



A prospective study on the incidence of postponed time-sensitive urological procedures during the SARS-CoV-2 pandemic due to patient preference

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Abstract

Background The risk of acquiring perioperative SARS-CoV-2 infection is concerning for surgeons and patients.

Aims In this study, we investigate the incidence of postponed, medically necessary, time-sensitive urological procedures due to a patient’s unwillingness to proceed to a recommended surgical intervention during the first phase of the SARS-CoV-2 pandemic.

Methods We prospectively monitored all patients undergoing elective urological surgery during the initial phase of the SARS-CoV-2 pandemic. The primary outcome measurement was incidence of postponed, medically necessary, urological procedures due to the patient’s decision not to proceed to a recommended urological intervention (16th of March–5th of June 2020). The secondary outcome measurements were the type of delayed procedure and duration of postponement.

Results During the initial 12-week period of the SARS-CoV-2 pandemic, 155 elective urgent urological procedures were scheduled after pre-operative SARS-CoV-2 screening. In total, 140 procedures were performed and 15 (10%) patients intentionally delayed their urological procedure due to the perceived risk of acquiring nosocomial perioperative SARS-CoV-2 infection. The duration for procedural delays is currently 42 ± 23 (range: 15–80) days. The most frequently postponed procedures among patients unwilling to proceed to surgery are urgent endourological procedures due to symptomatic urolithiasis ($n = 7/15$).

Conclusions The incidence for patients postponing urological procedures due to the risk of acquiring nosocomial SARS-CoV-2 is 10%. Endourological procedures for urolithiasis are the most frequently postponed procedures by patients. This study demonstrates that a subset of patients will decline urgent urological surgery during the SARS-CoV-2 pandemic.

Keywords Coronavirus · COVID · COVID-19 · Pandemic · SARS-CoV-2

Abbreviations

SARS-CoV-2 Severe acute respiratory virus coronavirus 2

Introduction

Healthcare systems across the globe face unprecedented challenges due to the severe acute respiratory virus coronavirus 2 (SARS-CoV-2) pandemic [1]. SARS-CoV-2 has simultaneously high transmission and high mortality rates. To date, many urological centres have prioritised their patients for

urgent surgical intervention due to a reduction in operating theatre availability and due to the risk of hospital acquired SARS-CoV-2 infection [1, 2]. Current epidemiological projections indicate that SARS-CoV-2 may persist for 12–18 months, and, while most centres have triaged major uro-oncological surgery during the initial phase and second phase, certain surgeries for benign disease such as obstructing and/or symptomatic urolithiasis cannot be delayed indefinitely [1, 3].

The first confirmed case of SARS-CoV-2 in the Republic of Ireland was diagnosed on February 29th, 2020 and associated with travel to Italy, with community transmission confirmed on March 5th [4]. The Irish Government initially introduced social restrictions on the 12th of March 2020 in response to a rising number of SARS-CoV-2 cases. A phased protocol for easing of restrictions was introduced on the 18th of May 2020 as the transmission rate of SARS-CoV-2 decreased throughout the country. On the 21st of October 2020, social restrictions were re-introduced in Ireland due to

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the increasing daily numbers of confirmed SARS-CoV-2 cases [5].

Of particular concern for surgeons, and their patients, is the risk of acquiring perioperative SARS-CoV-2 infection and its associated morbidity and mortality [1–3]. One recent prospective study reported that the 30-day mortality was 23.8% ($n = 268/1128$) in patients with perioperative SARS-CoV-2 infection [6]. Little is known about the incidence of patients' postponing medically indicated procedures due to their perceived risk of acquiring nosocomial perioperative SARS-CoV-2 infection. In this study, we investigate the incidence of postponed, medically necessary, time-sensitive urological procedures due to a patient's unwillingness to proceed to a recommended surgical intervention during the first phase of the SARS-CoV-2 pandemic.

Methods

Overview of study design

An institutional review-board approved study was performed on outcomes of all patients who underwent urgent elective urological surgery in Beaumont Hospital, a tertiary referral centre, during the initial phase of the SARS-CoV-2 pandemic in Ireland. In preparation for reduced elective urological activity, all patients on the surgical waiting list were triaged. A red list of all urgent cases (surgery within 6 weeks) was compiled to include radical cystectomy, radical nephroureterectomy, radical nephrectomy for renal cell carcinoma (RCC) > 4 cm, retroperitoneal lymph node dissection (RPLND), high-risk prostate cancer, radical orchidectomy, transurethral resection of bladder tumour (TURBT) and patients with obstructing ureteric stones or indwelling ureteric stents. The remaining elective cases were sub-categorised into semi-urgent (≤ 6 months) and non-urgent surgical cases. The primary outcome measurement was incidence of postponed, medically necessary, time-sensitive urological procedures due to a patient's unwillingness to proceed to a recommended surgical intervention (16th of March–5th of June 2020). The secondary outcome measurements were the type of delayed procedure and duration of postponement. Data was recorded prospectively and reported as a mean \pm standard deviation (SD) where applicable.

Testing protocol for SARS-CoV-2

Beaumont Hospital is an 820-bed adult tertiary referral hospital in Dublin, Ireland, providing specialty and acute care services to a catchment area of $> 300,000$ people. The hospital has an onsite microbiology laboratory which performs daily SARS-CoV-2 real-time reverse-transcription PCR testing using Altona Diagnostics RealStar SARS-CoV-2 RT-PCR to

detect B- β CoV (target E gene) and SARS-CoV-2 (target S gene) specific RNA. Suspected and confirmed SARS-CoV-2 cases and close contacts are managed with droplet and contact precautions with personal protective equipment (PPE). Departmental consent forms for urological procedures were modified to include 'Hospital Acquired SARS-CoV-2' as a potential post-operative complication with a risk of $\leq 2\%$ [2].

Telephone interview

From the 16th of March 2020, a screening process for all elective urology surgery cases was introduced. An initial phone interview was conducted prior to consideration of surgery. Patients were queried on SARS-CoV-2 related symptoms (i.e. fever, cough, shortness of breath, loss of smell/taste), recent foreign travel and any close contacts with confirmed SARS-CoV-2 cases. Surgery was deferred in patients with symptoms and they were advised to arrange testing through local clinical pathways. Surgery was also deferred for a minimum of 14 days in the event of a confirmed close contact and these patients were re-screened after 14 days.

SARS-CoV-2 real-time reverse-transcription PCR testing in elective cases

From the 28th of March 2020, all elective urology surgery patients were required to undergo pre-operative nasopharyngeal swab 24–48 h prior to their surgery (see "Testing protocol for SARS-CoV-2" section). A negative nasopharyngeal swab in conjunction with no COVID-19-related symptoms were pre-requisites prior to proceeding to elective urological surgery.

Results

Overview of elective urological surgery during SARS-CoV-2

During the initial 12-week period for SARS-CoV-2, 159 urgent elective urological surgeries were scheduled, of which 140 (88%) were performed. Three patients (1.8%) were postponed due to symptoms of SARS-CoV-2 at their pre-operative telephone interview and 1 (0.67%) asymptomatic patient was postponed due to a positive SARS-CoV-2 nasopharyngeal swab 24-h prior to their scheduled procedure. The age and ASA grade for elective surgical procedures were 62.5 ± 11 years and 2.59 ± 6 , respectively. The length of follow-up was 41 ± 24 days. A summary of all elective procedures performed in order of frequency is demonstrated in Table 1.

Table 1 Elective urological procedures performed during the initial phases of SARS-CoV-2 in order of frequency

Procedure	Number (n)
TURBT*	35
Ureteroscopy for calculus (with indwelling ureteric stent)	30
Radical prostatectomy (robotic and open)	25 (n = 17 robotic, n = 8 open)
Laparoscopic radical nephrectomy	12
Ureteroscopy and biopsy for suspected tumour	8
Radical cystectomy and ileal conduit	6
Bladder neck incision (BNI)/urethral dilatation	6
Laparoscopic nephroureterectomy	5
Percutaneous nephrolithotomy (PCNL)	2
TURP (indwelling urethral catheter)	2
Retroperitoneal lymph node dissection (RPLND)	1
Radical orchidectomy	1
Partial orchidectomy	1
Laparoscopic pyeloplasty (recurrent ED presentations)	1
Insertion of Tenckhoff catheter	1
Excision of scrotal lesion	1
Change of ureteric stents	1
Circumcision for suspected penile cancer	1
Rigid cystoscopy	1
Total	140

*TURBT, transurethral resection of bladder tumour, including bladder mapping; ED, emergency department

Post-operative SARS-CoV-2

In total, 3 male patients ($n = 3/148$, 2%) had a positive nasopharyngeal swab for SARS-CoV-2 during the post-operative period. All 3 SARS-CoV-2 positive patients had undergone an elective uro-oncology surgical procedure (i.e. laparoscopic radical nephrectomy, robot-assisted radical prostatectomy, transurethral resection of bladder tumour) [3]. All 3 SARS-CoV-2 positive patients developed significant post-operative pulmonary complications which led to 1 SARS-CoV-2 patient mortality. The most recent positive nasopharyngeal swab for SARS-CoV-2 during the post-operative period occurred on the 15th of April 2020.

Patients unwilling to proceed to surgery

In total, 15/155 (10%) patients were unwilling to proceed with a medically indicated urological procedures due to their perceived risk of acquiring nosocomial perioperative SARS-CoV-2 infection. Details on urgent elective procedures postponed due to patient preference are summarised in Table 2. At present, the duration for procedural delays is 42 ± 23 (range: 15–80) days and this duration is increasing daily. The number of times patients were offered an appointment date for their surgery was 1.6 ± 0.63 (range: 1–3) times. The most frequently postponed urological procedures among patients unwilling to proceed to surgery during the SARS-CoV-2 pandemic are

urgent endourological procedures due to symptomatic urolithiasis ($n = 7/15$).

Discussion

To date, most clinical studies have reported on the epidemiological, clinical features, laboratory and radiological characteristics of SARS-CoV-2, and little attention has been directed on investigating the incidence of postponed time-sensitive urological procedures during the SARS-CoV-2 pandemic due to the patient's own decision. The main finding in this prospective study is that approximately 10% of urological patients are intentionally postponing urgent urological procedures due to their perceived risk of acquiring nosocomial perioperative SARS-CoV-2 infection. An important secondary finding is that urgent endourological procedures pertaining to urolithiasis are the most frequently postponed urological procedures by patients during the SARS-CoV-2 pandemic.

In our study, the prioritisation of urgent elective surgeries was dependent on hospital capacity and on the potential consequences on the effects of delaying surgery. Like most surgical units worldwide, access to theatre space has been curtailed due to a surge in inpatient SARS-CoV-2 admissions requiring extensive ventilatory care. At one point, approximately 16% of all inpatient beds in Beaumont Hospital were occupied by SARS-CoV-2 patients and this led to an

Table 2 Summary of urgent elective procedures postponed due to patient preference

Postponed procedure	Number of times date offered to patient	Days overdue
Robot-assisted radical prostatectomy (RARP)	2	80
Change of indwelling ureteric stents	2	80
Laparoscopic pyeloplasty (indwelling ureteric stent)	1	80
Diagnostic ureteroscopy for suspected TCC	1	55
Ureteroscopy for obstructing stone (no stent in situ)*	2	50
Ureteroscopy for obstructing stone (stent in situ)	2	50
Ureteroscopy for obstructing stone (no stent in situ)*	2	42
PCNL for obstructing staghorn calculus	2	36
Ureteric reimplant (stent in situ)	1	35
Ureteroscopy for obstructing stone (no stent in situ)*	3	31
Rigid cystoscopy for suspected TCC	1	27
Ureteroscopy for obstructing stone (stent in situ)	2	19
Change of indwelling ureteric stents	1	19
Ureteroscopy for obstructing stone (no stent in situ)*	1	18
Laparoscopic nephrectomy for RCC	1	15

At present, the mean duration for procedural delays is 42 ± 23 (range: 15–80) days

*All patients with obstructing ureteric stones and no stent in situ have been still symptomatic with intermittent ureteric colic when contacted to schedule definitive ureteroscopy

increased demand on intensivists, anaesthetists, ventilators, with redeployment of theatre nursing staff and surgeons to the ICU and SARS-CoV-2 wards. During the SARS-CoV-2-related surge, patients with high-risk urological cancers and complicated urinary tract calculi stones were triaged by our department. Prioritisation was performed according to recent European guidelines, and patients were then placed on a centralised departmental theatre waiting list [1]. We advocate a similar centralised surgical triaging system in all SARS-CoV-2 hospitals worldwide until the SARS-CoV-2 has regressed.

Surgical studies on SARS-CoV-2-related outcomes have been limited to retrospective case series [7]. Therefore, data on the safety of performing surgical procedures in SARS-CoV-2 hospitals is important, so that knowledge can be provided to surgeons on perioperative SARS-CoV-2-related outcomes during this pandemic. In our urology unit, we found that the incidence of SARS-CoV-2 during the post-operative period is low at approximately 2% for elective urgent urological patients. We also found that the incidence for post-operative mortality due to SARS-CoV-2 was 0.7% ($n = 1/140$). These findings on SARS-CoV-2-related morbidity and mortality appear consistent with the current literature as post-operative mortality in SARS-CoV-2 patients is worryingly high at $\leq 28\%$ [6–8].

It appears that post-operative SARS-CoV-2-positive patients are at a disproportionately increased risk of significant pulmonary complications leading to mortality [2]. Importantly, the most recent positive post-operative nasopharyngeal swab for SARS-CoV-2 in our department occurred

several months ago on the 15th of April 2020, and this can be attributed to improved understanding and usage of personal protective equipment (PPE). In addition to the potential clinical implications of delaying urgent procedures, the decreasing risk for acquiring perioperative SARS-CoV-2 should be conveyed to patients during the surgical consent process during this pandemic.

To decrease the incidence of delayed time-sensitive urological procedures, we counsel extensively on the risks and complications associated with delaying their surgeries. Known clinical implications for delayed treatment of urinary tract calculi are urosepsis, encrusted ureteric stents and renal impairment leading to atrophy. For example, stent encrustation can be seen in 76.3% of cases when left in situ for more than 12 weeks [9]. Poorer long-term survival is perhaps the most significant implication for patients postponing urological cancer-related surgery. Any delay for radical nephroureterectomy in high-grade invasive UTUC is associated with a significant progression of disease [9]. This potential adverse effect on prognosis is clearly explained and documented to patients during the consent process in addition to their risk of hospital acquired SARS-CoV-2 infection.

Although our prospective study provides important information on patients postponing urgent elective urological surgery during SARS-CoV-2, there are some important limitations. Limitations include its single-centre nature, small sample size, short follow-up and lack of comparative global data with other SARS-CoV-2 institutions during the same time-period. However, comprehensive follow-up was maintained for all patients, and our findings do convey important

information to surgeons on the incidence of postponed urological procedures during the SARS-CoV-2 pandemic due to patient preference.

Conclusions

Our findings demonstrate that the incidence of postponed, medically necessary, time-sensitive urological procedures due to a patient's unwillingness to proceed to a recommended surgical intervention is approximately 10% during SARS-CoV-2. The most frequently postponed urological procedures by patients during the SARS-CoV-2 pandemic were urgent endourological procedures due to urolithiasis. Clinical implications for delayed treatment of urinary tract calculi may include urosepsis, encrusted ureteric stents and renal impairment. Information from this study demonstrates that a subset of urological patients will decline urgent urological surgery due to their perceived risk of acquiring nosocomial perioperative SARS-CoV-2 infection.

Author contributions A McDermott: Data collection, data analysis, manuscript writing.

J O'Kelly: Data collection, data analysis.

MR Quinlan: Data collection, data analysis.

DM Little: Project development.

NF Davis: Manuscript writing, supervision.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval This research follows the principles of the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

Consent to participate Verbal informed consent was obtained from all participants.

References

1. Stensland KD, Morgan TM, Moinzadeh A et al (2020) Considerations in the triage of urologic surgeries during the COVID-19 pandemic. *Eur Urol*. <https://doi.org/10.1016/j.eururo.2020.03.027>
2. McDermott A, O'Kelly J, de Barra E et al (2020) Perioperative outcomes of urological surgery in patients with SARS-CoV-2 infection [published online ahead of print, 2020 May 16]. *Eur Urol*. <https://doi.org/10.1016/j.eururo.2020.05.012>
3. Campi R, Amparore D, Capitanio U et al (2020) Assessing the burden of nondeferrable major uro-oncologic surgery to guide prioritisation strategies during the COVID-19 pandemic: insights from three Italian high-volume referral centres. *Eur Urol*. <https://doi.org/10.1016/j.eururo.2020.03.054>
4. HPSC. Novel coronavirus - health protection surveillance centre. <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/>. Published 2020. Accessed 23 April 2020
5. Centre HPS (2020) COVID-19 cases in Ireland. [Available from: <https://www.hpsc.ie/a-z/respiratory/coronavirus/novelcoronavirus/casesinireland/>]. Accessed 21 Oct 2020
6. COVID Surg collaborative (2020) Mortality and pulmonary complications in patients undergoing surgery with perioperative SARS-CoV-2 infection: an international cohort study [published online ahead of print, 2020 May 29]. *Lancet*. [https://doi.org/10.1016/S0140-6736\(20\)31182-X](https://doi.org/10.1016/S0140-6736(20)31182-X)
7. Aminian A, Safari S, Razeghian-Jahromi A et al (2020) COVID-19 outbreak and surgical practice: unexpected fatality in perioperative period. *Ann Surg* 272:e27–e29. <https://doi.org/10.1097/SLA.0000000000003925>
8. Akalin E, Azzi Y, Bartash R et al (2020) Covid-19 and kidney transplantation. *N Engl J Med* 382:2475–2477. <https://doi.org/10.1056/NEJMc2011117>
9. Hughes T, Ho HC, Shariat SF, Somani BK (2020) Where do urologists stand in the era of novel coronavirus-2019 disease. *Curr Opin Urol* 30(4):610–616. <https://doi.org/10.1097/MOU.0000000000000786>

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