

## **Urological Surgery During the COVID-19 Pandemic**

E. MacCraith<sup>1,2</sup>, L. Lyons<sup>2</sup>, S. Elamin<sup>2</sup>, M.F. O'Brien<sup>2</sup>, K.M. O'Connor<sup>2</sup>,  
P. Sweeney<sup>1</sup>, C.M. Brady<sup>1,2</sup>, D.B. Hennessey<sup>1</sup>

1. Department of Urology, Mercy University Hospital, Cork.
2. Department of Urology, Cork University Hospital, Cork.

### **Abstract**

#### **Aims**

Peri-operative SARS-CoV-2 infection is of particular concern for surgeons and their patients due to the high morbidity and mortality. In this study, we investigate the effectiveness of pre-operative SARS-CoV-2 screening in preventing peri-operative infections in a region with a low incidence of infection.

#### **Methods**

Data was collected prospectively on all patients who underwent urological surgery after the exponential phase of the pandemic. The primary outcome was the development of SARS-CoV-2 infection in patients. The secondary outcome was SARS-CoV-2 infections in healthcare workers.

#### **Results**

During the 6-week period following the exponential phase of the pandemic 136 procedures were performed. Ninety-nine (73%) patients had pre-operative SARS-CoV-2 swabs. Forty (29%) had a pre-operative CT Thorax. No patient was found to have SARS-CoV-2 infection pre-operatively. Five (3.6%) of patients developed symptoms that required a second SARS-CoV-2 swab in the post-operative period, all 5 (100%) were negative. No patient developed SARS-CoV-2 infection in the follow-up period, and no member of the urology team developed SARS-CoV-2 infection.

#### **Conclusion**

Our findings demonstrate that elective urological surgery can be safely performed in a region with a low incidence of SARS-CoV-2 with pre-operative screening. We report no cases of symptomatic SARS-CoV-2 infection or deaths among 136 patients undergoing urological surgery.

### **Keywords**

SARS-CoV-2, COVID, COVID-19, Coronavirus, Pandemic

## Introduction

The coronavirus (SARS-CoV-2) pandemic reached Ireland on 29<sup>th</sup> of February 2020, and within three weeks the virus had spread to all counties in the country<sup>1</sup>. On the 12<sup>th</sup> of March, the government of Ireland shut all schools, colleges, childcare facilities, cultural institutions, and advised cancelling large gatherings. On the 24<sup>th</sup> of March, almost all businesses, venues, facilities, and amenities were closed. Three days later, the government banned all non-essential travel and contact with people outside their home. Simultaneously, the Irish public health system, the Health Service Executive (HSE), were making preparations for an anticipated exponential phase of the SARS-CoV-2 pandemic.

SARS-CoV-2 is of concern for surgeons, and their patients, peri-operative SARS-CoV-2 infection is associated with increased morbidity and mortality<sup>2,3</sup>. To reduce the risk of peri-operative SARS-CoV-2 infection, pre-operative screening was introduced. In this study, we report the effectiveness of pre-operative SARS-CoV-2 screening in preventing peri-operative SARS-CoV-2 infection in a region of low SARS-CoV-2 infection incidence.

## Methods

A prospective study of patients who underwent urological surgery from the 17<sup>th</sup> of April to the 25<sup>th</sup> of May was performed. The procedures were performed in three hospitals; Cork University Hospital (CUH) and The Mercy University Hospital (MUH) - both tertiary referral Urological centres, and The Mater Private Hospital Cork, a private hospital acquired by the HSE for the immediate phase of the pandemic. Data collected included; age, sex, American Society of Anaesthesiologists (ASA) grade, indication for surgery (cancer/non-cancer), type of surgery (minor, intermediate, major), operation and urgency (emergency, time-sensitive, semi-urgent and elective). Emergency surgery was defined as surgery for an acute threat to life. Time-sensitive surgery was defined that should be performed by a specific date. Semi-urgent surgery is defined as surgery for a non-cancerous disorder that was symptomatic and elective surgery is a surgery that could be scheduled for a later date. Procedures deemed time-sensitive included radical cystectomy, transurethral resection of a bladder tumour (TURBT), radical nephroureterectomy, radical nephrectomy, partial nephrectomy, radical prostatectomy, radical orchiectomy, retroperitoneal lymph node dissection, obstruction ureteric stone, renal stones/ureteric stones with stents or symptomatic urolithiasis.

Pre-operative SARS-CoV-2 screening developed and progressed during this study. Initially, all patients had a telephone assessment; this was conducted by a nurse prior to consideration of surgery. Patients were asked a series of questions on SARS-CoV-2 related symptoms and risk factors. Pre-operative nasopharyngeal swabbing and real-time polymerase chain reaction (PCR) for SARS-CoV-2 RNA was not available initially due to a worldwide shortage of reagents. During this phase, full personal protection equipment was worn for each procedure. When accessible, a swab was taken 24 hours pre-operatively on all patients and sent for real-time reverse transcription PCR testing using Altona Diagnostics RealStar SARS-CoV-2 RT-PCR to detect B $\beta$ CoV (target E gene) and SARS-CoV-2 (target S gene) specific RNA. Later the GeneXpert Xpress SARS-CoV-2 test was utilised. This targets multiple regions of the viral genome for diagnosis. Patients undergoing major surgery had computerised tomography (CT) imaging of their thorax in addition to PCR testing.

All patients were required to cocoon (avoid all contact) for two weeks pre-operative and two weeks post-operative. In addition to these measures, aerosol reduction methods were practised in theatre. All patients were followed up for a minimum of 28 days for the development of SARS-CoV-2 infection. This follow up review was conducted at the subsequent outpatient clinic appointment or by telephone assessment in cases where patients did not require an outpatient clinic appointment.

The number of cases of SARS-CoV-2 in our region was determined from data published by the Health Protection Surveillance Centre (HPSC) for the National Public Health Emergency Team in Ireland. The HPSC produces epidemiological reports covering all areas of infectious and communicable disease surveillance carried out in Ireland. Data presented refers to the number and the cumulative number of confirmed COVID-19 cases notified in Ireland by notification date and represented at cumulative incidence per 100,000 people<sup>1</sup>.

Data are presented as the median and interquartile range (IQR) for continuous variables, and the number and percentage for categorical variables. Analysis were performed using IBM SPSS for Windows, version 22.

## Results

### *Patient demographics*

During the six weeks of this study, 136 urological operations were performed in the three institutions by six surgeons. Eighty-three patients (61%) were male, and 53 (39%) were female. The median age is 60 years, IQR (43-70). The median ASA grade is 2, IQR (2-2). Forty-nine patient (36%) had surgery for malignancy, and 87 (64%) had surgery for a benign condition. Fifty-two (38%) of performed surgeries were considered time-sensitive, 68 (50%) semi-urgent, 15 (11%) were emergency surgeries and one (1%) surgery was elective. Fifty major surgeries (37%) were performed, 66 (49%) were intermediate, and 20 (14%) were minor. The anaesthetic type was general in 93% of cases; spinal anaesthesia accounted for 6% and local anaesthetic in 1%. Data is shown in **table 1**. (Next page)

**Table 1: Patient demographics**

	Total, N (%)
Total	136
Sex	
Male	83 (61%)
Female	53 (39%)
Age, median IQR	60 (43-70)
ASA, median IQR	2 (2-2)
Indication for surgery	
Malignant	49 (36%)
Benign	87 (64%)
Urgency	
Emergency	15 (11%)
Time-sensitive	52 (38%)
Semi-urgent	68 (50%)
Elective	1 (1%)
Grade	
Minor	20 (14%)
Intermediate	66 (49%)
Major	50 (37%)
Anaesthetic	
GA	127 (93%)
Spinal	8 (6%)
LA	1 (1%)

*N*; number. *IQR*; interquartile range. *GA*; general anaesthetic. *LA*; local anaesthetic.

### *Surgical procedures*

Forty-nine (36%) of cases were for patients with malignancy. Urothelial cancer (bladder and upper tract) was the commonest cancer treated, followed by renal cancer and prostate. Two testicular cancer procedures (RPNLD and orchiectomy) and one penile cancer procedure were performed. Eighty-seven non-cancer surgeries were performed. Fifty-five (63%) of these were for symptomatic urolithiasis. Ten (11%) cases were stent exchanges, and eight cases (9%) were emergency stent insertions. Data is shown in **table 2**.

**Table 2: Surgical procedures**

	Total, N
Uro-oncology	49 (36%)
TURBT	21
Partial nephrectomy	9
Radical prostatectomy (robotic assisted)	8
Radical nephrectomy	4
Radical orchidectomy	1
Radical prostatectomy (open)	1
Radical cystectomy	2
Laparoscopic radical nephroureterectomy	1
Partial penectomy	1
Retroperitoneal lymph node dissection	1
Endourology	84 (62%)
FURS	35
PCNL	11
GA cystoscopy and exchange of jj stent	10
Rigid ureteroscopy	9
GA cystoscopy and jj stent insertion	8
Rigid cystoscopy and cystolitholapaxy	2
Rigid cystoscopy	4
Rigid cystoscopy urethral dilatation	2
Rigid cystoscopy and optical urethrotomy	1
Bladder Neck incision	1
Rigid cystoscopy and cystodistension	1
General emergency urology	3 (2%)
Scrotal exploration	2
Change of SPC	1
Laparoscopic repair of bladder rupture	1

N; number. TURBT; transurethral resection of bladder tumour. FURS; flexible ureteroscopy. PCNL; percutaneous nephrolithotomy. SPC; suprapubic catheter.

### *SARS-CoV-2 screening and outcome*

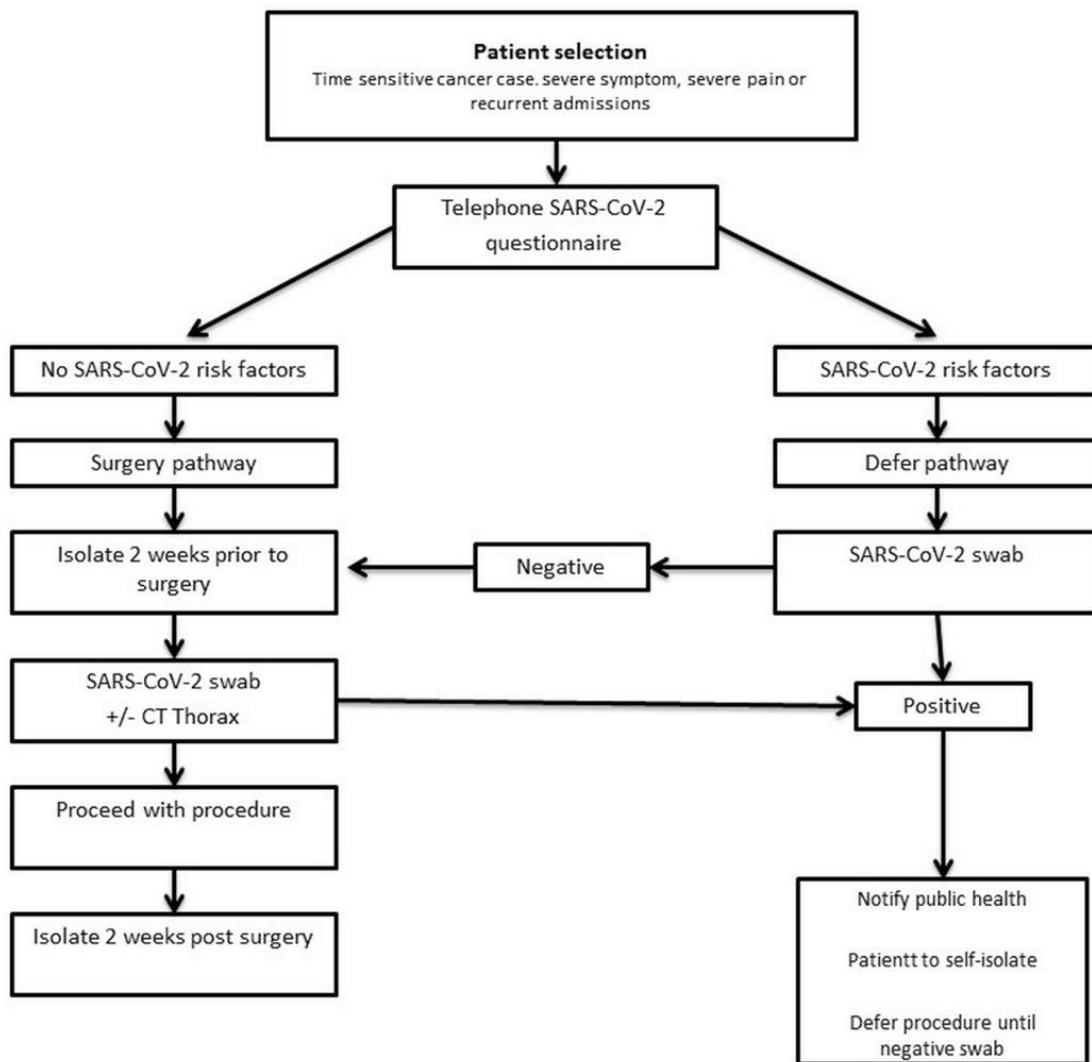
One hundred per cent of patients had had a SARS-CoV-2 questionnaire administered to determine their risk factors for SARS-CoV-2 exposure, and one hundred per cent of patients were cocooning prior to their surgery. Ninety-nine patients (72%) had pre-operative SARS-CoV-2 swabs. No patient (0%) was found to be positive. Forty patients (29%) had a pre-operative CT Thorax; all were negative. Pre- and post-intubation stoppages were utilised to reduce airborne aerosols in 100% of cases. In the post-operative period, five patients (3.6%) developed symptoms that required a second SARS-CoV-2 swab. The symptoms were pyrexia (n=3) and shortness of breath (n=2). All 5 (100%) were negative for SARS-CoV-2 infection and a diagnosis of post-operative atelectasis was made. No patient developed a clinical SARS-CoV-2 infection in the follow-up period, and no member of the Urology team developed SARS-CoV-2. Data is shown in **table 3**. Furthermore, there were no clinical cases of SARS-CoV-2 in the anaesthetic or nursing teams in any of the three hospital. SARS-CoV-2 screening is shown in **figure 1**.

**Table 3: SARS-CoV-2 screening and outcome**

	Total, N
SARS-CoV-2 questionnaire	136 (100%)
Cocooning pre-operatively	136 (100%)
SARS-CoV-2 swab and PCR testing	99 (72%)
CT Thorax	40 (29%)
Post-intubation stoppage for aerosol dispersion	136 (100%)
Full PPE worn	26/136 (19%)
Post-extubation stoppage for aerosol dispersion	136 (100%)
Outcome	
Post-op symptoms requiring repeat SARS-CoV-2 swab	5 (3.6%)
SARS-CoV-2 infection (Patients)	0 (0%)
SARS-CoV-2 infection (Urology team)	0 (0%)

*N*; number. *PCR*; Polymerase chain reaction. *PPE*; personal protective equipment.

**Figure 1: SARS-CoV-2 screening pathway**



*SARS-CoV-2 prevalence in the region*

On the 23<sup>rd</sup> of March 2020, there were 116 confirmed SARS-CoV-2 infections in the region. The incidence was 13.65/100,000 people<sup>1</sup>. Two weeks later, on the 6<sup>th</sup> of April, the total number of cases was 452, and the incidence was 63.50/100,000. On the 27<sup>th</sup> of April 2020, the total number of cases was 1413, and the incidence was 201.10/100,000. Social distancing measures appeared to have worked by this date, and viral spread was reduced. By the 15<sup>th</sup> of May, the total cases were 1746, and the cumulative incidence was 236.70/100,000.

**Discussion**

Our findings demonstrate that elective urological surgery can be safely performed in regions with low incidence of SARS-CoV-2 infection during the pandemic. We report no cases of symptomatic SARS-CoV-2 infection or deaths among 136 patients undergoing urological surgery during a 6-week period at the height of the pandemic in Ireland. This is the first study to evaluate the safety of urological surgery in a low-incidence region during the SARS-CoV-2 pandemic.

Peri-operative SARS-CoV-2 infection increases morbidity and mortality significantly<sup>3</sup>. Pulmonary complications occur in half of patients, and the ICU admission rate is reported to be as high as 44%(2, 3). The reported mortality varies between 20 and 23.8%<sup>2,3</sup>. Consequently, it was proposed that the threshold for surgery during the SARS-CoV-2 pandemic should be higher due to these risks<sup>3</sup>. Various guidelines based on expert opinion have been published in order to guide surgeon's decision making on elective surgery during the pandemic<sup>4-6</sup>. However, these guidelines are limited by their level of evidence and there is a demand for large studies with prospective data in order to guide decision making for surgeons. Furthermore, it must be noted that much of this data was published from regions with a high rate of SARS-CoV-2 infection.

There have been a limited number of studies from Ireland on surgery during the SARS-CoV-2 pandemic. McDermott et al reported on their experience of 101 Urological procedures in Dublin and demonstrated a 3% risk of peri-operative SARS-CoV-2 infection and 1% mortality<sup>7</sup>. Hintze et al. reported on a case series of 3 patients undergoing head and neck cancer surgery in Dublin who developed peri-operative SARS-CoV-2 infection, and two patients died<sup>8</sup>. It must be noted that the incidence of SARS-CoV-2 in Dublin was 2-3 three times that of Cork<sup>1</sup>. Similar to this study, Fitzmaurice et al reported their series of 56 patients undergoing elective cardiothoracic surgery and no patients developed peri-operative SARS-CoV-2 infection<sup>9</sup>. Our study is the most extensive series in Ireland to date on the safety of elective surgery during the pandemic and is the first study based on hospitals outside of Dublin. It is the first study from Ireland to report from a low-incidence region. Information from our study will inform surgeons in Ireland and other countries on the risk and benefits of elective surgery during this challenging period.

This study has several limitations. In the early stages of the study, protocols for pre-operative testing were not standardised across sites. Initially patients had a telephone screening assessment but as testing became more available all patients underwent protocolled pre-operative SARS-CoV-2 testing with a nasopharyngeal swab. Secondly, the limitations of laboratory testing mean that some patients with possible false negative results may have been excluded from the study. This is a relatively small series with short-term follow up.

It is important that urologists are provided with robust data on peri-operative outcomes during this pandemic. Our findings will help inform surgeons about the safety of elective surgery in low-incidence regions in order to reduce the risks associated with delayed elective surgery. This may prove urologists with evidence and reassurance to recommence urgent elective surgeon in order to minimise the harm to patients associated with deferred surgery.

Our findings demonstrate that elective urological surgery can be safely performed in regions with low incidence of SARS-CoV-2 infection during the pandemic. We report no cases of symptomatic SARS-CoV-2 infection or deaths among 136 patients undergoing urological surgery during a six-week period at the height of the pandemic in Ireland. This is the first study to evaluate the safety of urological surgery in a low-incidence region during the SARS-CoV-2 pandemic and is the largest series to date from Ireland.



**Declaration of Conflicts of Interest:**

The authors declare that they have no conflicts of interest.

**Corresponding Author:**

Mr Eoin MacCraith

Department of Urology,

Mercy University Hospital,

Cork,

Ireland.

Email: eoinmaccraith@rcsi.ie

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