



How urinary stone emergencies changed in the time of COVID-19?

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The pandemic acute respiratory syndrome coronavirus 2 (SARS-CoV-2), named COVID-19 [1], is generating a severe health emergency all over the world but particularly in some countries. The healthcare challenge is to provide assistance to the increasing number of infected patients, to contain ways of transmission and at the same time to treat all the non-deferrable medical conditions that continue to affect the population. Moreover, the most relevant problems are in the management of all first aid accesses and emergencies other than COVID-19. In this brief communication, we report our experience on the diagnostic and therapeutic procedures requested and performed for urinary stone emergencies during a 6-week period activity in a hospital partially converted to COVID-19 care and in the highest national level of COVID-19 infection (March–April 2020), with the management performed in the same hospital in a no-COVID-19 period (March–April 2019) 1 year ago. In particular, we analyzed differences between these two time-related populations in terms of patients and urinary stone characteristics, symptoms and complications at presentation, diagnostic and therapeutic approaches, time of hospitalization. ANOVA analysis and Chi square test were used to quantify the differences between the two time periods. Some relevant data are obtained (Table 1): (1) independent to COVID-19 infection, in our hospital, the number of first aid accesses for urinary stone emergencies did not significantly change (44 cases in the no COVID-19 period versus 36 cases in the COVID-19 period) (2) patients presenting during COVID-19 time showed significantly higher serum

levels of creatinine ($p=0.026$) when compared to a no-COVID-19 period. These data may suggest a delay in terms of patient presentation to the hospital, related to the pandemic. (3) However, no significant differences were detected in terms of complication rates, urinary stone diameter or grade of hydronephrosis due to COVID-19 pandemic. (4) Stone position significantly changed with a higher rate of lumbar ureter and lower of juxta-vesical site during COVID-19 period ($p=0.036$). The reduction of first aid access for juxta-vesical site stones may be interpreted through a higher rate of its management using medical therapies at home. (5) Diagnostic and therapeutic approach to urinary stone emergencies did not significantly change compared to the non-pandemic period. In particular, the use of nephrostomy or ureteral stent for the first aid did not significantly change. Across a 6-week period during the peak of the COVID-19 pandemic, urinary stone emergencies continued to be managed with few significant variations in a geographical area at medium density for COVID-19 and in a hospital partially converted in first aid cares. An effective reorganization of health care facilities in hospitals can consent to do not reduce cares and resources for patients with other urgent and emergent conditions such as urinary stones [2–3]. The findings presented here suggest that urinary stone emergencies are mainly severe, their care need to be continued and they were not significantly influenced by this pandemic.

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Table 1 Patient characteristics: percentage of cases (%); mean \pm SD and range

Variable	1st March–15th April 2019	1st March–15th April 2020	<i>p</i> value
Age (years)	56.55 \pm 15.98 (40–74)	54.25 \pm 18.54 (35–74)	0.776
Weight (kg)	69.18 \pm 9.53 (60.0–84.0)	89.00 \pm 15.26 (72.0–97.0)	0.003
BMI (kg/m ²)	25.11 \pm 3.85 (20–29)	26.87 \pm 4.07 (20–32)	0.349
Charlson Comorbidity Index			0.658
0	36.4%	50.0%	
1	18.2%	0.0%	
\geq 2	45.5%	50.0%	
sCR at ED entry (mg/dl)	1.20 \pm 0.54 (0.80–1.70)	2.87 \pm 1.25 (1.25–10.93)	0.026
WBC at ED entry (1000 \times UI/ml)	13.13 \pm 5.19 (7.0–19.0)	8.71 \pm 3.49 (5.0–12.0)	0.052
Previous history of urinary stones			0.370
Negative	63.6%	37.5%	
Positive	36.4%	62.5%	
Renal colic pain as main symptom			0.959
Absent	27.3%	25.0%	
Present	72.7%	75.0%	
Complicated UTI at ED entry		7	0.659
Absent	63.6%	75.0%	
Present	36.4%	25.0%	
Imaging test at ED			0.945
US and/or X-ray	45.5%	37.5%	
CT scan only	18.2%	12.5%	
Both	36.4%	50.0%	
Hydronephrosis at ED entry			0.955
Absent	18.2%	12.5%	
Present	81.8%	87.5%	
Side of hydronephrosis			0.247
Right	45.5%	50.0%	
Left	45.5%	12.5%	
Bilateral	9.0%	37.5%	
Grade of hydronephrosis			0.633
0–1	45.5%	25.0%	
2–3	54.5%	75.0%	
Number of stones			0.965
1	63.6%	62.5%	
2–5	27.3%	25.0%	
>5	9.1%	12.5%	
Stone position			0.036
Renal (ampulla, and/or calices)	36.4%	25.0%	
Lumbar ureter	0.0%	50.0%	
Juxta-vesical ureter	54.5%	12.5%	
Bladder	9.1%	12.5%	
Maximum diameter stone (mm)	10.0 \pm 4.3 (6–16)	8.0 \pm 2.8(6–13)	0.442
Nephrostomy at ED			0.181
None	8 (72.7%)	37.5%	
Yes	3 (27.3%)	62.5%	
Stone treatment			0.578
Medical therapy only	45.5%	37.5%	
RIRS	9.1%	0.0%	
ULT	18.2%	50.0%	
BLT	9.1%	12.5%	
Nephrectomy	18.1%	0.0%	

Table 1 (continued)

Variable	1st March–15th April 2019	1st March–15th April 2020	<i>p</i> value
Antibiotic treatment			0.542
No	0.0%	12.5%	
Fluoroquinolones	27.3%	12.5%	
Cephalosporin	36.4%	25.0%	
Penicillins	9.1%	25.0%	
Carbapenems	9.1%	25.0%	
Others	18.1%	0.0%	
Hospital stay (days)	6.0 ± 2.4 (3.00–12.00)	10.0 ± 7.6 (1.00–33.50)	0.778

p value chi-square test, *sCR* serum creatinine, *ED* emergency department, *WBC* white blood cells, *UTI* urinary tract infection, *US* ultrasonography; *CT* computer tomography, *ULT* ureterolithotripsy, *RIRS* retrograde intrarenal surgery, *BLT* bladder stone lithotripsy

Compliance with Ethical Statement

Conflict of interest The authors declare that they have no conflict of interest.

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