Author's Accepted Manuscript

Urology in the era of COVID-19: Mass Casualty Triage

Desouky E

DOI: 10.1097/UPJ.0000000000000152
Reference: UP-20-42

To appear in: *Urology Practice*
Accepted Date: 02 April 2020

Please cite this article as: Desouky E, Urology in the era of COVID-19: Mass Casualty Triage, *Urology Practice®* (2019), doi: 10.1097/UPJ.0000000000000152.

Urology Practice Publish Ahead of Print
DOI: 10.1097/UPJ.0000000000000152

Urology in the era of COVID-19: Mass Casualty Triage

Elsayed Desouky

Urology department, Wexham park NHS hospital, Berkshire, UK.

Urology department, Alexandria main university hospital, Alexandria, Egypt.

Abstract:

COVID-19 pandemic represents an uncertain challenge that could generate large numbers of patients in a short period of time. How best to manage this is evolving. There will not be an ideal solution so all are requested to work together to solve the challenge. Applying principles of mass casualty medicine in triaging urology patients in need for elective and emergent surgeries is of paramount importance. Accordingly, there is a crucial need to find a guide to pragmatic management of urological patients during this pandemic.

COVID-19 was announced as a pandemic by World Health Organization (WHO) on 11th March 2020. [(1)] This unprecedented health event poses a massive pressure on health care systems worldwide, in addition to severe negative social and economic impact.

Although, there is no direct effect of COVID-19 on the urinary tract from a urological point of view [(2)], this does not mean urologists will not get involved.

The massive impact on health care system needs a proper plan to face the anticipated rise in demand from health care hence the need to reduce the level of activity in all surgical specialties including urology. This stepping down approach is necessary to follow infection control guidance minimizing number of patients physically attending into the hospitals, to increase bed allowance for any possible sharp rise in COVID-19 admissions as well as freeing all possible equipment such as ventilators to be available whenever needed and to free many staff members to support health care demand for alternative roles.

Royal College of Surgeons (RCS) published guidance for surgeons working during the COVID-19 pandemic [(3)] stating that the surgical workforce will need to adapt during the pandemic and priorities in list of importance are;

- ✓ Maintain emergency surgical capabilities
- ✓ Preserve surgical workforce
- ✓ Fulfill alternate surgical roles
- ✓ Fulfill alternate non-surgical roles

The RCS recommendation was that any plan need to be dynamic, reactive and ready to change as situation unfolds. Surgeons need to be flexible, collaborative and showing leadership in what are expected to be testing times. At some point, surgeons will triage and deliver healthcare to patients for maximal benefit as in mass causality scenario. [3]

Multiple professional societies have studied the science of sudden onset disaster mass casualty incidents to create and promote surge response guidelines. The COVID-19 pandemic has presented the health care system with challenges that have limited science to guide the staff, stuff and structure surge response. [4]

WHO declared Europe as the epicenter of the COVID-19 pandemic with Italy having the worst hit. In the United Kingdom (UK), London is the worst affected. Similarly, in the United States of America (USA), New York city is the most affected. Unfortunately, USA had the highest number of cases reported at the time of writing this article. Meanwhile, COVID-19 has not yet hit the Middle East and North Africa as hard as the rest of the world. [1]

In the face of this pandemic, diminishing resources in most health care facilities make this pandemic more critical even if its hit is not as hard yet. This raises the crucial need to find a guide to pragmatic management of urological patients during this pandemic.

On 19th March 2020, British Association of Urological Surgeons (BAUS) launched a series of valuable guidance on management of various urological patients since service provision may need to deviate from the internationally accepted standard of care during the current COVID-19 pandemic. [5] This guidance can be summarised as following;

Outpatients

- All clinics are to be converted into a virtual/telephone clinic at main hospital site which is the simplest form of telemedicine.

Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance. The current COVID-19 pandemic is again reminding us of the importance of using telehealth to deliver care, especially as means of reducing the risk of cross-contamination caused by close contact. [6]

Nevertheless, relying just on sporadic uptake of telehealth, as in times of emergency such as COVID-19 pandemic, is problematic. Clinician's acceptance of telehealth relies on them perceiving telehealth as effective, safe and normal. Clinicians may not be knowledgeable and aware of telehealth, which is not surprising given there is limited telehealth training. [6]

- Preparing one room at the main hospital site outpatients department to be a *clean* urology room for patients who may need face to face consultation and it will be equipped with catheter stock and a flexible cystoscopy stack system.

BAUS COVID-19 Guidance: BLADDER CANCER [5]

- Hematuria investigation

Clinical scenario	Reduced service	Severely reduced service
Visible hematuria over 45 years	Hematuria clinic	USS / Emergency service if severe
Non visible hematuria over 60 years	USS / Defer	Defer

- TURBT

Clinical scenario	Reduced service	Severely reduced service
New bladder tumour	Restrict to solid tumours & actively bleeding tumours	Stop TURBT
Re-resection of bladder tumour	Restrict to very high risk NMIBC (i.e. very strong suspicion of under-staging)	Stop TURBT

- Treatment

Clinical scenario	Reduced service	Severely reduced service
NMIBT Low risk	Flexible cystoscopy at 12 months	Stop survillance
NMIBT Intermediate risk	Flexible cystoscopy at 6 months	Flexible cystoscopy at 12 months
NMIBT High risk	Flexible cystoscopy at 3 months	Flexible cystoscopy at 6 months
MIBT T2-4 N0 M0 disease	Radiotherapy	Radiotherapy if available
MIBT T2-4 N0 M0 where radiotherapy is contraindicated	Radical cystectomy & urinary diversion	Defer radical cystectomy for a maximum of 3 months

- COVID recommendation policy is against intra-vesical BCG or chemotherapy for NMIBC cancer due to potential immunosuppressive effects. For patients currently on BCG treatment; complete induction if possible, and then defer further treatment.

- COVID recommendation policy advise against neoadjuvant chemotherapy.

- All patients who have started radical radiotherapy to the bladder should continue.

BAUS COVID-19 Guidance: PROSTATE CANCER [5]

- Continue with current diagnostics and treatment protocols as long as possible but the diagnostic and treatment pathway may not be sustainable.

- Minimise risk of missing significant prostate cancer and minimise risk of disease progression in those already diagnosed.

- Minimise imaging requests as radiology staff likely to be deployed to emergency services.

- MRI scanners could be a potential source of COVID-19 transmission due to their enclosed space with reduced access/availability to cancer patients and CT scanners are likely to be vital resources for the respiratory/ITU teams.

- Assumption that PSA blood testing remains available. If patients are elderly/frail it may be most appropriate to not attend for blood testing at present. For patients on primary ADT, the need for PSA follow up can be put back to 6 monthly.

- Radiotherapy should be avoided unless urgent necessity due to rapid loss of function e.g. spinal cord compression

- BAUS panel acknowledge that this will be exposing an increasing proportion of men to hormone therapy who would not ordinarily have chosen this modality.

- COVID recommendation policy is to avoid TRUS prostate biopsy if possible due to risk of sepsis which will need hospital admission and possible critical care support .

- Investigation

Clinical scenario	Reduced service
PSA > 20	Bone scan + start on Hormone therapy + repeat PSA in 3 or 6 months
PSA < 20	USS estimation prostate volume so; If PSA density >0.15 = Offer prostate biopsy if PSA density < 0.15 Discharge for repeat PSA in 6 months

- Treatment

Clinical scenario	Reduced service
Low/intermediate risk Non metastatic Prostate cancer	Active surveillance PSA in 6 months or Bicalutamide 50mg OD
High risk Non metastatic Prostate cancer	LHRH or Bicalutamide 150mg OD Until a time is available to offer them curative therapy (radical prostatectomy/ radical radiotherapy)
Metastatic prostate cancer	LHRH Primary chemotherapy should be deferred

BAUS COVID-19 Guidance: KIDNEY CANCER [5]

❖ Wherever possible, patients with suspected or proven kidney cancer should be managed according to currently accepted investigative and treatment strategies, until such point that resources become so limited that severe risk stratification is required.

❖ Investigation

Clinical scenario	Reduced service
likely kidney tumours and complex cysts less than 4cm	Imaging follow up in 6 – 9 months
likely kidney tumours and complex cysts more than 4cm but less than 7cm	Imaging follow up in 3 – 6 months

- There is no role for renal mass biopsy.

- Treatment

Clinical scenario	Reduced service
T1a & T1b RCC	Surveillance
T2 RCC	Urgent Nephrectomy
T3 RCC	highest priority for urgent surgical intervention
Metastatic RCC	No Cytoreductive nephrectomy No renal biopsy Referral to oncologist Little evidence against TKI

- COVID recommendation policy advises that there should be no role for the use of partial nephrectomy, ablation or stereotactic radiotherapy in the management of T1 patients during this period.

BAUS COVID-19 Guidance: Testicular Cancer [5]

- Investigation

Clinical scenario	Reduced service	Severely reduced service
Testicular mass	USS testes + Tumour markers + staging CT	Clinical staging if restricted access to imaging & blood tests

- Treatment

Clinical scenario	Reduced service	Severely reduced service
Testicular cancer	Inguinal orchidectomy	Inguinal orchidectomy when access permits

- COVID recommendation policy advised there is no role for insertion of testicular prosthesis.

- Adjuvant treatment

Clinical scenario	Reduced service	Severely reduced service
Pure seminoma High risk	Active surveillance or adjuvant carboplatin (provided they understand the need to self-isolate)	Active surveillance
Non Seminoma High risk	Active surveillance or Single cycle BEP (provided they understand the need to self-isolate)	Active surveillance

Urolithiasis

There is no COVID-19 guidance schema regarding management of urolithiasis published by any international or national urological association up to the time of writing of this article. A recent publication [7] proposed a simplified protocol for triaging patients with urinary stones during this pandemic. Authors recommend conservative approach in managing cases of renal colic to avoid in-hospital admissions. Included in their protocol is a telephone consultation to screen patients for history and / or symptoms suggestive of COVID-19 in order to manage accordingly. Any patient with suspected or confirmed COVID-19, requiring urgent endo-urological intervention, would be managed in a dedicated operating room. [7]

Authors suggested surgical priority assessment for patients scheduled for stone surgical intervention based on several parameters: Stone size and location, obstructive uropathy, symptom control, presence of indwelling ureteric stent or nephrostomy tube and other related factors e.g. Solitary kidney or impaired renal function. [7]

Based on their model, a patient with a unilateral non-obstructing renal stone and normal renal function can be delayed giving priority to a patient with a solitary kidney or an obstructing ureteric stone. Patients with urinary stones represent a wide spectrum of different case scenarios that need a judicious clinical decision making to prioritise their management. [7]

Another recent publication[8] addressed the question of safety of using Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) e.g. Ibuprofen in urological practice especially after few recent reports raised concerns about whether NSAIDs worsens COVID-19 symptoms. They concluded that NSAIDs are the most efficient treatment for renal colic and are still indicated and should be maintained. Only in the case of doubt for a symptomatic viral infection with fever, NSAIDs should be avoided and paracetamol (acetaminophen) should be prescribed instead. [8]

Inpatients

- Emergency admissions are definitely justified yet communicating with A&E team and surgical SHOs to avoid any unnecessary admissions.

- High index of suspicion must be kept in mind before diagnosing a patient in emergency department with urosepsis in order to avoid misdiagnosis. Fever was identified in 43.8% of COVID-19 patients on presentation.[2] Hence, these patients need to be managed in isolation till a definite diagnosis is confirmed.

In such case, laboratory results can be helpful in giving physicians a clue to guide their clinical judgment. Checking full blood count is invaluable since lymphopenia has been found in over 80% of COVID-19 patients [2] compared to neutrophilia known for actual bacterial sepsis. Also, serum ferritin is elevated in severe morbidity associated with COVID-19. [9] Finally, According to European Urological Guidelines, procalcitonin is a raised inflammatory marker in severe bacterial rather than viral infections. [10] COVID-19 does *not* seem to increase the procalcitonin level. [2]

Theatres

The BAUS has published a triage schema for step down cancellation of urological surgical procedures during time of the pandemic [5] classifying certain procedures into low risk or high risk based on intensive care unit capabilities in face of high demand for ventilators to support COVID-19 patients. This schema can be summarised in the following table:

1st Cancellation	2nd Cancellation	Last to be cancelled	Emergency cases
Day surgery e.g. Varicocele / hydrocele	Cystectomy (low risk)	Cystectomy (high risk)	Testicular torsion
Benign nephrectomy	TURBT (low risk)	TURBT (high risk)	Obstructed infected kidney
Andrology	Radical prostatectomy	Radical nephrectomy	Abscess / Gangrene
Functional / Reconstructive surgery	Nephroureterectomy (low risk)	Nephroureterectomy (high risk)	
PCNL		Inguinal orchidectomy	
TURP, HoLEP and other procedures for BPH		Ureteroscopy with ureteric stone / stented patient	

American Urological Association (AUA) published considerations for elective urologic surgery during COVID-19 by AUA public policy chair, Dr. Chris Gonzalez who stated that *"we are seeing an incredibly rapidly evolving pattern which is also unprecedented and we do not have a road map for this, so a lot of learning is being done on the job"*. [11]

The AUA recommended the general guidance proposed by American College of Surgeons (ACS) to limit non-essential adult elective surgery and medical and surgical procedures. These considerations should assist in the management of vital healthcare resources during this public health emergency as well as in decisions that should be based on case-by-case evaluation. The ACS guidance for triaging surgical patients during the pandemic is summarised in the following table: [11]

Definition	Action	Example
Low acuity surgery	Postpone	-Hydrocele
Intermediate acuity surgery (Not life threatening but potential for future morbidity & mortality). Requires in-hospital stay	Consider postponing	-Low risk cancer -Stable ureteric colic
High acuity surgery	Do not postpone	-Organ threatening e.g. testicular torsion -Most Cancers -Highly symptomatic patients

Uro-pathology

The frequency of specimens in urology being sent for pathological examination is decreasing during the pandemic crisis. Nevertheless, some surgeries such as inguinal orchidectomy, radical cystectomy, and some radical nephrectomies cannot be delayed. Pathologists must be extremely cautious when handling such urological specimens. When sending fresh samples, pathologists should be given information regarding the patient's COVID-19 status. [12]

The WHO has recently published recommendations for handling COVID-19 positive specimens e.g. Pneumatic tube systems must not be used, specimens must be delivered by hand. Transport must be according to good biosafety practices and safety recommendations. Working under a laboratory extractor is mandatory in case of COVID-19 positivity. This applies to urine as well as surgical specimens. [12]

Regarding fresh-frozen specimen, the same protections for technical and medical staff must be applied but the main problem is persistence of COVID-19 coronavirus on inanimate

surfaces such as cryostats; the virus can survive temperatures of −20°C, the temperature used for cutting of fresh-frozen sections. Therefore, it is extremely important to reduce fresh-frozen sections to a strict necessity basis, as cryostat disinfection takes a long time and many laboratories have only one cryostat available for fresh-frozen sections. [12]

Use of Personal Protective Equipment (PPE)

Urologists generally do not perform aerosol generating procedures (AGP) but are exposed to urine and blood in the course of their work. The risk of contamination from urine splash is minimal, COVID-19 not having been identified in urine to date (other coronaviruses have been found in urine). Aerosol risks to urologists may be more significant from patients coughing during intimate procedures e.g. Catheter insertion, LA cystoscopy or following intubation / extubation. The following general advice has been published by BAUS: [5]

- ✓ If asked to perform a procedure on a ventilated patient e.g. catheterization, make sure that it has been at least 20 minutes since intubation or any disconnection, wear an FFP3 mask or ventilated hood, and assume that all surfaces are contaminated.

- ✓ You should only enter the theatre after 20 minutes when the airway is secured, fully connected and you have been informed that it is safe to do so (it can take 20 minutes for the aerosol to settle).

- ✓ At the end of the procedure, the patient should be moved to a bed with no disconnection. The surgical team should then leave the theatre, as soon as possible, to avoid exposure to aerosol during extubation. Everyone apart from the anaesthetic team must leave the theatre, and only then should that team wake the patient.

- ✓ We have to assume the majority of patients seen in the next 3 months will have been exposed to COVID-19.

- ✓ Only perform invasive procedures on urgent and emergency cases.

- ✓ FFP3 / N95 masks must be fit-checked.

- ✓ Remember all PPE equipment is SINGLE USE.

- ✓ Reduce patient contact to a minimum, and minimise the number of staff involved.

- ✓ Avoid diathermy smoke: if possible use a smoke extractor.

- ✓ Careful desufflation must be performed before port removal in laparoscopy to avoid it becoming an aerosol generating procedure.

- ✓ For self-ventilating cases, as well as your own PPE, make sure the patient wears a standard surgical mask during the procedure.

✓ Protection level

Level	COVID-19 risk	PPE
1	Low risk Asymptomatic	Gloves Apron **Surgical mask** Surgical cap Visor/goggles/glasses Surgical scrubs
2	COVID-19 +ve or high risk (symptoms + fever) Low aerosol risk	Gloves Surgical scrubs Gown **Surgical mask** Surgical cap Visor/goggles/glasses
3	COVID-19 +ve or high risk Receiving aerosol generating treatment (e.g. ventilation, CPAP, high pressure nasal oxygen) in ICU / ITU / HDU	Gloves Surgical scrubs Gown **FFP3 mask (fitted) or ventilated hood** Surgical cap Visor/goggles/glasses

Conclusion:

COIVD-19 pandemic is a health crisis facing the whole world and posing a major challenge to every health care system. Urologists and other health care professionals generally make decisions based on the best available evidence. Reliable evidence about COVID-19 has yet to emerge, which makes it difficult to determine best practices in providing care. Accordingly, applying principles of mass casualty medicine in triaging urology patients in need for elective and emergent surgeries is of paramount importance.

References:

1. https://www.who.int/

2. Guan WJ, Ni ZY, Hu Y, et al. Clinical Characteristics of Coronavirus Disease 2019 in China. *N Engl J Med.* Published online February 28, 2020.

3. www.rcseng.ac.uk/coronavirus/joint-guidance-for-surgeons-v1/

4. Paganini M., Conti A., Weinstein E. et al. Translating COVID-19 Pandemic Surge Theory to Practice in the Emergency Department: How to Expand Structure. *Disaster Medicine and Public Health Preparedness*. Published online March 27, 2020.

5. www.BAUS.org.uk/

6. Anthony S., Emma T., Centaine S. et al. Telehealth for global emergencies: Implications for coronavirus disease 2019 (COVID-19). *Journal of telemedicine and telecare.* Published online March 20, 2020.

7. Silvia B., Franco G., Guido G. Endourological Stone Management in the Era of the COVID-19. *Euro Urol*. Published online March 29, 2020.

8. Benjamin P., Guillaume P., James C. et al. The Use of Nonsteroidal Anti-inflammatory Drugs in Urological Practice in the COVID19 Era: Is "Safe Better than Sorry"? . *Euro Urol*. Published online March 29, 2020.

9. Puja M., Daniel FM., Michael B. et al. COVID-19: consider cytokine storm syndromes and immunosuppression. *LANCET*. Published Online March 13, 2020.

10. EAU Guidelines 2020 edition. uroweb.org/guidelines

11. www.auanet.org/covid-19-info-center/

12. Eva Comperat. What Does COVID-19 Mean for the Pathology-Urology Interaction?. *Euro Urol*. Published online March 29, 2020.

Commentary

This article brings timely attention to the current global COVID-19 viral pandemic. This pandemic is an unprecedented crisis of enormous social, economic and humanistic impact. During uncertain times like this, constructive input with pragmatic guidance is appropriate and welcomed.

The article borrows mainly from the authority of the British Association of Urological Surgeons, which has issued procedural guidelines for services administered to patients with urological conditions. Accordingly, recommendations are provided for managing a host of common clinical scenarios ranging from hematuria to PSA elevation; for logistical coordination of urologic clinics and surgical procedures; and for basic precautionary measures urologists may follow to mitigate the risk of COVID-19 infection for themselves or their patients.

The author acknowledges similar proactivity of other professional societies relevant to our practices including the American Urological Association and the American College of Surgeons as sources of guidance for urologists. The AUA provides an Information Center on its website (https://www.auanet.org/covid-19-info-center) that can be accessed for the latest information and direction in light of this pandemic. In addition, The Journal of Urology® is publishing several editorials on topics such as day-to-day patient care, office and hospital based triage of urology procedures, training issues and the personal impact of treating the virus. These editorials are open access and available to anyone at www.jurology.com.

We urologists are challenged in these times of urgency to implement certain initiatives and courses of action. This includes medical triaging, which implies selectively serving patients in the near term and relegating some to receive less prompt care. This practice reconciles the realities that our medical profession as clinical specialists only occasionally situates us on the front lines of medical care, unlike that for many of our colleagues whose service at this time is critically needed, and that many of our surgical procedures would not be readily classified as "essential." However, we should accept the responsibilities of conserving medical resources, applying alternative healthcare strategies (possibly for the long-term) such as telehealth services, and preparing to deploy as clinicians in ways unconventional for our medical backgrounds but nonetheless adaptively with qualifications we can lend.

We are challenged in these times of enormous humanitarian need. We all must move forward smartly and collectively to achieve the best good. Our response must be that of strength of mind, action and spirit, as well as unity of purpose, to overcome this crisis.

Arthur L. Burnett

Section Editor, Patient Care

The Johns Hopkins School of Medicine

Baltimore, Maryland