread from person to person through droplets, countries have taken strict measures, such as closing schools, working at home, and home quarantine [8, 9]. This situation has limited people's access to health services. On the other hand, at the beginning of the pandemic, people tended to strictly implement all social and personal precautions and respected restrictions, as they were afraid of contracting an incurable disease they had not encountered before [10]. Therefore, the number of outpatient clinic admissions decreased by more than half, especially during the pandemic period. This decrease was particularly evident in the first quarter of the pandemic. At the second and third months period after the beginning of the pandemic, the number of outpatient clinic admissions decreased by approximately 90% compared to the previous years (Fig. 1). Quarantine conditions and people's fear of getting seriously ill play an important role in this decrease. After June, with the relaxation of measures and decrease in the number of COVID-19 patients, there was an increase in outpatient clinic admissions. In the literature, various articles have reported a decrease of up to 50% in outpatient clinic admissions, especially in the first months of the pandemic [11-13]. In these publications, at six months after the onset of the pandemic, outpatient clinic admissions increased to similar numbers as observed in years before the pandemic. In our study, we determined that even during the calmest periods of the pandemic, outpatient clinic applications were approximately 30% less compared to previous years. This decrease reached 85% in the most severe periods of the pandemic. However, there was a greater decrease in other surgical branches. We consider that the consequences of this reduction in admissions will be demonstrated by future long-term studies.

The mean age of the patients who were admitted to urology clinic during the pandemic period was found to be lower (46.83 ± 17.86 years) when compared to the previous years. When the subgroup analysis was performed, the lowest mean age was found in the second period of the pandemic year (45.95 ± 17.29) years. Fig. 2 shows the age distribution of the patients who were admitted to outpatient clinics according to the periods. It was thought that the curfew imposed on citizens aged over 65 years in Turkey may have been effective in this finding. Similarly, due to of the pandemic, the number of repeated admissions to outpatient clinics decreased compared to the previous years. When the patients who presented to the hospital with an appointment were evaluated, it was observed that those in Group A arrived at the hospital closer to their appointment hours compared to the previous years, possibly to comply with the social isolation rules. The reason for the statistically significant increase in the duration of outpatient clinic procedures during the pandemic may be the obligatory hospitalization of patients with higher morbidity due to isolation measures and prolonged anamnesis and examination times.

With the spread of COVID-19, there has been a serious decrease in the number of admissions to ED. Even in life-threatening diseases, such as acute myocardial infarction and stroke, reductions of up to 40% are observed, while admissions for urological reasons, such as urinary tract infections were reported to have decreased by 50% [11]. In a previous study, it was shown that consultations from ED to the urology clinic decreased to one-third [14]. In our study, consultations showed more than a 30% decrease during the pandemic compared to the previous years, there was a similar decrease in other surgical branches. When compared with the literature, we consider that consultation services were less affected in our hospital. Perhaps the most important question here is how much the health of patients will be affected by this situation in future.

With the onset of the pandemic, hospitalizations dropped dramatically due to COVID-19 patients being prioritized, health delivery, and the easy spread of the disease. In addition, many elective operations and hos-

pitalizations were postponed due to the fear of infecting the environment by aerosol emitted during surgery. Shortly after the onset of the pandemic, the European Association of Urology (EAU) divided urological diseases and conditions into four main priority groups [15]. Similarly, in their respective studies, Ficarra *et al*. and Stensland *et al*. categorized urological cancer cases and set a priority order [16, 17]. Many different clinics have managed patients in line with these categories and provided similar recommendations [18, 19]. We also postponed elective operations and hospitalizations in our clinic by accepting only surgical patients in the high priority group. Considering the pandemic period, 1,301 patients were admitted to inpatient urology clinics (Fig. 3). Compared with the first and second years before the pandemic, the number of hospitalized patients during the pandemic decreased by 66% and 65%, respectively. However, this decrease was also seen in other clinics, although not to the extent observed in the urology clinic. Considering the demographic data of the hospitalized patients, the patients that were hospitalized during the pandemic were older compared to the previous years. The mean hospitalization duration of the patients admitted to the inpatient urology clinic during the pandemic was calculated as 4.21 ± 4.6 days, and the length of hospitalization was longer compared to the one and two years before the pandemic. Many low-priority operations were postponed in line with the EAU guidelines [15]. During the pandemic year, 998 (76%) of the 1,301 hospitalized patients underwent surgery. Compared to the previous years, the number of operations decreased by one-third. A lesser reduction was observed in other surgical branches than in urology.

One of the most important problems caused by the pandemic is the increase in the mortality rate. In most publications, it has been reported that this increase is due to patients' late admission to health institutions, as well as interventions being undertaken at more advanced stages of diseases [11, 13, 20]. During the pandemic, we determined that the number of deaths increased to 339 from 256 in previous years. In addition, when mortality was compared proportionally to the number of hospitalized patients, it was seen that there was a more than twofold increase in Group A compared to Groups B and C (1.3%, 0.6% and 0.5%, respectively). This was attributed to difficulties in accessing health services as a result of restrictions or individuals refraining from visiting health institutions due to their fear of contracting COVID-19. However, when the mortality rates of the urology clinic were examined, there was no change during the pandemic compared to the previous years, unlike the situation in other branches (0.3%). The reason why the mortality rate of the patients treated in the urology clinic did not change may be that urological operations were continued to be performed by taking precautions and following algorithms. However, long-term mortality rates may increase.

Limitations

One of the limitations of our study is that the results obtained cannot be generalized to all other countries due to the differences in health systems.

CONCLUSION

The COVID-19 pandemic has taken its place as one of the most important health problems that the whole world has had to face in the last century. While countries have had to react rapidly to provide healthcare services to tackle the disease, the management of other diseases has also been affected. As seen in our study, the number of outpatient clinic admissions, hospitalizations, and operations significantly decreased, especially in the early stages of the pandemic. During the pandemic period evaluated, although the spread of the disease was partially brought under control through measures and its impact decreased at certain times, these parameters did not return to their pre-pandemic levels. As a result of the decreased number of admissions, patients may have started to receive health services at more advanced stages, and the number of deaths may have increased secondary to this. In terms of urology, the number of hospitalized patients and the number of operations decreased to a greater extent, while the number of mortality and outpatient clinic admissions were less affected, compared to the other surgical branches. Although this study was conducted with a large number of patients presenting to a large hospital, there is still a need for multicenter studies with longer follow-ups.

Authors' Contribution

Study Conception: GD; Study Design: GD; Super-

vision: GD; Funding: GD; Materials: N/A; Data Collection and/or Processing: GD; Statistical Analysis and/or Data Interpretation: GD; Literature Review: GD, AE; Manuscript Preparation: GD, AE and Critical Review: GD.

Conflict of interest

The authors disclosed no conflict of interest during the preparation or publication of this manuscript.

Financing

The authors disclosed that they did not receive any grant during conduction or writing of this study.

Acknowledgement

We thank Ass. Prof. Guven Ozkaya for his contribution to the statistical analysis and Kerem Onur Ilbasi (IT staff) for his support in data collection. The first author also thanks Prof. Cengiz Alyılmaz for his academic guidance.

REFERENCES

1. Hui DS, Azhar EI, Madani TA, Ntoumi F, Kock R, Dar O, et al. The continuing 2019-nCoV epidemic threat of novel coronaviruses to global health--The latest 2019 novel coronavirus outbreak in Wuhan, China. Int J Infect Dis 2020;91:264-6.
2. Demirbilek Y, Pehlivantürk G, Özgüler ZÖ, Meşe EA. COVID-19 outbreak control, example of ministry of health of Turkey. Turk J Med Sci 2020;50(SI-1):489-94.
3. Dotzauer R, Böhm K, Brandt MP, Sparwasser P, Haack M, Frees SK, et al. Global change of surgical and oncological clinical practice in urology during early COVID-19 pandemic. World J Urol 2021;39:3139-45.
4. Ahmed K, Hayat S, Dasgupta P. Global challenges to urology practice during the COVID-19 pandemic. BJU Int 2020;125:E5-6.
5. Cohen MS, Hellmann N, Levy JA, DeCock K, Lange J. The spread, treatment, and prevention of HIV-1: evolution of a global pandemic. J Clin Invest 2008;118:1244-54.
6. Flecknoe D, Charles Wakefield B, Simmons A. Plagues & wars: the 'Spanish Flu' pandemic as a lesson from history. Med Confl Surviv 2018;34:61-8.
7. Pillai S, Siddika N, Hoque Apu E, Kabir R. COVID-19: Situation of European Countries so far. Arch Med Res 2020;51:723-5.
8. Wang J, Du G. COVID-19 may transmit through aerosol. Ir J Med Sci 2020;189:1143-4.
9. Atalan A. Is the lockdown important to prevent the COVID-19 pandemic? Effects on psychology, environment and economy-perspective. Ann Med Surg 2020;56:38-42.
10. Miller SM. Monitoring and blunting: validation of a questionnaire to assess styles of information seeking under threat. J Pers Soc Psychol 1987;52:345-53.
11. Birkmeyer JD, Barnato A, Birkmeyer N, Bessler R, Skinner JJHA. The impact of the COVID-19 pandemic on hospital admissions in the United States. Health Aff (Millwood) 2020;39:2010-7.
12. Helgeland J, Telle KE, Grøsland M, Huseby BM, Håberg S, Lindman ASE. Admissions to Norwegian hospitals during the COVID-19 pandemic. Scand J Public Health 2021;49:681-8.
13. Bodilsen J, Nielsen PB, Søgaard M, Dalager-Pedersen M, Speiser LOZ, Yndigegn T, et al. Hospital admission and mortality rates for non-covid diseases in Denmark during covid-19 pandemic: nationwide population based cohort study. BMJ 2021;373:n1135.
14. Motterle G, Morlacco A, Iafrate M, Bianco M, Federa G, Xhalka O, et al. The impact of COVID-19 pandemic on urological emergencies: a single-center experience. World J Urol 2020;39:1985-9.
15. Ribal MJ, Cornford P, Briganti A, Knoll T, Gravas S, Babjuk M, et al. EAU Section Offices and the EAU Guidelines Panels. European Association of Urology Guidelines Office Rapid Reaction Group: An Organisation-wide Collaborative Effort to Adapt the European Association of Urology Guidelines Recommendations to the Coronavirus Disease 2019 Era. Eur Urol 2020;78:21-8.
16. Ficarra V, Novara G, Abrate A, Bartoletti R, Crestani A, Nunzio CD, et al. Urology practice during COVID-19 pandemic. Minerva Urol Nefrol 2020;72:369-75.
17. Stensland KD, Morgan TM, Moinzadeh A, Lee CT, Briganti A, Catto JWF, et al. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. Eur Urol 2020;77:663-6.
18. Pepe P, Pepe L, Pennisi M, Fraggetta F. Prostate cancer diagnosis and management during one year of the COVID-19 pandemic. Anticancer Res 2021;41:3127-30.
19. Ok F, Durmus E. Disease management in a patient diagnosed with COVID-19 disease during induction intravesical BCG therapy: a case report and review of the literature. Urologia 2021. doi: 10.1177/03915603211001670
20. Woolf SH, Chapman DA, Sabo RT, Weinberger DM, Hill L. Excess deaths from COVID-19 and other causes, March-April 2020. JAMA 2020;324:510-3.