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## Platinum Opinion

# Endourological Stone Management in the Era of the COVID-19

Silvia Proietti\*, Franco Gaboardi, Guido Giusti

European Training Center for Endourology, Department of Urology, IRCCS San Raffaele Hospital, Ville Turro Division, Milan, Italy

The corona virus disease 2019 (COVID-19) pandemic is disrupting non-COVID-19 health care services and jeopardizing the ability of medical systems to respond to routine patient needs. In hospitals in geographic COVID-19 hot-spots, surgical departments have been asked to minimize or temporarily suspend scheduled elective operations to address the overwhelming and devastating increase in COVID-19 patient care needs.

De-escalation of surgical activity should depend on the emergency status of individual health care systems and what each hospital requires from urological departments. The aim of this strategy is to free up inpatient beds, anesthesiology staff, health care personnel, personal protective equipment, cleaning supplies, and operating rooms (ORs) that may become intensive care units (ICUs). Moreover, a reduction in elective surgery lowers the need for ICU postoperative care of critical patients, leaving space for COVID-19 patients requiring ventilators. This strategy helps to address the COVID-19 crisis by increasing health system availability to prepare and respond to the epidemic without becoming overwhelmed.

The unfortunate circumstance of being one of the first endourology tertiary referral centers involved in the COVID-19 Italian epidemic prompted us to provide proposals for the management of stone patients during the COVID-19 outbreak, minimizing virus dissemination and cross infection, without impacting on the already overburdened health system.

First, it is important to reduce the number of hospitalized patients and screen all of them before admission to the department. A detailed flowchart for patient screening may be helpful as a guide during the COVID-19 pandemic (Fig. 1). Any patient fulfilling any criteria for confirmed or suspected COVID-19 and requiring urgent endourological surgery should be managed in a dedicated OR with a negative pressure environment and separate access from the other ORs; the same anesthesia machine must only be used for

COVID-19 cases [1]. For hospitals in which a dedicated OR is not available, all postoperative cleaning protocols should adhere to institutional central disease control instructions. Access to the OR should be strictly limited to surgeons, anesthesiologists, and the nursing team. All training activity in the center should be suspended. Health workers must still follow occupational health and safety procedures according to the protocols provided by each hospital.

During the COVID-19 pandemic, a shortage of health care personnel should be anticipated because of spiking demand, COVID-19 illness among health workers, and a high rate of absenteeism. During crises, absenteeism among health care staff can reach up to 30% [2].

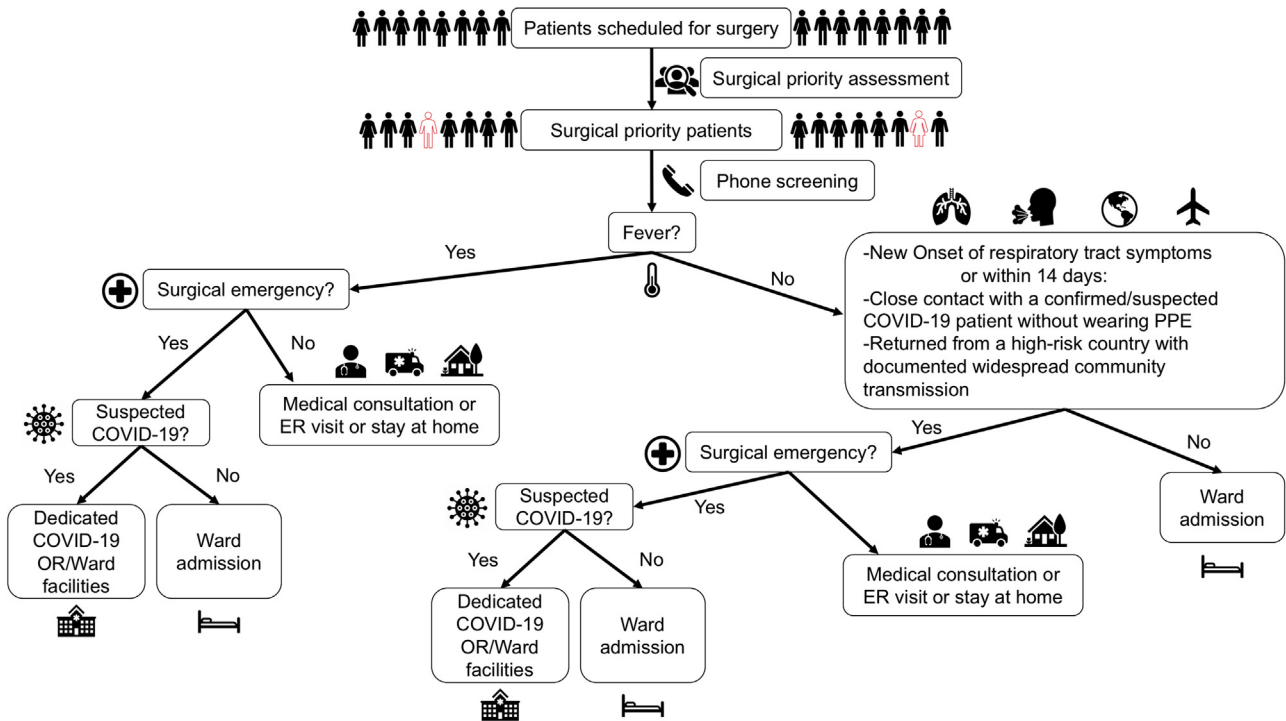
It is also of the utmost importance to stop all elective outpatient clinics to avoid gatherings of people within the hospital; only emergency consultations should be carried out. Wherever possible, one temporary solution to replace outpatient appointments could be via teleconsultations [3].

Patients with renal colic should be managed conservatively as much as possible to avoid admission to an overwhelmed emergency department. Stone patients scheduled for surgery should be thoughtfully selected according to surgical priority (Fig. 2). Even though urinary stone disease represents a benign condition, in a non-negligible number of cases it can lead to potential severe septic complications that could increase the burden on emergency services [4].

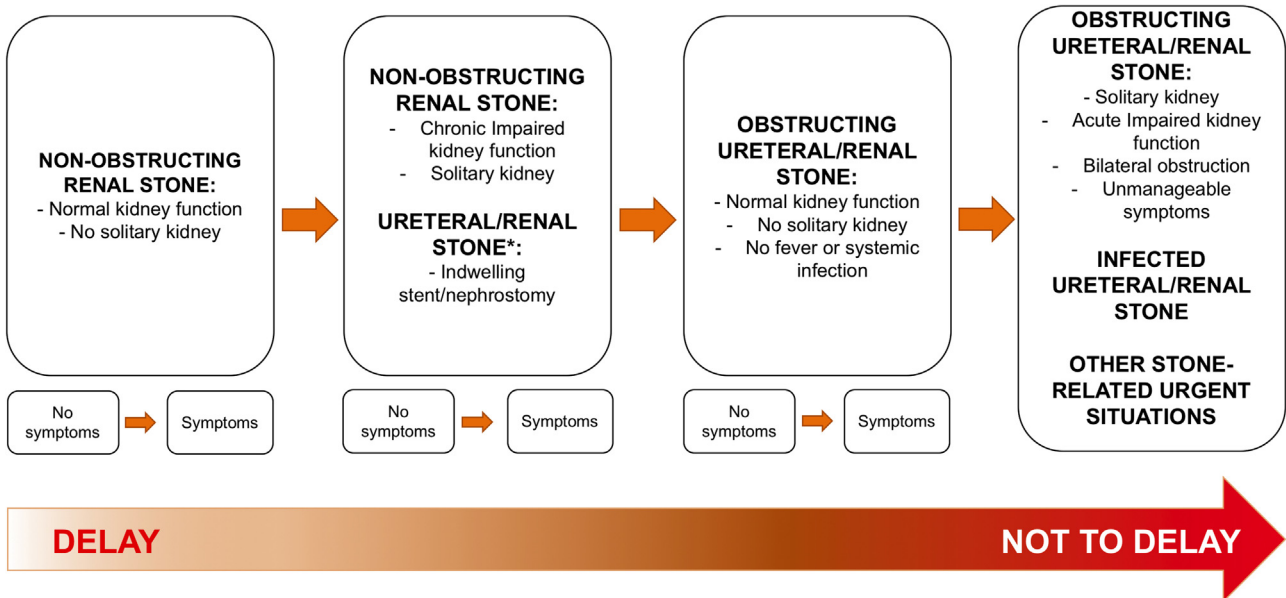
Over recent decades, elective and emergency admissions related to urolithiasis have been increasing [5]. Urosepsis due to an untreated obstructed infected kidney or a calculi matrix acting as a reservoir for bacterial growth is more frequent than in the past [4]. It is noteworthy that even with decompression of the urinary system, antibiotic therapy, and other supportive measures, 15% of these patients require ICU admission, with the mortality rate as high as 8–10% [4].

\* Corresponding author. Department of Urology, San Raffaele Hospital, Ville Turro Division, Via Stamira d'Ancona 20, Milan, Italy.





**Fig. 1 – Flowchart for triage of urological patients during the COVID-19 pandemic.** ER = emergency room; OR = operating room; PPE = personal protective equipment.



\*depending on stent indwelling time, urinary infections, symptoms

**Fig. 2 – Prioritization scheme for stone patients scheduled for surgery during the COVID-19 pandemic.**

In the case of an obstructed/infected kidney, only decompression of the system is suggested, which can be achieved safely via either stenting or percutaneous nephrostomy [6]. In the current pandemic scenario, it is advisable to take extra effort to avoid the latter because of the high risk of inadvertent removal and likely long delay

to subsequent surgical lithotripsy. Whenever possible, the ureteral stent or nephrostomy tube should be placed under local anesthesia, sparing a ventilator [7]. Careful review of the waiting list for stone patients can identify those at low risk for whom a procedure can be postponed. Once identified, it is advisable that the surgeon should personally

inform these patients that this was a medical decision based on patient history and ongoing medical emergencies and not an administrative one.

Another concern is how to manage patients who already had a ureteral stent for complicated urolithiasis before the COVID-19 pandemic. In some cases, infection associated with urinary stents can lead to significant morbidity such as acute pyelonephritis, bacteremia, urosepsis, and even death [8]. Therefore, this subset of patients should be considered with some priority in order to avoid an extended delay. The stent indwelling time should be a factor considered in the prioritization process, keeping in mind that the majority of ureteral stents can be left in place for up to 6–12 mo. At present, even though the evidence is insufficient to support antibiotic prophylaxis for patients with indwelling stents, given the likely delays in surgery, at least some pulse antibiotic therapy could be considered to reduce the risk of urosepsis and consequent requirement for a mechanical ventilator [9].

Depending on the de-escalation phase, outpatient procedures should be pursued and stenting with strings should be considered after uneventful procedures to avoid a clinic visit for stent removal. Moreover, endourologists have to be prepared to subsequently manage more difficult cases for patients whose procedure have been postponed because of lower surgical priority; in addition, a significant increase in waiting lists should be anticipated. Nevertheless, these patients should be followed routinely via telephone calls to monitor their stone status.

Standard sterilization of the endourological reusable armamentarium is also considered safe in terms of COVID-19 cross-contamination because so far the virus has not been detected in urine, although the evidence is not yet robust [10].

In conclusion, inspired by the Roman aphorism *Si vis pacem, para bellum* (if you want peace, prepare for war), endourologists have to be prepared to fight the COVID-19 pandemic to return to long-lasting normality as soon as possible.

**Conflicts of interest:** Guido Giusti is a consultant for Coloplast, Rocamed, Olympus, Boston Scientific, BD-Bard, Cook Medical, and Quanta System. Silvia Proietti is a consultant for Quanta System. Franco Gaboardi has nothing to disclose.

## References

- [1] Ti LK, Ang LS, Foong TW, Ng BSW. What we do when a COVID-19 patient needs an operation: operating room preparation and guidance. *Can J Anesth*. In press. <https://doi.org/10.1007/s12630-020-01617-4>.
- [2] Damerly S, Wilson S, Draper H, et al. Will the NHS continue to function in an influenza pandemic? A survey of healthcare workers in the West Midlands, UK. *BMC Public Health* 2009;9(142).
- [3] Hollander JE, Carr BG. Virtually perfect? Telemedicine for COVID-19. *N Engl J Med*. In press. <https://doi.org/10.1056/NEJMp2003539>.
- [4] Fukushima H, Kobayashi M, Kawano K, Morimoto S. Performance of Quick Sequential (Sepsis Related) and Sequential (Sepsis Related) Organ Failure Assessment to predict mortality in patients with acute pyelonephritis associated with upper urinary tract calculi. *J Urol* 2018;199:1526–33.
- [5] Rukin NJ, Siddiqui ZA, Chedgy ECP, Somani BK. Trends in upper tract stone disease in England: evidence from the Hospital Episodes Statistics database. *Urol Int* 2017;98:391–6.
- [6] European Association of Urology. EAU urolithiasis guidelines. 2019 In: <https://uroweb.org/guideline/urolithiasis/>
- [7] Stensland K, Morgan TM, Moynadeh A, et al. Considerations in the triage of urologic surgeries during the COVID-19 pandemic. *Eur Urol* 2020;77:663–6.
- [8] Paick SH, Park HK, Oh SJ, Kim HH. Characteristics of bacterial colonization and urinary tract infection after indwelling of double-J ureteral stent. *Urology* 2003;62:214–7.
- [9] Tenke P, Kovacs B, Benko R, Ashaber D, Nagy E. Continuous versus intermittent levofloxacin treatment in complicated urinary tract infections caused by urinary obstruction temporarily relieved by foreign body insertion. *Int J Antimicrob Agents* 2006;28:S82–5.
- [10] Wang W, Xu Y, Gao R, et al. Detection of SARS-CoV-2 in different types of clinical specimens. *JAMA*. In press. <https://doi.org/10.1001/jama.2020.3786>.