Urology during a Crisis: A Management Algorithm

Efstathios Papaefstathiou[1], Aikaterini Apostolopoulou, Eirini Papaefstathiou, Kyriakos Moysidis, Konstantinos Hatzimouratidis, Pavlos Sarafis

As of March 11, 2020, Coronavirus disease (COVID-19) has been declared a pandemic from WHO organization. On June 30, 2020, the disease has already spread in all continents numbering 10 million confirmed cases and 500.000 deaths[(1)]. In regions with limited cases, health-care units suffice to provide routine services and manage infected with coronavirus patients simultaneously. However, during an epidemic outbreak, the high number of cases compared to the shortage of health workforce increases the risk of system collapse. In order to respond adequately, hospitals should reprioritize their services, including operations and outpatient clinics and protect its personnel from infection[(2)] Shrinkage of surgical activity in emergency surgeries saves equipment and personnel necessary for the care of COVID-19 patients and protects high risk patients from getting infected[(3)]. In order to maximize the provided urological surgeries, 4 parameters should be considered: the emergency of the operation, the risk of infection, the capacity of the hospital and cooperation between different urological departments. Initially, all emergency surgeries should be performed promptly in order to ameliorate the health status of the patient and reduce hospital stay (**Table 1**). In case the results of COVID-19 test, are not readily available the operation should be performed without delay in special operating rooms and the patient treated in separate wards. Regarding elective operations, all non-oncological surgeries should be postponed. In oncological diseases, where possible, opt for alternative treatments, such as radiotherapy with ADT in prostate cancer or ablation of renal tumors. Next, all surgical candidates should be tested for COVID-19 before surgery. In case of positive result, the surgery should be rescheduled. In countries where this measure is not feasible, preoperative evaluation of the respiratory tract from an internist, including a chest x-ray is suggested. Following that, the operating program should be adapted to hospital capacities. In case of small number of COVID-19 cases, surgical candidates should continue to be treated according to oncological severity. On the contrary, when hospital capabilities are overwhelmed by the inflow of COVID-19 patients consider treating patients with the longest expected survival, irrespective of the underline disease. Otherwise, urologist must consider maximizing the number of treated patients and minimizing the hospital stay, possibly by performing less time-consuming surgeries particularly in patients without good performance status. The expertise of each center should also be evaluated and candidates for radical, time-consuming operations referred to specialized centers (**Figure 1**). During de-escalation phase, special attention should be given in patients with urolithiasis and ureteral stents, since they are at increased risk of encrustation and complicated pyelonephritis [(4)]. All previous measures could reduce attendance in hospitals with the cost of increasing waiting lists.

Despite, closure of outpatient departments prevents crowding and hinders dispersion of the virus[(5)], the demand for urological services is ongoing and, also expected to increase during the de-escalation phase of COVID-19 pandemic. However, there is no single protocol in the management of urological patients. In order to preserve general population healthy and face current demands the urologist should consider the following questions (**Figure 2**).

1. Is this case an emergency?

In order to provide consultation in urological patient urologists are encouraged to use telemedicine[(6)]. Through video-communications urologist can diagnose effectively common urological disease and even prescribe medications and tests. Additionally, urologists can screen patients with acute urological problems and symptoms of COVID-19 infection referring appropriately. Particularly patients at increased risk for severe COVID-19 pneumonia such as renal transplant patients, oncological patients and those with renal dysfunction should have their clinical evaluation through telemedicine[(7)]. On the contrary, the inability to perform clinical and diagnostic tests, along with the lack of experience in teleconsultation lowers diagnostic accuracy.

2. Is there a possibility of COVID-19 infection?

Screening for COVID-19 is necessary for all urological patients. Regarding outpatients, phone screening about respiratory symptoms within the last 14 days (fever, cough, myalgia, fatigue, dyspnea), travel history and fever could detect high risk patients requiring further referral to special units. Likewise, patients should be screened upon

[1] MSc, PHD © , 2nd Urology Department of Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece.
[2] MSc, PHD© , GP- Emergency Department, General Hospital AHEPA, reference center for COVID-19, Thessaloniki, Greece.
[3] MSc, Primary Care Doctor, Chalkida, Greece.
[4] Assistant Professor in Urology, 2nd Urology Department of Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece.
[5] Professor in Urology, Director of 2nd Urology Department of Medical School, Aristotle University of Thessaloniki, Thessaloniki, Greece.
[6]Assistant Professor in Nursing, Department of Nursing, School of Health Sciences, Limassol, Cyprus.
*Correspondence: Department of Nursing, School of Health Sciences, Cyprus University of Technology 15, Vragadinou Str, 3041 Limassol, Cyprus.
Telephone Number: +357 2500 2586. Fax: +357 2500 2864. E-mail address: pavlos.sarafis@cut.ac.cy
Received May 2020 & Accepted August 2020

Table 1. Emergency surgeries

CONDITION	Causal factor	Type of treatment	Rationale
Sepsis with obstruction of upper urinary tract	UTI + lithiasis (/obstruction of the ureteral catheter or nephrostomy tube) , abscess, xanthogranulomatous pyelonephritis, emphysematous pyelonephritis	1. Nephrostomy tube placement	Can be performed at the bed side with local anesthesia or under CT guidance
		2. ureteral catheter placement/change	In case of failure or little experience with nephrostomy tube placement
Obstruction of the upper urinary tract without sepsis	Lithiasis, tumor, surgical complication, retroperitoneal fibrosis	1. ureteral catheter placement/change	In case of failure of nephrostomy tube placement
		2. Nephrostomy tube placement	Can be performed at the bed side with local anesthesia or under CT guidance
Obstruction of the lower urinary tract	BPH, strictures, urethral/penile/ prostatic cancer, lithiasis	1. Urethral catheter placement	Outpatient procedure
		2. Suprapubic catheter placement	Outpatient procedure
Hematuria	bladder/prostatic cancer/post-radiation therapy	TUR-hemostasis	Reduces the duration of hospital stay and need for blood transfusion
Soft tissue infections	Fournier Gangrene	Extensive tissue debridement	Extremely lethal condition usually with prolonged hospital stay has increased needs in treatment, plastic repair should be deferred
	Presence of artificial urinary sphincter or penile prosthesis	Removal of prosthesis	Reduce the duration of hospital stay
Acute testicular torsion/trauma		Testicular detorsion/ orchidopexy / repair /ochiectomy	Short duration of stay
Priapism		1. Shunting for priapism	
		2. Consider penile prosthesis	In case of shunting failure, reduce recurrence of priapism
Trauma	renal	Nephrectomy only when indicated	Most renal trauma improve with conservative treatment
	Injury of the ureter and lower urinary tract	In case immediate treatment is contraindicated ensure adequate urine drainage	Definite treatment can take place later
Renal transplantation		Only in deceased donor transplants	Cannot be deferred
Elective surgeries- all others			

arrival in the emergency department in order to avoid dispersion of the disease. In inpatients, symptoms of respiratory infection or signs of atypical pneumonia in chest x-ray could trigger clinical suspicion. Laboratory test including decreased total white blood cell count and lymphocyte count, normal levels of procalcitonin and increased liver enzymes, C-reactive protein, LDH and muscle enzymes could be helpful in differential diagnosis [8]. In suspected cases, further evaluation from an internist is necessary while confirmation with RT-PCR remains the gold standard[9].

3. Is there a need for intervention?

Either in a medical office or in the emergency department, patients' examination during a pandemic is challenging. Treating patients demands accuracy and speed in diagnosis and can be hampered by physical protection materials and unavailable equipment. Initially, identifying unstable patients and those requiring immediate urine drainage can be catalytic for their health[10]. In stable patients, diagnosis can be obscure and choosing between conservative treatment and immediate intervention is plausible. However, the former has in-

creased risk of failure resulting in complications, multiple visits in the ED or even readmission to the hospital. This could result in dissemination of the disease from asymptomatic individuals. Additionally, deterioration of the health status of urological patients on account of lack of diagnosis or definitive treatment could complicate an infection from COVID-19. As a result, complete laboratory and imaging evaluation in ambiguous health problems is mandatory in order to promote immediate therapeutic actions. Performing bedside procedures not requiring anesthesia in outpatients such as ureteral stenting, or nephrostomy tube change can also reduce complications and multiple visits[11]. Furthermore, immediate urine drainage with nephrostomy tube or ureteral catheter in inpatients with upper urinary tract obstruction is advisable in order to prevent complication and reduce length of stay.

On the contrary, conservative management is suggested in primary care of mild cases in order to reduce attendance to the emergency departments. Nevertheless, there are few points that should be considered. Firstly, usage of broad-spectrum antibiotics as first line treatment and urine culture may be preferable in uncomplicated urinary tract infections. Next, chemoprevention may be required in patients with lithiasis, foreign bodies (mainly ureteral stents) or those whose definite treatment was postponed[12]. The previous measures are essential in order to avoid severe life-threatening complications and reduce readmissions. Furthermore, in cases of symptomatic viral infection and concomitant renal colic, NSAID should be avoided[13]. In extreme situations, where the emergency departments are overwhelmed and hospital capacities diminished, conservative treatment may be prolonged. When conservative management is chosen, close follow up of patients through telephone and repeated laboratory tests is suggested.

4. Is there a need for admission?

Hospitalization allows for aggressive treatment, increased care and close surveillance of patients at the cost of reduced resources. In stable patients with urological problems and high-risk for COVID-19 infection that do not need hospitalization, home care is preferable. In those patients, close monitoring with telemedicine is helpful to avoid repeated visits in healthcare units. When hospitalization is required patients should be screened for COVID-19 in order to prevent nosocomial dissemination. Special wards should be available for all COVID-19(+) patients. Regarding hospitalization of patients, urologists must follow institutional policies and national guidelines[14]. In times of shortage of screening tests, examination from internist along with complete laboratory evaluation is mandatory. In complicated cases, where there is lack of experience or when hospital facilities cannot satisfy the demand in beds, transfer patients in other specialized urological units. Finally, efforts to keep days of hospital stay to a minimum should be constant. All previous measures target at controlling dispersion of COVID-19 between inpatients and healthcare workers.

Physicians must adhere to institutional policies and national guidelines for protection from COVID-19 infection. Several organizations have published guidelines, including the U.S. Department of Health & Human Services, UK government and WHO[14,15]. In general, protective measures apply to patients, health professionals and facilities. The former should wear face mask and report symptomatology as soon as they arrive at the ED[14]. Healthcare workers should perform hand hygiene between contacts, while, personal protective equipment (PPE) is essential when examining suspected or confirmed cases[15]. During emergency and elective operations PPE with the use of respirator is mandatory in order to avoid droplets and contaminated body fluids. Particularly aerosol generating procedures should be performed in dedicated airborne infection isolation rooms (AIIR). Isolation of symptomatic individuals in dedicated wards and minimizing the number of caregivers implicated in their treatment can restrict nosocomial dispersion. Finally, educational activities in the hospital should be postponed until de-escalation of the pandemic[14].

Since there are no clear estimations about the duration of the COVID-19 pandemic and due to the high frequency of urological problems, a management protocol for suspected and known COVID-19(+) urological patients is essential. Implementation and adaptation of the protocols according to local requirements and guidelines will ameliorate the quality of services and prepare health systems for future crisis.

REFERENCES

1. WHO Coronavirus disease 2019 (COVID-19). Situation Report – 123. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200629-covid-19-sitrep-161.pdf?sfvrsn=74fde64e_2 Accessed 29 June 2020
2. Iacobucci G. Covid-19 : all non-urgent elective surgery is suspended for at least three months in England. 2020;1106(March):18-19. doi:10.1136/bmj.m1106
3. Akladios C, Azais H, Ballester M, et al. Recommandations pour la prise en charge chirurgicale des cancers gynécologiques en période de pandémie COVID-19 – Groupe FRANCOGYN pour le CNGOF [Guidelines for surgical management of gynaecological cancer during pandemic COVID-19 period - FRANCOGYN group for the CNGOF] [published online ahead of print, 2020 Mar 25]. Gynecol Obstet Fertil Senol. 2020;S2468-7189(20)30130-6. doi:10.1016/j.gofs.2020.03.017
4. Proietti S, Hospital SR, Division VT, et al. European Urology Endourological Stone Management in the Era of the COVID-19. EURUROL-D-20-00386R1. https://els-jbs-prod-cdn.jbs.elsevierhealth.com/pb/assets/raw/Health%20Advance/journals/eururo/EURUROL-D-20-00386_R1-1585252056623.pdf Accessed 19 June 2020
5. Adhikari SP, Meng S, Wu Y, et al. A literature review of 2019 Novel Coronavirus during the early outbreak period: Epidemiology, causes, clinical manifestation and diagnosis, prevention and control. Infect Dis Poverty. 2020;9(29):1-12. doi: 10.20944/preprints202002.0060.v1
6. Hollander JE, Carr BG. Virtually Perfect? Telemedicine for Covid-19. N Engl J Med. March 2020; doi:10.1056/NEJMp2003539
7. Al-Tawfiq JA, Hinedi K, Ghandour J, et al.

Middle East respiratory syndrome coronavirus: a case-control study of hospitalized patients. Clin Infect Dis. 2014;59:160-5.
8. Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19) [Updated 2020 May 18]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK554776/
9. M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19) [Updated 2020 Mar 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2020 Jan-. Chan JF-W, Yip CC-Y, To KK-W, et al. Improved molecular diagnosis of COVID-19 by the novel, highly sensitive and specific COVID-19-RdRp/Hel real-time reverse transcription-polymerase chain reaction assay validated in vitro and with clinical specimens. J Clin Microbiol. March 2020;JCM.00310-20. doi:10.1128/JCM.00310-20
10. Manjunath AS, Hofer MD. Urologic Emergencies. Med Clin North Am. 2018;102(2):373–385. doi:10.1016/j.mcna.2017.10.013
11. Nourparvar P, Leung A, Shrewsberry AB, et al. Safety and Efficacy of Ureteral Stent Placement at the Bedside Using Local Anesthesia. J Urol. 2016;195(6):1886–1890. doi:10.1016/j.juro.2015.11.083
12. Shabeena KS, Bhargava R, Manzoor MAP, Mujeeburahiman M. Characteristics of bacterial colonization after indwelling double-J ureteral stents for different time duration. Urol Ann. 2018;10(1):71–75. doi:10.4103/UA.UA_158_17
13. Misrai V, Pasteur C, Ploussard G, Catto JFW. European Urology The Use of Nonsteroidal Anti-inflammatory Drugs in Urological Practice in the COVID-19 Era: Is "Safe Better than Sorry"? EURUROL-D-20-00416, https://els-jbs-prod-cdn.jbs.elsevierhealth.com/pb/assets/raw/Health%20Advance/journals/ eururo/EURUROL-D-20-00416-1585252059337.pdf. Accessed 21 June 2020.
14. Centers for Disease Control and Prevention. U.S. Department of Health &Human Services. Interim Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed Coronavirus Disease 2019 (COVID-19) in Healthcare Settings. Retrieved online from: https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html. Accessed 22 June 2020
15. WHO. Coronavirus disease 2019, Technical guidance for Health Workers. https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance/health-workers. Accessed 23 June 2020.