



# Urological service provision during the COVID-19 period: the experience from an Irish tertiary centre

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Received: 13 July 2020 / Accepted: 22 August 2020 / Published online: 27 August 2020

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## Abstract

**Purpose** Urological service provision has changed dramatically with the advent of the SARS-CoV-2, necessitating restructuring and reorganization. The aim of this study was to review the reorganization of our unit, map the change in volume of departmental activities and discuss potential solutions.

**Methods** Departmental activities over the months of April and May 2020 and 2019 were analysed. Details of admissions, operations, diagnostic procedures, outpatient reviews, morbidities and mortalities were recorded. Operations were performed on two sites, with elective operation transferred to an offsite, COVID-free hospital.

**Results** Seventy-four emergency operations were performed onsite, with 85 elective operations outsourced. A total of 159 operations were performed, compared with 280 in the same period in 2019. Five (5.0%) of 101 admitted patients to the COVID hospital contracted COVID-19. No patients outsourced to the COVID-free hospital were infected there. Outpatient referrals to urology service decreased from 928 to 481. There was a 66% decrease in new cancer diagnoses. A virtual review clinic was established, with remaining outpatients reviewed through a telephone clinic platform.

**Conclusion** Compared with 2019, we performed fewer operations and outpatient procedures, had fewer admissions and diagnosed fewer patients with new cancers. However, outsourcing elective operation to designated non-COVID hospitals prevented the infection of any patient with COVID-19 in the post-operative period. The use of virtual clinic and telephone clinic has had some success in replacing traditional outpatient visits. The overall significant decrease in operative volume will likely precipitate a mismatch between demand and service provision in the coming months, unless capacity is increased.

**Keywords** Coronavirus · COVID-19 · SARS-CoV-2 · Service provision · Urology

## Introduction

Urological service provision has changed dramatically in every country with the advent of COVID-19. Additional measures to ensure patient safety and protect staff are required, compelling us to re-prioritize waiting lists and rethink service provision and structure. However, until a vaccination for

COVID-19 is widely available, we need to continue to provide a safe and workable service, in parallel with the virus.

In Ireland, the first case of SARS-CoV-2 was detected on 29 February 2020 [1]. Following initial restrictions on large gatherings, the Irish government imposed stringent restrictions on movement from 27 March. Societal compliance was high, and peak new cases occurred on 10 April, with 1068 new diagnoses that day [2]. In our centre, 10 of 12 operating theatres were repurposed to augment intensive care unit (ICU) capacity. Two remained as functioning operating theatres for emergencies only. Simultaneously, effective on 30 March, the Irish government brokered a deal with 19 private hospitals nationwide, seconding those centres exclusively for public healthcare, for 3 months, increasing national public bed capacity by approximately 2000 [3]. Time-sensitive elective

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surgery was outsourced to these hospitals, which, in the absence of emergency admissions, were deemed ‘COVID-free’.

During this time, we experienced a paradigm change in every aspect of our urological service. Elective surgery was performed at 2 sites, with mandatory pre-operative COVID-19 testing for all patients. Many non-oncological operations and clinic appointments were deferred, and outpatient clinics were conducted by telephone. Patients with urgent conditions who were required to attend in person were separated in space and time, and we could not provide the same volume of diagnostic procedures as previously. Nevertheless, the hyperstratification of patients for procedures and investigations has also forced us to reflect on our practice and review our criteria for accepting, investigating and discharging patients.

The aim of this study is to provide an insight into the measures taken to restructure the urology service in our unit. We compare the current work volume to the equivalent period last year and explain the rationale and methods used to triage care provision. Although our initial reaction may be to mourn the loss of high-volume operating lists, and our previous structure, attention must turn to how we will provide a safe and workable service until, and perhaps beyond, the introduction of COVID-19 vaccination.

## Methods

### Patient selection and study design

Departmental activities for April and May 2020 (the study period) and 2019 were analysed. The Urology Department at Tallaght University Hospital is a high-volume tertiary referral centre, with five consultants, five senior urology trainees, one junior trainee, two interns and a team of specialist nurses. Details of admissions, diagnostic procedures, outpatient reviews, operations, morbidities and mortalities were recorded. Following the government initiative to provide access for elective operation in offsite non-COVID hospitals, we prospectively recorded the outsourcing of these cases. All robotic prostate surgery was performed offsite prior to COVID-19—access for robotic-assisted radical prostatectomy (RARP) was retained in the offsite COVID-free hospital for this period.

### Management protocol

#### Inpatient care

To avoid potential infection of the entire urological team at once, the service was divided, with 2 consultants and 4 non-consultant hospital doctors (NCHDs) per team. Teams alternated between emergency operating and emergency referrals for a week, followed by a week covering outpatient activity. To map the change in urological emergency referrals,

consecutive emergency admissions during matched 16-day pre-COVID and intra-COVID periods were evaluated. Diagnosis, intervention, length of stay (LOS), and alteration in management due to COVID-19 were recorded. Statistical analysis was performed using Mann-Whitney U test.

### Testing for COVID-19

In the initial study period, all patients were questionnaire screened, and those with fever, respiratory symptoms, or feeling generally unwell were tested. Sigma Virocult® nasopharyngeal swab was used and run on a standard reverse transcriptase polymerase chain reaction (RT-PCR) assay. Total processing time was 5 h, with 2 assays run per day. All patients who required operative intervention were tested. From May onwards, all patients were tested on admission, even if asymptomatic. All patients for elective procedures are tested in pre-assessment clinic 1–3 days before surgery. In select, high-risk cases, the GeneXpert® test was used, with a result available within an hour.

### Diagnostic procedures

In the initial period, no prostate biopsies were performed. Following this, high-risk patients were selected, and their biopsies prioritized. Each planned list of flexible cystoscopies was reviewed and risk stratified. Haematuria clinic capacity was halved, with patients receiving cystoscopy, phlebotomy and same-day CT urogram. CT replaced renal ultrasound, to avoid close contact between sonographer and patient.

### Outpatient clinic

All outpatient clinics were conducted by telephone. Only patients with a new cancer diagnosis, or those requiring urgent, nondeferrable attention, were asked to attend in person and met with the consultant and cancer nurse specialist. Appointments for these patients were spaced 30 min apart, to minimize and ideally avoid contact with other patients.

### Virtual clinic

With increasing volume of referrals and many outpatient appointments deferred, virtual models of care are essential. A proportion of less urgent return patients were cohorted. These patients were assessed by a consultant in a ‘virtual’ clinic using electronic records (letters, imaging, blood results) and chart review if required.

Patients were either discharged, were discharged for GP testing with specified re-referral criteria, received a phone call or follow-up letter by a clinical nurse specialist, were investigated and reviewed by phone/letter or were booked in for face-to-face consultation.

## Multidisciplinary meetings

The weekly multidisciplinary meeting was curtailed with attendance limited to essential members. Two urologists, one radiation and one medical oncologist, one pathologist, one radiologist and the cancer coordinator met weekly, in a physically distanced setting. Additional participants could join via teleconference.

## Emergency operating

Patients presenting to the emergency department who required operative intervention were managed surgically as in the pre-COVID period. Where possible, surgery was delayed until confirmation of a negative COVID test. However, the absence of a negative test did not preclude time-sensitive surgery, which was then performed with additional precautions. We performed an analysis of volume of emergency referrals and time to operative intervention in matched 16-day periods in the pre- and intra-COVID periods.

## Outsourcing of surgery

Urgent elective cases were identified and outsourced to the non-COVID private hospital, temporarily seconded to the public healthcare system and operated on by their own consultants [4]. Each consultant and their senior NCHD reviewed their waiting list and selected these patients. Patients were tested for COVID-19 the day before their procedure and deferred if positive. On the day of surgery, patients completed a symptom questionnaire and were temperature-screened. Patients were asked to self-isolate for 14 days before their surgery.

## Analysis

Data were collated and analysed, to determine the effect of COVID-19 restrictions on volume and outcome. The number of positive cases for COVID-19 was measured, to determine if the system of separate-site elective operation facilitated urgent intervention without iatrogenic coronavirus infections.

## Results

### Operating

During the study period, 74 emergency operations were performed onsite in the COVID hospital, with 85 elective operations outsourced to the COVID-free hospital. A total of 159 operations were performed, compared with 280 operations in the same period in 2019. Of cases performed in the primary centre, 78.4% ( $n = 58$ ) were for urolithiasis. Two (2.7%) cases

performed onsite were oncological resections, both of which were deemed unsuitable for outsourcing. Of the 37 surgical oncology cases, 35 were performed offsite. Fifty-three oncological resections were performed in the same period in 2019. Details of operations performed in each period are displayed in Table 1.

### COVID-19 infection rates

Of the 101 patients admitted to the primary centre, 5 (5.0%) tested positive for COVID-19 during their admission. A further patient was transferred directly from a regional hospital to the non-COVID centre for planned major cancer surgery. This patient tested positive on arrival and required admission and ICU care. Of these six inpatients who had COVID-19, two (33.3%) died, 1 (16.7%) required prolonged high-flow oxygen and 3 (50%) had mild symptoms. All patients had been an inpatient in a hospital for a minimum of 10 days prior to testing positive. Four of the five positive cases in the primary centre had tested negative earlier in their admission. One was admitted with epididymo-orchitis and had a negative screening questionnaire and therefore was not initially tested. None of the COVID-19 positive patients had undergone a procedure under general anaesthetic. Three (50.0%) had tested negative at admission and underwent nephrostomy insertion for infected and obstructed kidneys but subsequently contracted COVID-19 in the hospital.

### Staff COVID-19 rates

Following the segregation of the two urology teams, two members of one team contracted COVID-19, 3 weeks apart. All other team members were tested, and none were positive. Among the 13 doctors on the service, there were a combined 55 days of absence due to sick leave or self-quarantining. On the urology ward, 12 (44.4%) of 27 nurses tested positive for coronavirus in the study period.

### Inpatient workload

There were 91 and 107 emergency admissions, and 10 and 87 elective admissions in the 2020 and 2019 study periods, respectively. In total there were 101 admissions in the 2020 period and 194 in the 2019 period (Table 2). To assess the change in urological emergency referrals, we performed a separate evaluation of matched 16-day pre-COVID and intra-COVID periods. There were 41 emergency admissions in the pre-COVID and 24 in the intra-COVID periods. Mean admissions, consults and phone calls per 24 h decreased significantly from 2.6 to 1.5 ( $P = 0.03$ ), 3.1 to 1.6 ( $P = 0.01$ ) and 18 to 12 ( $P = 0.005$ ), respectively. Urolithiasis accounted for 53.7% ( $n = 22$ ) of pre-COVID and 41.7% ( $n = 10$ ) of intra-COVID admissions. Operative intervention was required in

**Table 1** Comparison of operations performed in the 2-month COVID-19 study period with same period in 2019

	COVID hospital	COVID-free hospital	Total in period (2020)	Total in period (2019)
Total operations	74	85	159	280
Day cases	19	33	52	110
Oncology	2	35	37	53
Nephrectomy	1	4	5	14
Cystectomy	0	1	1	0
TURBT	0	8	8	15
RARP	0	21	21	18
Orchidectomy	1	1	2	3
RPLND	0	0	0	3
Nephrolithiasis	58	25	83	126
PCNL	1*	0	1	8
FURS	1	15	16	24
Semi-rigid URS	56	10	66	94
Reconstruction	0	0	0	5
Pyeloplasty	0	0	0	1
Other	0	0	0	4
Other endourology	8	21	29	74
Rigid cystoscopy procedures**	8	21	29	63
TURP	0	0	0	11
Inguinoscrotal and other	6	4	10	22

\*Percutaneous renal access for antegrade flexible ureteroscopy

\*\*Rigid cystoscopy procedures, e.g. stent insertions, bladder biopsies, diathermy destruction of bladder tumours, cystolitholapaxy and botulinum toxin injections

TURBT transurethral resection of bladder tumour, RARP robotic-assisted radical prostatectomy, RPLND retroperitoneal lymph node dissection, PCNL percutaneous nephrolithotomy, FURS flexible ureteroscopy, URS ureteroscopy, TURP transurethral resection of prostate

78.1% ( $n = 32$ ) and 50.0% ( $n = 12$ ) of patients in each cohort. However, there was no significant difference in mean time to intervention or median length of stay (LOS) between groups. Of patients presenting with urolithiasis, there was no change in proportion of presentations with concomitant acute kidney injury ( $P = 0.78$ ). Among the intra-COVID group, 12.5% ( $n = 3$ ) of patients reported delaying their presentation (median 7 days) due to COVID-19.

### Outpatient clinic

More patients ( $n = 972$ ) were reviewed through phone clinic than were seen in person previously in the pre-COVID clinic setting ( $n = 895$ ). There were considerably fewer flexible cystoscopies, prostate biopsies and ESWL sessions performed in the 2020 period than the 2019 period (Table 2). The urodynamics advanced nurse practitioner was re-deployed—no urodynamics were performed during this time. Outpatient referrals to the urology service decreased to 481, compared with 928 in the same period last year (Table 2).

During this time, a virtual clinic was established. Four hundred patients were assessed by a consultant through

this medium. One hundred sixty (40%) patients were discharged directly with a letter and advice sent to the patient and their primary care physician. One hundred twenty-one (30%) required further imaging. Seventy-nine (20%) were suitable for phone or formal review by the LUTS clinical nurse specialist. Forty (10%) necessitated face-to-face review for assessment or investigation. In 47 patients, there was insufficient information available in the electronic platforms, thus requiring formal chart review. Overall, 360 patients could be managed via ‘virtual’ means. The potential outpatient cost savings were estimated at €27,000.

### New cancer diagnoses

There were 16 new cancer diagnoses, compared with 47 in the same period last year. New renal tumour diagnoses fell from 10 to 4, and prostate cancer diagnoses from 26 to 4.

With careful prioritization of high-risk patients, there was no decrease in the number of new bladder cancer diagnoses. Cancer diagnosis numbers are displayed in Table 2.

**Table 2** Comparison of COVID hospital activity in the 2-month study period with the same period in 2019

	April–May 2020	April–May 2019
<b>Admissions</b>		
Emergency admissions	91	107
Elective admissions	10	87
Total admissions	101	194
Bed days	271	881
<b>Outpatient workload</b>		
Outpatient referrals	481	928
Outpatient clinic*	972	895
Early prostate cancer nurse*	198	224
Cancer coordinator*	195	294
<b>Outpatient procedures</b>		
Flexible cystoscopy	156	343
Prostate biopsy	9	38
ESWL**	66	113
Urodynamics	0	73
Nurse-led procedure clinic	181	383
<b>New cancer diagnoses</b>		
Bladder cancer	5	5
Renal cancer	4	10
Testicular cancer—primary	2	1
Testicular cancer—RPLND	0	1
Prostate cancer	4	26
Ureteric TCC	1	3
Penile cancer	0	1

\*Majority of consultations were conducted by phone in the COVID-19 period and in person in the 2019 period

\*\*ESWL included ‘hot ESWL’ for ureteric stones in 2020 but no ‘hot ESWL’ performed in 2019

Bed days, summative number of days during which a bed was occupied by a urology patient; *TRUS* transrectal ultrasound-guided, *ESWL* extracorporeal shock wave lithotripsy, *RPLND* retroperitoneal lymph node dissection, *TCC* transitional cell carcinoma

## Teaching/training

Three national urology training days and all weekly educational meetings were cancelled. Across the two senior training programme NCHDs, the mean number of operations per trainee fell from 50 cases per month to 7.

## Discussion

Compared with the same period in 2019, we performed fewer operations and fewer outpatient procedures, had fewer admissions, diagnosed fewer cancers, and reviewed most outpatients by phone rather than in person. We were reasonably successful in preventing our patients contracting COVID-19. For patients who became infected, outcomes were poor, with

33% of cases culminating in death. An increased length of stay leads to an increased risk of contracting COVID-19. As cases in Ireland drop, the greater risk to patients is not in the community, but in the hospital.

Similar to other centres, there were fewer emergency admissions and fewer average calls per 24 h in the COVID period compared with pre-COVID [5, 6]. However, patients admitted emergently requiring operative intervention continued to have timely surgery, with no difference in time to intervention or LOS.

With a return to elective onsite operating lists, requirements for pre-operative testing and physical distancing preclude a return to pre-COVID volume. Therefore, although neither our catchment area nor our population has decreased, our ability to offer operative management has markedly declined. This will require re-triaging of waiting lists, with a predilection for oncology and for urgent renal function-preserving operations. For urological cancer surgery, moving elective operation offsite during the study period was successful. No patients contracted the virus in the post-operative period. Case selection was important, and we found that cases that could be performed by one operator (e.g. endoscopic cases) were ideal for outsourcing. Other cases suited for outsourcing included those where intensive post-operative monitoring was not required. It was ideal for most day case work including flexible ureterorenoscopy. We were highly selective on outsourcing patients requiring cystectomy and did not outsource RPLND, percutaneous renal surgery or major reconstructive surgery. Tackling the mounting list of patients for benign surgery will require diversification from our previous systems. Additional elective lists at weekends, in model 2 and 3 hospitals (smaller regional hospitals), or by purchasing additional access in private hospitals, offer potential options to alleviate waiting lists [7].

Stringent triage of patients for diagnostic procedures has led to higher cancer diagnosis ratio. However, it is difficult to gauge how many other cancers and other pathologies await diagnosis. Continued deferral of lower-risk investigation is not a viable long-term strategy.

There was a 66% decrease in new cancer diagnoses in the study period compared with the previous year, predominantly prostate and renal tumours. This was due to the temporary cessation and then cautious reintroduction of prostate biopsies as well as decreased primary care referrals. There was also a 52% decrease in new referrals to the outpatient clinic. A rebound increase in diagnoses is therefore inevitable in the coming months. The combination of smaller-volume operating lists with this reciprocal surge in oncological cases will undoubtedly present challenges.

Similar to other institutions, innovative models such as a ‘virtual’ outpatient clinic allows reliable review of outpatients with fewer face-to-face follow-up attendances [8, 9]. We will review many nephrolithiasis patients in this way, as well as



those requiring surveillance investigations (e.g. blood tests or scans) post-cancer treatment. The traditional outpatient model will be reserved for patients requiring clinical examination, uroflowmetry, discussion of a new cancer diagnosis or consultation for major surgery. The remaining patients will be contacted by phone or virtual telehealth platform, in a hybrid clinic model.

With any closely working team, many members could conceivably be simultaneously infected, eliminating the entire specialty service. We found the short-term division of the team an effective model in preventing potential cross-infection. Should there be a second surge, we would repeat this. We feel that if any doctor or nurse on the urology ward tests positive, it is prudent to test all other team members at that time.

Despite initial frustration with upheaval of the long-established and efficient delivery of care, we have learned much in restructuring our service. Through the measures outlined, we have been reasonably successful in preventing the spread of COVID-19 among patients attending the hospital. There has undoubtedly been an opportunity cost, with significant effects on training and operative experience. This is neither unique to our unit nor indeed to our country [10, 11]. Much time was spent re-triaging the clinical and operative waiting list, based on limited clinical information. Considerable time was spent attempting to safely decide who not to treat or defer, rather than actually providing care. There are several challenges facing the provision of high-quality urological care in 2020. Although the impact of SARS-CoV-19 on Irish healthcare and society has been profound, we have not been as intensely affected as some of our European and American counterparts. As society continues to re-open, we look to safely navigate the parallel agendas of coronavirus prevention and adequate service provision for our community and catchment area.

**Authors' contributions** PM Collins: Data collection, data analysis and manuscript writing

A Madden: Data collection, data analysis and manuscript writing

C O'Connell: Data collection and manuscript writing

SA Omer: Data collection

MS Inder: Data collection and data analysis

RG Casey: Project development and manuscript editing

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**Data availability** Due to the sensitivity of the patient information used in this study, raw data is confidential and will not be shared.

## Compliance with ethical standards

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

**Ethics approval** Retrospective review of anonymized audit data. Ethical approval is waived.

**Consent for publication** All authors consent to the publication of this manuscript and are aware of its submission.

**Code availability** SPSS Statistics v26.

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