



Research Article

The Global Impact of the Covid-19 Pandemic on Urological Practice

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Abstract

Objective: To examine the impact and effects of the COVID-19 pandemic on urology practice around the world through examination of published literature and personal experiences.

Subjects and methods: A literature search of EMBASE and MEDLINE was performed with search terms including “urology”, “coronavirus”, “covid-19”, “impact” and “outcome”. All articles were reviewed in full and hard search of paper references was performed. Online resources and publications from international and national professional bodies were reviewed in full.

Results: The spread of coronavirus has caused significant changes to the daily working of both qualified and training urologists the world over. Benign urology treatment was first to be deferred when services were limited. Urology cancer management has also seen drastic changes to standards of care. Urology patients as a result have been seriously impacted, with detrimental biopsychosocial effects as a result of treatment delays. The ripple effect of the pandemic on both Urology healthcare professionals and healthcare settings are unforetold.

Conclusion: Urology as a profession has had to overcome many hurdles in treating patients amidst the pandemic, and continues to encounter new challenges. The consequences of service limitation and restrictions on working has inescapably changed urology practice hereafter. The repercussions of the pandemic will be felt permanently as a new normal is introduced.

Keywords: Coronavirus; COVID-19; Impact; Urology; Pandemic

Introduction

COVID-19 is the disease caused by Severe Acute Respiratory Syndrome Coronavirus two (SARS-COV-2). It has triggered the greatest challenge to worldwide healthcare provision in modern times. Most COVID-19 patients recover, however severe infection leads to Acute Respiratory Distress Syndrome (ARDS), sepsis, multi-organ failure, and death [1]. The most significant risk factors associated with mortality are age, male sex, obesity, smoking, and chronic conditions including kidney disease and cancer [2,3]. Mortality rates in those with no pre-existing conditions is 0.9% [2]. Overall Case Fatality Rate (CFR) in China was 14.8% in those over 80 [4]. WHO estimates global mortality rate at 3.4% [5]. At

the time of writing, there are a total of 86,704,216 confirmed cases globally, and 1,874,732 mortalities [6]. Due to the rapid global spread and severe consequences of COVID-19, we aim to examine the effects of the pandemic on benign and oncological urology services for both trainee and senior urologists. We explore through published literature and personal experience, how urology as a specialty has responded to the challenges of the pandemic and the impact on patients, professionals and healthcare settings.s.

Methods

A literature search of Embase and Medline was performed. Search terms included: “urology”, “coronavirus”, “covid OR covid-19”, “impact”, and “outcome”. All articles were reviewed in full. Further sources were located through hard search of paper references. Online resources and publications from international and national professional bodies were reviewed in full.

Results and Discussion

Global impact on healthcare

Globalization has enabled rapid transmission, with contagion through human, aerosol and surface contact transmission. Infection is caused by deposition of respiratory droplets onto mucous membranes [7]. There is no cure for COVID-19 and medical treatment provides supportive care only. Vaccine development was aimed for early 2021, but completed by the end of 2020 [8]. Public health intervention is to limit spread through social isolation, travel restrictions, and closure of non-essential businesses.

Disease burden has overwhelmed healthcare systems, as seen in Lombardy, Italy. The region experienced extremely high incidences of COVID-19, and saw 112.9 deaths per 100,000 population, with Italy's CFR in those over 80 at 20.2% [9,10]. Two-thirds of hospital beds were allocated for COVID-19 in just 10 days in Bergamo [11]. Urology operating capacity was reduced to 30% and eventually stopped altogether over a period of two weeks. The urology department saw half its team simultaneously self-isolating after testing positive for coronavirus [11]. As "unprecedented" becomes a part of daily vernacular, the challenge posed has been to limit infection whilst maintaining functional healthcare services and ensuring staff safety through provision of personal protection equipment (PPE). 3.7% of total cases in China were those of healthcare workers [4]. Italy lost over 150 doctors due to COVID-19 [12] and the UK has seen over 160 deaths of National Health Service (NHS) staff [13]. Health services have suffered enormous disruption. ITU capacity required increases by multiple factors to meet ventilation demands. All non-urgent elective care was stopped. Redeployment of staff is seen worldwide [14], with a quarter of urology staff redeployed to screening centres in Singapore [15].

Socio-economic impact on healthcare

The financial burden and subsequent healthcare fallout following COVID-19 will certainly be significant. Urology will continue to see both direct and indirect repercussions of this. Patients avoiding emergency presentation and delays to treatment will lead to poorer outcomes. The increasing reservoir of work from a prolonged delay to services poses new challenges. Iran was one of the first nations to be severely affected by COVID-19 [16]. Already a resource limited setting, such difficulties were compounded. Iran has a third of the beds (per 1000 population) compared to China [17]. Exacerbating the issue amidst the crisis is the continuing economic sanctions from the USA [18]. This led to high rates of COVID-19 morbidity and mortality. Healthcare workers suffered as hospitals were overwhelmed [19]. Lower and Middle Income Countries (LMIC) may require additional economic and technical support for COVID-19 responses. The majority have enacted containment and mitigation measures, with

varying levels of contact tracing and self-isolation. Many countries are aiming to quickly increase testing capacity [20]. Concerns have been raised about the efficacy of national policies, such as those seen in Brazil [21]. Older populations in LMIC are particularly at risk. The ramifications of sickness on family structures where grandparents look after children, because parents live away for work, are profound. Infections in nursing homes significantly increase risk of mortality [22]. Specialised care is provided for in tertiary settings and management of acute conditions will suffer as such facilities experience access limitation due to COVID-19 [23].

Impact on Urology training

Urology training has suffered during the pandemic. A study of Italian urology residents demonstrated significant compromise, with final years most affected [24]. The first clinical activities to be deferred are usually those where trainee involvement is highest, in benign and low risk cancer management [25]. All membership and board examinations have been postponed [15,26,27]. Recruitment to specialty experienced severe limitations, with face to face interviews cancelled or deferred due lack of resources and social distancing measures [28,29]. This profoundly impacts both candidate and recruitment process [30]. Applicants are reduced to scores with assessments unable to examine for skills, communication or personality. Medical rotations have also been stopped worldwide for trainees and undergraduate students [11,15,29,31]. This lack of exposure is a detriment to attracting desirable candidates to specialty [29].

The disruption has directed the profession towards new ways of working and teaching. Urologists are early adopters of novel technology and this willingness to adapt is vital in turbulent times. Online both and on-demand learning resources have exploded with webinars and podcasts provided by renowned institutions. The use of video-teleconferencing for both teaching and clinical use is commonplace [15]. Social media has enabled global communication for urologists to effectively and rapidly disseminate information and collaborate on research. Experts and colleagues engage in direct discussion with open dialogue. Surgical simulation remains encouraged during such times where exposure is at an all-time minimum [25].

Impact on urology services

The pandemic has required healthcare systems to adopt new strategies to ensure safe working, minimise patient exposure, prevent resource saturation, and contain viral spread. National and international bodies have urgently updated guidelines which share many of the aforementioned principles amidst a rapidly changing environment. Significant reduction in surgical activity is seen across all specialties and has presented challenges to surgical triage [11,32]. Guidelines published by European Association of Urology (EAU) stratifies risk into four categories; life threatening,

high, intermediate, and low priorities [33,34]. A stepwise management structure is key to allow recommendations to be relevant at the local level (Table I) [35]. Other national guidelines have reflected a similar structure [36].

STAGE 1 First cancellations	STAGE 2 Secondary cancellations	STAGE 3 Last to be cancelled	STAGE 4 Emergency cases only
Day Surgery (vasectomy, circumcision, scrotal surgery, cystoscopy)	Cystectomy (for low-risk cancer) (dependent on ITU capability)	Cystectomy (for high-risk cancer) (dependent on ITU capability)	Obstructed, infected kidneys
Possible RARPs	LA transperineal biopsies (for high PSA)	Nephrectomy (time-sensitive)	Emergency urology, abscesses, washouts etc
GA transperineal biopsies	TURBT (low-risk cancer)	TURBT (high-risk cancer)	Torsion
Benign nephrectomy or partial nephrectomy	RARPs	Orchidectomy	
Andrology	Nephroureterectomy (low-risk cancer)	Nephroureterectomy (high-risk cancer)	
Brachytherapy		URS with stent or ureteric stones	
Functional & reconstructive surgery		Nephrectomy with IVC exploration (dependent on ITU capability)	
Elective URS & PCNL			
TURP, HoLEP & other procedures for BPH			
Ureterolysis			

Table 1: Prioritisation of treatment during service limitation due to COVID-19 pandemic, published by British Association of Urological Surgeons 19/03/2020.

Patient impact

Patients with low priority conditions are the first to have treatment delayed. These delays can escalate the priority of certain pathologies. The impact of prolonged symptoms on patient psychosocial wellbeing has significant negative consequences. Patients' queries regarding duration of wait and significance of deterioration are difficult to quantify. Delays in cancer diagnoses cause increased anxiety and poorer quality of life [37]. Higher priority patients are also impacted. Social distancing measures mean fewer surgeon-patient interactions preoperatively. This can lead to decreased rapport/confidence and increased stress. Operating with minimised face to face contact increases risk of clinical error. Such practice would be previously unheard of and deemed dangerous. Preoperative assessment now tests patients for COVID-19 with nasopharyngeal swabs. Carriers are deferred until a negative result is returned. Such testing has shown to have a high risk of false negatives [38]. Therefore proceeding to surgery with development of postoperative COVID-19 persists. These risks should be discussed and documented when consenting patients preoperatively. Patients must balance the risks of treatment with hospital exposure, especially when comorbidities such as cancer and chronic kidney disease are known predictors of poor COVID-19 outcomes.

Operations take place under local or regional anaesthetic where possible to minimise ventilator use. Risks of general anaesthesia and aerosol generating procedure are reduced. However issues such as sedation requirement, prolonged operative time and patient distress arise. Postoperative care given by staff in PPE can dull the carer-patient relationship; masks and hoods render staff indistinguishable and can be frightening for patients. Length of stay is curtailed with patients discharged earlier than usual. The patient's desire for home recovery is balanced against clinical supervision.

Staff impact

Staff amidst peak pandemic experience daily occupational risk of infection. Redeployment of urologists has necessitated utilising old skills and new training. Risk of contagion has required sacrifices such as distancing from family to minimise risk of transmission to loved ones. Departments may function with significantly few members as colleagues are redeployed or off sick, requiring those remaining to increase their workloads. Urologists operating in theatre experience a significant change as staff are kept to a minimum. Additional challenges are faced working with new colleagues in unfamiliar environments [39]. Operating in full PPE is hot, cumbersome, and obstructs vision and impedes communication. Operations are limited to senior operators following standardized techniques to minimise theatre time. Dedicated theatres for COVID-19 patients with segregated areas for recovery are needed. The psychological burden of COVID-19 is predicted to cause staff adverse mental health outcomes. PTSD is a common consequence following major disasters [40]. Such trauma usually has delayed onset, presenting after acute coping mechanisms are exhausted. Workplaces and professional associations have set up dedicated sources for mental health support [41].

Healthcare setting impact

Minimising resource use prevents healthcare systems becoming overwhelmed. This directive affects all aspects of urology, from usage of personnel and bed space, to management of time and equipment. Capacity becomes a premium and clinicians must work within the restrictions imposed. The provision of PPE has been one of the greatest challenges during the pandemic. PPE is consumed rapidly and poses challenges from local to international levels in meeting demands and distribution. Training and fit-testing is another hurdle to ensure appropriate protection. Doctors in the UK have sought judicial review into government failure of PPE provision [42]. Concerns were raised regarding infection from aerosol generation during minimally invasive surgery. The Royal College of Surgeons issued guidelines on 25th March 2020 stating that laparoscopic surgery should “generally not be used” [43]. Subsequent BAUS guidelines published 30th March 2020 advised that its use “should not carry any excess risk to staff” if safety measures were implemented [44]. Use of the lowest intra-abdominal pressure for safe operating are advised [45]. Closed system laparoscopic smoke filters and lower energy electrocautery is recommended to minimise smoke release.

Specimens received in pathology departments should have documented COVID status [32]. Use of pneumatic pod delivery systems are not recommended, and extractors should be used when dealing with positive specimens [32]. Good clinical leadership and hospital management is essential to effective working during the crisis. Logistical updates, organising clinical activities,

implementing urgent guidelines and resolving scheduling issues need efficient resolution [15]. Administrative proficiency is vital to maintaining functional services during manpower cuts and department restructuring [15]. Clear communication between primary, secondary and tertiary care is vital in appropriate pathway utilization. Updated uro-oncology referral guidelines require dissemination and adherence, with thresholds set for re-referral. Social distancing amongst staff and patients is paramount. The majority of urological patients have at least one risk factor for unfavourable COVID-19 outcomes [46]. All outpatient appointments are replaced by telemedicine and meetings are replaced by video-conferencing to minimise personnel proximity [47,48].

Urology Cancer Services

Urology cancer management has changed significantly during COVID-19. The contingency plans are based on a three step model for mild, moderate and severely reduced services [33,49-51]. The first wave of operations postponed include Robotic Assisted Radical Prostatectomy (RARP) for lower risk prostate cancer, general anaesthetic prostate biopsies and partial nephrectomies. The moderate stage defers TURBT, cystectomy, nephroureterectomy for all lower-risk disease, and stopping all RARP. Only the most severely reduced services stop operative management of higher risk urological cancers [35]. Medical and clinical oncological services are also severely affected. Patients should continue previously started radiotherapy regimes [32]. Bladder cancer management has paused or shortened intravesical chemotherapy regimens for high risk NMIBC [49]. Neoadjuvant chemotherapy for radical cystectomy is withheld [49]. Prostate cancer has stopped brachytherapy, and advises against chemotherapy given the risks of immunosuppression [50]. Guidelines advise starting neoadjuvant hormone therapy in high risk and unfavourable intermediate risk disease where radical prostatectomy is deferred. This deviates significantly from pre-pandemic standards of care [50]. Testicular cancer advises for surveillance in low risk groups, who previously would have received adjuvant chemotherapy [51].

Similar stepwise treatment reduction has been published by the EAU and in the USA, reflecting the same challenges faced by urologists worldwide [34,36]. Referral thresholds from primary care are changed in the UK to decrease referral for lower risk cancers. Patients are generally seeing their GPs less, but those who do may present with more significant symptoms from cancer burden. Diagnostic scans may be deferred to according to risk stratification. Patients who need postoperative ITU support following major uro-oncological surgery may require CT chest as part local protocols, but scanning is not recommended as part of routine preoperative screening [52]. Such management changes provide unique opportunities to perform observational studies to

evidence future practice change. For example assessing whether neoadjuvant hormones for high risk prostate cancer can downstage final histopathology at radical prostatectomy [53,54]. Current such evidence has limitations regarding its quality and insufficient risk stratification. Nationwide, or global, practice changes could provide meaningful results.

Benign urology services

All benign urology care is on hold during peak pandemic. The most 'severely reduced' services still provide emergency care. Patients will likely suffer increased morbidity as a result of delays, for example stent symptoms before stone management [55] or catheter associated infections prior to bladder outlet obstruction surgery [56]. Ureteric calculi are conservatively managed to avoid admission and prolonged indwelling of ureteric stents [57]. Initial concerns regarding adverse COVID-19 outcomes and use NSAIDs were raised [58] but cautious use in urological patients symptoms was still advised [59]. WHO has since stated there is no evidence linking NSAIDs to worse COVID-19 outcomes [60]. Other benign urology such as LUTS, incontinence and neuro-urological conditions may be managed and triaged via teleclinics, with hospital attendance reserved only for urgent issues [33]. Telemedicine fosters the doctor-patient relationship without increased exposure [61]. Preliminary assessment and immediate patient concerns can be addressed remotely. Benign and functional urology requires assessment through examination, functional testing and imaging. Until such time however, advice on conservative measures can be delivered via telemedicine [62]. Patients can still complete validated questionnaires and bladder diaries. These interventions empower the patient and reinforces self-management. Provisional medications for conditions such as benign prostatic obstruction, OAB, or recurrent UTIs can be started. Those at risk of upper tract deterioration and urosepsis will require urgent review without delay [63]. A strong recommendation has been made to postpone all robotic surgery for functional and reconstructive surgery, and benign robotic radical nephrectomies [45].

Conclusion

Post pandemic recovery

A significant change to urology practice will persist. The very definition of normal has changed. The two critical questions for resuming services relate to timing and means. The answers are interlinked, with one resolving the other. As with stopping services, guidelines for starting them include incremental steps dependent on resource availability [64,65]. When urological services resume is dependent upon incidence and prevalence of COVID-19. Many factors are summarized by the Royal College of Anaesthetists into four categories; Space, Staff, Stuff (equipment), and Systems [65]. Elective surgery should only begin when provisions in all categories are met. Starting prior to this risks compromising safe

care. Though capacity will be reduced, it at least allows for services to continue in a limited fashion.

The increasing backlog, of which benign cases make up a significant portion, will need to be addressed. An calculation based on a 20% increase in baseline surgical volume has estimated a median of 45 weeks to clear the backlog of operations resulting from 12 weeks of disruption [66]. Patients experiencing diagnostic delay due to altered guidelines will need subsequent management. Those with treatments deferred need clinical priority reassessment. How this is achieved will be dependent upon the recovery phase in each individual healthcare setting. Urologists will need to work together in new and efficient ways to deal with this novel burden. Coronavirus will likely remain circulating amongst the population for the foreseeable future. The potential for further peaks and surges in healthcare demand are ever present. How urology as a specialty tackles this new challenge is a piece of a larger puzzle in reshaping healthcare delivery and shifting societal paradigms.

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