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Abstract

The severe acute respiratory syndrome coronavirus 2 and the disease it causes, coronavirus disease 2019 (COVID-19) is generating a rapid and tragic health emergency in Italy due to the need to provide assistance to an overwhelming number of infected patients and, at the same time, treat all the non-deferrable oncological and benign conditions. A panel of Italian urologists has agreed on possible strategies for the reorganization of urological routine practice and on a set of recommendations that should facilitate the process of rescheduling both surgical and outpatient activities during the COVID-19 pandemic and in the subsequent phases. This document could be a valid tool to be used in routine clinical practice and, possibly, a cornerstone for further discussion on the topic also considering the further evolution of the COVID-19 pandemic. It also may provide useful recommendations for national and international urological societies in a condition of emergency.

Keywords: Coronavirus; COVID-19; pandemic; urology; clinical practice guidelines; surgery; endourology

Introduction

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the disease it causes, coronavirus disease 2019 (COVID-19) [1] is generating a rapid and tragic health emergency in Italy due to the need to provide assistance to an overwhelming number of infected patients and, at the same time, treat all the non-deferrable oncological and benign conditions [2]. Since February 21st to March 21st 2020, 53,578 cases of COVID-19 have been diagnosed only in Italy, causing, at the time of the present paper drafting, a total of 4,825 deaths, with 17,708 critically ill patients and 2,857 patients under mechanical ventilation in intensive care units. Seventy-two per cent of the cases are located in four regions of Northern Italy (Lombardy, Emilia Romagna, Veneto, and Piedmont), where the first clusters of COVID-19 infection were identified [3]. However, the increasing number of positive patients in other regions makes one predict a diffusion of COVID-19 across the whole country, despite the aggressive containment effort implemented by the national political and health authorities.

The need to dedicate major economic, infrastructural, and medical resources to the assistance of critically ill COVID-19 patients is causing a redistribution of the activities of several medical disciplines not primarily involved in the management of COVID-19 patients. This is happening in one of the richly resourced health care system of the western world.

The suspension of all outpatient, non-urgent activities and the restrictions in scheduling the procedures that are non-deferrable or urgent has determined a major reorganization of all activities in the urological wards, mainly depending on the availability of anesthesiologists, mechanical ventilators, and hospital beds. This is of particular relevance considering that currently there is no reliable prevision on the duration of emergency and its economic and social consequences.

Whereas in some hospitals massively dedicated to treatment of COVID-19 patients urological activity is mainly limited to urgent procedures, elective and non-deferrable urological procedures are still possible in other regions with lower burden of COVID-19 cases, which are reorganizing their activities in preparation for the emergency. A proper identification of the procedures to prioritize for the treatment of most common urological conditions has not been yet defined. Stensland et al recently proposed some recommendations on the triage of urologic surgeries during the pandemic [4]. The authors distinguished surgical procedures for oncological diseases that should be recommended and performed during the pandemic; procedures that should be postponed without special concerns for patient health; procedures that should be replaced by alternative treatments not requiring general anesthesia (e.g. radiotherapy, chemotherapy, androgen deprivation therapy, ablative treatments).

Possible strategies for the reorganization of urological surgical activities were the subject of discussion in the context of a large team of Italian experts affiliated to the Research Urology Network

(RUN), who decided to draft the present document with the purpose to facilitate the process of reorganization at different institutions during the COVID-19 pandemic and in the subsequent phases.

Methods

The present document is based on the limited data available in the urological literature and on the experience reported by members of the panel in the management of COVID-19 pandemic in their institutions. After agreement on the aims of the paper, the first draft was circulated among the Authors and extensively discussed in a conference call on March 21st 2020. All Authors subsequently approved the final version of the paper on March 22nd 2020. Finally, this document was sent to two senior urologists (VM and RMS) for supervision.

Proposed management of urological patients who are not suspected of harboring COVID-19

Urgent procedures

Table 1 summarizes the procedures that should be performed in urgent conditions for the corresponding urological disorders.

In consideration of the limited availability of anesthesiologists and ventilators during the COVID-19 pandemic, even in the management of urgent urological conditions it is preferable to adopt those procedures that can be performed under local anesthesia. For example, in the management of upper urinary tract obstruction, we advocate the use of ureteral stents because they allow for an easier home care. Whenever possible, the cause of the obstruction should be treated in agreement with the locally available resources. However, in the absence of anesthesiology support, percutaneous nephrostomy or ureteral stenting under local anesthesia are recommended to drain the upper urinary tract.

With regard to gross hematuria, the need to limit the use of blood derivatives in consideration of the decreased donation supports the adoption of all the measures necessary to treat the underlying condition.

Management of genitourinary traumata clearly has to follow the recommendations of the international guidelines. Although the vast majority of traumata may benefit from conservative management, endovascular embolization to treat active bleeding or ureteral stent placement in case of urinary leakage are to be performed timely in order to minimize the need for blood transfusions and the risk of infection, and to shorten in-hospital stay. Surgical treatment has to be considered for the most severe traumata and for hemodynamically unstable patient.

The panel suggest to take into account all possible patient-related factors and comorbidities when triaging urgent conditions and planning the corresponding treatment.

Procedures for oncological diseases

Urological procedures to treat cancers can be distinguished in four categories: a) non-deferrable; b) semi-non-deferrable c) deferrable; d) replaceable by other treatments.

All the procedures whose delay can jeopardize cancer-related outcomes have to be considered non-deferrable. Table 2 summarizes all the urological procedures that are considered non-deferrable [4]. However, in the planning of those procedures that are considered non-deferrable from the oncological standpoint, other considerations should be made in the COVID-19 pandemic with regard to availability of intensive care beds and patient comorbidity profile (Table 3).

Implementation of non-COVID surgical areas in the context of hospitals treating COVID-19 patients or the creation of hospital networks in order to refer patients needing non-deferrable procedures to non-COVID hospitals has to be strongly recommended. In this context, the adoption of all measures necessary to limit the contagion of non-COVID areas or non-COVID hospitals is, similarly, strongly recommended.

In all areas where the level of COVID-19 diffusion is limited enough and in hospitals where the resources needed by COVID-19 patients are not imposing the suspension of all surgical activities, other surgical procedures for urological cancers could be considered as semi-non-deferrable. Among those procedures, we could include radical prostatectomy for intermediate and high-risk patients, transurethral resection of small or low-grade bladder cancer, and radical or partial nephrectomy for cT1b renal tumors.

All other urological surgical procedures for malignancies can be considered deferrable or replaceable by other treatments [4]. Specifically, partial nephrectomy can be deferred in patients with cT1a renal tumors, and selected cases of small renal tumors could be managed with ablative treatments not requiring general anesthesia. Patients with testicular cancer for whom a retroperitoneal lymph node dissection would be indicated should be preferably treated with radiation therapy or chemotherapy in agreement with the international guidelines. However, the caveats in the administration of chemotherapy during the COVID-19 pandemic should also be considered [5,6].

Similarly, radiation therapy could be preferred in patients with high-risk or locally advanced prostate cancer due to the need for limiting the use of general anesthesia. However, this could lead to an increase in waiting list times as well as to the need for repeated access to the hospital for treatment delivery. This could ultimately increase the risk of contagion and diffusion of the infection. As an

alternative, androgen deprivation therapy could be considered for those patients with high-risk prostate cancers who cannot receive timely curative treatments.

However, the opinion of the panel is that all efforts should be done during the pandemic era to deliver appropriate treatments in order not to jeopardize cancer-related outcomes and quality of life as compared to standard of care in non-pandemic times.

Procedures for benign diseases

All the procedures to treat urinary stones in the absence of complicated upper urinary tract obstruction, lower urinary tract symptoms due to benign prostatic enlargement, urinary incontinence, genitourinary prolapse, elective reconstructive surgery, surgery for male urethral diseases, prosthetic surgery, and surgery for infertility should be deferred until the end of the COVID-19 emergency.

Outpatient procedures

All diagnostic procedures aiming at evaluating benign conditions (e.g. pressure-flow study for lower urinary tract symptoms) should be deferred until the end of the COVID-19 emergency. Table 4 summarizes the panel suggestions to schedule some of the most common outpatient urological procedures, mainly performed in patients with known or suspected malignancy.

Proposed management for urological patients who are COVID-19 positive

All urologists practicing in hospitals treating COVID-19 patients may be in need to perform urgent procedures on those patients. Although Ling et al reported the presence of COVID-19 in the urine of 6.9% of the convalescent patients [7], in most other studies no single case of urinary positivity for SARS-CoV-2 was documented [8]. However, all health care workers should follow the national rules in order to decrease the risk of contagion.

Urgent surgical procedures on COVID-19 patients should be performed in dedicated operating rooms and following the pathways implemented by the single hospitals. Due to the fact that urological complications by COVID-19 have not been reported yet, it is likely that surgical procedures eventually needed in COVID-19 patients are those reported in Table 1.

Surgical approach, surgical techniques, and new technologies

In the pandemic era, the adoption of standardized surgical technique is recommended in order to reduce the operating room time and the risk of postoperative complications. For those reasons, all

procedures should be performed by experienced surgeons, outside of their learning curve. Implementation of new technologies as well as specific clinical studies on new technologies should be postponed until the end of the COVID-19 emergency.

Specific attention must be paid to laparoscopic procedures needing bowel handling or a transperitoneal approach. Previous studies demonstrated that other viruses can be transmitted during laparoscopic surgery through carbon dioxide [9,10]. It is now known that SARS-CoV-2 is present in the stools of COVID-19 patients, but the transmission during laparoscopic procedures has not been described, and fecal-oral transmission has not been reported, although theoretically possible [11]. However, the Society of American Gastrointestinal and Endoscopic Surgeons has recently recommended the use of a filtration system to reduce the viral release under pressure with the release of a pneumoperitoneum [12]. Awaiting further studies, the panel recommends caution during laparoscopic procedures in suspected or overt COVID-19 patients, and suggests the implementation of the maneuvers proposed by Zheng et al (e.g. prevention of aerosol dispersal, lowering pneumoperitoneum pressure, lowering electrocautery power setting, using bipolar cautery) [13].

General organization and multidisciplinary management

The rapid evolution of the COVID-19 emergency should not limit the adoption of multidisciplinary management of patients with genitourinary malignancies. The panel recommends the implementation of a team of surgeons who share the same operating rooms and anesthesiologists in order to assign the most appropriate priority to patients, taking into account the availability of the health care workers to activate the rooms. A proper planning should identify weakly a pool of surgical procedures to be prioritized and a daily verification of the possibility to accomplish them (Figure 1).

Although current Italian laws do not encompass this, it would be preferable that all patients candidates for prioritized surgical procedures would be tested preoperatively with a nasopharyngeal sample for SARS-CoV-2. The same should be recommended for any patients undergoing an urgent procedure, if the procedure can be deferred until the sample result is available. In the absence of such procedures, it is recommended that all the patients scheduled for surgery received at least a telephonic assessment in order to exclude the presence of symptoms suspicious for COVID-19. It is also recommended that all patients had their temperature measured in the days before hospitalization, in order to prevent the hospitalization of suspected cases directly in the urological wards. At the time of hospitalization, all patients should wearing a surgical mask. Moreover, all urological departments performing non-deferrable or semi-non-deferrable procedures should reduce the number of beds in

order to increase the distance among patients. Finally, as far as the complex management of patients with genitourinary malignancies is regarded, the implementation of virtual multidisciplinary meetings based on locally available web technologies is recommended.

General recommendations

Urologists practicing in hospitals with COVID-19 patients can be requested to perform evaluation of those patients for some coexisting or preexistent urological conditions. Moreover, the redistribution of medical resources could imply that even urologists could be directly involved in the management of COVID-19 patients. For those reasons, the panel recommends that all general preventive measures be followed and that all personal protective equipment be used in order to protect physicians, relatives, and patients in agreement with the national regulations for the different areas of the hospital where the urological activity may occur (non-COVID-19 areas, emergency department, outpatient clinic). The need to use the personal protective equipment properly and to respect the hospital pathways is highlighted by the high number of infected health care workers diagnosed in Italy (about 8%) and by the constant increase of such trend (Figure 2). To date, specific data on urologists are lacking.

Conclusions

The present paper is based on the opinion of experts as well as on the experiences of a group of urologists directly involved in the organization of the urological wards in Italy. Hopefully, it is a valid tool to be used in the clinical practice and, possibly, a cornerstone for further discussion on the topic also considering the further evolution of the pandemic. Finally, it may provide a useful set of recommendations for national and international urologic societies in a condition of emergency.

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Figure Legends

Figure 1. Proposal for a decisional algorithm for multidisciplinary planning of operating rooms during COVID-19 pandemic.

Figure 2. Number of health care workers infected by SARS-CoV-2 in Italy in the period March 11th - March 20th 2020. New cases in blue, curve of cumulative cases in red (available at www.gimbe.org, latest access on March, 22nd 2020).

Tables

Table 1. Urgent or emergent urological conditions and suggested treatments during COVID-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)

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

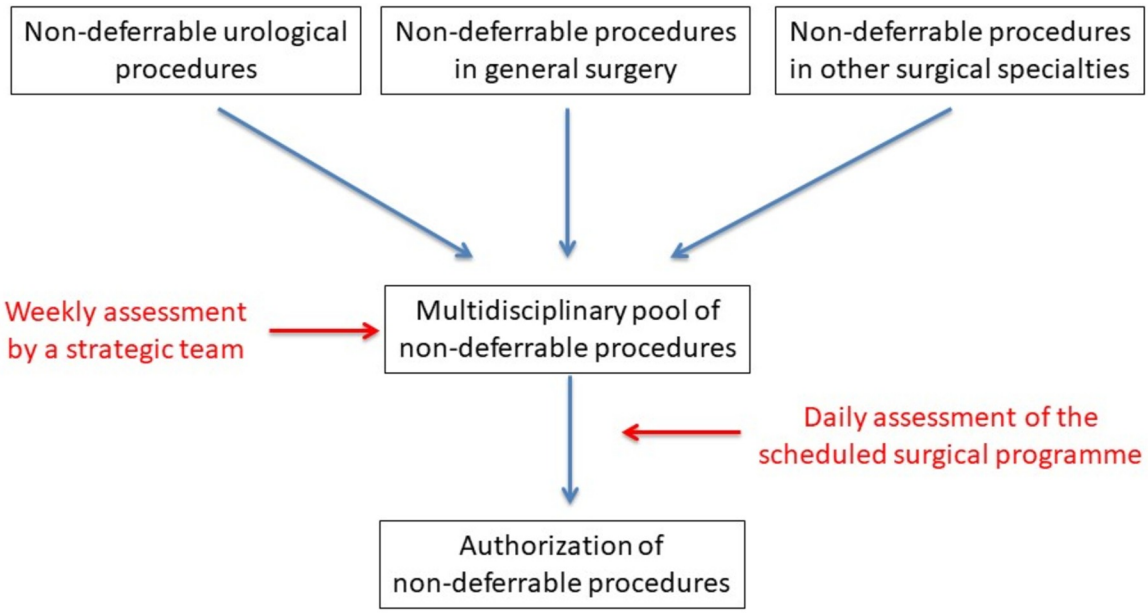
Specific factors	**Notes**
Need for postoperative intensive care	According to patients age, comorbidity, ASA class and complexity of the surgical procedures, those patients who are at risk of needing postoperative intensive care should be postponed
Need for blood transfusion or other blood products	High 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

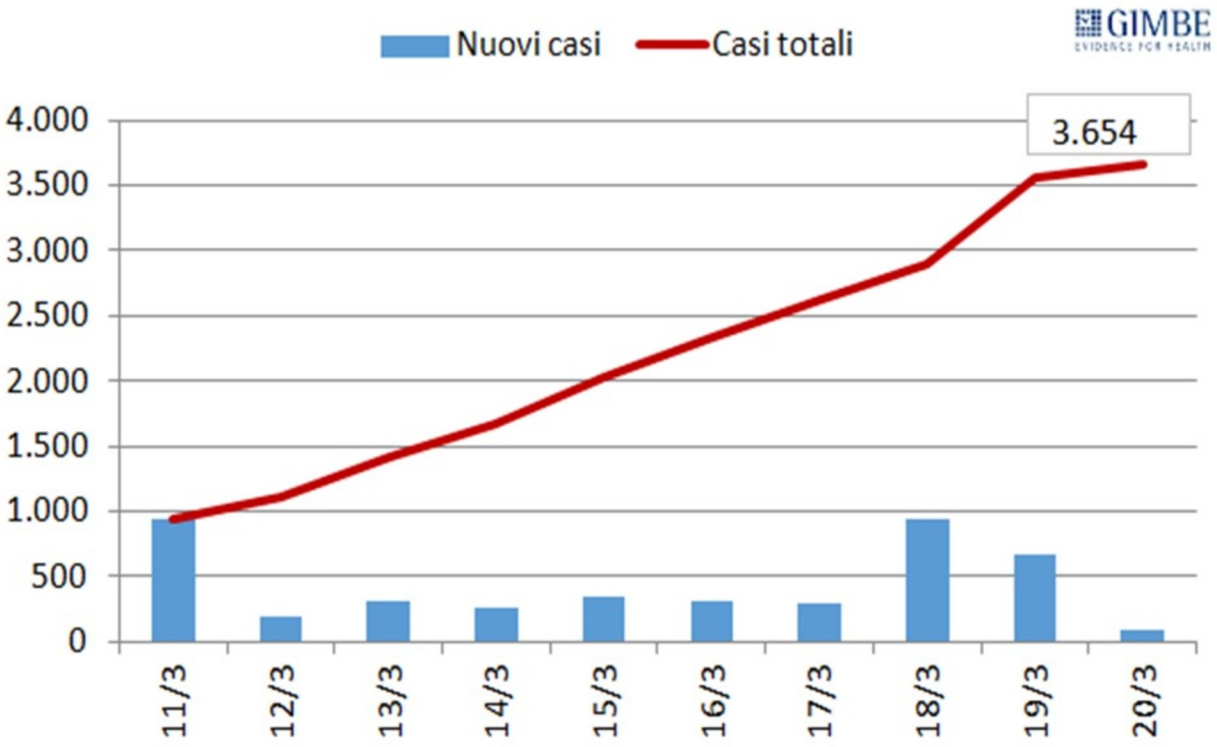
Table 4. Proposal for rescheduling of the most common outpatient urological procedures during COVID-19 pandemic.

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	

Appendix

The Italian version of the present document is available as Supplementary file.





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