

The Impact of COVID-19 Pandemic on Acute Urology Admissions in a Busy District General Hospital in the UK

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Abstract—Coronavirus disease 2019 (COVID-19) has had unprecedented effects on the healthcare system in the UK. The pandemic has impacted every service within secondary care, including urology. Our objective is to determine how COVID-19 has influenced acute urology admissions in a busy district general hospital in the UK. To conduct the study, retrospective data of patients presenting acutely to the urology department were collected between January 13 to March 22, 2020 (pre-lockdown period) and March 23 to May 31, 2020 (lockdown period). The nature of referrals, types of admission encountered, and management required in accordance with the new set of protocols established during the lockdown period were analysed and compared to the same data prior to UK lockdown. Included in the study were 1092 patients. The results show that an overall reduction of 32.5% was seen in the total number of admissions. A marked decrease was seen in *non-urological pathology* as compared to other categories. *Urolithiasis* showed the highest proportional increase. Treatment varied proportionately to the diagnosis, with conservative management accounting for the most likely treatment during lockdown. However, the proportion of patients requiring interventions during the lockdown period increased overall. No comparative differences were observed during the two periods in terms of *source of referral, length of stay and patient age*. The results of the study concluded that the admission rate showed a decrease, with no significant difference in the nature and timing of presentation. Our department was able to continue providing effective management to patients presenting acutely during the COVID-19 outbreak.

Keywords—COVID-19, lockdown, admissions, urology.

I. INTRODUCTION

IN December 2019, Chinese authorities declared clusters of pneumonia cases identified in Wuhan, Hubei Province, attributed to a virus named Severe Acute Respiratory Syndrome -Coronavirus-2 (SARS-CoV-2), now commonly known as COVID-19 [1]. By the end of January 2020, the rapid spread of the virus caused alarm internationally and was eventually characterized as a pandemic by WHO on March 11, 2020 [2].

The UK confirmed its first COVID-19 case on January 29, 2020 and registered its first death from the virus on March 5, 2020 [3]. An exponential rise in the number of cases was seen with more than 4000 positive cases daily in April peaking at 6199 [4]. In the same month, the highest average hospital admissions recorded was 3116 and daily deaths were also on the rise averaging to just more than 1300 [5], [6].

Governments had to take drastic measures to curb the pandemic ranging from social distancing, gathering restrictions

to complete lockdowns. The rise in COVID-19 cases had a deep impact on healthcare systems globally, including the UK. Dramatic changes were implemented with two main aims: firstly, keeping healthcare professionals safe and secondly, preventing spread of infection to patients. Changes included limiting surgical procedures to urgent cases only, deferring outpatient visits and adaptation of treatment [7]. In Italy, services in otolaryngology were restricted to oncological conditions, as risk of virus transmission to medical practitioners through aerosol generating procedures was high [8]. Similarly, significant readjustment was made in urological practice. European Association of Urology (EAU) and British Associations of Urological Surgeons (BAUS) guidelines were adapted and laparoscopic/robotic surgery was suspended [7], [9]. All guidelines on urological malignancy were reviewed and revised recommendations made on diagnosis, treatment and follow up [10]-[14]. NHS providers suggested implementation of similar changes across hospitals in the UK [15].

With global measures and public health messages emphasizing strict “stay at home” rules, clinicians were concerned that patients would refrain from seeking medical attention for acute non-COVID-19 conditions, hence, delaying detection of other life-threatening diseases. Studies conducted in France reported a decrease in the number of patients admitted with cardiovascular disease since lockdown was established [16]. In Italy, an overall reduction in urgent urological consultation requests in emergency departments was noted during COVID-19 although probability of admission seemed higher [17]-[20].

This study was conducted in a district general in the UK which provides acute and community services in the region covering more than half a million people. It also has two specialist units in burns and spinal injuries. The bed capacity is around 1083, including 722 medical, 209 surgical, 77 maternity and 75 paediatric. In 2017/2018 more than 239,000 people presented to the A&E department, 161,000 patients were admitted, more than 512,000 attended outpatient appointments and 6,300 babies were delivered [21], [22].

To cope more effectively with the crisis locally, the hospital opted to adhere to the policies suggested by the NHS providers. In this particular context, the aim of the study was to evaluate the effects of COVID-19 pandemic on acute urology admissions in the hospital.

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II. PATIENTS AND METHOD

This retrospective study of data was conducted on all patients referred to the acute urology department between March 23 to May 31, 2020 (lockdown period/COVID-19 period) and a similar 10-week period from January 13, to March 22, 2020 (pre-lockdown period/pre-COVID-19 period).

Daily urology handover sheets (from 0800-hrs and 1700-hrs handover) were reviewed for a 24-hours acute take. The source of referral, patients' demographics, length of hospital stay, diagnosis and management characteristics were gathered from the hospital's online database. The nature of diagnosis and management were further categorized into specific groups facilitating the analysis between the pre-lockdown and lockdown admissions. Raw data, whereby the number of patients presenting with a particular diagnosis during and before the COVID-19 period, were also analysed to give a more representative comparison of certain conditions.

III. RESULTS

A. Acute Attendances

The number of acute admissions during the lockdown period was 440 compared to 652 prior to lockdown, accounting for a reduction of 32.5%.

As shown in Fig. 1, flank pain was the most common presentation in both periods. A decrease in the proportion of referrals was seen in three categories during the epidemic, namely *testicular/scrotal pathology* (3.69%), *post-operative complications* (2.02%) and *non-specific abdominal pain* (2.02%).

A more marginal drop was seen in two categories *other* (incidental radiological findings) and *retention*. The proportion of referrals for *flank pain* and *catheter/nephrostomy complications* was higher (by 3.76% and 3.67%, respectively). A lesser increase in proportion was noted in *hematuria/clot retention* (0.85%) and *urinary tract infection* (0.75%) (Fig. 1).

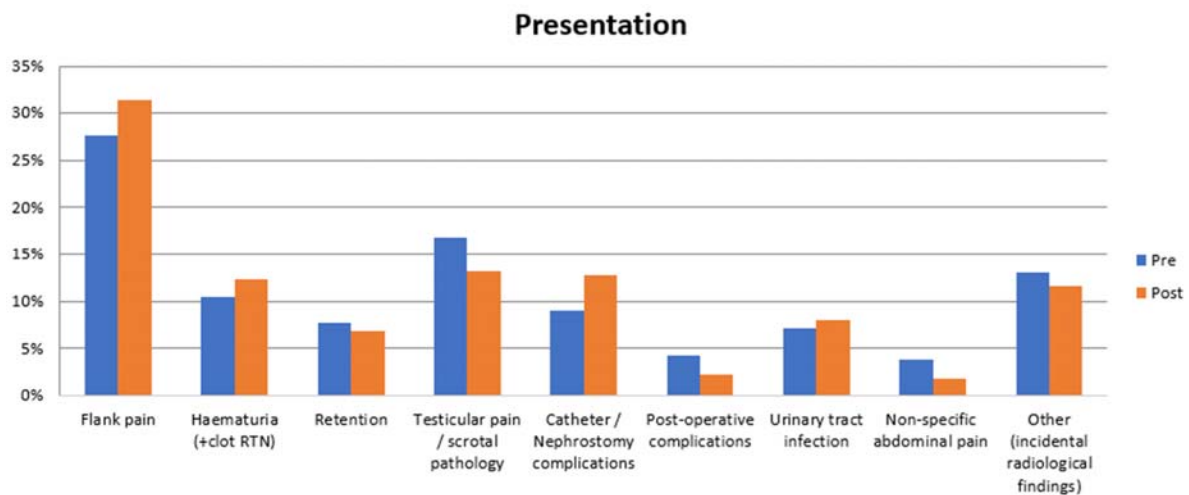


Fig. 1 Percentage differentiation in the presentation during and before lockdown

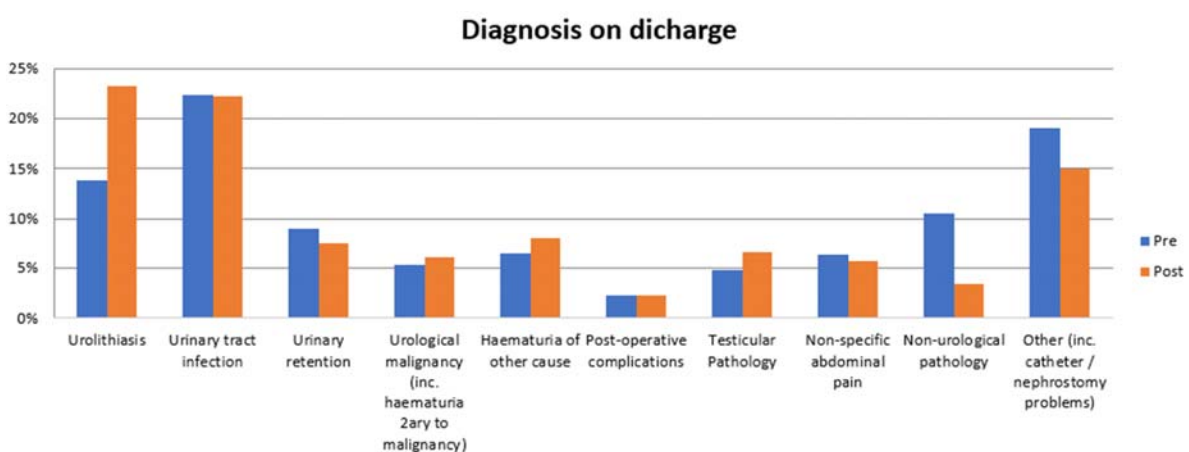


Fig. 2 Percentage comparison in the trend of diagnosis on discharge

The proportion of patients diagnosed with *urinary tract infection* and *other* (including *catheter/nephrostomy problems*) remained relatively high at 15% and above during the COVID-19 period. *Other* (including *catheter/nephrostomy problems*)

decreased by 4.02% (Fig. 2).

A marked decrease of 7.17% was seen in the proportion of *non-urological pathology* compared to less significant decreases in other categories namely: *urinary retention*

(1.55%), *non-specific abdominal pain* (0.61%) and post-operative complications (0.03%) (Fig. 2).
 The proportion of patients with *Urolithiasis* showed a steep rise of 9.38%. In addition, the proportion of patients diagnosed

with *testicular pain* and *haematuria of other causes* increased by a more modest 1.84% and 1.51% respectively. There was also a small increase in the proportion of patients presenting acutely with *urological malignancy* (less than 1%) (Fig. 2).

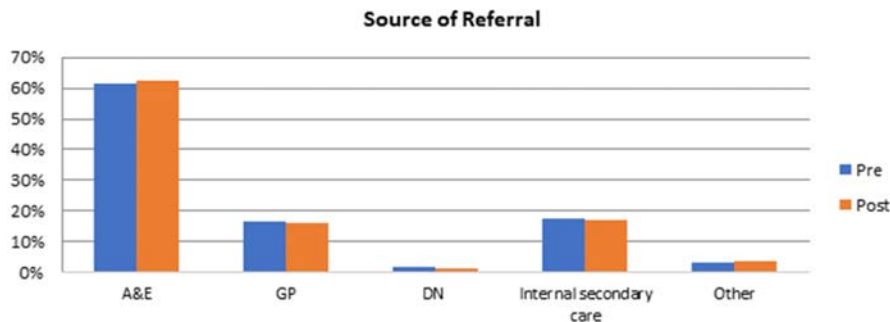


Fig. 3 Percentage differentiation in source of referral during and before lockdown

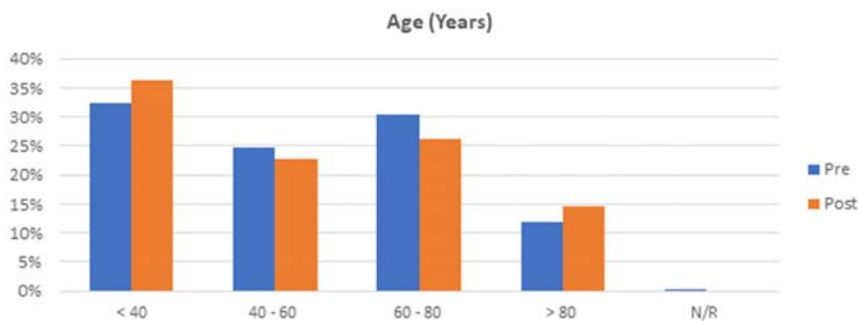


Fig. 4 Percentage difference in age group during and before lockdown

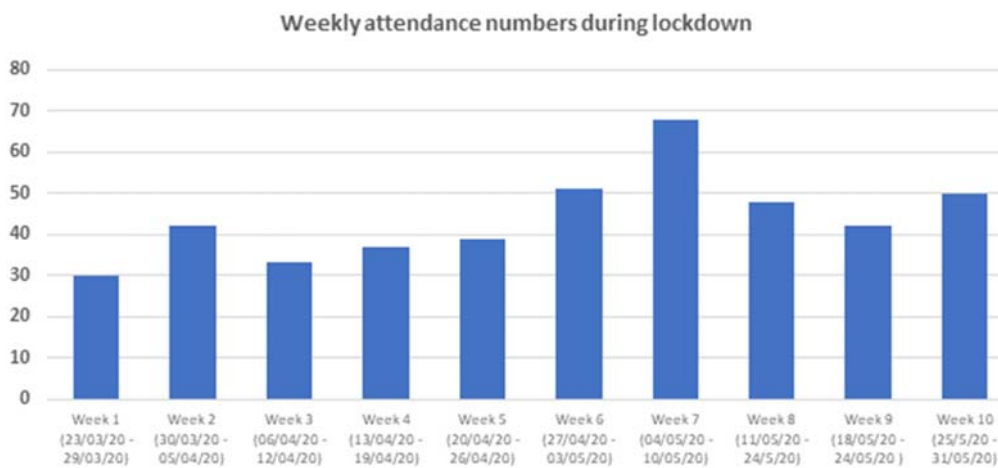


Fig. 5 Breakdown of weekly attendance numbers during lockdown

Figs. 3 and 4 show that no comparative differences were noted during the two periods in the *source of referral* and the proportion of patients referred according to *age*.

The first week of lockdown recorded the lowest number of admissions at 30 patients. Week 2 recorded a slightly higher number at 42. As from week 3 onwards, a gradual increase was noted with a sharp rise during week 6 at 51 and week 7 at 68. The number of admissions varied from week 8 to week 10 (Fig. 5).

As shown in Fig. 6, the overall weekly admission was higher in general prior to lockdown.

B. Testicular Pathology

Suspected torsion accounted for the highest percentage diagnosis during the COVID-19 period at 58.6% (Fig. 7). As shown in Table I the outcomes of patients undergoing scrotal exploration varied with no generalized trend.

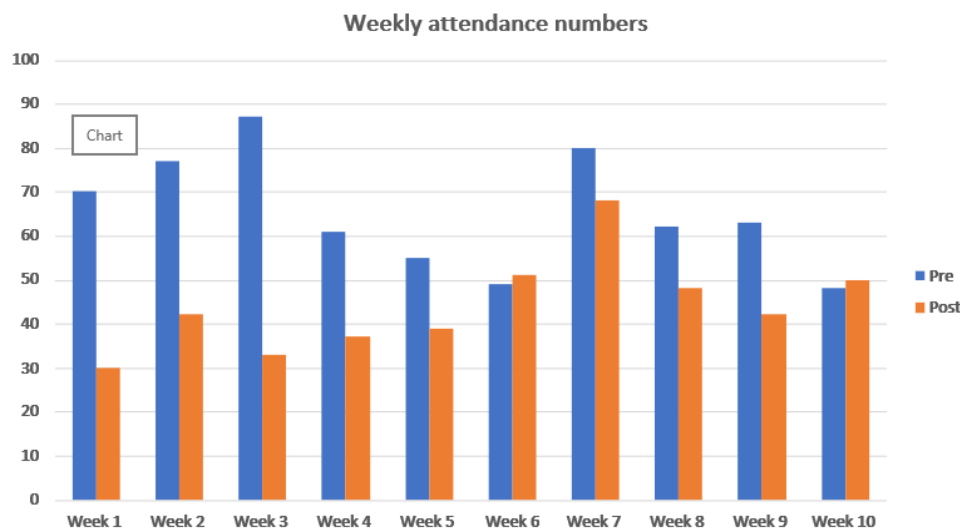


Fig. 6 Breakdown of weekly attendance numbers during and before lockdown

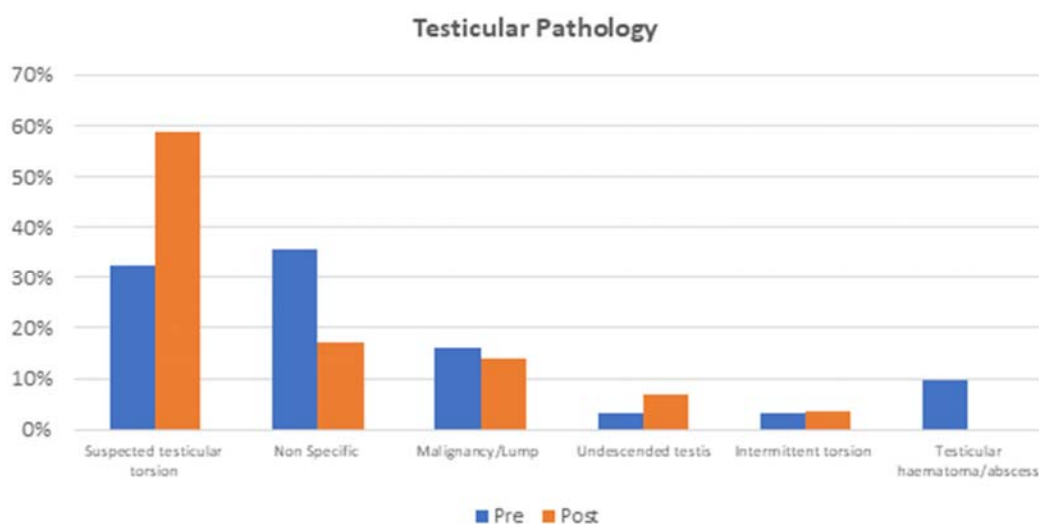


Fig. 7 A more detailed percentage diagnosis of testicular pathology

TABLE I
SURGICAL OUTCOME OF PATIENTS UNDERGOING SCROTAL EXPLORATION

Outcome	Pre-lockdown		Post-lockdown	
	Numbers	Percentage	Numbers	Percentage
Orchidectomy	3	30	2	17.8
Orchidopexy	1	10	4	23.5
Excision of Hydatid cyst of Morgagni	2	20	7	41.2
No pathology	4	40	4	23.5

The percentage of *non-specific* testicular pathology almost halved during COVID-19 from 35.5% to 17.2%. The other category with a relatively high presentation rate was malignancy at 16.1% (pre COVID-19) and 13.8% (COVID-19) (Fig. 7).

C. Treatments

The number of patients requiring *conservative management or further investigations planned* was higher as compared to other categories throughout the whole period of the study at

35.0% (COVID-19 period) and 40.3% (pre-COVID-19 period). Categories such as *planned elective surgery, referral to other speciality* and *other* consisted less than 5.0%, with a reduction in trend across all three groups by 1.01%, 0.26% and 0.77% respectively. Patients requiring interventions during the lockdown period increased both in terms of *surgical* by 1.49% and 1.51% for *others* (ESWL, IR, Flexible cystoscopy). Similarly, 4.83% more required management in terms of *catheter/catheter care* during lockdown. However, acute treatment with *antibiotics* was slightly higher in the pre-COVID-19 period (around 0.50%) (Fig. 8).

No comparative differences were observed during the two periods in the *length of stay* (Fig. 9).

IV. DISCUSSION

This study has allowed an evaluation of the acute urology admissions during the 10-week period from when lockdown was enforced by the UK government on March 23, 2020. A clear drop in the overall admission rate was observed during the

COVID-19 epidemic. During the first four weeks of full lockdown, a marked overall decrease in the number of patients was noted. However, as from April 22, 2020, when government

urged people to seek healthcare if needed, a sharp rise in the admission rate was observed. The proportion of admission varied during partial lockdown (11/5/20 – 31/5/20).

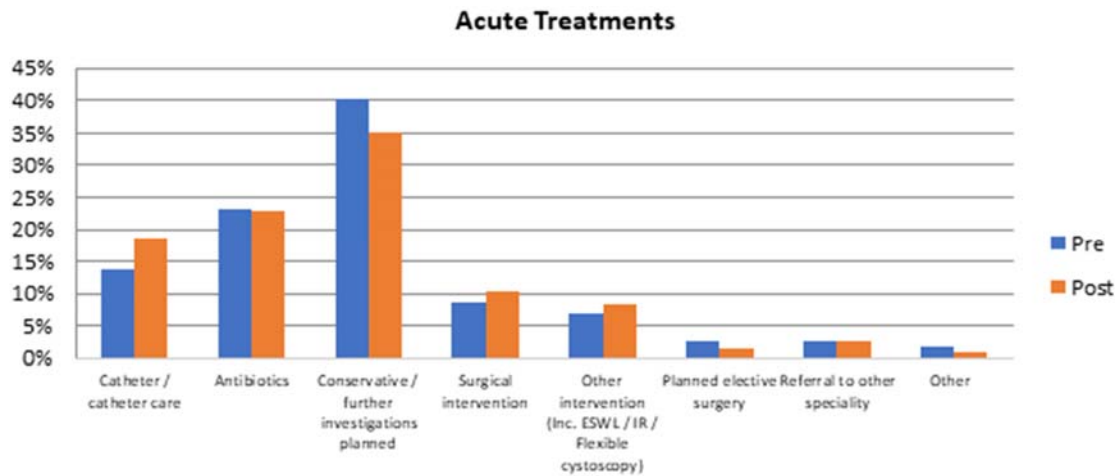


Fig. 8 Comparison in the acute treatment during the pre-COVID-19 and COVID-19 periods

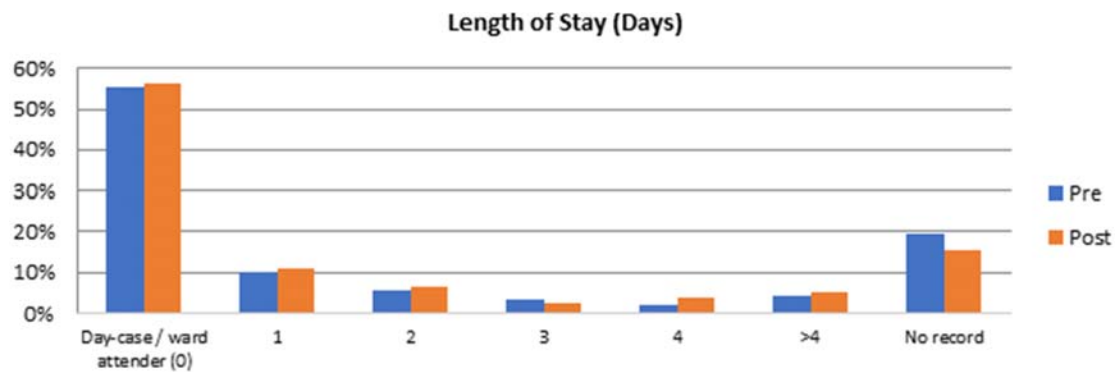


Fig. 9 Percentage differentiation in the length of stay (in days) during and before lockdown

A possible explanation for the overall drop in the admission rate may be the “stay at home” rule and patient’s fear of infection when attending hospital. It can be argued that the overall proportion of patients with non-specific symptoms presenting to hospital was reduced, hence, the marked decrease in *non-urological pathology* and *non-specific abdominal pain*.

Other key findings were:

- I. Diagnoses such as *urinary retention* or *other (including catheter/nephrostomy problem)* declined during the lockdown period. No obvious direct correlation is present between the coronavirus and these conditions. Therefore, it could be hypothesized that greater proportion of such patients were managed within primary care without being referred to secondary care. Alternatively, there may have been more effective triage system by the emergency department suggesting that patients with such pathologies may be referred more often than needed.
- II. The number of patients presenting with *urological malignancy*, *hematuria* and *testicular pathology* decreased respectively during lockdown but accounted for a higher proportion of patients admitted to the urology department. It can therefore be concluded that, patients with more

significant urological complaints were more likely to present to hospital. Although the COVID-19 virus clearly had some impact in reducing acute admissions, it could also be inferred that the department typically has to deal with a significant volume of non-urological cases in ‘normal’ times.

As a corollary, it was observed in Italy, that although the total number of patients admitted in a stroke unit was markedly reduced, the prevalence of severe stroke at admission was relatively higher during the pandemic [19]. However, no directly comparable change in severity was observed during this study. For instance, where it may have been hypothesized that, restriction policies could lead to an increase in the number of orchidectomies performed for patients with delayed presentation of testicular pain, our data showed that the number of patients requiring orchidectomy was actually less.

- III. The total number of patients diagnosed with *urolithiasis* was almost similar during both periods (Table II). This therefore reflected a relative increase in the proportion of such admissions during the lockdown period. Ureteric colic, often described as being one of the worst pains experienced by patients, did not deter patients to seek

treatment despite the ongoing epidemic [22]. Persistent presentation of patients with ureteric colic could also be explained by the weather conditions. Spring 2020, especially May, was recorded as the warmest month of the year and dehydration is a well-known risk factor for urolithiasis [23], [24].

There were concerns that, while dealing with the pandemic, care provided to patients with acute urological presentations had fallen below UK best practice. This study, however, showed a consistency in the management of patients presenting acutely. The difference in management varied proportionately to the admission rate of any given diagnosis between the two periods. For instance, the rate of *antibiotic* prescriptions was proportional to the percentage of admissions for *urinary tract infection*. The rate of interventions required (both surgical and other) was higher by around 1.5% during the lockdown period. The three most common procedures performed were stenting/ESWL for ureteric stones and scrotal exploration for likely testicular torsion. These procedures had been classified as emergency or of high priority as per revised guidelines by the urological associations [8].

As seen in other institutions across Europe, restructuring and re-adaptation of the existing facilities were required. Prioritization of services took precedence over usual practice so as to minimize risk of spread of the virus in general and to protect health-care workers from over-exposure, while maintaining an appropriate standard of care for patients. Studies conducted in Urology departments in France showed that surgeries performed were limited to only acute urological emergencies during lockdown, hence, resulting in a huge drop in the overall number of surgeries performed [25].

It is worthwhile noting that in a study with such a narrow scope, limitations would be present. Factors such as severity of symptoms or delay at the time of presentation to the hospital have not been considered. The findings are representative of the trend as seen locally and may not reflect the situation in other hospitals across the country or internationally. A regional or even national approach to assess the impact of COVID-19 on acute urology care to establish the full impact on emergency urology in the UK should be considered to allow better planning for such situations in the future.

V. CONCLUSION

An overall decrease of 32.5% was noted in the admission rate during the COVID-19 outbreak. There was little difference in the proportion of cases seen, except for an increase in urolithiasis and a reduction in non-urological pathology. The source of referral and the length of stay did not differ greatly. Patients' demographics were comparable. Most importantly, patients in need of medical attention still felt safe to attend hospital when necessary and the urology department managed to cope with the acute admissions during this challenging period.

APPENDIX

TABLE II
COMPARISON IN THE NUMBERS AND PERCENTAGE OF DIAGNOSIS BEFORE AND POST LOCKDOWN

Diagnosis	Pre-lockdown		Post-lockdown	
	Numbers	Percentage	Numbers	Percentage
Urolithiasis	90	13.8	102	23.2
UTI	146	22.3	98	22.3
Urinary Retention	59	9.05	33	7.50
Urological Malignancy	35	5.37	27	6.14
Haematuria	42	6.44	35	7.95
Post-op Complications	15	2.30	10	2.27
Testicular pathology	31	4.75	29	6.59
NSAP	41	6.29	25	5.68
Non-urological pathology	69	10.6	15	3.41
Other	124	19.0	66	15.0

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest

FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ETHICAL APPROVAL

The Mid Yorkshire NHS Trust does not require ethical approval for reporting individual cases or case series.

INFORMED CONSENT

Not applicable for this study.

TRIAL REGISTRATION

Not applicable for this study.

GUARANTOR

DB and ME are the guarantor for the study.

CONTRIBUTIONS

ME and AA conceived the study. MY was involved in data analysis and reviewing the first draft. DB collected data and wrote the first draft of the manuscript. All authors reviewed, edited and approved the final manuscript.

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Not applicable for this paper.

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