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Continuing our work: urology services in a tertiary hospital during the COVID-19 Movement Control Order in Malaysia

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INTRODUCTION

Severe acute respiratory syndrome coronavirus 2 (SARS CoV-2), also known as coronavirus disease 2019 (COVID-19) is rapidly spreading around the globe like bush fire. This outbreak has been declared a pandemic by the World Health Organisation on 11th March 2020. It is an unprecedented global health crisis, a century after the great influenza pandemic (Spanish Flu) in 1918.

After China reported its first four cases on 29 December 2019, the virus soon arrived in South East Asia and Malaysia reported its first confirmed case on 25 January 2020. The number of reported positive cases surged by 16th March, the cause of which was linked to a religious assembly at Sri Petaling (a suburb of Kuala Lumpur) held from 27 February to 3 March 2020. To prevent worsening of the outbreak, the Malaysian government implemented a nationwide Movement Control Order (MCO) effective from 18 March to 30 March 2020.⁽¹⁾ As the number of cases continued to increase with occasional plateauing, the MCO was further extended into Phase 2 (1–14 April 2020), Phase 3 (15–28 April 2020) and Phase 4 (29 April to 12 May 2020). Since 4 May 2020, as the number of new COVID-19 cases started reducing, the government implemented Conditional MCO (CMCO), where regulations were relaxed with the aim to reopen Malaysia's economy. Economic sectors slowly resumed their operations under strict regulations and standard operating procedures (SOP). During the Phase 5 CMCO which was enforced from 12 May to 9 June 2020, most of the business sectors were allowed to open for business and people were allowed to move more freely within the state.⁽²⁾

Since the start of the MCO, all public hospitals in Malaysia implemented changes at all level to conserve our limited resources and manpower for the battle against this pandemic, while reducing the number of patients visiting the hospital. Elective surgeries were cancelled, outpatient clinics postponed and various infection control measures were implemented. By end of Phase 4, the outbreak appeared to be under control and healthcare institutions slowly returned to their normal activities. In this study, the changes in the clinical activities including

admissions, outpatient consultations and surgical procedures in a urology centre in southern Selangor state are described.

METHODS

We identified patients who were admitted to the urology service or those who underwent urological surgery at Serdang Hospital, during the MCO, from 18 March to 12 May 2020. Inpatient admissions and urological surgeries performed before the MCO (from 19 January to 17 March 2020) were identified and compared with the MCO group. Serdang Hospital is a 620-bedded public tertiary hospital which is serving the southern Selangor state and its neighbouring state Negeri Sembilan, covering about a population of 1.7 million.⁽¹⁾ As our department has an ongoing collaboration with the surgical oncology team at National Cancer Institute (IKN), patients who were admitted to IKN and operated by Urology team, were included in the study as well. Retrospective review of the electronic medical records of these patients were performed. The data on patient characteristics, hospital admissions and surgery were reviewed and compared between these two groups.

For outpatient consultations at urology clinic, we compared the total numbers of new cases and repeat visits during the MCO (18 March 2020 to 12 May 2020) and before the MCO. During the MCO, the following measures were implemented in our department.

The Urology ward was converted to a COVID ward. Multidisciplinary wards were shared by all specialties with daily update on bed occupancy status by the ward sisters. Admissions during this period came mainly from Emergency Department (ED) or clinic. Inpatient transfers from other referring hospitals were reduced as much as possible.

All elective cases were cancelled during the MCO with the aim to conserve resources and ICU beds for potential COVID-19 patients. Emergency surgery such as ureteral stents insertion, scrotal exploration and trauma surgery still continued as per usual during this period. Two weeks after the implementation of MCO, the hospital management introduced the SOP

for Semi-Elective Surgery (Semi-E). The purpose of the Semi-E was to prevent unnecessary delay of surgical treatment for urgent or progressive conditions especially malignant disease. Cases were screened and triaged by consultants. No fixed criteria were stipulated but priority was given for cancer patients requiring early surgical intervention and also patients suffering from complications of stone disease such as sepsis, recurrent haematuria etc. Patients were then referred to the anaesthesia clinic for pre-operative assessment. The date of surgery was arranged and decided by the anaesthetists. For high-risks patients (cardiorespiratory comorbidities or ASA [American Society of Anaesthesiologists] III and above), bed reservations in the Intensive Care Unit (ICU) were arranged for post-operative care.

Patients were usually admitted three days prior to surgery for COVID-19 test. Under the specific instructions from the Ministry of Health, clinicians performed a COVID-19 diagnostic test via RT-PCR (reverse transcription – polymerase chain reaction) prior to surgery with nasopharyngeal or throat swabs. These pre-operative patients were admitted to a designated ‘quarantine’ ward, which is a combination of single-room isolation ward and cohort ward where beds were arranged in different cubicles. Some of the measures taken to prevent spread of COVID-19 to those under quarantine include the following:

- Patients were placed at least 1 meter (6 feet) apart from each other.
- Windows were opened to allow natural ventilation.
- Patients must adhere to the standard precautions throughout their stay in the ward which include: wear surgical face mask, wash hands regularly and strict physical distancing between patients in the cubicle.
- Visitors were not allowed to enter the ward.
- Contact between healthcare staffs and patients were limited to admission clerking and review when necessary, until the PCR results were available.
- Patients who came from high-risk (red zone) area or those who deemed high risk based on screening questionnaire were placed in single-room isolation.

- Healthcare staffs wore surgical face mask, face shield, plastic apron and gloves while in contact with patients in the cohort ward. Full PPE was required when staffs were in contact with patients in the single-room isolation ward.

Once the COVID-19 test was reported negative, patients were transferred to the multidisciplinary wards to prepare for surgery. For high-risk patients or those who required a caretaker, they were admitted directly to the isolation room and the COVID-19 tests were performed in that room. If a swab result returned positive, the surgery for that patient would be cancelled and the patients would be managed according to hospital COVID protocol. COVID-positive patients could be operated on at designated operating theatres exclusively for COVID patients. All patients were assessed by the anaesthetist 1 day prior to surgery.

For emergency surgeries, COVID swab tests were performed prior to surgery and surgeons need not wait for the results to proceed with surgery. In life-threatening emergency situation, the team proceeded with the surgery and performed the swab tests after the surgery. Meanwhile, SOP for the control of COVID-19 was strictly adhered to with the proper use of personal protective equipment (PPE). Semi-E surgeries were mainly performed at Hospital Serdang with few open oncological surgeries at the IKN. In order to minimise unnecessary inter-hospital transfers, our surgical teams travelled to the referring hospitals and performed some emergency procedures there, provided the necessary equipment were available. Surgical complications were classified according to the Clavien-Dindo classification system.⁽³⁾

During the MCO, we reduced the number of clinic consultations to about 30 - 40 patients per week, compared to 250-300 patients per week prior to MCO.⁽¹⁾ The medical officers screened the referral letters and prospective clinic visit lists while the clinic staffs were responsible in rescheduling and informing the patients via telephone call. For new cases, only oncological cases or patients who needed urgent intervention such as ureteral stenting for obstructive uropathy, were seen during this period. As for repeat visits, we only saw immediate post-operative patients and patients who were due for vital therapy such as three-monthly

androgen deprivation therapy (ADT) injections for prostate cancer and change of expiring ureteral stents. Patients with non-urgent conditions such as benign prostatic enlargement, Prostate Specific Antigen (PSA) surveillance, incontinence, overactive bladder syndrome, non-obstructive urolithiasis, treated or stable cancers were rescheduled to a later date. Patients who required medications were given options for refilling their prescriptions: pickup at hospital pharmacy or delivery services. Most of the patients opted for delivery services. It generally took about one week for the medicines to reach the patients.

All patients and visitors were required to sign the “COVID-19 Risks Declaration Form” at every level of encounter in the healthcare facilities. They were reminded that legal actions would be taken against them if they intentionally lied about their risks and travel history.

Descriptive statistic was used to present the findings from this study. Statistical analysis was performed using the Chi-square test, Student’s T-test and Mann-Whitney U test for categorical, parametric continuous and non-parametric continuous variables respectively, with IBM SPSS Statistics for MacOS Version 23 (IBM Corp. Armonk, NY, USA). Statistical significance was given if p -value < 0.05 .

RESULTS

141 and 64 patients were admitted before the MCO and during the MCO respectively (55% reduction) within a similar time frame. Mean age was the same between both groups and majority of the patients were men and Malays. Before the MCO was implemented, the ratio between elective and emergency admissions were somewhat equal (Table I). During the MCO period, elective admissions were significantly reduced, mainly for planned semi-elective surgeries, followed by intervention radiological procedure and hydration in preparation for CT scans requiring the use of intravenous contrast media. 67.2% of admissions during the MCO were emergency admissions for infections/urosepsis, oncological complications and gross haematuria. More than half of the patients had interventions (surgical or intervention radiology)

during the admission (Fig. 1). The median time to procedure and length of hospital stay during MCO were 2 days long than before MCO period ($p < 0.05$). The extra two-day stay during the MCO were attributed to the pre-operative COVID-19 testing. At that time, our hospital did not have in-house facility to run the COVID-19 RT-PCR. Specimens were sent twice a day (morning and evening) to IKN, which is about 20 minutes' drive from our hospital. The turnover time required for result release was about 24–48 hours.

There was 64% reduction in procedures or surgeries performed during the MCO. The mean age in the two groups is the same. Surgical interventions reported in this series also include minor procedure such as flexible cystoscopy, retrograde pyelography and ureteral stents insertion. Radiological procedures reported include percutaneous nephrostomy tubes insertion, percutaneous drainage of abscess, imaging-guided biopsy and prostatic artery embolisation. Before the MCO, there were more ASA I patients who underwent surgery (Table II). During the MCO, priority was given to cancer patients and this group of patients usually have multiple comorbidities. Hence, there were more ASA II and III patients within the “during MCO” group. One female patient (ASA V) at 27 weeks of gestation presented with life-threatening hypovolemic shock secondary to bleeding angiomyolipoma of the kidney, and underwent emergency nephrectomy for haemostasis after caesarean section.

16 patients were admitted for planned (Semi-E) surgery during the MCO period, of which two were admitted three days prior for COVID swab test before minor daycare procedures under local anaesthesia (circumcision and bilateral orchidectomy). During the MCO period, our team performed two emergency nephrectomies for septic patients with emphysematous pyelonephritis, at Seremban Hospital and Kajang Hospital respectively. These two patients were excluded from the analysis table (Table II) but they were included in the presented charts (Fig. 2 and Fig. 3).

Up to December 2020, a total of 144 pre-operative urology patients were tested using COVID-19 RT-PCT and all patients returned negative results. In our study cohort, all 27 patients who were operated during the MCO period were tested negative for COVID-19 RT-PCR.

Compared to the months in 2019, outpatient clinic visits on April 2020 and May 2020 were significantly reduced due to the MCO. With the relaxation of regulations and activities slowly resumed by end of Phase 4 CMCO, the number of clinic visits gradually increased (Fig. 4).

DISCUSSION

The pandemic and the exponential increase in the number of cases had forced healthcare institutions around the world to conserve and relocate resources to treat patients with COVID-19 infection. A survey conducted in Europe which involved 57 urology centres showed more than 50% reduction in all clinical activities including newly diagnosed cancer, follow up clinic visits and major uro-oncological surgeries.⁽⁴⁾ In Italy, there was a 55% year-on-year reduction in the overall number of urological consultations in the emergency departments. During the lockdown in Italy, the patients who visited hospital were significantly older and there were more cases of gross haematuria and acute urinary retention. There was a higher percentage of patients with gross haematuria who were managed endoscopically and more patients with urinary stones who received Double-J stenting and ureteroscopy procedures.⁽⁵⁾

During this pandemic, resources like healthcare staffs, equipment, ventilators, operating theatres, ICU beds, blood products and drugs were being conserved to cater for treatment of COVID-19 patients. With cancellation of most elective surgeries and surgical treatment for only high priority or emergency cases, innovative surgeons and organisations around the world had develop numerous surgical triage systems. The principles are almost similar across all guidelines and recommendations. Factors to consider mainly categorised into disease factors (natural history of disease, prognosis, complications), patient factors (age, comorbidity) and environmental factors (severity of outbreak locally, available resources and

ventilator capacity). The European Association of Urology provides a list of recommendations for surgical procedures specifically for this difficult time.⁽⁶⁾ Non-essential urological procedures such as surgeries for infertility/female urology/incontinence, non-infective reconstructive surgeries, BPH procedures, all are recommended to be postponed. Ureteral stent placement for obstructive uropathy can be performed under local anaesthesia or nephrostomy tube can be inserted depending on the local resources and policy. For uro-oncological surgeries, recommendations vary depending on the natural history of the disease. Most prostatectomies and planned nephrectomy for cT1 or cT2 renal cancers can be delayed if necessary.⁽⁷⁾ Prioritisation was given to obstructive ureteral stone with infection, solitary kidney, bilateral obstruction, acute kidney injury and those with intractable symptoms. Whenever possible, stone treatment should be preferred over drainage procedures and stentless or stent-on-string should be considered to avoid additional clinic visits. PCNL should be deferred unless recurrent infection, indwelling nephrostomy with tube-related complications or chronic renal deterioration.⁽⁸⁾ Katz EG et al also described the triage of office urological procedures. They suggested that diagnostic cystoscopy for gross haematuria, surveillance cystoscopy for high-risk non-muscle invasive bladder cancer within first 6 months of initial diagnosis, induction intravesical BCG therapy and removal of ureteral stent after ureteroscopy should be performed without delay. For patients with risks of high-risk prostate cancer, doctors should try to obtain magnetic resonance imaging initially and if indicated for biopsy - to perform transperineal biopsy to minimise infectious risks and faecal exposure. Delay in diagnosis of high-risk prostate cancer by three months and delay in androgen deprivation therapy for six to eight weeks are unlikely to affect the long-term oncological outcomes.⁽⁹⁾

During the first two weeks of MCO, all elective surgeries were cancelled in our hospital. We only used questionnaires as risk screening tool but unfortunately there were many patients who lied about their risk factors and travel history. During the initial period, the fear

virus factor haunted all doctors and all surgeons operated with strict precautions and full PPE. To operate with full PPE was challenging. Most surgeons felt so uncomfortable, warm and sweaty with poor vision due to constant fogging of the face shield. Subsequently on 27 March 2020, the College of Surgeons in Malaysia recommended COVID-testing for all patients undergoing emergency surgery and CT Thorax should be performed prior to emergency surgery in high-risk patients. The hospital management resumed semi-elective surgeries under the SOP described above. All patients who underwent surgeries should have had COVID-testing. Most of the pre-operative screening study using chest CT and RT-PCT were reported by otorhinolaryngologists, probably due to their high risk of aerosol exposures from their procedures. In a retrospective review with small sample size by Gruskay JA et al in USA revealed the importance of universal screening of COVID-19 preoperatively. They found that 12.1% of patients who were tested positive for COVID-19, shockingly 58.3% were asymptomatic. These patients had post-operative hypoxia and two required intubation.⁽¹⁰⁾ In studies involving larger sample size, the positive rates were significantly much lower (0.5% or lower).⁽¹¹⁻¹³⁾ Up to December 2020, a total of 144 pre-operative Urology patients were tested using COVID-19 RT-PCT and all patients returned negative results. At present, we do not have data for pre-operative screening for surgical patients of all specialities from our hospital or at the national level. However, based on our clinical experiences, the positivity rates were very low, similar to the study reported above. Antibody serological test to detect IgA, IgM and IgG, is also recommended as part of the screening protocol⁽¹⁴⁾ but we did not include that in our screening protocol. During the MCO, we did not have rapid PCR facility. The rapid test kit (RTK) was only introduced at later stage during the conditional MCO period and they were used for high-risk patients who required urgent emergency surgery. Outpatient testing was not adopted during the MCO due to the following reasons:

- During MCO, citizen's movements were restricted. Multiple journeys to hospital and back were hence not practical and discouraged by the government.

- Although movements were restricted during MCO, there was still risks of exposure in the community after the outpatient testing. We could not ensure all patients would strictly isolate themselves at home until the day of surgery.

As compared to the European countries and the United States, the COVID-19 cases in Malaysia were much lower. As of 8th July 2020, the number of positive COVID-19 cases in Malaysia was 8674 with a low case fatality rate (CFR) of 1.39%, as compared to high CFR in Italy (14.24%) and United Kingdom (15.25%).⁽¹⁵⁾ Looking at the numbers of these studies and experiences over the last few months, it appears that mass screening in asymptomatic patients pre-operatively might not be an efficient and cost-effective strategy, especially in countries with low incidence and CFR. However, this data was not available when this strategy was implemented in our setting. COVID-19 is regarded as a contagious disease and many healthcare staffs were concerned of the risk of being infected from asymptomatic patients especially our anaesthesia colleagues who were performing tracheal intubation (aerosol-generating procedure). At the later stage of the pandemic, when Malaysia was entering Recovery MCO in July 2020, the pre-operative testing strategy was changed to screen patients who were symptomatic, high-risks (staying at red zone area, elderly, immunocompromised, patients with cancer or comorbidities) and those with positive examination or radiological findings. In the authors' opinions, mass testing was warranted during the MCO to ensure the safety of healthcare staffs. As our knowledge on COVID-19 grows, we adjust our strategy to test symptomatic patients and asymptomatic patients who are high-risks.

From our admission data, there was more emergency admission than planned admission (67.2% vs 32.8%). There were more cancer patients referred to us for continuation of care and surgery due to movement restriction and many hospitals in Klang Valley with urology service were converted to COVID-designated hospitals. Almost half of the urological cancer admissions during this period were for obstructive uropathy from metastatic castrate-resistant prostate cancer, resulting in uraemia requiring emergency interventions and

haemodialysis. Our centre also received a few referrals from COVID-19 designated hospitals for oncological surgery, stents exchange or removal. During MCO, median time between admission to procedure and median hospital length of stay were both two days more than the period before the MCO. This was because patients were required to undergo COVID-tests before any planned interventions. The swab specimens were sent to National Cancer institute (IKN) and the result were usually released within 24–48 hours. Hence, our patients were generally admitted at least three days prior to their planned procedures.

At the start of MCO, only emergency procedures were carried out, until the hospital resumed semi-elective surgeries in April 2020 under specific SOP. Semi-elective surgery list operates 24 hours every day and is shared between all specialties. Two noteworthy emergency cases encountered during the MCO were hypovolemic shock from bleeding angiomyolipoma in a lady with 27 weeks of pregnancy and a gentleman who presented with priapism for the duration of three weeks (due to fear of contracting COVID-19 infection). As we slowly adapted to the new norm and system, more cases were listed starting from mid-May 2020. Ultimately, with this new semi-elective system which runs 24 hours every day, we performed more major surgeries than we did before the MCO. We hoped that we could clear the backlog of cases on waiting-list, and minimize the complications caused by delayed treatment.

Most of the patients had uneventful post-operative recovery, except for one patient who had pneumothorax after radical nephrectomy which was treated with chest tube insertion. Another patient with a very large prostate (200g) and mechanical heart valve on warfarin, had refractory bleeding from the prostate despite multiple attempts of cystodiathermy. He subsequently underwent prostatic artery embolization and stayed approximately 4 weeks at the hospital. One patient succumbed to hospital acquired pneumonia after open radical nephroureterectomy for advanced upper tract urothelial cancer. He was tested negative for COVID-19.

In conclusion, although our clinical activities were affected by the COVID-19

pandemic and the Movement Control Order, we continued to provide timely treatment to our patients, especially for emergency and oncological cases. This global health crisis showed us the need of flexibility in time of emergency, the importance of pre-crisis preparation and protocols, and also well-coordinated efforts at institutional and national level. Lessons must be learnt so that we can be better prepared for any similar crisis in the future.

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Table I: Urology Inpatient Admissions Data

Variables	Before MCO (n = 141)	During MCO (n = 64)	p-value
Patient characteristics:			
○ mean age (SD), year	58.1 (17.8)	58.5 (16.7)	0.88
○ gender, n (%)			
○ male	96 (68.1)	40 (62.5)	0.42
○ female	45 (31.9)	24 (37.5)	0.42
○ ethnicity, n (%)			
○ Malay	92 (65.2)	37 (57.8)	0.32
○ Chinese	34 (24.1)	14 (21.9)	0.69
○ Indian	15 (10.6)	10 (15.6)	0.32
○ Others	0 (0)	3 (4.7)	0.01
Hospital admission data:			
○ admission type, n (%)			
○ Elective	77 (54.6)	21 (32.8)	<.005
○ Emergency	64 (45.4)	43 (67.2)	<.005
○ intervention / treatment			
○ Non-surgical ward treatment	55 (39.0)	24 (37.5)	0.97
○ surgical intervention	79 (56.0)	37 (57.8)	
○ interventional radiological procedure	7 (5.0)	3 (4.7)	
○ median time between admission to surgery / procedure (interquartile range), day(s)	1 (1)	3 (3)	0.01
○ median duration of hospital stay (interquartile range), day(s)	3 (4)	5 (3)	<.005

Table II: Urological Surgery Data

Variables	Before MCO (n = 74)	During MCO (n = 27)	p-value
Patient characteristics:			
○ mean age (SD), year	47.9 (21.8)	54.6 (18.2)	0.16
○ gender, n (%)			
○ male	56 (75.7)	20 (74.1)	0.84
○ female	18 (24.3)	7 (25.9)	0.84
○ ethnicity, n (%)			
○ Malay	52 (70.3)	14 (51.9)	0.09
○ Chinese	15 (20.3)	5 (18.5)	0.84
○ Indian	6 (8.1)	7 (25.9)	0.02
○ Others	1 (1.4)	1 (3.7)	0.45
○ ASA status of the patient, n (%)			
○ ASA I	29 (39.2)	4 (14.8)	0.02
○ ASA II	34 (45.9)	16 (59.3)	0.23
○ ASA III	11 (14.9)	6 (22.2)	0.37
○ ASA IV and V	0(0)	1 (3.7)	0.09
Surgery data:			
○ type of surgery, n (%)			
○ elective / semi-elective	55 (74.3)	16 (59.3)	<.005
○ emergency	19 (25.7)	11 (40.7)	<.005
○ mean duration of surgery (SD), minutes	93.6 (71.5)	96.9 (81.4)	0.85
○ complication, n (%)			
○ No complication or Clavien I	70 (94.6)	22 (81.5)	0.05
○ Clavien II	3 (4.0)	2 (7.4)	0.48
○ Clavien III	1 (1.4)	2 (7.4)	0.11
○ Clavien IV and V	0 (0)	1 (3.7)	0.09
○ median duration of hospital stay (interquartile range), day(s)	4 (3.3)	6 (6.0)	0.01

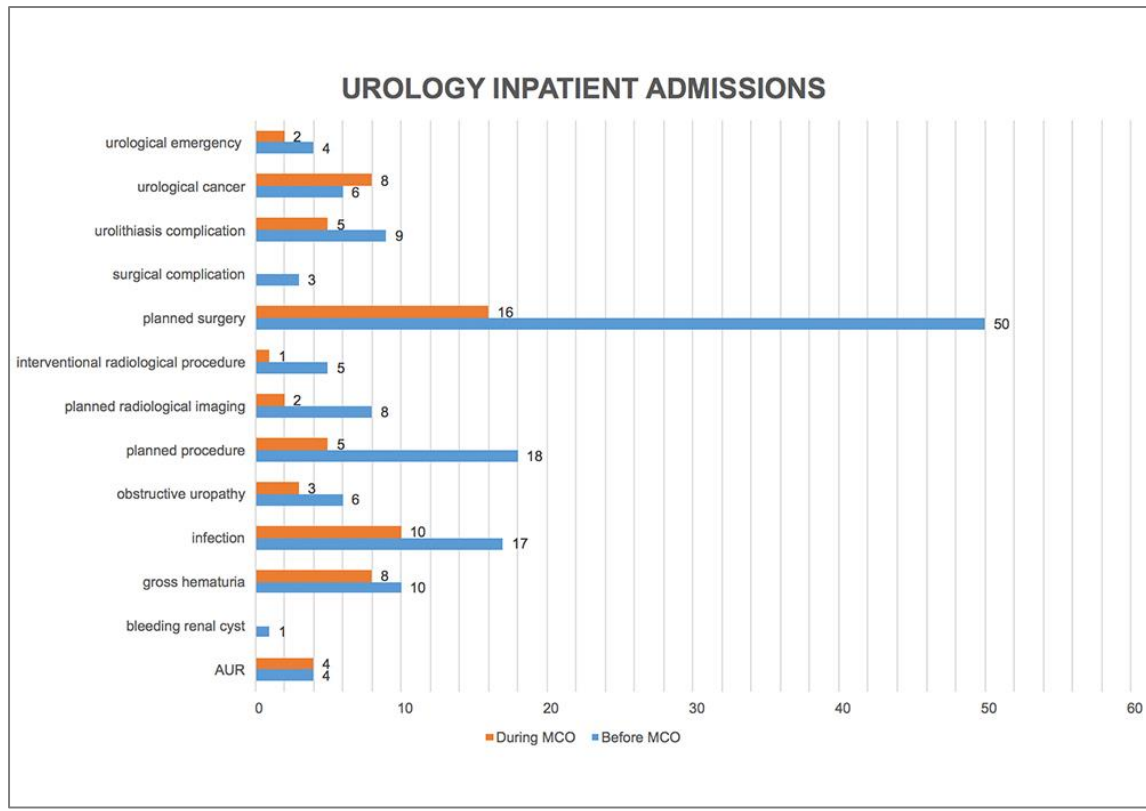


Fig. 1: Comparison of urology admissions before and during MCO.

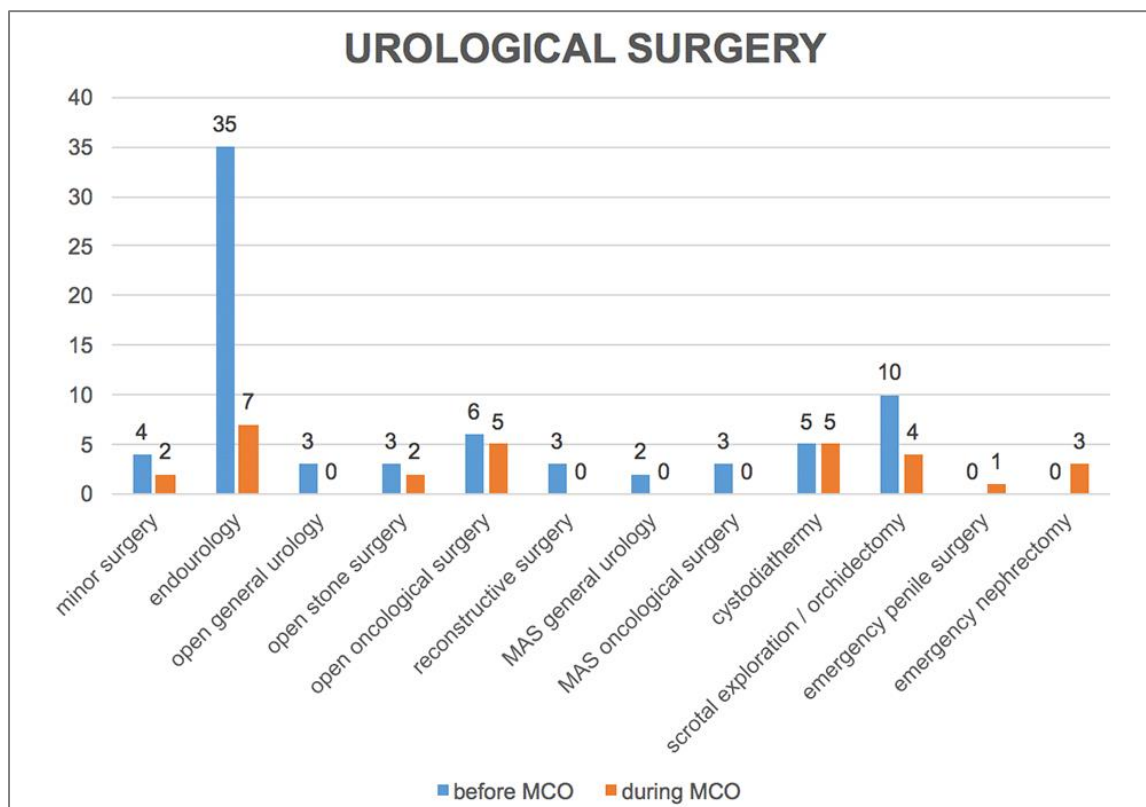


Fig. 2: Comparison of urological surgery performed before and during MCO.

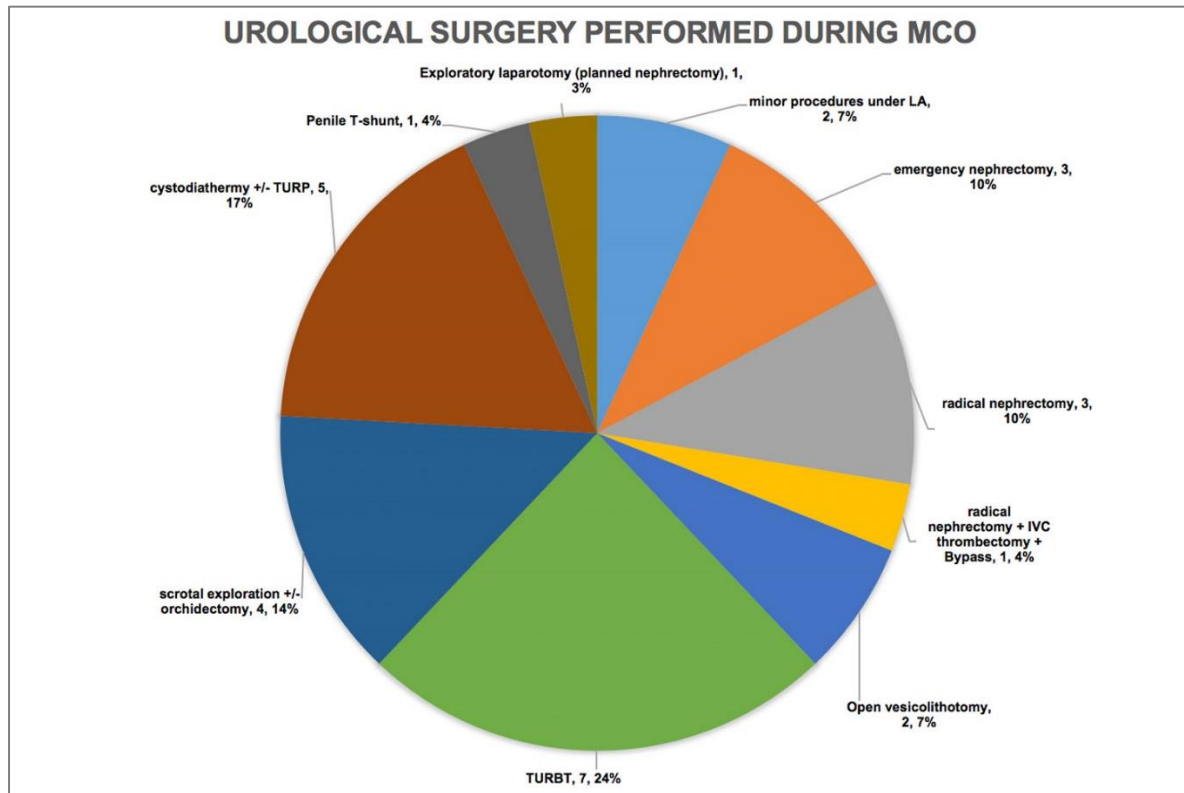


Fig. 3: Urological surgeries performed during the MCO period.

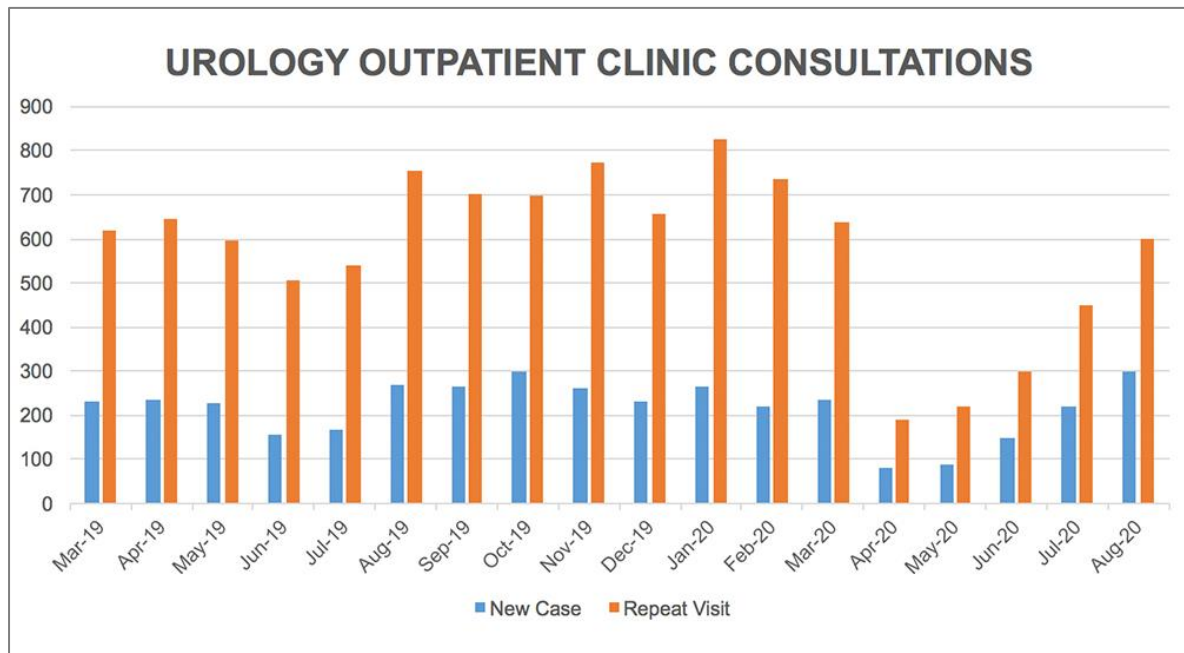


Fig. 4: Outpatient consultations for urology clinic from March 2019 to May 2020.