How the COVID-19 Wave Changed Emergency Urology: Results From an Academic Tertiary Referral Hospital in the Epicentre of the Italian Red Zone

Andrea Gallioli, Giancarlo Albo, Elena Lievore, Luca Boeri, Fabrizio Longo, Matteo Giulio Spinelli, Giorgio Costantino, Emanuele Montanari, and Elisa De Lorenzis

OBJECTIVE To quantify and characterize the burden of urological patients admitted to emergency department (ED) in Lombardy during Italian COVID-19 outbreak, comparing it to a reference population from 2019.

METHODS We retrospectively analysed all consecutive admissions to ED from 1 January to 9 April in both 2019 and 2020. According to the ED discharge ICD-9-CM code, patients were grouped in urological and respiratory patients. We evaluated the type of access (self-presented/ambulance), discharge priority code, ED discharge (hospitalization, home), need for urological consultation or urgent surgery.

RESULTS The number of urological diagnoses in ED was inversely associated to COVID-19 diagnoses (95% confidence interval −0.41/−0.19; Beta = −0.8; $P < .0001$). The average access per day was significantly lower after 10 March 2020 (1.5 ± 1.1 vs 6.5 ± 2.6; $P < .0001$), compared to reference period. From 11 March 2020, the inappropriate admissions to ED were reduced (10/45 vs 96/195; $P = .001$). Consequently, the patients admitted were generally more demanding, requiring a higher rate of urgent surgeries (4/45 vs 4/195; $P = .02$). This reflected in an increase of the hospitalization rate from 12.7% to 17.8% (Beta = 0.88; $P < .0001$) during 2020.

CONCLUSION Urological admissions to ED during lockdown differed from the same period of 2019 both qualitatively and quantitatively. The spectrum of patients seems to be relatively more critical, often requiring an urgent management. These patients may represent a challenge due to the difficult circumstances caused by the pandemic. UROLOGY 147: 43–49, 2021. © 2020 Elsevier Inc.

On 20 February 2020, the first patient with coronavirus disease 2019 (COVID-19) was diagnosed in Lombardy, Italy. Since then, an exponential increase in the number of affected patients was recorded in the same country. On 10 March 2020, the Prime Minister imposed a nationwide lockdown. The day after, the World Health Organization (WHO) announced COVID-19 outbreak a pandemic.[1] At that point, Italy was the second most affected country in the world after China presenting 53,578 cases, 46% of which detected in Lombardy.[2,3]

Considering the growing number of admissions to emergency department (ED) and the need for patient's hospitalization (about 40% in Italy[3,4]), strategic actions to activate surge capacity (ie, the ability of a health system to manage a sudden and unexpected influx of patients in an emergency) soon became mandatory. As stated in the WHO Technical Guidance,[5] the 4 S's of surge capacity are space (hospitals and beds), staff, supplies and systems. Our institution was early on the frontline because it was identified as the coordinator of the intensive care unit (ICU) network of Lombardy[6] and accounts for one of the highest inpatient bed capacity among regional hospitals.[7] We have dynamically redefined COVID-19 and non-COVID-19 areas, especially in ED, and a great number of beds and staff dedicated to surgical patients have been redirected to the new COVID-19 wards. Anaesthesiologists have been redistributed in ICU, operating and recovery rooms have been converted into ICUs and consequently, all elective procedures have been postponed giving priority only to oncological cases. Panels of urologists published a series of suggestions for the

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From the Urology Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy; the University of Milan, Milan, Italy; the Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy; and the Emergency Department & Emergency Medicine Unit, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, Italy

Address correspondence to: Elisa De Lorenzis, M.D., F.E.B.U., Department of Urology, Foundation IRCCS Ca' Granda Ospedale Maggiore Policlinico, Department of Clinical Sciences and Community Health, University of Milan, Via della Commenda 15, Milan 20122, Italy. E-mail: elisa.delorenzis@gmail.com

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reorganization of urological practice and proposals for the triage of elective urologic surgeries during this pandemic.[8,9] Moreover, the European Association of Urology reviewed and adapted its guidelines considering the COVID-19 plague.[10] Understanding the influx and the characteristics of urological patients at the ED during COVID-19 pandemic could be useful to calibrate and eventually readapt the adopted measures and to plan strategies during the de-escalation phase.

However, to the best of our knowledge, there are no data regarding the effective burden of urological patients admitted to ED during the exacerbation of COVID-19, and its impact on urologic practice. Aim of this study was to evaluate the number and the features of the urological accesses to an ED in the epicentre of the Italian COVID-19 outbreak, comparing it to a reference population from 2019.

MATERIAL AND METHODS

We conducted a retrospective study at the Foundation IRCCS Ca' Granda Ospedale Maggiore Policlinico, in Milan, an academic tertiary referral centre.

We reviewed all data regarding consecutive admissions to our ED from 1 January 2020 to 9 April 2020, in both 2019 and 2020. Analysing the ED discharge records, patients aged >18 years were divided according to the primary discharge diagnosis based on International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) codes (Supplementary Material 1).[11] We focused on urological and respiratory codes, and the latter were further categorized in COVID-19 and non-COVID-19 cases. The diagnosis of COVID-19 at discharge was formulated through a positive result of real-time reverse transcriptase-polymerase chain reaction assay of nasal and pharyngeal swabs or of lower respiratory tract aspirates performed in ED.[12] Patient's admissions were divided in 3 periods, based on the dates that have marked the outbreak progression in Italy: from 1 January to 19 February; from 20 February (date of the first COVID-19 case in Italy) to 10 March (the day of the lockdown) and from 11 March to 9 April.

Considering the diagnosis at discharge, urological cases were further grouped into: lower urinary tract/genital symptoms, genitourinary infections, haematuria and upper urinary tract symptoms (including renal pain, hydronephrosis and urolithiasis). Respiratory diagnoses were gathered into: fever, cough/bronchitis, respiratory insufficiency, pneumoniae and flu.

The recorded data included the following: gender, age, type of access (self-presented/ambulance), discharge priority code (white = non-urgent, green = minor urgency, yellow = urgent and red = non-deferrable emergency)[13] and ED discharge outcome (hospitalization, home). We also evaluated the number of CT scan, urological consultations and urgent surgeries provided to ED urological patients. Inappropriate admissions to ED were defined as non-urgent or minor deferrable urgency not requiring ambulance nor urological consultation. The institutional ethics board of Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milan, approved this non-interventional, retrospective cohort study.

Statistical Analysis

Sample size was equal to the number of patients treated during the study period. Categorical variables were presented as absolute number and percentage, quantitative variables were presented as mean ± standard deviations (SD). The data were compared with t test for numeric variables and chi-square for qualitative variables. Linear regressions tested the correlation between quantitative data. Graphs were created to report the trends of the evaluated variables as mean per day/cumulative cases over the period in question. All statistical tests were 2-tailed, and statistical significance was defined as $P < .05$. Analyses were performed using SPSS Statistics 26 and graphs were generated using Microsoft Excel v.2019.

RESULTS

Patients With Respiratory Diagnosis

In 2020, 1665 patients were discharged from ED with a respiratory diagnosis (Table 1), with an average access per day of 16.7 ± 7.8. A total of 451 (27.1%) confirmed COVID-19 cases were diagnosed in ED. Figure 1A shows the curve of respiratory diagnoses in ED: an increase of admissions was observed from 31 January 2020 to 4 February 2020 reaching its peak (30 patients/day) in the period between 16 and 20 March 2020. When compared to the same period in 2019, from 20 February 2020 to 10 March 2020, the average access per day doubled (18.4 ± 6.3 vs 8.9 ± 3.2; $P < .0001$) and trebled in the subsequent month (23.4 ± 7.9 vs 7.4 ± 2.6; $P < .0001$).

Patients With Urological Diagnosis

The characteristics of urological patients are reported in Table 2. Overall, in 450 patients a urological diagnosis was formulated in ED between 1 January 2020 and 9 April 2020. The average access per day was significantly lower in 2020 than in 2019 (4.5 ± 2.9 vs 6.4 ± 2.6; −29.1%; $P < .0001$). The number of urgent surgeries performed in 2020 was higher (17/450 [3.8%] vs 12/635 [1.9%]) but did not reach the statistical significance ($P = .06$).

The urgent surgeries in 2020 were 15 decompressions of the renal collecting system (88.2%), 1 ureteroscopy with lithotripsy in a patient on anticoagulant therapy (5.9%) and 1 inguinal exploration (5.9%). On the other hand, the distribution of type of access, priority code, urological symptoms, number of CT scans required and discharge outcome from ED were comparably distributed (all $P > .2$).

COVID-19 and Urological Patients

The curve of access to ED by urological patients (Fig. 1B) shows a significant reduction starting from 20 February 2020, after a peak (10.6 patients/day) between 6 and 10 January 2020. Figure 1C shows the trend of COVID-19 diagnoses and the inverse relation with urological patients presenting to ED (95% confidence interval [CI] −0.41/−0.19; Beta = −0.8; $P < .0001$; Supplementary Table 1). In fact, during 20 February 2020 and 10 March 2020 and 11 March 2020 and 9 April 2020, there was a 15.9% (4.5 ± 1.8 in 2020 vs 5.7 ± 2.9 in 2019; $P = .13$) and 76.9% (1.5 ± 1.1 vs 6.5 ± 2.6; $P < .0001$) reduction in ED admissions by urological patients, respectively, compared to 2019.

The trend of urological patients during COVID-19 pandemic depended from the reduction of access by self-presentation (95% CI −0.36/−0.17; Beta = −0.8; $P < .0001$) rather than by ambulance (−0.07/−0.005; Beta = −0.39; $P = .09$; Fig. 1D; Supplementary Table 1). In fact, the patients presented more frequently in ambulance after the lockdown start (24/45 [53.3%] in 2020 vs 42/195 [21.5%] in 2019; $P < .0001$). Urgent cases

Table 1. Demographic data and clinical distribution of patients discharged from emergency department with respiratory diagnosis, divided by study periods

	Overall			01/01-19/02			20/02-10/03			11/03-09/04		
	2019	2020	*P*	2019	2020	*P*	2019	2020	*P*	2019	2020	*P*
No. patients	980	1665	<.0001	587	596	.82	170	368	<.0001	223	701	<.0001
Mean (SD) per day	9.9 (3.8)	16.7 (7.8)		11.7 (3.6)	11.9 (4.3)		8.9 (3.2)	18.4 (6.3)		7.4 (2.6)	23.4 (7.9)	
Age	63.1 (22.3)	56.1 (21.1)	<.0001	62.8 (22.5)	56.8 (24.3)	<.0001	63.2 (22.7)	52.1 (20.6)	<.0001	63.6 (21.6)	57.6 (18)	.0002
Mean (SD) per day												
Sex			.0005			.97			.045			.003
Male	497 (50.7)	960 (57.7)		296 (50.4)	301 (50.5)		86 (50.6)	220 (59.8)		115 (51.6)	439 (62.6)	
Female	483 (49.3)	705 (42.3)		291 (49.6)	295 (49.5)		84 (49.4)	148 (40.2)		108 (48.4)	262 (37.4)	
COVID-19	/	451 (27.1)		/	/		/	55 (14.9)		/	396 (56.5)	
Non–COVID-19	980 (100)	1214 (72.9)	<.0001	587 (100)	596 (100)	.08	170 (100)	313 (85.6)	<.0001	223 (100)	305 (43.5)	<.0001
Fever	181 (18.5)	367 (30.2)		105 (17.9)	124 (20.8)		31 (18.2)	113 (30.7)		45 (20.2)	130 (42.6)	
Bronchitis/cough	205 (20.9)	284 (23.4)		119 (20.3)	148 (24.8)		43 (25.3)	74 (20.1)		43 (19.3)	62 (20.3)	
Respiratory insufficiency	91 (9.3)	83 (6.8)		64 (10.9)	47 (7.9)		12 (7.1)	17 (4.6)		15 (6.7)	19 (6.2)	
Pneumonia	422 (43)	374 (30.8)		240 (40.9)	220 (36.9)		74 (43.5)	66 (17.9)		108 (48.4)	88 (28.9)	
Flu	81 (8.3)	106 (8.7)		59 (10)	57 (9.6)		10 (5.9)	43 (11.7)		12 (5.4)	6 (2)	

SD, standard deviation; COVID-19, coronavirus disease 2019.

slightly decreased after 25 February 2020 without a significant association with COVID-19 (95% CI −0.05/0.00001; Beta = −0.45; *P* = .05), while green codes diminished only after Italian lockdown (Fig. 2A). White codes declined after the first case of COVID-19 in Italy, although they still represented the 23.3% (21/90) of the ED admissions before 11 March 2020. Moreover, the inappropriate admissions to ED were significantly lower after Italian lockdown, compared to 2019 (10/45 [22%] vs 96/195 [49.2%], respectively; *P* = .001). The type of urological diagnosis decreased uniformly during 2020 compared to 2019 (Fig. 2B and Table 2). After 10 March 2020, urological consultations relatively raised (20/45 [44.4%] in 2020 vs 68/195 [34.8%] in 2019; *P* = .4; Fig. 2C). Similarly, the number of urgent surgeries was not related to the COVID-19 outbreak (95% CI −0.02/0.006; Beta = −0.28; *P* = .2) but increased in percentage after 10 March 2020 (4/45 [8.8%] in 2020 vs 4/195 [2.1%] in 2019; *P* = .02). The hospitalization rate was directly associated with COVID-19 outbreak (95% CI 0.009/0.05; Beta = 0.57; *P* = .009), as it raised from 12.7% of the first period to 17.8% after Italian lockdown. This reflected in an increasing hospitalization rate during 2020 (Beta = 0.88; *P* < .0001), while remaining stable in 2019 (Beta = −0.44; *P* = .06; Supplementary Fig. 1, Supplementary Table 1).

In our COVID-free department, 2 patients who were admitted from ED with urological diagnosis subsequently resulted positive for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) without evidence of contagion to other patients and healthcare professionals.

DISCUSSION

In this study, we demonstrated a significant reduction of the admissions to ED by urological patients after the Italian lockdown establishment (−76.9% compared to the reference period of 2019), inversely correlated with the increasing incidence of COVID-19. To date, this is the first study in literature analysing the relation between the COVID-19 wave and emergency urology. The observation of a general reduction in the mean ED access number per day by urological patients is in line with the literature provided in other fields,[14] but given the actual lack of data, a proper comparison with other studies cannot be performed. However, the urological patients entering the ED after the declaration of pandemic were characterized by a significantly low rate of inappropriate admissions (22%) and a high rate of patients that underwent a paramedic evaluation and were transported in ambulance, especially among urgent/emergency cases (71.4%). Additionally, these patients had a relatively high rate of urgent priority codes (15.6%), and need for a urological consultation (44.4%) when compared to 2019 data. As a result, a high rate of urgent surgeries (8.8%) and hospitalization (17.8%) was reported. These results are particularly meaningful, as during the emergency the beds were reallocated to COVID-19-dedicated wards whenever possible, with a dramatic reduction in everyday surgical activities and deferral of all non-urgent ones. We can speculate 3 possible interpretations of the collected data. Firstly, this change could be the consequence of the limited access to urological office-based visits, leading to a surge of

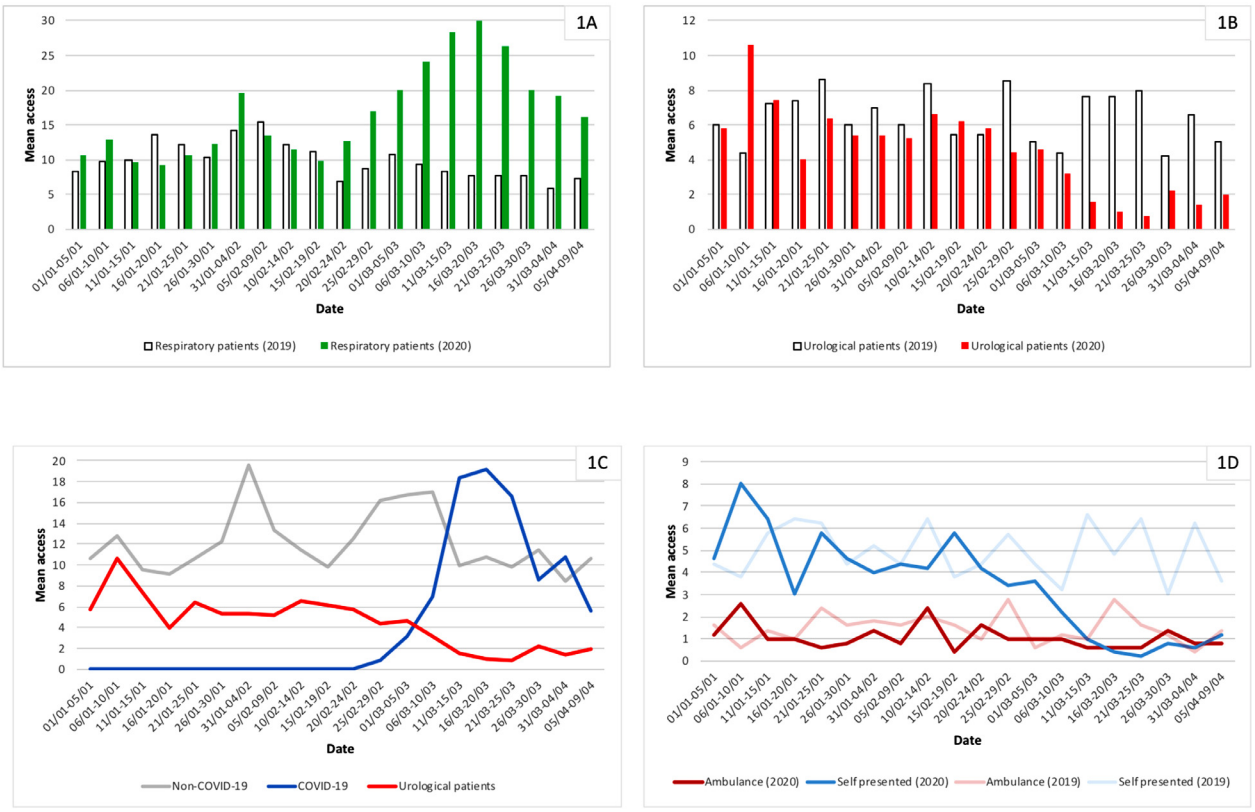

Figure 1. Average admissions to emergency department with respiratory (**A**) and urological diagnosis (**B**) in 2019 and 2020. Mean access of respiratory patients (divided on the basis of COVID-19 diagnosis) and urological patients in 2020 (**C**). Mode of presentation to the emergency department (ambulance vs self-presented) (**D**). All dates are expressed as day/month. (Color version available online.)

undiagnosed conditions. Many urological patients, scared by the risk of contagion, may have deferred the admission to an overwhelmed ED. These patients may later be directed to ED during de-escalation phase, provoking a new surge in self-presented patients. Secondly, development of complications may be related to patients whose elective surgery was postponed (14.3% in our series, from 20 February 2020 on). The delay of surgical procedures was mainly dictated by the lack of resources. Of note, few data about links between the effects of surgery and SARS-Cov-2 carriers are available. A study conducted in Wuhan reported a 44.1% rate of ICU admission and a 20% mortality rate in asymptomatic patients who tested COVID-19 positive after the surgical procedure.[15] These results highlighted the pitfall of the asymptomatic carrier of SARS-CoV-2 and/or the risk of infection in the hospital settings, especially in the first outbreak phases, when swabs were not routinely performed in candidates to elective surgeries. Lastly, the undeferrable emergencies were probably not affected by the fear of the COVID-19 pandemic, as suggested by the low rate of patients inappropriately presenting to ED. While the analysis of the consequences of COVID-19 pandemic in urology is of the utmost importance, we should not underestimate the need to understand how and why Lombardy has been invested by such a surge. The stratification of admissions by priority code (Fig. 2A) shows that for green codes, the admission's curve inversion is delayed after the lockdown and it slightly decreases for non-urgent patients from 20 February 2020. In fact, between 20 February 2020 and 10 March 2020, almost 1 urological patient out of 4 (23.3%) was non-urgent and 50% (45/90) fulfilled the criteria for improper admission with a rate similar to those reported in 2014 by Vedovetto et al.[16] This resulted in a relative and unnecessary overcrowding of the ED, enhancing exposure risk to the virus among a population mainly composed by males older than 50 years. In addition, it has been demonstrated that non-urgent patients have to wait for longer time before receiving treatment in case of overcrowding.[17] The same concept could be generalized for patients of other specialties and might partly explain COVID-19 outbreak in Lombardy, which is a region well known for the highly hospital-centred healthcare system. This dangerous setting should be limited in view of the near future of re-established daily activity reopening and concurrent risk of a second outbreak. Primary care resources should be reinforced and the continuity of care guaranteed. In this context, the role of the general practitioner is essential to screen patients' conditions, thus minimizing patients' self-presentation to ED for non-urgent cases. Moreover, the implementation of the territorial medicine system could offer a valid alternative to the ED for minor urgencies. In our hospital, the use of telemedicine has been activated for control visits. With a

Table 2. Demographic data, clinical characteristics and outcomes of patients discharged from emergency department with urological diagnosis, divided by study periods

	Overall			01/01-19/02			20/02-10/03			11/03-09/04		
	2019	2020	*P*	2019	2020	*P*	2019	2020	*P*	2019	2020	*P*
No. patients	635	450	<.0001	332	315	.5	107	90	.13	195	45	<.0001
Mean (SD) per day	6.4 (2.6)	4.5 (2.9)		6.6 (2.5)	6.3 (2.5)		5.7 (2.9)	4.5 (1.8)		6.5 (2.6)	1.5 (1.1)	
Age	53.7 (21.4)	52.6 (20.9)	.36	53.9 (21.9)	51.3 (20.7)	.13	54.2 (20.6)	57.9 (21.2)	.22	53.3 (21.1)	50.6 (20.2)	.43
Sex			.8			.74			.87			.5
Male	386 (60.8)	277 (61.6)		196 (59)	190 (60.3)		66 (61.1)	56 (62.2)		124 (63.6)	31 (68.9)	
Female	249 (39.2)	173 (38.4)		136 (41)	125 (39.7)		42 (38.9)	34 (37.8)		71 (36.4)	14 (31.1)	
Clinical presentation			.62			.08			.3			.37
Lower urinary tract/genital	116 (18.3)	83 (18.4)		64 (19.3)	47 (14.9)		20 (18.5)	24 (26.7)		32 (16.4)	12 (26.7)	
Upper urinary tract	239 (37.6)	178 (39.6)		122 (36.7)	141 (44.8)		41 (38)	24 (26.7)		76 (39)	13 (28.9)	
Genitourinary infections	197 (31)	142 (31.6)		97 (29.2)	94 (29.8)		35 (32.4)	33 (36.6)		65 (33.3)	15 (33.3)	
Haematuria	83 (13.1)	47 (10.4)		49 (14.8)	33 (10.5)		12 (11.1)	9 (10)		22 (11.3)	5 (11.1)	
Type of urgency			.75			.98			.25			.4
Non-urgency (white code)	171 (26.9)	112 (24.9)		87 (26.2)	83 (26.3)		36 (33.6)	21 (23.3)		48 (24.6)	8 (17.8)	
Minor urgency (green code)	397 (62.5)	289 (64.2)		209 (63)	199 (63.2)		60 (56.1)	60 (66.7)		128 (65.6)	30 (66.7)	
Urgency (yellow/red code)	67 (10.6)	49 (10.8)		36 (10.8)	33 (10.5)		12 (11.2)	9 (10)		19 (9.7)	7 (15.6)	
Type of presentation			.7			.17			.69			<.0001
Self-presented	490 (77.2)	343 (76.3)		254 (76.5)	255 (81)		83 (76.9)	67 (74.4)		153 (78.5)	21 (46.7)	
Ambulance	145 (22.8)	107 (23.7)		78 (23.5)	60 (19)		25 (23.1)	23 (25.6)		42 (21.5)	24 (53.3)	
Inappropriate admissions	306 (48.2)	226 (50.2)	.5	160 (48.2)	171 (54.3)	.002	50 (46.7)	45 (50)	.7	96 (49.2)	10 (22.2)	.001
Urological consultations	222 (34.9)	143 (31.8)	.27	115 (34.6)	95 (30.2)	.19	39 (36.4)	28 (31.1)	.4	68 (34.8)	20 (44.4)	.2
Computed tomography	30 (4.7)	22 (4.9)	.9	18 (5.4)	17 (5.4)	.98	4 (3.7)	3 (3.3)	.88	9 (4.6)	2 (4.4)	.96
Urgent surgeries	12 (1.9)	17 (3.8)	.06	7 (2.1)	10 (3.2)	.39	1 (0.9)	3 (3)	.23	4 (2.1)	4 (8.8)	.02
Type of discharge			.31			.46			.76			.28
Hospitalization	73 (11.5)	61 (13.6)		36 (10.8)	40 (12.7)		14 (13)	13 (14.4)		23 (11.8)	8 (17.8)	
Home	562 (88.5)	389 (86.4)		296 (89.2)	275 (87.3)		94 (87)	77 (85.6)		172 (88.2)	37 (82.2)	

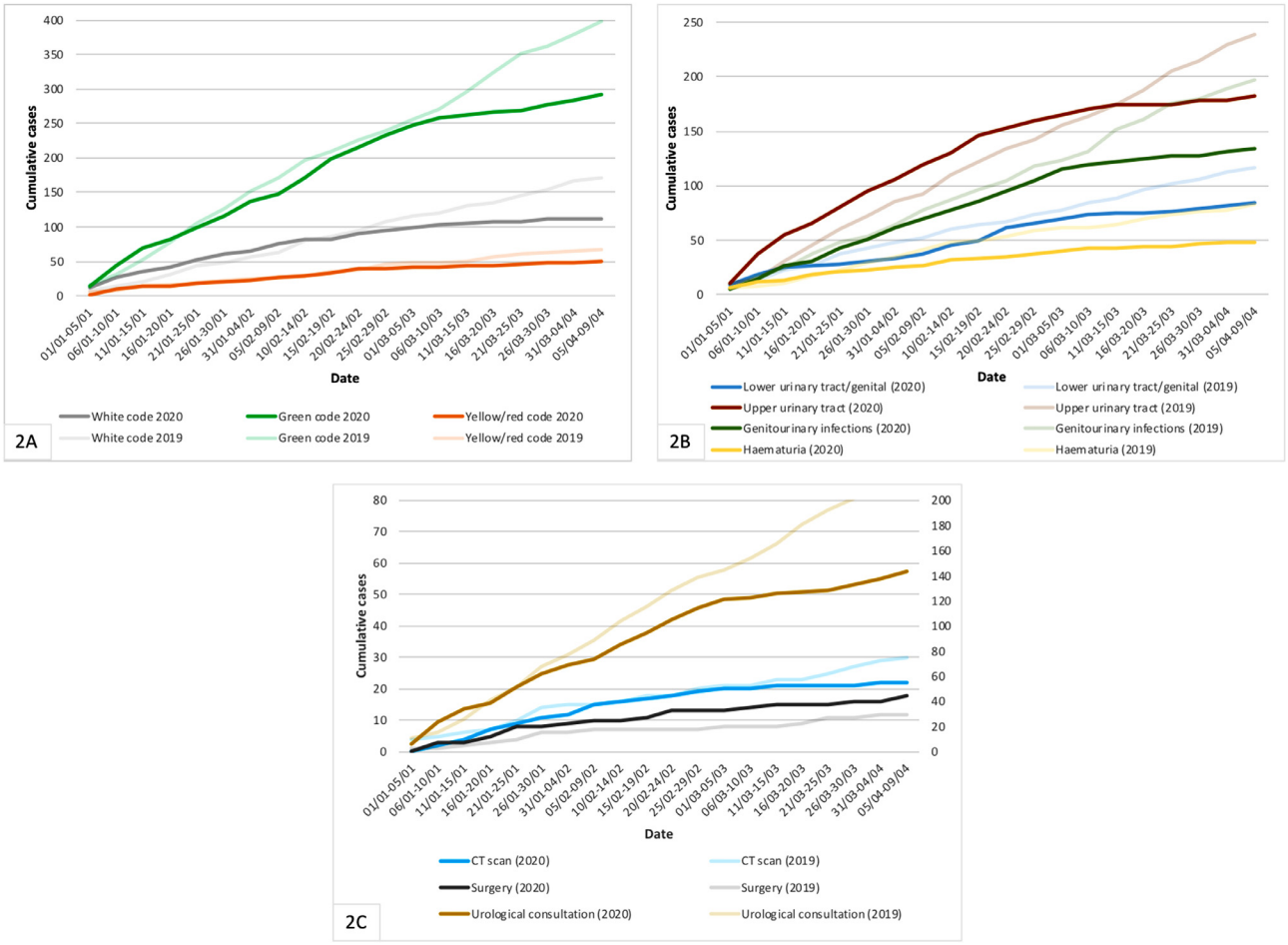

Figure 2. Cumulative cases of urological patients stratified by urgency code (**A**), clinical presentation (**B**) and required urologic procedure (consultation, computed tomography scan, urgent surgery) (**C**). All dates are expressed as day/month. (Color version available online.)

specific-free platform, the patients who adhere may undergo a virtual consultation avoiding unnecessary accesses to the hospital. As described by Boehm et al,[18] about 60% of patients may be suitable for televisits, keeping the usual number of outpatient visits in a contact-free context.

Regarding the prioritization of the surgeries, the European Association of Urology offered specific guidelines.[10] In our department, all the procedures that are not urgent have been postponed (date to be determined) and all the patients have been warned of this delay. Oncological procedures were not deferred, except for radical prostatectomies in low-risk patients. Endourological surgeries were kept to a minimum, and all the patients eligible for shock wave lithotripsy were advised to shift to this treatment due to the decreased availability of the operating rooms.

As reported by Naspro et al,[19] we will be dealing with currently unpredictable implications and repercussions not only on patients' health but also on our future practice and on the healthcare system organization.

Our study is not devoid of limitations. First, it is a retrospective single-centre study. Second, the use of primary ICD-9-CM discharge code from ED may limit a more comprehensive evaluation of patients' clinical conditions. However, after lockdown every hospital in the region was overwhelmed by COVID-19 cases. Of note, no specific hub for urological urgencies was instituted by local government.

CONCLUSION

The present study demonstrated that, in our hospital, urological admissions to ED during lockdown differed from the same period of 2019 both qualitatively and quantitatively. The spectrum of patients seems to be relatively more critical and demanding, often requiring an urgent management. Will this trend continue or even get worse during the flattening the infection curve? Currently, the answer is still unknown, but urologists must be ready to face with this occurrence.

SUPPLEMENTARY MATERIALS

Supplementary material associated with this article can be found in the online version at https://doi.org/10.1016/j.urology.2020.09.028.

References

1. WHO. *Director-General's opening remarks at the media briefing on COVID-19: 11 March 2020*. 2020. Available at: https://www.who.int/dg/speeches/detail/who-director-general-s-opening-remarks-at-the-media-briefing-on-covid-19—11-march-2020. Accessed April 24, 2020 .
2. WHO. Coronavirus disease (COVID-2019) situation reports. Available at: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports Accessed April 24, 2020.
3. The Civil Protection Department – COVID 19-Italia (Summaries). Available at: http://opendatadpc.maps.arcgis.com/apps/opsdashboard/index.html#/b0c68bce2cce478eaac82fe38d4138b1. Accessed April 24, 2020.
4. Lazzerini M, Putoto G. COVID-19 in Italy: momentous decisions and many uncertainties. *Lancet Glob Health*. 2020. https://doi.org/10.1016/S2214-109X(20)30110-8.
5. WHO. Health Systems Respond to COVID-19. Technical Guidance #2. Creating surge capacity for acute and intensive care Recommendations for the WHO European Region. 2020. Available at: http://www.euro.who.int/__data/assets/pdf_file/0006/437469/TG2-CreatingSurgeAcuteICUcapacity-eng.pdf. Accessed April 25, 2020.
6. Grasselli G, Zangrillo A, Zanella A, et al. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy region, Italy. *JAMA*. 2020. https://doi.org/10.1001/jama.2020.5394.
7. Italian Ministry of Health. 2018. Italian Ministry of Health: bed capacity of Italian hospitals. Available at: http://www.dati.salute.gov.it/dati/dettaglioDataset.jsp?menu=dati&idPag=18. Accessed April 24, 2020.
8. Ficarra V, Novara G, Abrate A, et al. Urology practice during COVID-19 pandemic. *Minerva Urol Nefrol*. 2020. https://doi.org/10.23736/S0393-2249.20.03846-1.
9. Stensland KD, Morgan TM, Moinzadeh A, et al. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. *Eur Urol*. 2020. https://doi.org/10.1016/j.eururo.2020.03.027.
10. Ribal MJ, Cornford P, Briganti A et al. EAU guidelines office rapid reaction group: an organisation-wide collaborative effort to adapt the EAU guidelines recommendations to the COVID-19 era. Available at: https://uroweb.org/wp-content/uploads/EAU-Guidelines-Office-Rapid-Reaction-Group-An-organisation-wide-collaborative-effort-to-adapt-the-EAU-guidelines-recommendations-to-the-COVID-19-era.pdf. Accessed April 25, 2020.
11. Italian Ministry of Health, The International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM): Italian version. Available at: http://www.salute.gov.it/imgs/C_17_pubblicazioni_2251_allegato.pdf. Accessed April 24, 2020.
12. WHO, Clinical management of severe acute respiratory infection when novel coronavirus (nCoV) infection is suspected: interim guidance, 2020. Available at: https://apps.who.int/iris/handle/10665/330854. Accessed April 25, 2020.
13. Franchi C, Cartabia M, Santalucia P, et al. Emergency department visits in older people: pattern of use, contributing factors, geographical differences and outcomes. *Aging Clin Exp Res*. 2017;29:319–326. https://doi.org/10.1007/s40520-016-0550-5.
14. De Filippo O, D'Ascenzo F, Angelini F, et al. Reduced rate of hospital admissions for ACS during Covid-19 outbreak in Northern Italy. *N Engl J Med*. 2020. https://doi.org/10.1056/NEJMc2009166.
15. Lei S, Jiang F, Su W, et al. Clinical characteristics and outcomes of patients undergoing surgeries during the incubation period of COVID-19 infection. *EClin Med*. 2020. https://doi.org/10.1016/j.eclinm.2020.100331.
16. Vedovetto A, Soriani N, Merlo E, Gregori D. The burden of inappropriate emergency department pediatric visits: why Italy needs an urgent reform. *Health Serv Res*. 2014;49:1290–1305. https://doi.org/10.1111/1475-6773.12161.
17. Cremonesi P, di Bella E, Montefiori M, Persico L. The robustness and effectiveness of the triage system at times of overcrowding and the extra costs due to inappropriate use of emergency departments. *Appl Health Econ Health Policy*. 2015;13:507–514. https://doi.org/10.1007/s40258-015-0166-5.
18. Boehm K, Ziewers S, Brandt MP, et al. Telemedicine online visits in urology during the COVID-19 pandemic-potential, risk factors, and patients' perspective. *Eur Urol*. 2020;78:16–20. https://doi.org/10.1016/j.eururo.2020.04.055.
19. Naspro R, Da Pozzo LF. Urology in the time of corona. *Nat Rev Urol*. 2020. https://doi.org/10.1038/s41585-020-0312-1.