



Where do urologists stand in the era of novel coronavirus-2019 disease

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Purpose of review

The novel coronavirus-2019 disease (COVID-19) pandemic has had devastating consequences on healthcare systems globally. The effect this has on urologists and the patients they care for is not fully understood and presents the challenge of prioritizing the most urgent cases. We aim to review the impact on urology services and evaluate strategies to minimize disruption.

Recent findings

Various healthcare systems have been forced to postpone treatment for many urological conditions as resources are dedicated to the treatment of COVID-19. Training has been postponed as staff are reallocated to areas of need. Face-to-face contact is largely minimized and innovative, virtual communication methods are used in the outpatient setting and multidisciplinary team meetings. Surgical practice is changing because of the risks posed by COVID-19 and procedures can be prioritized in a nonurgent, low priority, high priority or emergency category.

Summary

Although the COVID-19 pandemic will inevitably affect urological services, steps can be taken to mitigate the impact and prioritize the patients most in need of urgent care. Similarly, in future; simulation, e-learning and webinars will allow interaction to share, discuss and debate focused training and education.

Keywords

anaesthesia, coronavirus, novel coronavirus-2019 disease, endourology, laparoscopy, training, urology, ventilation

INTRODUCTION

Since the first cases were identified in Hubei Province, China, in December 2019, the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has relentlessly spread around the world affecting all inhabited continents [1]. As of the 7th April 2020, more than 1.2 million people have been infected with approximately 67 000 deaths globally. The WHO declared novel coronavirus-2019 disease (COVID-19), caused by SARS-CoV-2, to be a public health emergency and a pandemic on 11th March 2020 [2].

SARS-CoV-2 causes a wide range of clinical manifestations from asymptomatic infection to death [3]. The majority of patients develop a mild upper respiratory tract infection with fever that does not require hospitalization in most cases. However, a significant proportion of patients develop severe viral-pneumonia, which can result in respiratory failure requiring mechanical ventilation. Overall, the fatality rate due to COVID-19 is currently

estimated to be between 1 and 5% [4]. However, this is higher in older patients and those with comorbidities including hypertension, diabetes, cancer and coronary heart disease [3].

The key initial management for all suspected cases is infection control and prevention by isolation into a separate area and adequate protective

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KEY POINTS

- COVID-19 has had an unprecedented effect on global healthcare.
- It has severely struck the urological services leading to delay in treatment.
- Patient suffering and oncological consequences of delayed treatment could worsen clinical outcomes.
- There will be severe impact on surgical training, potentially affecting trainee progression.

personal equipment (PPE) [5]. Diagnosis will require laboratory confirmation. Nasopharyngeal swabs and sputum are widely tested using the real-time transcription polymerase chain reaction. Radiological imaging of the chest including x-ray and computed tomography can be used to aid diagnosis. Currently, serology testing is under development aiming to identify antibodies to SARS-CoV-2 [6].

The rapid, overwhelming surge of COVID-19 cases has resulted in unprecedented numbers of critically unwell patients requiring ICU treatment, straining health systems globally. As ICU and hospitals are overwhelmed by the impact of COVID-19, the progressive cancellation of elective services is widely enacted.

IMPLICATIONS TO CLINICAL PRACTICE

The significant increase in demand on critical care facilities in health systems throughout the world has had extensive implications on the urological service provision [7^a–9^a]. The number of patients requiring intubation and ventilation to manage respiratory failure from COVID-19 has resulted in the redeployment of anaesthetists to ICUs. In many cases, ventilators and theatres are being repurposed to ICUs as existing facilities are overburdened by the number

of cases requiring admission. Furthermore, the number of acutely unwell patients requiring admission to the hospital has meant that wards have been allocated for the care of those with COVID-19, reducing availability of bed space for non-COVID-19 patients. Medical staff are at particular risk of developing COVID-19 from increased exposure to the virus, especially in areas where there is reduced availability of adequate PPE [10]. This can result in staff shortages throughout hospitals, necessitating redeployment to areas most in need such as ICU and the emergency department. Many organizations and governments have ordered a suspension of elective surgeries as a consequence of this. The impact on individual centres will vary in intensity and timing; however, the urologist should be prepared to work outside of their usual range of practice in the depths of the crisis.

As a speciality, urology provides a variety of services to the local population. This ranges from lower priority surgical procedures including circumcision and vasectomy to emergency procedures for testicular torsion or infected obstructed kidneys. Urology services must focus on continuing to provide an emergency service, while postponing lower priority procedures to allow capacity for COVID-19 cases. The challenge for urology departments is managing cases that lie somewhere between these two categories including those with malignancy or awaiting renal transplantation for end-stage renal failure.

NON-ONCOLOGICAL DISEASES

Renal stone disease

Although a benign condition, many cases of renal stones present a serious threat to health if associated with renal impairment and/or infection Table 1. Cases awaiting surgery should be carefully evaluated to determine their priority. Renal stone treatment

Table 1. Showing prioritization for nononcological disease

	Nonurgent	Low priority	High priority	Emergency
Renal stone disease	Asymptomatic renal stone		Obstructing ureteric stone Stone disease with ureteric stent <i>in situ</i>	Obstructed/infected kidney
Renal transplant	Live donor renal transplantation		Deceased donor renal transplantation	
Benign scrotal	Hydrocele/varicocele			Testicular torsion
Infection				Scrotal abscess/Fourniers gangrene
Haematuria		Flexible cystoscopy		Clot retention
Other	Andrology and incontinence surgery			Urinary tract trauma surgery

may need to be postponed and only ureteric stones treated actively. Preferential cases would be those with a solitary kidney, renal impairment, associated with sepsis or with a ureteric stent *in situ* for a prolonged period. Ureteric stents can increase the risk of infection and stent encrustations, making their removal challenging. Stent encrustation can be seen in 76.3% of cases when left *in situ* for more than 12 weeks [11]. In patients where stents have been left *in situ* for over six months, complications can arise from longer procedural time or the need for multistep invasive procedures [12].

Alternatives to ureteroscopy or percutaneous nephrolithotomy such as shockwave lithotripsy should be utilized where possible as these can be performed as an outpatient procedure and reduce the need for a general anaesthetic [13]. When stone surgery is performed and ureteric stenting is required, stent-on-strings should be considered to avoid further hospital attendance for removal. Although there is a 10% risk of premature stent dislodgement with string use, this was not associated with adverse outcomes [14].

Renal transplant

Decisions regarding renal transplantation can be particularly challenging with many patients dying on the waiting list which is usually long, yet transplantation can lead to increased risk of exposure to COVID-19 and mortality [15].

Patients with chronic kidney disease are at an increased risk of mortality from COVID-19 [16]. Those requiring haemodialysis will still need attend a healthcare setting regularly, which increases the potential exposure to the virus [17].

Renal transplant patients are on life-long immunosuppression leaving them more susceptible to infectious diseases, which is particularly relevant in the immediate postoperative period when on a high-dose induction regimen [18]. Although at a higher risk of developing severe disease in COVID-

19, early recognition and appropriate treatment can improve prognosis [19].

Some may require intensive or high dependency care postoperatively which may not be possible during the COVID-19 pandemic [20]. In-depth counselling with the patient about the risks is essential. To reduce transmission risk, while addressing the current demand of transplantation, deceased donors should be prioritized but live donors should be delayed.

Other benign urological diseases

Bladder outflow obstruction secondary to benign prostatic enlargement (BPH) can be managed conservatively with a urethral catheter or suprapubic catheter and surgical management deferred until the pandemic has eased. Similarly, surgery for urinary incontinence and andrology or infertility procedures should be suspended to reduce burden on theatres and staffing. Benign scrotal procedures for disease such as epididymal cyst or hydrocoele are usually performed for mild symptoms and can therefore be deferred [21]. Although usually performed as a day-case procedure, prolonged length of stay or readmission may be required from haematoma or infection in the postoperative period.

ONCOLOGICAL DISEASES

Renal cancer and upper urinary tract cancer

Renal cell carcinoma (RCC) usually presents late with up to 30% having metastatic disease on initial diagnosis and is therefore associated with high mortality [22] Table 2. However, if diagnosed early, active surveillance and delaying treatment up to three months in stage T1 RCC does not worsen prognostic outcomes. Ablative treatments could be considered for cT1a tumours rather than surgical intervention [23]. Stage T2 RCC with scheduled nephrectomy could be considered to be postponed

Table 2. Showing prioritization for oncological disease

	Nonurgent	Low priority	High priority	Emergency
Renal cancer		Nephrectomy (low risk)	Nephrectomy (high risk)	
Upper urinary tract cancer		Nephroureterectomy (low risk)	Nephroureterectomy (high risk)	
Bladder cancer		Cystectomy (low risk) TURBT (low risk)	Cystectomy (high risk) TURBT (high risk)	
Prostate cancer		Radical prostatectomy transrectal/perineal prostate biopsy		
Testicular cancer			Orchidectomy	

TURBT, Transurethral resection of bladder cancer.

for one month with considerations of patient and tumour characteristics [23]. Stage T3 and above RCC, especially those extending into the inferior vena cava are aggressive tumours requiring prompt treatment. They may be more technically challenging, associated with a longer length of stay and higher risk of postoperative complications like requiring haemodialysis and ICU admission [24]. Hence, treatment need not be delayed for Stage T3+ RCC but careful counselling of risks are required.

Delaying surgery in low-grade nonmuscle-invasive uppertract urothelial carcinoma (UTUC) for up to three months does not affect survival outcome [25,26]. However, delaying radical nephroureterectomy in high-grade invasive UTUC is associated with a significant progression of disease [27].

Bladder cancer

Two-thirds of bladder cancer cases are nonmuscle-invasive bladder cancer (carcinoma *in situ*, Ta and T1) [28]. High-grade T1 bladder cancer is associated with a high risk of recurrence and understaging at transurethral resection of bladder cancer (TURBT) [29]. Cases that are clinically deemed to be T1 should be prioritized for TURBT because of the risk of muscle-invasive bladder cancer (MIBC). Delaying treatment of MIBC by three months is associated with worse overall survival rates [30]. Similarly, delaying radical cystectomy by more than 10 weeks after neoadjuvant chemotherapy is associated with worse overall survival [31]. However, radical cystectomy is a major operation and the median length of stay is seven days even on an enhanced recovery after surgery pathway and ICU admission may be required [32,33]. The stage and grade of tumour and the availability of postoperative high-care bed should guide cystectomy procedures. Patients who are cisplatin-eligible should be offered this even more actively than before. Cisplatin ineligible MIBC should be offered a radical cystectomy within 12 weeks.

Prostate cancer

A watch and wait approach is often adopted for many patients with prostate cancer. Postponing radical prostatectomy has not been associated with increased risk of biochemical or clinical recurrence of prostate cancer in those with low or intermediate-risk groups [34]. Even in high-risk disease, the risk of recurrence increased only after 12 months, suggesting radical prostatectomy can be considered to be postponed [34,35]. Other treatment modalities including radiotherapy and androgen deprivation

therapy should be considered with the multidisciplinary team [36]. Some centres have stopped performing prostate biopsies during the outbreak [37]. Additional consideration should be given to performing transperineal prostate biopsy under fusion MRI guidance scan as opposed to transrectal prostate biopsies for diagnostic purposes as SARS-CoV-2 RNA has been identified in 29% of faecal samples in patients with COVID-19 and may be a potential route for transmission of infection [38].

Testicular cancer

Delayed presentation, diagnosis and orchidectomy of testicular cancer is associated with higher rates of mortality from testicular cancer [39,40]. Orchidectomy also serves the purpose of providing tissue for diagnosis and risk stratification to determine further management including chemotherapy [41]. Inguinal orchidectomy for testicular cancer can be performed as a day case procedure, reducing pressure on beds [42]. Therefore, radical orchidectomy is high priority and should be performed whenever possible.

Emergency urology service

In the event that pressures on hospital resources by the COVID-19 pandemic are so great that high-priority malignancy operations have to be delayed, an emergency service must be maintained to provide surgery for 'life-or-limb' cases. This may mean that more innovative management options are pursued. In certain situations, surgery is mandated, such as debridement of Fournier's gangrene, exploration and fixation of testicular torsion or drainage of urosepsis.

In urinary retention as a result of BPH for example, a urethral catheter should be used to relieve the obstruction. Similarly, renal colic should be managed conservatively wherever possible. However, in cases of an infected and obstructed kidney, decompression and intravenous antibiotics are indicated. Urosepsis associated with nephrolithiasis can be associated with severe illness and even death with ICU admission required in as many as 18% of patients [43]. Decompression can be facilitated with either ureteric stenting or percutaneous nephrostomy. Careful consideration should be given to which procedure is chosen as nephrostomy under local anaesthetic can spare a ventilator [44]. In centres with suitable experience, ureteric stenting under local anaesthetic in the outpatient setting can be considered [45]. Definitive stone surgery can then be postponed for a few weeks.

Laparoscopic procedures

The Royal College of Surgeons [46] and Society of American Gastrointestinal and Endoscopic Surgeons [47] advise caution when performing laparoscopic surgery due to limited evidence of the risk posed by COVID-19. The potential exposure to aerosolized biological fluid carried within surgical smoke or while removing trocars or surgical specimens can result in an explosive release of smoke, risking COVID-19 aerosol exposure. Although it can potentially be mitigated by the use of smoke filters, smoke extraction devices and use of PPE.

OUTPATIENT

'Telemedicine' and 'Telehealth' are consultations using electronic devices, for example, telephone or video call. Since the COVID-19 outbreak, it is much more widely used in different countries to reduce face-to-face contact, while addressing a patient's medical concerns. Video calls should be the preferential option as it provides visual cues to help gain better rapport [48,49].

In the cases where face to face contact is necessary, further stratification is required. All appointments requiring attendance should be screened, ensuring the patient is well and COVID-19 infection risk is low. Clinicians should be wearing adequate PPE including eye protection, gloves, fluid repellent surgical masks and fluid resistant aprons [5,8^{*}].

Routine appointments for elective procedures should be postponed. Postoperative follow-up could be initially addressed via telephone or video consultation and assessed for the need of a face to face appointment. Urgent appointments for suspected malignancy or obstructive uropathy should still proceed with screening [8^{*}].

FUTURE IMPLICATIONS

The long-term impact of the pandemic is difficult to fully appreciate, while still in the midst of the crisis and the effects are likely to have long-lasting implications. The toll on mental health and training progression of medical staff should not be overlooked and colleagues may be in need of support. The effects of delaying procedures and diagnosis may have far-reaching effects that will not be understood for many years. It might also mean testing of all patients on wards and in theatres.

TRAINING

All trainees have been greatly impacted in the COVID-19 outbreak. In several countries, trainees

are no longer rotating as per their scheduled training program with many being redeployed to areas of need like emergency department, medicine or ICU. The focus is service provision and training opportunities have subsequently suffered. Routine procedures are no longer being performed, prioritizing emergency or cancer surgeries. Only experienced surgeons will perform these procedures to ensure efficiency with minimal staffing. Exams and training courses essential for progression are being cancelled. This combined with the lack of training opportunities could be detrimental to trainee progression [8^{*},50]. However, these might lead to development of online courses and journal clubs. It will also allow for more online training and simulation as an emerging field and a solution for urologists to address those and similar situations. Simulation training would allow a safe environment for trainees to acquire and enhance surgical skills [51]. Similarly, in future, e-learning and webinars will allow interaction to share, discuss and debate focused training and education.

MENTAL HEALTH

Deterioration of mental health could be a major issue amongst all clinicians. During the unprecedented crisis, clinicians will be faced with more stress than ever before, personally and professionally. Workload may have significantly increased and some clinicians may be working in areas outside the remit of their expertise. The simple fear of spreading the virus to their closest and especially in those living with vulnerable members brings a large amount of psychological burden. Mental health support will be paramount to ensure the wellbeing of clinicians during and following the pandemic [52].

Outpatient and surgical waiting time

Waiting lists for outpatient appointments and surgical procedure has been an issue prior to the pandemic. With the additional cancellations and rescheduling, the backlog will be a major issue that will need addressing in due course.

As the surgical waiting time further lengthens, patients may present with more advanced disease leading to increasingly complex procedures. As procedures become complex, more senior, experienced surgeons will be required to perform these and training opportunities may be further impeded.

The use of 'telemedicine' could be more widely used in the outpatient settings following the pandemic, to help with efficiency and guide prioritization according to clinical need. The future following

the pandemic remains uncertain but issues addressed above expresses the necessity of careful planning to minimize the negative implications.

CONCLUSION

Various healthcare systems have been forced to postpone treatment for many urological conditions as resources are dedicated to the treatment of COVID-19. Training has been postponed as staff are reallocated to areas of need. Face-to-face contact is largely minimized and innovative, virtual communication methods are used in the outpatient setting and multidisciplinary team meetings. Surgical practice is changing because of the risks posed by COVID-19 and procedures can be prioritized in a nonurgent, low priority, high priority or emergency category. Although the COVID-19 pandemic will inevitably affect urological services, steps can be taken to mitigate the impact and prioritize the patients most in need of urgent care.

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Conflicts of interest

There are no conflicts of interest.

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- of special interest
- of outstanding interest

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