Implementation and strategies to ensure adequate coordination within a Urology Department during the COVID-19 pandemic

Francesco Esperto 1, Francesco Prata 1, Angelo Civitella 1, Karl H. Pang 2, 3, Michele Marchioni 4, Piergiorgio Tuzzolo 1, Roberto M. Scarpa 1, Rocco Papalia 1

1 Department of Urology, Campus Bio-Medico University of Rome, Rome, Italy; 2 Department of Oncology University of Sheffield, Sheffield, United Kingdom, UK; 3 Department of Metabolism, University of Sheffield, Sheffield, United Kingdom, UK; 4 Department of Medical Oral and Biotechnological Sciences “G D’Annunzio” University of Chieti. Urology Unit SS Annunziata Hospital Chieti, Italy

ABSTRACT

Purpose: to provide an update on the management of a Urology Department during the COVID-19 outbreak, suggesting strategies to optimize assistance to the patients, to implement telemedicine and triage protocols, to define pathways for hospital access, to reduce risk of contagious inside the hospital and to determine the role of residents during the pandemic.

Materials and Methods: In May the 6th 2020 we performed a review of the literature through online search engines (PubMed, Web of Science and Science Direct). We looked at recommendations provided by the EAU and ERUS regarding the management of urological patients during the COVID-19 pandemic. The main aspects of interest were: the definition of deferrable and non-deferrable procedures, Personal Protective Equipment (PPE) and hospital protocols for health care providers, triage, hospitalization and surgery, post-operative care training and residents’ activity. A narrative summary of guidelines and current literature for each point of interest was performed.

Conclusion: In the actual Covid-19 scenario, while the number of positive patients globally keep on rising, it is fundamental to embrace a new way to deliver healthcare and to overcome challenges of physical distancing and self-isolation. The use of appropriate PPE, definite pathways to access the hospital, the implementation of telemedicine protocols can represent effective strategies to carry on delivering healthcare.

INTRODUCTION

A novel coronavirus was identified and considered responsible for a cluster of new cases of interstitial pneumonia in December 2019, in Wuhan, China. On February 11th, 2020, the disease caused by the SARS-CoV-2 virus (Severe Acute Respiratory Syndrome Coronavirus 2) was officially termed “COVID-19” by the World Health Organization (WHO) (1). The high potential of human to human transmission led to a rapid COVID-19 epidemic in China, and subsequently, the
WHO declared COVID-19 as a global pandemic on March 11th (1). In Europe, Italy has been one of the most affected countries and the first one to adopt important restrictive measures on the whole national territory (2).

At the time of writing (May 7th, 2020), 3,833,547 total cases were reported. Of these, there were 2,261,992 symptomatic patients. Those in intensive care unit (ICU) represented 2%. Overall, 265,210 deaths have been reported in Italy. Meanwhile, the spread of the disease has dramatically increased in the USA, making it the leading country for total cases and total deaths (3).

All countries affected by COVID-19 are facing the major problem of ICU overcrowding and the progressive lack of resources. Many hospitals have to postpone major elective surgeries. Hospital departments worldwide limit procedures to urgent and non-deferrable cases, following the adoption of internal inpatients and outpatients management protocols. With the exponential increase in the number of cases, all countries had to reallocate medical resources to manage COVID-19 patients, with redistribution of medical and surgical activities (4).

To provide a snapshot of the current uro-oncological management in Europe during the COVID-19 emergency, Oderda et al. conducted a survey involving 57 European urological referral centers. They showed that the management of the main urological cancers has been altered dramatically by the COVID-19 pandemic, with most European centers (82%) declaring to be “much” or “very much” affected. Uro-oncological consultations for newly diagnosed cancers and follow-up were more than halved or almost suspended, in 55% and 71% of centers, respectively (5).

Guidelines have been provided by major national and international scientific societies to aid physicians in the management of urological conditions during the COVID-19 outbreak. We aim to summarize the current state of literature on the management of a Urology Department during the COVID-19 outbreak, suggesting strategies to optimize assistance to the patients, to implement telemedicine and triage protocols, to define pathways for hospital access, to reduce risk of contagious inside the hospital and to determine the role of residents during the pandemic.

**MATERIALS AND METHODS**

On May 8th, 2020 we performed a review of the literature through online search engines (PubMed, Web of Science and Science Direct). We looked at recommendations on management of urological patients during the COVID-19 pandemic provided by the European Association of Urology (EAU) and the EAU Robotic Urology Section (ERUS). The main aspects of interest were: the definition of deferrable and non-deferrable procedures, Personal Protective Equipment (PPE) and hospital protocols for healthcare providers, triage, hospitalization and surgery, post-operative care, training and residents’ activity.

A narrative summary of guidelines and current literature for each point of interest was performed.

**Deferrable and non-deferrable procedures**

ICUs are being filled up rapidly, causing a shortage of hospital beds, mechanical ventilators and anesthesiologists. To decrease the general inflow of patients to hospitals, recommendations have been provided to reduce the number of medical and surgical procedures ensuring that only urgent and non-deferrable oncological surgeries are performed. On February 28th, the president of the Robert-Koch-Institute (RKI) suggested to defer all non-urgent surgeries (6). Similarly, in most of European National Health Systems a reduction of surgical activity was recommended. Several definitions of deferrable and non-deferrable procedures have been proposed. In particular, the EAU guidelines categorized procedures into priority groups (Table-1):

1) emergency, life-threatening situations that cannot be postponed for more than 24 hours; 2) high priority, the last to postpone because of the concrete possibility of a clinical harm; 3) intermediate, should be cancelled but recommended not to postpone for more than 3 months. Clinical harm (progression, metastasis, loss of organ function) is possible if postponed 3-4 months but unlikely and; 4) low priority, that can be postponed for more than 6 months (7).
Stensland et al. (8) defined a list of urological conditions and surgical procedures that patients may undergo during the pandemic, stressing a more conservative approach whenever feasible. For example, benign prostate hyperplasia (BPH) and urinary tract stones should be treated only if complication occurs, with catheterization, and nephrostomy or ureteral stenting, respectively. Surgery should be maintained just for urological urgencies, such as testicular torsion, refractory gross hematuria and oncological disease (i.e. invasive muscle bladder cancer, suspected high grade T1 bladder cancer, kidney tumors >cT3) (Table-2). The Research Urology Network (RUN) group has outlined priorities for urological patients (Table-3), providing strategies for the management of urological patients not suspected of, or positive for COVID-19 (4). Treatments that ensure a fast discharge with the resolution of functional harms should be used. For instance, in

### Table 1 - Summary of EAU guidelines Office Rapid Reaction Group for oncological and non-oncological conditions (7).

| Priority         | Condition                                                                 | Treatment                                      |
|------------------|---------------------------------------------------------------------------|-----------------------------------------------|
| **Oncological**  |                                                                           |                                               |
| Emergency        | Life threatening– organ function threatening condition                   | Cannot be postponed more than 24 hours.       |
| High priority    | Clinical harm (progression, metastasis, loss of organ function and deaths) if postponed > 6 weeks | The last to cancel, prevent delay of > 6 weeks. |
| Intermediate priority | Clinical harm possible (progression, metastasis, loss of organ function) if postponed 3 months but unlikely. | Not recommended to postpone more than 3 months. |
| Low Priority     | Clinical harm very unlikely (progression, metastasis, loss of function) if postponed | Postpone up to 6 months.                     |
| **Non-oncological** |                                                                       |                                               |
| Emergency        | Life threatening situation                                                | Cannot be postponed more than 24 hours.       |
| High priority    | Clinical harm very likely if postponed > 6 weeks                          | The last to cancel, prevent delay of > 6 weeks. |
| Intermediate priority | Clinical harm possible if postponed 3-4 months                            | Not recommended to postpone more than 4 months. |
| Low Priority     | Clinical harm very unlikely if postponed                                  | Postpone 6 months.                           |
Table 2 - Summary of suggested triage of urological surgical cases during the COVID-19 pandemic by Stensland et al. (8).

| Condition            | Pathology                          | Treatment Recommended                              | Comments                                      |
|----------------------|------------------------------------|----------------------------------------------------|-----------------------------------------------|
| **Bladder cancer**   | MIBC (regardless CHT) – refractory CIS (3rd line) | Radical cystectomy                                  | 5-8 days’ hospital stay                       |
|                      | Suspected >cT1 BC                  | TURB                                               | Outpatient procedure                          |
|                      | Suspected testicular cancer        | Orchietomy                                         | Outpatient procedure                          |
| **Testicular cancer**| Post-CHT LN (testicular cancer)    | RPLN dissection – RT/CHT post-orchietomy (if clinically appropriate) | Balance CHT (immunosuppression).              |
|                      | >cT3 renal tumor                   | Radical nephrectomy + thrombectomy                 |                                               |
|                      | cT1 renal tumor                    | Delay surgery / Ablative approach                  |                                               |
|                      | cT2 renal tumor                    | Delay surgery up to 3 months                       |                                               |
| **Renal tumor**      | PCA high-risk                      | RT – Surgery (if ineligible for RT) – delay in selected cases | Most prostatectomy should be delayed          |
|                      | PCA intermediate/low risk          | Delay surgery                                      |                                               |
| **Upper urinary tract cancer** | High grade >cT1 UTUC | Nephroureterectomy                                 | 1 – 4 days of hospital stay                   |
|                      | Adrenal tumor >6 cm (suspected for carcinoma) | Adrenalectomy                                      | 0 – 1 day of hospital stay                    |
|                      | Adrenal tumor <6 cm                | Consider to delay                                  | Possible rapid progression                     |
| **Adrenal tumor**    | Urethral/penisive or obstructive cancer | Limited data, consider partial penile penectomy, avoid LN dissection | Outpatient procedure                          |
|                      | Stones                             | Nephrostomy/stent (preferable under local anaesthesia) | Emergency if obstructive/ infected           |
| **Urethral/penile tumor** | Indwelling ureteral stent          | Delay most procedures (from 6-12 to 30 months)     | Outpatient procedure                          |
|                      | PNH                                 | Only if obstructive suprapubic/urethral catheter   |                                               |
|                      | Urinary incontinence               | Delay all procedures                               |                                               |
|                      | Cystitis                           | Delay all procedures                               |                                               |
| **Female urology**   | OAB                                | Delay all procedures                               | High risk of infection                        |
|                      | Neurogenic Bladder                 | Delay all procedures                               |                                               |
|                      | External nerve stimulator          | Internalized or removed                            |                                               |
|                      | Fistula with pelvic sepsis repair  | Urine/fecal diversion (delay definitive repair)    |                                               |
| **Reconstructive surgery** | Infected urinary sphincter        | Explantation                                       |                                               |
|                      | Urethral obstruction               | Suprapubic/urethral catheter                       | Outpatient procedure                          |
|                      | Penile prosthesis                  | Explant if infected                                |                                               |
| **Prosthetic surgery** | Priapism                           | Shunt                                              |                                               |
|                      | Spermatic cord torsion             | Detorsion/orchidopexy                              |                                               |
|                      | Refractory gross hematuria         | Clot evacuation                                    |                                               |
| **General urology**  | Acute scrotal abscess and Fournier’s gangrene | Surgery                                           | Outpatient procedure                          |
|                      | PNH                                | Surgery                                           |                                               |
|                      | Penile/ testicular fracture         | Surgery                                           |                                               |
|                      | Urethral injury                    | Surgery                                           |                                               |
|                      | Bladder perforation                | Surgery                                           |                                               |
| **Transplant**       | Renal transplant                   | Deceased donor, don’t delay Live donor, delay      |                                               |
| **Infertility**      | Infertility                        | Delay all procedures                               |                                               |

MIBC = muscle-invasive bladder cancer; BC = bladder cancer; CHT: = chemotherapy; TURB = trans-urethral resection of bladder; LN = lymphnodes; RPLN = retroperitoneal lymphnodes; RT = radiation therapy; PCA = prostate cancer; BPH = benign prostate hyperplasya; OAB = overactive bladder
Table 3 - Summary of RUN group recommendations for urological conditions during Sars-CoV-2 era (4).

| RUN Group       | Upper urinary tract obstruction/infection | Acute urinary retention | Clot retention | Spermatic cord torsion | Infection of artificial sphincter/prothesis | Scrotal abscess | Fournier’s gangrene | Priapism |
|-----------------|------------------------------------------|-------------------------|---------------|------------------------|---------------------------------------------|----------------|---------------------|----------|
| Urgent          | Nephrostomy/stent (preferable under local anaesthesia) | Urethral/suprapubic catheter | Cystoscopic clot evacuation - TURB/TURP | Manual derotation/surgery | Explant | Drainage | Surgery | Corpora cavernosa aspiration/irrigation or Shunt (preferable under local anaesthesia) |
| Non-deferrable  | MIBC / refractory CIS | Radical cystectomy + Urinary diversion (high virus load in stool) | TURB + intravesical therapy | Radical orchietomy | Surgery | Radical nephrectomy + thrombectomy | Radical nephrectomy + LN dissection | Radical prostatectomy + LN dissection |
| Semi-non-deferrable | NMIBC (>2cm/high grade) | Testicular cancer | Post-CHT retroperitoneal residual LN | cT3-T4 renal tumor | cT2 | High grade >cT1 upper urinary tract urothelial cancer | High-risk/locally advance PCA unsuitable for RT or ADT |
| Deferrable      | >cT1G3 penile cancer | Partial penectomy + groin LN dissection | PCA intermediate/high-risk | NMIBC (<2cm/low grade) | cT1b renal tumor | cT1a renal tumor | Uncomplicated urinary stones | BPH with LUTS |
| Replaceable with other treatments | Radical prostatectomy | TURB | Radical nephrectomy | Radical prostatectomy | Radical nephrectomy | Partial nephrectomy | Medical therapy | Medical therapy |
| Replaceable     | Low-grade NMIBC | Postpone replacement up to 6 months | Postpone intravesical therapy | Postpone prostate biopsy | Postpone flexible cystoscopy | RT or ADT (if cannot receive timely curative treatments) | Ablative treatment not requiring general anaesthesia | RT or CHT |

TURB = trans-urethral resection of bladder; TURP = trans-urethral resection of prostate; MIBC = muscle-invasive bladder cancer; NMIBC = non-muscle-invasive bladder cancer; CHT = chemotherapy; PCA = prostate cancer; BPH = benign prostate hyperplasia; LUTS = lower urinary tract symptoms; RT = radiation therapy; ADT = androgen deprivation therapy; LN = lymphnodes
cases of upper urinary tract obstruction, ureteral stents or percutaneous nephrostomy are preferred to more definitive procedures such as PCNL (Percutaneous nephrolithotomy) or RIRS (Retrograde intra-renal surgery). In cases of gross hematuria, surgery should be limited to cystoscopy for clot evacuation and concomitant hemostasis, preferably in an outpatient setting. However, bladder tumors should be removed if identified. The aim of these conservative approaches is to limit the need for blood transfusions and post-operative intensive care bed occupation. Considering the limited resources, urgent and emergent urological conditions are suggested to be treated under local or regional anesthesia whenever feasible to reduce aerosol generation (4).

The RUN group divided uro-oncological procedures into four categories: non-deferrable; semi-non-deferrable; deferrable; and replaceable with other treatments. Non-deferrable surgeries include muscle-invasive or high-risk progression bladder cancer, testicular cancer, renal tumor ≥T2, upper urinary tract cancer ≥cT1, high-risk prostate cancer unsuitable for radiation therapy (RT), and penile cancer >cT1G3 (4). For these pathologies, a delay could result in poorer cancer-related outcomes. If a hospital struggles with limited resources due to an uncontrolled COVID-19 spread, the patient should be transferred to a lower impact area for treatment. High-complexity surgery carries higher rates of morbidity and mortality and, in cases where patient’s health is not jeopardized, it should be delayed (9). For selected patients not fit for major surgery, conservative approaches such as bladder-sparing treatments, may provide comparable oncological outcomes without affecting patients’

---

Table 4 - Summary of COVID-19 task force actions regarding PPE for HWs (13).

| At station in direct contact with patients | At station with progressive glass | In contact with a suspected or confirmed case of COVID-19 | In contact with a patient who presents symptoms of fever and/or cold and/or cough | Performing endoscopic procedures | Assigned to take a biological sample for COVID-19 patient | Anesthesiologists performing intubation | Laboratory staff in contact with biological samples |
|------------------------------------------|---------------------------------|------------------------------------------------------|-----------------------------------------------------------------|----------------------------------|--------------------------------------------------------|-----------------------------------------|------------------------------------------------|
| Frequent hand hygiene by using 60% alcohol solution | Frequent hand hygiene by using 60% alcohol solution | FFP2 filtering mask (use FFP3 only for the procedures that generate aerosols) | FFP3 filtering mask | FFP3 filtering mask | FFP3 filtering mask | FFP3 filtering mask | FFP3 filtering mask |
| Wear the FFP2 filtering mask during the entire work shift | / | Goggles or visors to protect eyes from biological liquids’ splashes | Goggles or visors to protect eyes from biological liquids’ splashes | Goggles or visors to protect eyes from biological liquids’ splashes | Goggles or visors to protect eyes from biological liquids’ splashes | Goggles or visors to protect eyes from biological liquids’ splashes | Goggles or visors to protect eyes from biological liquids’ splashes |
| / | Water repellent PPE coat | / | Water repellent PPE coat | Water repellent PPE coat | Water repellent PPE coat | Water repellent PPE coat | Water repellent PPE coat |
| Provide a surgical mask, supplied at the desk, to be worn by the patient with visible respiratory symptoms | Provide a surgical mask, supplied at the desk, to be worn by the patient with visible respiratory symptoms | Double gloves | Gloves | Gloves | Double gloves | Double gloves | Double gloves |
comorbidities and safety (10). However, it has to be considered that the delay of surgical treatment of non-emergent oncological cases could lead to poorer standard oncological outcomes, affecting survival (11). In COVID-19 positive patients, non-emergent procedures should be postponed, while urgent surgeries have to be performed in a separated and dedicated operating theatre, following local institution recommendations for protection of the operating staff (11). Finally, all interventions for benign uncomplicated disease should be deferred until the end of the pandemic (4).

PPE and hospital protocols for healthcare providers

The main goals for urologists and all health-care providers during the COVID-19 pandemic are to prevent patients from getting COVID-19, protect themselves as health care professionals, and deliver optimal urological care. To reach these goals, all medical personnel should comply with the PPE regulations. PPE includes: gloves, medical masks, goggles/face shield, gowns and aprons. For specific procedures, respirators (i.e. N95 or FFP2 standard or equivalent) are recommended (12). An adequate use of PPEs is essential to limit and contain the spread of the virus (Table-4) (13). Effective preventive measures for the community, according to the WHO, include: performing hand hygiene frequently with a 60% alcohol-based solution avoiding touching eyes, nose, and mouth; practicing respiratory hygiene by coughing or sneezing on to the bent elbow or tissue; wearing a surgical mask and performing hand hygiene after its disposal; maintaining the social safe distance (a minimum of 1 meter) (12). To keep the risk of infection as low as possible, it is important to monitor temperature with thermoscan before each work shift, use PPE correctly and perform periodic swab for all health care providers (14).

Triage

Hospitals should be divided into COVID-19 free and COVID-19 hospitals. The aim of triage is to stop any possible COVID-19 positive patient to access a COVID-19 free hospital. Accordingly, triage should be organized in hierarchic parts. Firstly, a telephone interview is required to enquire about clinical history, such as the presence of flu symptoms, sore throat, cough, fever, cold, intestinal symptoms and dyspnea within 3 weeks, and also about epidemiological history, such as a direct contact with a positive COVID-19 patient or origin from a red zone area. If there are no suggestions of a possible COVID-19 infection, the patient can be accepted to the hospital for the second phase of triage. At this stage, the patient is asked to wear a surgical mask, protective gloves and to follow all the recommended hygiene rules. The patient will then undergo thermoscan for the evaluation of the body temperature and all pre-hospitalization tests will be performed including chest x-ray and pharyngeal swab for COVID-19. Since most of the elective procedures are performed for malignant pathology it will be important, as far as staging is concerned, to strictly follow the guidelines thus avoiding non-essential tests, a valid aid to maintain the safety distance between patients. Simonato et al. proposed reducing the number of beds per room and/or to ensure the minimum safety distance between beds (15).

Hospitalization and surgery

Hospital transmission was reported to be responsible for 41% of the nosocomial SARS infection (16). To prevent the spread of COVID-19 among healthcare providers, all staff members should be monitored with periodic swabs and, when serology tests become available, should undergo serology testing. For inpatients, social safe distance should be granted with all beds at least one meter away from each other. Since there is no vaccine nor cure for SARS-CoV-2, the spread of the virus should be stopped by preventing close contact (17). The spread from dry surfaces contaminated with secretions of infected people has been proven in previous studies (18). For this reason, an accurate cleaning of surfaces, following local hospital recommendations, has to be done systematically.

Elective surgeries have been cancelled to prevent any potential risk of infection of the patient and surgical team. Research protocols and experimental treatments have to be avoided and surgeries must be performed by skilled surgeons according to the standard approach in order to reduce operative time, post-operative complications
and to spare resources. Any kind of surgery may increase the transmission risk of respiratory tract infections that could induce life-threatening outcomes, in case COVID-19 diagnosis is missed (19). For this reason, during intubation and extubating, the surgical team should wait outside the operating room, and all intubation maneuvers should be performed in negative-pressure operating theatre wearing appropriate PPE (20). Operative rooms usually have positive pressure technology in their aseptic zone (operating area) and are separated only by doors. These sliding barriers imply that the laminar air flow will be disrupted once doors are opened letting particles and aerosols to circulate freely. That is why it has been recommended to set up operating rooms at negative pressure to reduce COVID-19 dissemination beyond the theatre. The more people in the operating room, the more air-turbulences could worsen, regardless of the positive or negative pressure system (21). Therefore, there is the need to reduce the surgical team number to the minimum. Urologists were, and are pioneers of minimally invasive surgery (MIS): from endoscopy to robot-assisted laparoscopic surgery. MIS has been shown to reduce post-operative complications and peri-operative blood transfusions when compared to the open approach (22), supporting the need to limit the use of blood derivatives due to the decrease in blood donation. In order to spare resources, MIS should be performed where possible, by experienced surgeons outside of their learning curve (4).

Until now, there is little evidence on the differences in the risk of virus spread between MIS and open surgery (23). The possibility of theatre staff contamination during open, laparoscopic or robotic surgery is of a concern in case of a positive patient. Measures to reduce aerosolization in the operating room, such as insufflators continuous cycle, closed circuits fume extraction and performing surgeries at the lowest intraabdominal pressure allowed, should always be considered. Avoiding the use of two-way pneumoperitoneum insufflators is suggested to prevent the colonization of circulating aerosol in the insufflator or pneumoperitoneum circuit (24). Even if previous research has shown that laparoscopy promotes the aerosolization of viral pathogens present in the blood (25–27), currently, there are no specific data proving an aerosol spread of the SARS-CoV-2 during minimally invasive abdominal surgery (24).

It is known that any form of electrosurgery can produce smoke, with a potential of aerosolization. Li et al. showed that only 10 minutes using ultrasonic or electrical equipment during laparoscopy was sufficient to have a significantly higher particle concentration of the smoke compared to open surgery (28). Gas has a low mobility in the pneumoperitoneum, and this leads to an accumulation of aerosol formed during procedure in the abdominal cavity. A sudden release of trocar valves, larger skin incisions or incorrect trocar removal before the complete disinflation can expose the theatre staff to potentially infected pneumoperitoneum aerosol (23). Thus, operating room staff must confirm the complete and correct disinflation of the pneumoperitoneum at the end of every procedure. Otherwise, the proven benefits of MISs in terms of reduced post-operative complications and length of stay, as well as the advantages of ultrafiltration of most or all aerosol particles, must be strongly considered. Filtration of aerosolized particles can be more difficult during open surgery (26, 27).

### Post-operative care

During the post-operative phase, the hospital stay should be reduced to the minimum without compromising patients’ health. The aim is to discharge patients early, avoiding the onset of post-operative complications or even hospital readmission. In an ideal COVID-19 free hospital, patients should have undergone at least one nasopharyngeal swab with negative result before returning home. With regards to triage, post-operative care should be performed remotely whenever possible: lower infection rates among the staff and reducing patients contact are the main purposes to pursue (29). Laboratory values and pathological reports could easily be sent by e-mail, followed by a phone consultation and discussion. Cremades et al. found no difference in clinical results, and a similar number of patients required extra visits after the initial follow-up (30). Analogue results have also been shown in other previous studies (31, 32).
Training

The COVID-19 outbreak has led to cancelation or minimization of all elective major deferrable surgeries (33). In Italy and Spain, patients with scheduled oncological interventions were moved to hospitals considered COVID-19 free (13, 33). Even face to face and diagnostic activities underwent a great reduction, and in some cases a complete cancellation. The COVID-19 pandemic will have a profound effect on surgical education for the foreseeable future. The Centers for Disease Control and prevention recently recommended avoiding any gatherings with more than 10 people (34). As a result, face to face academic activities, including teaching conferences and simulation labs should be avoided. The rotations between different institutions and abroad fellowships have been limited or cancelled, as rotating through different hospitals may significantly increase the risk of contagion for residents, patients, and other healthcare personnel. In addition, national and international urological conferences, such as the EAU and the American Urology Association (AUA) congresses have been postponed, cancelled or converted to a telematic format (35). The EAU guidelines, the American College of Surgeons (ACS), and even many government institutions, are suggesting to cancel elective surgery (7, 36) and most facilities are minimizing participants in any operation to essential personnel only. A recent survey conducted by Amparore et al. showed an overall decrease in daily residents’ exposure. Overall, 41.1% experienced a reduction of on call duties, 81.2% of ambulatory visits, 74.1% of diagnostic procedures, 62.1% of endoscopic surgery, 57.8% of open surgery and 44.2% of MIS. This decrease was even more pronounced for last year trainees (37).

In some countries, such as Italy, France and UK redeployment of urology residents has occurred allocating them to work on medical wards or ICU. Furthermore, the debate on the participation of trainees in clinical activity during the COVID-19 outbreak is still open. In some countries, tutors and educators suggest residents to stay home and step down if they are not required for any clinical or ward duties (38). Many residency programs have responded to the pandemic by assembling rotating teams to cover their urology services, reducing the risk of COVID-19 exposure to patients and residents alike (39). These factors will undoubtedly decrease resident case volume and will impact strongly on every aspects of their training. However, it is of note that health crisis could lead to an opportunity for trainees to improve skills not acquirable during the normal practice: how to manage urology patients during a pandemic.

In this scenario to avoid a complete slowdown of the residents’ training and a possible burnout, that is already relatively high compared to other specialties (39), it is important to introduce new and alternative teaching methods such as smart learning. Webinars, podcasts, prerecorded sessions, social media and platforms, such as the EAU education section (https://uroweb.org/education/online-education) and the EAU Surgery in Motion School (https://surgeryinmotion-school.org/) are all important tools to reduce the effects of the SARS-CoV-2 pandemic on residents training and to continue with the theoretical learning.

CONCLUSIONS

In the current COVID-19 pandemic, while the number of positive patients globally are rising, it is fundamental to embrace a new way to deliver healthcare and to overcome challenges of physical distancing and self-isolation. In this review, we provided an insight into the COVID-19 overall situation and presented a picture of the current state of art in terms of the impact on urological patients, surgeons and trainees, providing practical recommendations.

Telemedicine is playing a crucial role because it can be used to support patients during an infectious pandemic to minimize contacts and the risk of SARS-CoV-2 exposure, reducing unnecessary hospital access, empowering patient’s self-care, and also maintaining resident training. Even if the containment of the pandemic burst is currently the main purpose of all countries health and economic systems, we can’t lose the focus on maintaining the best standard of care for non-urgent pathologies. A problem that we will soon have to cope with is
the accumulation of cases delayed during this pandemic and the consequent extent of surgical waiting lists. A precise subdivision of hospitals into COVID-19 positive and COVID-19 free, and strictly following hygiene precautions will allow urological surgical activity to carry on, reducing the number of postponed cases.

ACKNOWLEDGEMENTS

Roberto M. Scarpa and Rocco Papalia contributed similarly as first author

CONFLICT OF INTEREST

None declared.

REFERENCES

1. [No Authors]. WHO Timeline - COVID-19. World Health Organization, Last updated April 27, 2020. [Internet]. Available at. <https://www.who.int/news-room/detail/08-04-2020-who-timeline---covid-19>

2. [No Authors]. Decreto del presidente del consiglio dei ministri 9 marzo 2020. Gazetta Ufficiale (Della Repubblica Italiana). [Internet]. Available at. <https://www.gazzettaufficiale.it/eli/id/2020/03/09/20A01558/sg>.

3. [No Authors]. COVID-19 Coronavirus Pandemic, Worldometer. Last updated: June 03, 2020. [Internet]. Available at. <https://www.worldometers.info/coronavirus/>.

4. Ficarra V, Novara G, Abrate A, Bartoletti R, Crestani A, De Nunzio C, et al. Urology practice during COVID-19 pandemic. Minerva Urol Nefrol. 2020. Epub ahead of print.

5. Oderda M, Roupert M, Marra G, Merseburger AS, Oderda G, Falcone M, et al. The Impact of COVID-19 Outbreak on Uro-oncological Practice Across Europe: Which Burden of Activity Are We Facing Ahead? Eur Urol. 2020; S0302-2838;30299-2.

6. [No Authors]. Wie schnell eine Region zum Corona-Hotspot wird. WELT Stand: 17:30 Uhr | Lesedauer: 5 Minuten. [Internet]. Available at. <www.welt.de/vermischt/article208763045/Covid-19-Wie-eine-Region-zum-Corona-Hotspot-wird-Welche-Entwicklung-das-RKI-kritisch-nennt.html>.

7. Ribal MJ, Cornford P, Briganti A, Knoll T, Gravas S, Babjuk M, et al. European Association of Urology Guidelines Office Rapid Reaction Group: An Organisation-wide Collaborative Effort to Adapt the European Association of Urology Guidelines Recommendations to the Coronavirus Disease 2019 Era. Eur Urol. 2020; S0302-2838;30324-9.

8. Stensland KD, Morgan TM, Moizadeh A, Lee CT, Briganti A, Catto JWF, et al. Considerations in the Triage of Urologic Surgeries During the COVID-19 Pandemic. Eur Urol. 2020; 77:663-6.

9. Tuech JJ, Gangloff A, Di Fiore F, Michel P, Brigand C, Slim K, et al. Strategy for the practice of digestive and oncological surgery during the Covid-19 epidemic. J Visc Surg. 2020: S1878-7886;30070-9.

10. Murali-Krishnan S, Pang KH, Greco F, Fiori C, Catto JW, Vavassori VL, et al. Bladder-sparing treatment in MIBC: where do we stand? Minerva Urol Nefrol. 2019; 71:101-12.

11. Mottrie A. EAU Robotic Urology Section (ERUS) guidelines during COVID-19 emergency. EAU. [Internet]. Available at. <https://uroweb.org/au-robotic-urology-section-erus-guidelines-during-covid-19-emergency/>.

12. [No Authors]. Rational use of personal protective equipment (PPE) for coronavirus disease (COVID-19): interim guidance. World Health Organization (WHO). [Internet]. Available at. <http://apps.who.int/iris/handle/10665/331498>. Accessed March 19, 2020.

13. Esperto F, Papalia R, Ana María Gómez, Scarpa R: COVID-19’s impact on Italian urology. Int Braz Urol. 2020 (extra).

14. Rosario Leonard, Piera Bellinzoni, Luigi Brogli, Renzo Colombo. Hospital care in Departments defined as COVID-free: A proposal for a safe hospitalization protecting healthcare professionals and patients not affected by COVID-19. Arch Ital Urol Androl 2020; 92: 67-72.

15. Simonato A, Giannarini G, Abrate A, Bartoletti R, Crestani A, De Nunzio C, et al. Pathways for urology patients during the COVID-19 pandemic. Minerva Urol Nefrol. 2020. Epub ahead of print.

16. Wang D, Hu B, Hu C, Zhu F, Liu X, Zhang J, et al. Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus-Infected Pneumonia in Wuhan, China. JAMA. 2020; 323:1061–9.

17. Whitworth J. COVID-19: a fast evolving pandemic. Trans R Soc Trop Med Hyg. 2020; 114:241-8.

18. Otter JA, Donskey C, Yezli S, Douthwaite S, Goldenberg SD, Weber DJ. Transmission of SARS and MERS coronaviruses and influenza virus in healthcare settings: the possible role of dry surface contamination. J Hosp Infect. 2016; 92:235-50.

19. Brindle ME, Gawande A. Managing COVID-19 in Surgical Systems. Ann Surg. 2020. Epub ahead of print.

20. Liana Zucco, Nadav Levy, Desire Ketchandji, Mike Aziz, Satya Krishna Ramachandran. Perioperative Considerations for the 2019 Novel Coronavirus (Covid-19). Anesthesia Patient Safety Foundation. [Internet]. Available at. <https://www.apsf.org/news-updates/perioperative-considerations-for-the-2019-novel-coronavirus-covid-19/?swpmtxnonce=fc1df9988d>
21. Wong J, Goh QY, Tan Z, Lie SA, Tay YC, Ng SY, et al. Preparing for a COVID-19 pandemic: a review of operating room outbreak response measures in a large tertiary hospital in Singapore. Can J Anaesth. 2020; 67:732-45.

22. Albisinni S, Veccia A, Aoun F, Diamand R, Esperto F, Porpiglia F, et al. A systematic review and meta-analysis comparing the outcomes of open and robotic assisted radical cystectomy. Minerva Urol Nefrol. 2019; 71:553-68.

23. Zheng MH, Boni L, Fingerhut A. Minimally Invasive Surgery and the Novel Coronavirus Outbreak: Lessons Learned in China and Italy. Ann Surg. 2020. Epub ahead of print.

24. Pryor A. Sages and aas recommendations regarding surgical response to Covid-19 crisis. Society of American Gastrointestinal and Endoscopic Surgeons (SAGES). [Internet]. Available at. <https://www.sages.org/recommendations-surgical-response-covid-19/>. Accessed March 29, 2020.

25. Alp E, Bijl D, Bleichrodt RP, Hansson B, Voss A. Surgical smoke and infection control. J Hosp Infect. 2006; 62:1-5.

26. Kwak HD, Kim SH, Seo YS, Song KJ. Detecting hepatitis B virus in surgical smoke emitted during laparoscopic surgery. Occup Environ Med. 2016; 73:857-63.

27. Choi SH, Kwon TG, Chung SK, Kim TH. Surgical smoke may be a biohazard to surgeons performing laparoscopic surgery. Surg Endosc. 2014; 28:2374-80.

28. Li CI, Pai JY, Chen CH. Characterization of smoke generated during the use of surgical knife in laparotomy surgeries. J Air Waste Manag Assoc. 2020; 70:324-32.

29. Abelson A. Doctors and patients turn to telemedicine in the coronavirus outbreak. The New York Times. [Internet]. Available at. <https://www.nytimes.com/2020/03/11/health/telemedicine-coronavirus.html>. Accessed March 11, 2020.

30. Cremades M, Ferret G, Parés D, Navenés J, Espin F, Pardo F, et al. Telemedicine to follow patients in a general surgery department. A randomized controlled trial. Am J Surg. 2020; S0002-9610(20)31793-3.

31. Huang EY, Knight S, Grether CR, Davis CH, Moller M, Slama E, et al. Telemedicine and telementoring in the surgical specialties: A narrative review. Am J Surg. 2019; 218:760-6.

32. Gunter RL, Chouinard S, Fernandes-Taylor S, Wiseman JT, Clarkson S, Bennett K, et al. Current Use of Telemedicine for Post-Discharge Surgical Care: A Systematic Review. J Am Coll Surg. 2016; 222:915-27.

33. Pang KH, Carrion DM, Rivas JG, Mantica G, Mattigak A, Pradere B, et al. The Impact of COVID-19 on European Health Care and Urology Trainees. Eur Urol. 2020: S0302-2838;30305-5.

34. [No Authors]. 15 Days to Slow the Spread. The White House. [Internet]. Available at. <https://www.whitehouse.gov/articles/15-days-slow-spread/>. Accessed March 16, 2020.

35. [No Authors]. Coronavirus disease (COVID-19) pandemic. World Health Organization. [Internet]. Available at. <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>.

36. [No Authors]. COVID-19: Elective Case Triage Guidelines for Surgical Care. American College of Surgeons. [Internet]. Available at. <https://www.facs.org/covid-19/clinical-guidance/elective-case>. Accessed March 24, 2020.

37. Amparore D, Claps F, Cacciamani GE, Esperto F, Fiori C, Liguori G, et al. Impact of the COVID-19 pandemic on urology residency training in Italy. Minerva Urol Nefrol. 2020. Epub ahead of print.

38. Porpiglia F, Checcucci E, Amparore D, Verri P, Campi R, Claps F, et al. Slowdown of urology residents’ learning curve during the COVID-19 emergency. BJU Int. 2020; 125:E15-7.

39. Vargo E, Ali M, Henry F, Kmetz D, Drevna D, Krishnan J, et al. Cleveland Clinic Akron General Urology Residency Program’s COVID-19 Experience. Urology. 2020; 140:1-3.

Correspondence address:
Francesco Esperto, MD, FEBU
Department of Urology, Campus Bio-Medico University of Rome, Via Alvaro del Portillo, 21 Rome, 00128, Italy
Telephone: +39 329 216=4886
E-mail: francescoesperto@gmail.com