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Guidelines for Urology Practice During the COVID-19 Pandemic

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These are unprecedented times. This is why we do not have a ready-made playbook to tackle the pandemic and how to modify our current practice to accommodate the situation appropriately. Nevertheless, our goals are in consonance with the national government, Department of Health and the country as a whole, these are: to stop the transmission of the COVID-19 virus, to protect our medical staff, to maximize the use of resources necessary to treat COVID-19 patients and to minimize collateral damage to patients requiring care for non-COVID diseases.

There is limited literature available on the topic of Urology practice in times of pandemic. The situation is evolving at a different pace in different parts of the world. We are fortunate that the American Urological Association, European Association of Urologists through ERUS (European Robotic Urology Section) and Italy through (Research Urology Network) have published their guidelines to aid their members in modifying their practice to address the present situation. These guidelines are applicable to our local situation since we are faced with the same set of challenges: an increasing number of COVID positive patients, the possibility of our healthcare system being overwhelmed by COVID positive patients with moderate to severe symptoms, the limited number of personal protective equipment or PPE to ensure the safety of our medical staff, and the limited number of ICU beds and ventilators.

From the above sources, we are adopting the following guidelines, all of which are aimed at providing recommendations to the urologic community based on the available evidences. Urologists are invited to apply the following recommendations in their hospitals when performing procedures on patients.

1. **General Protection**. All patients should receive preoperative health screening, regardless if they are symptomatic or not. As operating staffs might become infected, and therefore reduced in number, all medical personnel have to comply with the tertiary protection regulations. General health and COVID screening should be performed in all patients candidate to undergo surgery. In case of COVID+ patient, the procedure should be postponed if not emergent. However, they can also be referred to designated COVID hospitals where urologists treating COVID-19 patients can perform urgent procedures on them. In these cases, procedures should be performed in dedicated operating room (OR) following the hospital recommendation for OR staff protection. In case of negative COVID result, considering also the possibility of false negative, all the necessary protection tools and general recommendation to reduce COVID transmission need to be adequately followed.

2. **Patient Selection**. In order to ensure an adequate number of medical personnel involved in the COVID-19 emergency, as well as in emergencies other than those related to COVID-19, including internists, anesthesiologists, or nurses, all elective surgeries that can be delayed without any risk for the patient should be postponed . Moreover, this measure is aimed at minimizing the expenditure of medical equipment, useful to deal with the COVID-19 emergency, such as masks, sanitizing gel or beds for SARS-CoV-2+ patients, as well as to ensure the ordinary course of emergency cases requiring the use of operating rooms and intensive care units.

3. **Urgent Procedures**. Table 1 shows the emergent urologic conditions and the preferred procedures to be done in times of a pandemic. Procedures that can be done under local anesthesia are preferred over procedures that require an anesthesiologist and a ventilator. This is to preserve these 2 precious

resources. Stenting or percutaneous nephrostomy tube insertion under local anesthesia is the preferred method of draining upper urinary tract obstruction. However, if anesthesiologist support is available then the most convenient procedure can be done. In patients with gross hematuria, the definitive surgical intervention must be done to avoid the need of blood transfusion since blood derivatives would be scarce in times of a pandemic. Management of genito-urinary trauma follows international guidelines.

4. **Procedures for Cancer Cases**. Surgery for Genito-urinary cancer can be classified into 4 categories: 1. Non-deferrable, 2. Semi-non deferrable, 3. Deferrable, 4. Replaceable by alternative treatments. Table 2 lists non-deferrable cancer cases. These are cancer cases where a delay in treatment would jeopardize cancer-related outcomes.

In areas where COVID-19 infection is limited and hospital resources are not stretched out by COVID-19 patients, there is no suspension of surgical activities and surgical procedures for genito-urinary cancer can be considered semi-non deferrable. These would include radical prostatectomy for intermediate to high risk patients, TURBT for small or low grade bladder cancer and nephrectomy or partial nephrectomy for CT1b renal tumors.

All other surgeries for GU cancer can be considered deferrable or replaceable with alternative treatments. This is the case in CT1a renal tumors where they can be managed through

Table 1. Urgent or emergent urological conditions and suggested treatments during COVD-19 pandemic.

Condition	Treatment options
Upper urinary tract obstruction or infection	Nephrostomy tubes Stent placement under local anesthesia Stent placement under anesthesia
Acute urinary retention	Urethral or suprapubic catheter
Clot retention	Clot evacuation and eventual concomitant hemostatic transurethral resection of bladder cancer or prostate in order to minimize the need of blood transfusion
Urinary tract trauma	- Favor procedures not in need of general anesthesia (e.g. endovascular embolization, ureteral stenting) - Surgical treatment only for hemodynamically unstable patient
Spermatic cord torsion	Manual derotation Surgical exploration and orchidopexy
Infection of artificial urinary sphincter or penile prosthesis	Explant of the infected device
Scrotal abscesses, Fournier's gangrene	Drainage Surgical treatment
Priapism	Corpora cavernosal aspiration/irrigation under local anesthesia Shunt

Table 2. Strongly recommended urological surgical procedures during COVID-19 pandemic.

Organ	Condition	Surgical procedure
Bladder	- Muscle-invasive bladder cancer - Refractory bladder CIS	Radical cystectomy and urinary diversion (continent/incontinent) * * caution in case of bowel resection due to the high prevalence of high virus load in stool
	- Non-muscle invasive high-risk bladder cancer. - Tx high-grade bladder cancer - Bladder cancer >2 cm at the moment of the first diagnosis	Transurethral resection (absence or low prevalence of COVID-19 in urine is not associated with risk of contagion in asymptomatic patients not diagnosed by nasopharyngeal sample)
Testis	Testicular cancer	Radical orchidectomy
	Post-chemotherapy retroperitoneal residual lymph nodes	Surgical treatment
Kidney	Clinical T3-4 renal cancer	Radical nephrectomy with thrombectomy in case of tumor thrombosis
	Clinical T2 renal cancer	Radical nephrectomy Partial nephrectomy in selected cases
Upper urinary tract	High grade, ≥ cT1 urothelial cancer	Nephroureterectomy with eventual concomitant lymph node dissection
Prostate	High risk, locally advancer prostate cancer, unsuitable for radiation therapy	Radical prostatectomy and pelvic lymph node dissection
Penis	Clinical > T1G3 penile cancer	Partial penectomy Groin lymph node dissection (when indicated by international guidelines)

ablative treatments. Testicular cancer requiring retroperitoneal node lymph node dissection can be treated with chemotherapy or radiation therapy in accordance with international guidelines.

In the planning of procedures considered non-deferrable, other factors should be considered so as to maximize the use of ICU beds specially in this time of pandemic.

5. **Procedures for Benign Diseases**. All surgeries to treat stones without complicated upper urinary tract obstruction, lower urinary symptoms for benign prostatic enlargement. Urinary incontince, genito-urinary prolapse, elective reconstructive urologic surgery, surgery for male urethral diseases, prosthetic surgery and surgery for infertility should be deferred until the resolution of the COVID-19 pandemic.

6. All diagnostic procedures aimed at evaluating benign conditions (i.e. pressure flow studies for lower urinary tract symptoms) should be deferred after the resolution of the pandemic. Table 4 lists the outpatient procedures most commonly done for patients with known or suspected malignancy and the recommendation of the Italian Panel of Urologists from Research Urology Network.

7. **Management of COVID-19 Positive Patients**. These patients should be referred to identified COVID centers where Urologists in those hospitals can perform urgent urologic procedures. Ling et al reported the presence of the virus in 6.9% of convalescing patients. In most other studies, no single case for urine positivity for the virus was documented. All health care workers however, should follow national rules to decrease the possibility of being contaminated. These procedures should be done in COVID designated operating rooms. These procedures are most likely the same procedures listed in table 1.

Table 3. Factors potentially affecting the choice of the different urological procedures during COVID-19 pandemic.

Specific factors	Notes
Need for postoperative intensive care	According to patients age, comorbidity, ASA class and complexity of the surgical procedures, those patients who are at risk of needing postoperative intensive care should be postponed
Need for blood transfusion or other blood products	High complex surgical procedures potentially requiring intraoperative or postoperative blood transfusion should be considered with caution due to the frequent shortage of blood products due to decreased donations.
Cardio-vascular or respiratory or infective comorbidities	Those categories of patients could request assessment by other health care workers experienced in management of symptomatic COVID-19 patients not in need for mechanical ventilation
Need for familiar assistance and psychophysical support	Effort to contain COVID-19 contagion is causing in many hospitals the suspension of familiar assistance to patients

Table 4. Proposal for rescheduling of the most common outpatient urological procedures during COVID-19 pandemic.

Procedure	Indication for the emergency phase	Note
Prostate biopsy	Postpone	Reconsider performing prostate biopsy in patients with high clinical suspicion of prostate cancer if the emergency phase should prolong
Flexible cystoscopy	Postpone	Reconsider performing cystoscopy in patients with high-risk bladder cancer if the emergency phase should prolong
Replacement of ureteral stents and nephrostomy tube	Postpone up to 6 months	
Intravesical therapy for high-risk bladder cancer	Do not postpone	
Intravesical therapy for low- or intermediate-risk bladder cancer	Postpone	

8. **Surgical Approach, Techniques and New Technologies**. The adoption of a standardized technique is recommended to reduce OR time and the risk of postoperative complications. An experienced surgeon should perform the procedure. Application of new techniques or technologies should be postponed until the resolution of the pandemic.

9. **Prevention and Management of Aerosol Dispersal in Laparoscopic Surgery**. In the case of non-deferrable surgery, the release of surgical smoke during laparoscopic procedures may carry small viral particles. In consequence, any laparoscopic or robotic surgery should only be performed when needed. It may be of particular importance to perform robotic surgery at the lowest intra-abdominal pressure allowed. In this regard, the use of intelligent integrated flow systems is recommended. Indeed, the use of these devices allows the surgeon to keep the intra-abdominal pressure as low as possible, ensuring a self-maintained constant pneumoperitoneum. Avoid using two-way pneumoperitoneum insufflators to prevent pathogens colonization of circulating aerosol in the pneumoperitoneum circuit or the insufflator. These integrated flow systems need to be configured in a continuous smoke evacuation and filtration mode. Specifically, through an Ultra Low Penetrating Air (ULPA) Filter that meets the AORN guidelines, the smoke evacuation and filtration mode allow capturing of particles above 0.01 mcm and the SARS-CoV-2 aerodynamic size has been reported in the range of 0.06-0.14 mcm. Consequently, the use of devices with smoke evacuation filters may have a role in reducing the diffusion of SARS-CoV-2. However, it is important to remark that there is no specific data demonstrating an aerosol presence of the COVID-19 virus released during minimally invasive abdominal surgery, as reported in recent SAGES guidelines update.

10. **Surgical Smoke**. As reported by Zheng, et al. ultrasonic scalpels or electrical equipment commonly used in minimally invasive surgery can easily produce large amounts of surgical smoke, and in particular, the low-temperature aerosol from ultrasonic scalpels or scissors cannot effectively deactivate the cellular components of virus in patients. In previous studies, activated Corynebacterium, papillomavirus and H.I.V. have been detected in surgical smoke and several doctors contracted a rare papillomavirus suspected to be connected to surgical smoke exposure. The risk of COVID-19 infection aerosol should not be any exception. One study found that after using electrical or ultrasonic equipment for 10 minutes, the particle concentration of the smoke in laparoscopic surgery was significantly higher than that in traditional open surgery. Thus, lowering electrocautery power setting as much as possible is recommended.

11. **Pneumoperitoneum Disinflation**. In addition to the previous point, it is mandatory to confirm the complete and correct disinflation of the pneumoperitoneum at the end of the procedure. In fact, due to the low gas mobility in the pneumoperitoneum, the aerosol formed during the operation tends to concentrate in the abdominal cavity . Sudden release of trocar valves, non- airtight exchange of instruments or even small abdominal extraction incisions can potentially expose the health care team to the pneumoperitoneum aerosol. This evidence further supports the use of system with integrated active smoke evacuation mode. Conversely, classical insufflation systems that are not implemented with active smoke evacuation mode or other filters may result to higher risk of SARS-CoV-2 aerosol transmission.

12. **Renal Transplantation**. Possible risks associated to transplant in COVID-19 positive recipients are described by Michels et al. for liver transplantation. Given the lack of specific recommendation for kidney transplant surgery, we suggest adopting the same approach proposed for liver transplantation. Specifically, renal transplantation should be performed only in the most urgent cases. All recipients need to be screened to avoid transplantation in SARS- CoV-2 positive subjects.[19] Donors should also be COVID negative. As previously stated, no clear evidence of SARS-CoV-2 transmission through aerosol generated during minimally invasive surgery

is currently available . In consequence, no specific indication regarding the use of minimally invasive techniques for renal transplantation can be offered.

13. **Operating staff protection**. All the surgical team (including surgeons, anesthetists and nurses) should adopt adequate protection devices. Goggles, FFP2/3 mask and body protective garb represent necessary tools in case any minimally invasive procedure is performed during the COVID-19 emergency. Surgeons must avoid contact with droplets and full body protection is needed. This may also mean wearing a sealed visor mask for the console

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