

Urological surgery in the time of coronavirus pandemic



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Abstract

The current coronavirus pandemic forces us to realize the significance of the careful utilization of financial and health-care resources. At the same time, it is important to ensure the ability of urologists to function through this crisis to provide essential and emergency services. With regards to urological procedures, a triage of non-emergent operations is hence recommended considering various disease-related factors. Case conduct should also be categorized based on the up-to-date information of the evolving national, regional and local conditions of this pandemic, as marked variation in these conditions can lead to significant differences in decision-making. Over the coming weeks and months, we are bound to face an increasingly difficult task of treating Coronavirus disease 2019 (COVID-19) infected patients presenting with urological ailments. Instituting well-thought plans to perform the un-deferrable urological procedures and emergencies during this pandemic will go a long way in keeping the surgeons and health-care workers safe to perform essential duties.

Keywords: Urology, Surgery, Coronavirus, COVID-19, Pandemic

Introduction

The world was taken by surprise when in December 2019, Chinese authorities reported to the World Health Organisation (WHO) about a rapidly spreading unusual pneumonia. This was thought to have originated from a Huanan sea-food market in the Wuhan city of Hubei province (1). All efforts were then concentrated on finding the causative agent of this illness. Chinese researchers were successful in identifying a novel coronavirus as the pathogen for this flu-like illness. The genetic sequencing of this virus was deciphered and was then reported to WHO in January 2020 (2). It was termed severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and the illness as coronavirus disease 2019 (COVID-19). Thailand, on 13th January 2020, reported the first case outside China in a woman with travel history to Wuhan (3). Soon the viral illness spread in South-East Asian countries. Human to human transmission was established when two individuals contracted the disease from affected

family members along with health care workers (4). This rapidly became a public health emergency across the world and WHO declared this outburst as a pandemic on 11th March 2020 (5).

As of 12th April 2020, the number of COVID-19 cases was 1 696 588 with 105 952 COVID-related mortalities according to WHO COVID-19 Situation Report (6). The United States has emerged as a new epicenter for COVID-19 with mortality and morbidity increasing daily. It became the first country in the world to record more than 2000 coronavirus deaths in a single day. Statistics from the Johns Hopkins University showed that 2108 people died in 24 hours (7). There has been a daily increase in the number of cases and associated mortality that has forced lockdown in several countries to check the spread of the virus.

According to WHO, the new coronavirus so far has an average R_0 (contagion metric) between 2 and 2.5, which means a person infected with COVID-19 can pass it on to



more than two people, which is more than a seasonal flu (R_0 at 1.3), Influenza A virus subtype H1N1 (R_0 at 1.2 and 1.6) and Ebola (R_0 at 1.6 to 2), but less than severe acute respiratory syndrome (SARS) (R_0 at 4) and Middle East respiratory syndrome (MERS) (R_0 at 2.5 and 7.2) (8,9). COVID-19 pandemic is perhaps a massive challenge to the global health-care systems. In these testing circumstances, the field of urology also faces a great challenge as we strive to find solutions for this global health emergency.

COVID-19 and Bacillus Calmette-Guérin

Historically, Bacillus Calmette-Guérin (BCG), a weakened strain of *Mycobacterium bovis*, has been used as a vaccine against tuberculosis. It is given to children in their first year of life in most countries across the world and is known to prevent tubercular meningitis and miliary tuberculosis in them. The protection against active tuberculosis is variable among different countries and studies, but it is estimated to be approximately 60% (10). It has been observed that BCG vaccination could lead to trained immunity, which often helps to eliminate various non-*Mycobacterium* infections such as staphylococci, candidiasis, yellow fever, and influenza. This innate immune system and trained immunity can be considered in the fight against bladder cancer, but more importantly in the fight against viruses including COVID-19 (11).

Protection of health-care workers and triage of urological surgeries

A pandemic of such enormous magnitude puts a lot of burden on the health-care delivery system. As the hospitals are preparing to meet the demands of ventilator-level care for COVID-19 patients, we need to safeguard the valuable health-care resources. It is essential to encourage extreme vigilance and ensure that the highest standard of hygiene is being practiced by health-care workers, paramedics and support staff. This starts right from the patient entry point inside the hospital where a temperature screening can be employed by using non-contact infra-red thermometers (Figure 1a). Other measures like widespread use of banners portraying good hygiene practices and information regarding the disease displayed at the entrance and corridors of the hospital can create awareness and reduce the risk of transmission of COVID-19 amongst non-infected patients and attendants. Elective surgical procedures may need cancellation if they are judged non-essential in these circumstances. The term "elective" certainly appears ambiguous and is open to clarification and debate. Howsoever difficult it may seem, but we are forced to make a choice about which surgeries should continue at the time of a pandemic. On the other hand, the choice of urgent surgeries that should continue will be subject to demand and capacity. This must also be counterbalanced by the risks of delaying such procedures. This is principally essential for patients with urological cancer and obstructive calculus disease. In the urology

community, we must also weigh the risks of non-surgical therapies such as systemic chemotherapy, which will leave patients at a greater risk for contracting and possibly succumbing to COVID-19.

In this regard, various organizations like American Urological Associations (AUA), American College of Surgeons, European Association of Urology (EAU) and the Urological Association of India (USI) have proposed that surgeons should restrict the performance of elective procedures. While some cases can be postponed indeterminately, a majority of cases need careful assessment as they can continue to progress at variable, disease-specific rates. Some conditions like cancers might even advance in the absence of surgical intervention, hence, it becomes extremely important to recognize certain realities. The decision to cancel or perform a procedure should be judiciously made from the perspective of several concerns, both medical and logistical. Given the uncertainty of the impact this pandemic will have over the next few months, postponing some cases at present can increase the burden on health-care at the time of maximum COVID-19 caseload.

Hospitals should consider both the patient's needs and their logistical capability to meet the needs. Logistical viability for a surgery should be determined by administrative personnel taking into consideration the hospital limitations, beds, staff, equipment and supplies. The American College of Surgeons suggests the use of the Elective Surgery Acuity Scale (ESAS) conceived by St. Louis University to determine whether a procedure needs consideration or can be postponed (12). As per the Scale most cancers and highly symptomatic patients are considered Tier 3, requiring high acuity surgery, which should not be postponed.

With regards to urological procedures a triage of operations is recommended considering various disease-related factors (Table 1) (13). Triage is important to minimize the demand on resources like ventilators, ICU beds and personal protective equipment (PPE). Triage will also help free-up manpower, increase bed availability and avoid the risk of transmission of COVID-19 to patients without compromising outcome. Case conduct should also be decided based on the up-to-date information of the evolving national, regional and local conditions of the COVID-19 pandemic, as marked variation in these conditions can lead to significant differences in decision-making.

Shifting landscape of genitourinary oncology during the COVID-19 pandemic

Marandino et al (14) reported that patients with cancer had a higher risk of developing serious complications and dying from COVID-19 (15,16). They carried out a nationwide survey among Italian medical oncologists that focused on the management of patients with genitourinary malignancies. A total of 72 physicians

Table 1. Triage of urological operations for decision-making algorithm.

Stage 1: First cancellation	Stage 2: Optional/Secondary Cancellation	Stage 3: Not to be Cancelled	Stage 4: Emergency cases
Vasectomy, circumcision, scrotal cyst, cystoscopy	Radical cystectomy (low risk cancer)	Radical Cystectomy (high risk cancer)	Obstructed kidneys, Infection in diabetics/emphysematous pyelonephritis
Radical prostatectomy (Low risk cancer)	TRUS biopsies (LA)	Radical nephrectomy (time sensitive)	Emergency urology – abscesses/washouts, Grade IV, V renal trauma
TRUS biopsies (GA)	TURBT (low risk cancer)	TURBT (High risk cancer)	Testicular torsions, intraperitoneal bladder rupture
Benign nephrectomy/ Partial nephrectomy	Radical prostatectomy (High risk cancer)	Nephroureterectomy (High risk cancer)	
Andrology cases, female urology	Nephroureterectomy (low risk cancer)	URS with stents or Ureteric stones	
Brachytherapy		IVC Thrombectomy with Radical Nephrectomy	
Functional reconstruction			
Elective URS/PCNL			
TURP/HoLEP/BPH			
Ureterolysis			

TRUS: Trans-rectal ultrasound; GA: General anaesthesia; URS: Uretero-rensoscopy; PCNL: percutaneous Nephrolithotomy; TURP: Trans-urethral resection of prostate; HoLEP: Holmium laser enucleation of prostate; BPH: Benign Prostatic Hyperplasia; LA: Local anaesthesia; TURBT: Trans-urethral resection of Bladder Tumour; IVC: Inferior vena cava.

provided the feedback. There was a consensus among the oncologists to pursue treatment, possibly without delays or interruptions, for patients with locally advanced or metastatic disease, particularly patients suffering from prognostically aggressive disease requiring timely treatment. Despite the public health care emergency brought about by the COVID-19 pandemic, Italian oncologists still opted for close adherence to guidelines regarding the administration of perioperative therapies, such as neoadjuvant chemotherapy in patients with clinical T₃₋₄ N₀ M₀ urothelial bladder cancer and adjuvant therapy in high-risk, clinical stage I germ-cell tumors. The authors also felt that telemedicine would be critical in managing follow-up visits and oral drug delivery.

Anesthetic considerations

A careful anesthetic planning is of paramount importance to minimize the chances of cross-infection from an infected patient to health-care workers. An experienced

anaesthesiologist should utilize the intubation technique with maximum odds of success to avoid repeated instrumentation of the airway (17). The staff must be equipped with standard PPE which should include disposable long-sleeve waterproof gowns, disposable head caps, gloves, protective goggles, shoe covers and FFP2/FFP3 (Filtering Face Piece) or N95 respiratory depending on the risk the procedure carries for generating aerosols (Figure 1b). Technical modifications can also help in carrying out high-risk procedures like intubation. Our team of anaesthetists devised a method to contain the spread of aerosols in case the patient coughs during the time of intubation or extubation (Figure 1c). The patient's head and upper torso are surrounded by a shielded orthopaedic walker which is commonly used for lower limb rehabilitation. When a general anesthetic is required, a high-efficiency particulate air filter should be connected at the patient-end of the re-breathing circuit. At the end of the case after extubation both the air-filter and soda-



Figure 1. Hospital(s) prepared standards for patients admitted into the hospital during COVID-19 pandemic.

lime must be changed (17). The staff should immediately discard the PPE and replace it with new ones in case of heavy contamination.

Urologists role in this pandemic

In dealing with the COVID-19 pandemic, we have been reminded of our essential duty as doctors. Urologists may not be trained for the management of infectious diseases or providing emergency medical services, but we must remember the Hippocratic oath we took at our graduation ceremony. The oath acts as a moral compass. It helps us in circumstances where we are unsure of our actions. It gives a sense of purpose to our medical practice and reminds us to put our patients at the heart of our decisions. We must adopt strategies to protect ourselves from contracting infection when caring for COVID-19 patients. In these testing times of the COVID-19 pandemic, we do have a significant role to play in serving the humanity.

Conclusion

Over the coming months we are bound to face an increasingly difficult task of treating COVID-19 infected patients presenting with urological ailments. Instituting well-thought plans to perform the un-deferrable urological procedures and emergencies during this pandemic will go a long way in keeping the surgeons and health-care workers safe to perform essential duties.

Authors' contributions

Concept and Design: RBN, MS. Literature Search and Data Collection: MS, SP, SM. Analysis: SG, MS, NRN, RBN. All authors reviewed and edited the manuscript and approved the final version.

Ethical issues

Ethical issues have been completely observed by the authors.

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