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RESEARCH ARTICLE

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Emergency room access during pandemic: Can urologist learn something from the covid-19? An italian experience

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ABSTRACT

Backgrounds: Head to head critical comparison of data about Emergency Room (ER) admission due to urological conditions during the first month of COVID-19 pandemic (March 2020) with the data about the same period of 2019.
Methods: One of the authors queried the clinical database of a hospital with a catchment area of around 600.000 inhabitants about urologic consults and procedures in ER. Thus, all the Authors analyzed the data, comparing them with the most recent literature.
Results: In March 2019 202 pts have been admitted to ER for urological problems. The most frequent urological conditions have been renal colic (32.2%) and acute scrotum (25.4%). 24.3% of pts has been hospitalized and 13.4% of all the pts have been operated, with endoscopic treatment of ureteral calculi being the most frequent procedure. In march 2020 47 pts have been admitted to ER for urological problems and the most common urological condition has been, again, renal colic (32%), acute scrotum (19.2%), together with gross hematuria (19.2%). 40.6% of pts have been hospitalized and 17.2% have been operated. The half of the procedures has been endoscopy for treating ureteral calculi. All the other procedures were executed in a maximum of 1 patient. Conclusion: The total number of ER access has comprehensibly reduced due to pandemic. COVID-19 outbreak can lead to a significant delay in the management of urinary tract infections and urosepsis. Thus, urologists have to be ready to manage the related complications in the next future.

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Introduction

The World Health Organization (WHO) declared the disease caused by the novel Coronavirus SARS-COV-2 a global pandemic on March 11th, 2020 [1]. In Italy, from January, 30th to April, 11st, 147.577 cases and 18.851 deaths COVID-19 related have been confirmed [2]. This outbreak has led to profound repercussions from social, healthcare, economic and political perspectives all over the World. The Italy Government was the first in Europe who progressively adopted a series of "Urgent measures with regard to the containment and management of the epidemiological emergency due to COVID-19". The fulcrum of restrictive physical and social distancing measures has been based on early estimates, which stated that social distancing can reduce COVID-19 transmission by around 60% [3]. Thus, the Italian Government imposed progressively closure of educational and commercial activities, until reaching complete social lockdown, with the final aim of reducing both the spread of the virus and promoting "the flattening of the curve" [4-7]. In this complex context, the general health management by patients (pts) has been characterized by uncertainties and doubts in all fields, also considering admission criteria to emergency room (ER), both for Covid and non-Covid related reasons. On the other hands, all the physicians, including the Urologists, despite of Personal Protective Equipment (PPE), have faced many difficulties, with the final common aim to

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ensuring safety of themselves and all the team at the same time:

1. The need of limiting the interaction with pts as much as possible;
2. The unintentionally transmission of the virus by the health workers, even if asymptomatic;
3. The possible shortage of health care personnel until 30% due to COVID-19 infection

[8,9]. The aim of the present study is to critically analyzed the ER urological consults and procedures in non-academic center during the first month of SARS-COV-2 outbreak, comparing the data with those of March 2019, considered as a month of "ordinary activity".

Materials and Methods

One of the authors queried the database of a non-academic hospital with a catchment area of about 600.000 inhabitants about ER urologic consults and procedures during both March 2019 and March 2020.

The queries regarded

- General characteristics of pts admitted to ER for urological problems: Total number of pts, sub-analysis of males, females and pediatric pts medium age.
- Urological conditions that caused access to ER.
- Number of discharged pts.
- Number and type of interventions among hospitalized patients.

Thus, the information has been analyzed by all the Authors, comparing them with the most recent published papers. We performed Medline research using the key words: "COVID-19", "emergency room", "urology". Moreover, we studied the information and the related links reported by the websites of the most important Scientific Societies (European Association of Urology, American Urological Association, Italian Society of Urology), epidemiologic Centers European Centre for Disease Prevention and Control (ECDC), and Italian Government websites (Ministry of Health, Italian National Institute of Health), as reported in references list.

Results

In March 2019 202 pts have been admitted to ER for urological problems: The medium age was 56.3 (range 4-93 years). 167 pts were males (82.6%), 35 were females (17.4%); 24 were children or adolescents (11.8%) (Table 1).

The urological conditions that caused access to ER have been reported in order of frequency in detail in (Table 2). The most frequent condition has been renal colic (32.2%) and acute scrotum (25.4%) with most of the pts being pediatrics (24/25). Considering malfunction of urological devices (7.4%), these have been subdivided as follow: 2% (4/202) bladder catheters, 3% (6/202) nephrostomies and 2.4% (5/202) ureteral catheters in urostomies.

Fever has been the reason for being admitted to ER in 3% of pts (6/202): Among these 1% pts (2/202) with the symptoms during the last two months after cystectomy with ileal conduit and 2% (4/202) affected by ureteral stones; Finally, we observed mixed caused in 3% of pts (6/202): Among these 1% of pts (2/202) complained of abdominal pain in advanced urological cancer, 1% of pts presented with hematomas after urological procedure (1/202 after radical prostatectomy and 1/202 after radical cystectomy); 0.5% (1/202) with artero-venous malformation in the kidney and 0.5% (1/202) with acute kidney failure. 24.3% of pts (50/202) has been hospitalized. 13.4% of all the pts (27/202) admitted to ER have been operated and 54% of hospitalized pts (27/50). The most frequent procedures have been in the field of endoscopy for treating ureteral calculi:

14/27 (52%) and transurethral resection of the bladder tumours because of hematuria: 3/27 (11%) (Table 3). In March 2020 47 pts have been admitted to ER for urological problems: The medium age was 53.5 (range 15-91 years). 41 pts were males (87.2%), 6 were females (12.8%); 7 were adolescents (14.8%) (Table 1).

The most common urological conditions that caused access to ER have been renal colic for (32%) gross haematuria (19.2%) and acute scrotum (19.2%) (Table 2). Fever has been present in 2% of pts (2/47), both during the last two months after cystectomy with ileal conduit). 40.6% of pts have been hospitalized: And 17.2% have been operated (40% of hospitalized pts (8/20). The half of the procedures have been in the field of endoscopy for treating ureteral calculi. All the other procedures

were executed in a maximum of 1 pt (Table 3).

Data	2019	2020
Number of Pts	202	47
Medium age	56.3 (range: 4-93)	53.5 (range: 15-91)
M:F	167 M (82.6%), 35 F (17.4%)	41 M (87.2%), 6 F (12.8%)
Pediatric pts	24 (11.8%)	7 (14.8%)
Discharged pts	152 (75.3%)	27 (59.4%)
Hospitalized pts	50 (24.7%)	20 (40.6%)
Urological surgical interventions	27/202 (13.4%) 27/50 (54%)	8/47 (17.2%) 8/20 (40%)

Table 1. General characteristics of the patients

Reasons for emergency room admission	2019	2020
Renal colic	65 (32.2%)	15 (32%)
Gross haematuria	35 (17.3%)	9 (19.2%)
Acute scrotum	25 (12.4%)	9 (19.2%)
Acute urinary retention	16 (7.9%)	7 (15%)
Urological devices malfunction	15 (7.4%)	1 (2%)
Dysuria	13 (6.4%)	0
Orchi-epididymitis	11 (5.4%)	2 (4.3%)
Fever	6 (3%)	2 (4.3%)
Other causes	6 (3%)	0
Sepsis	3 (1.5%)	1 (2%)
Penis trauma	3 (1.5%)	0
Renal trauma	2 (1%)	1 (2%)
Haemospermia	2 (1%)	0

Table 2. Reasons for emergency room admission

Surgical Procedure	2019	2020
Total	27/202 (13.4%)	8/47 (17.2%)
	27/50 (54%)	8/20 (40%)
Retrograde Intrarenal Surgery/ Ureteral LitoTripsy	14/202 (7%)	4/47 (8.5%)
	14/50 (28%)	4/20 (20%)
	14/27 (52%)	4/8 (50%)
Trans-urethral resection of the bladder with haemostatic aim	3/202 (1.5%)	1/47 (2%)
	3/50 (6%)	1/20 (5%)
	3/27 (11%)	1/8 (12.5%)
Acute Scrotum	2/202 (1%)	1/47 (2%)
	2/50 (4%)	1/20 (5%)
	2/27 (7.4%)	1/8 (12.5%)
Urethral stent positioning	2/202 (1%)	1/47 (2%)
	2/50 (4%)	1/20 (5%)
	2/27 (7.4%)	1/8 (12.5%)
Urological device substitution	2/202 (1%)	1/47 (2%)
	2/50 (4%)	1/20 (5%)
	2/27 (7.4%)	1/8 (12.5%)
Sovrapubic catheterization	2/202 (1%)	0
	2/50 (4%)	
	2/27 (7.4%)	
Selective embolization for renal trauma	1/202 (0.5%)	0
	1/50 (2%)	
	1/27 (3.7%)	
Corpora cavernosa restoration	1/202 (0.5%)	0
	1/50 (2%)	
	1/27 (3.7%)	

Table 3. Analysis of urgent/emergent surgical procedures.

Discussion

The management of the initial stage of COVID-19 pandemic has reinforced some old convictions and has led to some rethinking in the daily practice in the field of urology, as indicated in (Tables 4a and 4b). The most common urologic conditions leading to access to ER still remained renal colic. International and National Societies have recommended to manage these pts as conservative as possible, in order to avoid admission to an overwhelmed emergency department [10-20]. This should be done with the administration of nonsteroidal anti-inflammatory drugs (NSAIDs) which represents a cornerstone in daily urological practice due to drug's benefitis for different aspects, not delivered by other medications: Glomerular filtration, renal pelvic pressure, ureteric peristalsis, and ureteric oedema [21-23]. Nevertheless, some recently published reports evidenced that one of the mechanisms of action of SARS-CoV-2 involves binding to target cells through ACE2 protein, present also in epithelial cells of both lung and kidney [15, 16]. This binding can increase the risk of developing severe and fatal COVID-19. In this context,

NSAIDs administration has been discouraged by some Authors [24]. Conversely, the European Medicines Agency and World Health Organization stated on March 18, 2020 that to date there is no scientific evidence that NSAIDs can worsen COVID-19 and they do not recommend against the use of NSAIDs

[25,26]. According to this statement, Pradére and Coll. have proposed a rigorously screening of pts for COVID-19 symptoms, as well as detailed information to pts before prescribing any medication. In the case of any doubt, NSAIDs should be avoided, following the same rules as during pregnancy and for febrile renal colic. Thus, acetaminophen should be prescribed instead [21]. In the center analyzed in the study, the number of pts who have been admitted in the ER during March 2020 (including pediatric population) was consistently lower that the number of pts in the same month of 2019. Additionally, both the age and the M: F ratio is comparable.

The ER admission due to trauma has significantly decreased, accordingly to the reduction of cars and motorcycle circulation. These data do not constitute news and they are clearly attributable to the restrictive measures and epidemic itself. As a matter of fact, these issues compel pts to go to ER only in case of extreme necessities.

This explanation may also justify the almost doubling number of hospitalized pts in March 2020, even if the percentage of surgical procedure has remained similar. The number of urological consults with discharging of pts has been consistently higher in 2019 (75% vs 59%), accordingly to the recent data published by Zhao and Coll. The authors have reported the non-operative urology consults rate to be over 50% [27]. Similarly to these Authors, the percentage of urological intervention in the reference center for the present paper has been about 17%, comparing to 18% evidenced by the same authors. Some important news has been evidenced during the analysis of the motivations of admission to ER. The first four reasons have remained the same both in 2019 and in 2020: Renal colic, gross haematuria, acute scrotum and acute urinary retention have been not saved by COVID-19. This consideration can be made in every month of the years and it can make us to believe that all represents real urological emergencies. Curiously, during COVID-19 pandemic no patient with dysuria has been admitted to ER comparing to 2019. Thus, the percentage of pts with acute urinary retention during March 2020 has doubled. Probably, this reflects the tendency of pts to go to ER only in case of real necessity; thus, we can hypothesize that the most of cases of dysuria have been naturally evolved in acute urinary retention. The same reasoning may be applied to the pts with hemospermia, who did not access to ER during COVID-19 pandemic. Perhaps this pts can be evolved in acute prostatitis, with access in ER, or it has naturally disappeared as usually happens. The data to register is that during March 2020 no patient has worried about this symptom, but in ordinary period this alteration move pts to go to ER. All the surgical procedures have been executed accordingly to the Italian Urological Society recommendations, the European Robotic Urology Society (ERUS) 2020 Guidelines and Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) [12,20-28] (Tables 4a and 4b). Similarly to the suggestions reported by Ficarra et al. and Stensland et al. the urologists of the center performed transurethral hemostasis of the bladder in case of clot retention, leading the pts without the need of blood transfusion [13,29]. Curiously, acute scrotum has reduced to a third during March 2020, comparing to march 2019. Can we be authorized to think that during "normal" periods this is an over admission to ER of this reason, especially in the pediatric population, partly due to parents' anxiety? Yes, we can. The percentage of surgical explorations of scrotum during the two months is comparable. Accordingly to guidelines and to the considerations made by Ficarra et al. and Stensland et al. during the COVID-19 pandemic, the pediatric urologic intervention have to be considered only in order to exclude acute torsion [13,29,30]. Interestingly, fever and sepsis have been dramatically reduced during epidemic month. We can hypothesized that signs and symptoms generally attributed to an infection, and independently from the site, have taken a back seat comparing to COVID-19 outbreak, due to attention given to respiratory symptoms. This can be dangerous in the urologic field because urinary tract infections generally represent the second cause of death due to infectious disease. We started thinking that SARS-Covid 2 will disguise other infectious disease, just as potentially lethal like the first one. As a matter of fact, the initial signs and symptoms of COVID-19 may overlap the one typical of urosepsis: Fever or hypothermia, leukocytosis or leukopenia, tachycardia and tachypnea. This analysis can be particularly insidious in elderly pts with several comorbidities, including diabetics, immunosuppressed and patients receiving cancer chemotherapy. In these cases, an immediate differentiation could prompt the treatment and avoid the shortcoming of a missed or delayed COVID-19 diagnosis [19,31]. On the other hand, Rocco B et al. have recently raised the concern that some urologists may have to deal with COVID-19 pts presenting only with fever as they may be misinterpreted as urosepsis

[19]. In these cases laboratory findings may be helpful in rapidly distinguishing these two clinical entities, whose treatment differs. Lymphopenia (70%), prolonged prothrombin time (58%), elevated lactate dehydrogenase (40%) are typical of COVID-19; conversely, high levels of procalcitonin are suspicious of urosepsis [19,31-34]. Finally, we always have to consider the affinity of SARS-COV-2 both for bladder and kidney.

Two studies have reported acute kidney injuries occurring in 0.1-29% of pts affected with COVID-19.

Additionally, this injury may be explained by the sepsis resulting in cytokine storm syndrome or by the immune-mediated kidney damage [35,36]. New data about this localization of the virus can significantly contribute to comprehend a possible role of the kidney failure in pts who died in few hours or days, even if mechanical ventilation and all the immune therapies dedicated to block the cytokines storm. Two other papers have described contrasting data about the presence of the viral RNA in the urine: Lin and Coll. identified the RNA in the urine samples of 6.9% of pts, Wang and Coll. did not find it in any pts [15,17]. Currently, there is no available evidence on urine transmission and we urgently need data about it. Interestingly, we have reported about only one COVID-19 pts with acute urinary retention [37]. Probably, this limited data cannot permit to make any considerations about the urinary localization of the virus. Moreover it can be considered as an accident of a patient affected with COVID-19(Table 5). Again, additional data are needed in this filed. In all cases, it is recommended that endoscopic procedures and urethral catheterization should be performed with caution and urologist should use PPE in case of both suspicious and confirmed COVID-19, as indicated by Guidelines as well as usually made by the urologists of the center reported in the present paper.

GENERAL OR ISSUES	UROLOGICAL NOTES	REFERENCES
1. Mandatory careful evaluation of the individual case about COVID-19 infection criteria.	Evaluation of synchronous COVID-19 and urinary tract infection/urosepsis	Proietti S, Eur Urol 2020 [8] Campi R, BJU Int 2020 [10]
2. Access to all ORs strictly limited to surgeons, anesthetists, and the nursing team.		Proietti S, Eur Urol 2020 [8]
3. In case of confirmed or suspected COVID-19 management in a dedicated OR with: • separate access from the other ORs; • negative pressure environment; • same anesthesia machine used only for COVID-19 cases.	1. Ventilator sparing is advisable whenever possible (performing instead local anaesthesia): • Bedside ureteral stent • Nephrostomy 2. Doubts about presence of COVID-19 in the urine. Standard sterilization of surgical reusable armamentarium procedures are actually considered safe in terms of COVID-19 cross-contamination.	Proietti S, Eur Urol 2020 [8] Ti LK, Can J Anesth 2020 [9] ERUS 2020 Guidelines [12] Stensland KD, Eur Urol 2020 [13] Nourparvar P, J Urol 2016 [14] Lin L, Emerg Microbes Infect 2020 [15] Zou X, 2020 [16] Wang W, JAMA 2020 [17] SAGES Recommendations [28]
3. If not suspected for COVID, all the emergencies have to be performed in ORs not-Covid pts dedicated, with provided adequate PPE for both patients and staff		Campi R, BJU Int 2020 [10]
4. The choice of urgent or emergent surgeries depend upon capacity and demand, but must also be counterbalanced by the effects of delaying surgery.	growth is more frequent than in the past. 2. 15% of these patients require ICU admission, with mortality rate about 8–10%, even with decompression of the urinary system, antibiotic therapy, and other supportive measures.	Fukushima H, J Urol 2018 [18] Rocco B, Eur Urol 2020 [19]

Table 4a. Key points of rethinking emergent/urgent urological procedure during COVID-19 pandemic

	Endoscopic Surgery	Open Surgery
Ureteral stones	Ureteral Ureterolytotripsy	
Bladder problems: - Gross Hematuria - Extraperitoneal bladder rupture	Trans-urethral intervention	
Scrotum involvement Scrotal abscesses Fournier's gangrene		Local toilette
Traumas: - Bladder (intra peritoneal) - Testis - Penis		Reparation

Table 4b. Urological procedure during COVID-19 pandemic.

Lessons learnt by Urologist in emergency room from COVID-19
1. The urological reasons of being admitted to ER still remain the same, outside the pandemic: renal colic, acute scrotum and gross haematuria.
2. The management of common urological condition needs to be significantly improved in outpatient setting, with the final aim to persistently reduce the ER admissions.
3. COVID-19 outbreak is leading a significant delay in the management of both urinary tract infections/urosepsis. Urologist has to be ready to manage the complications in the next future.
4. Telemedicine has to gradually become daily practice also for urologists, whenever possible.

Table 5. Lessons learnt by Urologist in emergency room from COVID-19

Conclusion

What lesson does the urologist can learn about ER management from COVID-19? We can resume that the total number of ER access have comprehensibly reduced due to pandemic, as the traumas in general, even if the principal reasons to access to the ER because of urological problems still remain the same. We have to think about the utility of urological consult during ordinary periods. Perhaps the education about urologic conditions in the outpatients setting needs to be ameliorate, with the final aim to reduce ER access to for real emergencies (i.e. dysuria, hemospermia). We have to take into serious consideration that probably many urinary tract infections and urosepsis have been misdiagnosed during the epidemic, as ER access by many patients, including the oncologic ones, because of fear or being infected by the virus. In this context, urology still remains a field with a lot of emergencies to treat and urologist cannot let their guard down about pts, otherwise we have to pay a higher price in the next future in terms of irreversible damage and significant prognosis worsening, as well as going on fighting against COVID-19. Finally, in the next future telemedicine and virtual visits will become the primary and safest form of outpatients clinical care, even if telemedicine itself is not highly used by the urologists,. The journal of Urology has recently reported an increased rate of usage of telemedicine from 257% to 700% during Covid 19 outbreak. Thus, it's real time to take telemedicine into urologists' daily practice, thinking also about the ER.

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