

# Virtual consultation in paediatric urology during the COVID-19 pandemic: The effect of pathology on the outcome

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## Abstract

**Introduction:** Virtual consultation (VC) has exponentially increased during the COVID-19 pandemic. Lessons from using this modality during the pandemic will need to be appraised carefully before integrating it into the routine practice. Some paediatric urology patients can potentially be excellent candidates for routine VC.

**Objectives:** Investigate the ability of clinicians to make management plans using VCs and identify accordingly the group of patients that can benefit from routine VC. Evaluate the routine use of VC without travel restrictions.

**Methods:** Designed in two phases. Phase 1, during the lockdown, prospective collection of data after the consultation assessing the clinician satisfaction in making a decision by VC. The results were then divided according to the patient pathology; internal organ pathology (IOP), functional urological pathology (FUP) or external organ pathology (EOP). Data was then analysed to demonstrate if different outcomes can be related to the pathology. Phase 2 after the ease of the lockdown to judge the lessons learnt looking at the same parameters in patients who are selected to receive VC and evaluate journey saved by the patients, measured in miles.

**Results:** One hundred and forty-four consultations were assessed. One hundred and fourteen in phase 1 and 30 from phase 2. Mean age 7.2 years. In phase 1, 57% of patients were reviewed by consultants and 72% were followed up. Thirty-seven per cent had IOP, 24.5% FUP and 38.5% EOP. Clinicians were more likely to reach a decision with patients with IOP and FUP  $P < 0.0001$  and  $0.0024$ , respectively. Phase 2 demonstrated the change of practice where 93% of the patients were either IOP or FUP. An average of 27 miles per patient was saved on journeys.

**Discussion:** VC for paediatric urology patients was employed effectively to avoid hospital contact during the lockdown. From the lessons learnt that patients with IOP and FUP can continue to benefit from VC after the ease of lockdown without compromising the decision making. VC is a viable way to structure services in the future for selected paediatric urology conditions.

## Keywords

Remote consultation, ehealth, teleconsulting, telehealth, virtual consultation, pathology

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## Introduction

Virtual consultation (VC) was the norm during the surge of the COVID-19 pandemic. Its role was imperative in maintaining communication with patients and their carers while reducing the risk of contracting the virus.<sup>1</sup> Although it has been an established mode of contact since well before the pandemic, the magnitude of the utilisation during the surge invited several centres to investigate the outcomes and learn from the experience.<sup>2</sup> If virtual consultations could be provided safely and effectively, it would go a long way to alleviate the challenges involved in accessing surgical care for children and would be a useful addition

to routine paediatric urology care after the pandemic. Furthermore, it would help to reduce the carbon footprint of health care.

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For many renal and bladder pathologies management is guided by the interpretation of investigations and, commonly, the conclusions of multidisciplinary team discussions. Physical examination in the clinic beyond the first appointment is, hence, sometimes unnecessary.

Management of functional urological pathology (FUP), such as nocturnal enuresis and neuropathic bladder, is more complex in that it does not necessarily require repeat examination after the initial assessment, but the ongoing interaction between clinician, patient and their family constitutes an important part of the treatment.

This study prospectively evaluates the VCs undertaken in paediatric urology at a tertiary paediatric centre in the UK during the lockdown attributed to the COVID-19 pandemic (phase 1) and after the ease of the lockdown (phase 2).

We hypothesised that the pathology of the patient has a detrimental effect on the outcome of VC.

The main objectives were to:

- Assess the ability to make a management plan using VC.
- Generate a recommendation for which patients (by pathology) can be managed routinely with VC.
- Evaluate the lessons learnt and distance of travel saved from the routine use of VC (phase 2).

## Methods

For this prospective study, VCs were carried out using a secure software platform (Attend Anywhere). A link to the software and instructions were included in the letter to notify the patients of the appointment, sent in advance via post. If a trainee was doing the consultation the case was always discussed with their consultant before and after the clinic. Telephone contacts were made using secure hospital telephones.

We evaluated video and telephone consultations from urology outpatients in May and June 2020 (phase 1) then in August and September 2021 (phase 2) at the Royal Alexandra Children's Hospital, Brighton, UK. Consultations from two other outreach clinics were included (Worthing and East Surrey Hospitals). The consultations were non-coronavirus related. In phase 1, VCs were carried out instead of the patients' previously scheduled appointments. Phase 2 VCs included patients that were selected as per the judgment of the clinician or at parental request new patients are triaged by a consultant and the mode of the appointment VC or face to face is specified. Follow up patients are classified to VC or face to face based on an agreement between the clinician and the parents. The clinician then will specify the mode in a separate outcome sheet.

Ethics pre-approval was not required. Our methods conformed to the Code of Ethics of the World Medical Association (Declaration of Helsinki).

Patients' registered postcodes were used to calculate the travel distance saved by each patient per visit.

Cases are stratified, according to diagnosis and the process of decision making in our department, into three:

- Patients with internal organ pathology (IOP): renal, ureteric or bladder anatomical pathology, where decisions are primarily made after investigations and commonly in MDT.
- Patients with FUP: defined as patients with symptoms or signs without a clear structural or organic basis<sup>3</sup>
- Patients with external organ pathology (EOP): where external physical signs are needed to make a diagnosis – penile and scrotal pathologies.

Each VC episode was assessed and assigned an outcome, as follows:

- Outcome 1 – definitive diagnosis and plan can be made with VC.
- Outcome 2 – definitive diagnosis and/or plan cannot be made without physical contact but this can be safely deferred.
- Outcome 3 – definitive diagnosis and/or plan cannot be made without physical contact and the patient needs to be brought in for a physical consultation urgently (within 4 weeks).
- Emergency department admissions and change of surgical plan on the day of the surgery were documented.

The assessment process was done by three different reviewers based on the clinician input at the end of each clinic.

This assessment was an alternative to the questionnaire used by Turcotte et al.<sup>4</sup> Their outcomes were different though being complete, incomplete or suboptimal.

Similarly, Winkelman et al.<sup>1</sup> described these outcomes by the provider assessment at the end of consultation as 'satisfactory' or 'not satisfactory'.

Phase 2 outcomes were subsequently subdivided according to the clinic outcome sheets to:

- Book for surgery
- Follow up for clinical assessment
- Follow up after further investigations
- Follow up after change in medications
- Discharge/refer to other specialty

Data was collected prospectively, immediately after each clinic session, by gathering the required information from

**Table 1.** Demographics and secondary outcomes.

	Phase 1	Phase 2
Age years (mean)	7.2	7
Sex		
Male	87	19
Female	28	11
Appointment		
New	32	3
Follow up	82	27
Clinician		
Consultant	65	26
Trainee	49	4

the clinical notes or letters and inputting it into a secure spread sheet.

Using Microsoft Excel® 2010, a test of association was calculated using chi-square and *P*-value <0.05 was used to determine statistical significance.

## Results

Data from 144 patients' appointments were included in the study across the two phases (114 from phase 1 and 30 from phase 2). The mean age was 7.2 years in phase 1 and 7 years in phase 2 (24.3% of patients were female in phase 1, compared to 37% in phase 2); see Table 1.

### Phase 1

In this phase (Figure 1), patients were offered VC invariably due to lockdown restrictions. Those deemed requiring an essential travel to the hospital after the VC were then invited to a face-to-face appointment.

One hundred and fourteen VC sessions were evaluated over the 2 months. Fifty-seven per cent (65 of 114) were reviewed by two consultant paediatric urologists and 43% (49 of 114) by four different trainees.

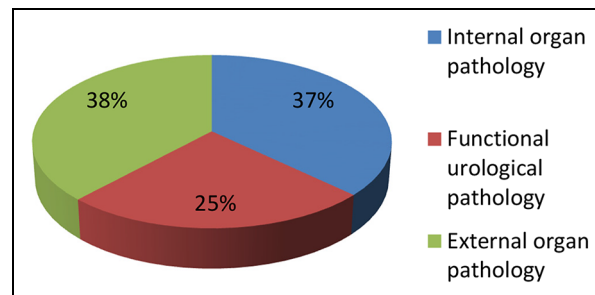
Twenty-eight per cent (32 of 114) were new patients and 72% (82 of 114) follow-ups. The characteristics of the consultations are shown in Table 2.

Thirty-seven per cent (42 of 114) of the patients had IOP, 24.5% (28 of 114) had FUP and 38.5% (44 of 114) had EOP.

Details of the diagnoses are presented in Table 2.

Seventy-two per cent of the consultations (82 of 114) were assessed as outcome 1, 26% (30 of 114) as outcome 2 and 2% (2 of 114) were as outcome 3.

The two patients that had outcome 3 had Balanitis Xerotica Obliterans disease of the foreskin (i.e. EOP). The first boy had symptoms of obstruction postoperatively after circumcision for the disease, but when invited urgently for physical review there were no true clinical concerns and so he was discharged with topical steroids and reassurance.

**Figure 1.** Phase 1 - Pathology type (n=114).

The second child needed urgent admission for catheterisation and circumcision. He was subsequently discharged home safely.

As per the aim of the study, data was analysed to determine which patients are likely to have outcome 1. Hence, outcomes 2 and 3 were grouped together in the statistical analysis.

Chi-square tests were used for comparison, *P* values <0.05 were considered significant.

Patients with IOP and FUP almost invariably had outcome 1 (61 of 62 patients).

Patients with EOP were more likely to have outcome 2 or 3. (*P*<0.00001).

There was no significant difference when outcomes were compared between new and follow-ups (*P* = 0.13) or when patients were reviewed by a consultant or a trainee (*P* = 0.46; Table 3).

### Phase 2

This phase of the study was conducted after the ease of lockdown, between 1 August 2021 and 31 September 2021 (Figure 2), when there was no restriction on patients' and carers' elective attendance. Patients were either booked to VC only by the clinician or upon parental request. New patients were offered VC as a first appointment based on the clinician triage.

Thirty virtual clinic sessions were successfully assessed. Demographics are presented in Table 1.

Forty-three per cent (13 of 30) had IOP, 50% (15 of 30) had FUP and 7% (2 of 30) had EOP.

Eighty-seven per cent were held by four different consultant paediatric urologists and 13% were contacted by three different trainees. Ninety per cent were follow-up patients. Further characteristics of the consultations are also shown in Table 1.

As phase 2 patients were specifically selected, either by the clinician or by parents who opted for a remote consultation, only two patients were from the EOP group. Details of patients' diagnoses from phases 1 and 2 are presented in Table 2.

**Table 2.** Case descriptions.

Diagnosis	Numbers phase 1	Numbers phase 2
<b>Internal organ pathology</b>		
• Duplex anomalies	7	2
• Dysplastic kidney	3	2
• Obstructive uropathy	9	1
• Vesico-ureteric reflux	15	5
• PUV	3	0
• Non-obstructive anomaly	0	3
• Total	37	13
<b>Functional urological pathology</b>		
• Dysfunctional voiding and nocturnal enuresis	12	7
• Neuropathic bladder	1	1
• Recurrent UTIs – NOS	12	6
• Haematuria	0	1
• Total	25	15
<b>External organ pathologies</b>		
• Testicular pathologies	12	0
• Hypospadias	11	2
• Buried penis	3	0
• Phimosis and BXO	25	0
• Penile torsion	1	0
• Total	52	2
<b>Total</b>	<b>114</b>	<b>30</b>

BXO: Balanitis Xerotica Obliterans; PUV: posterior urethral valve; UTI: urinary tract infection; NOS: nitric oxide synthase.

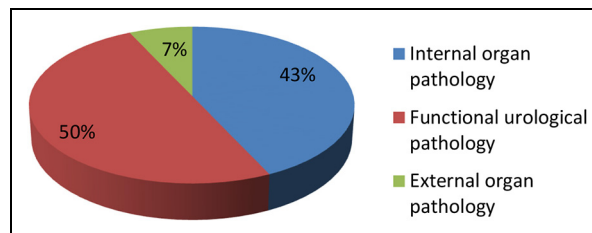
**Table 3.** Phase I analysis.

	Outcome 1	Outcomes 2 & 3	P-value
New/follow-ups	20/62	13/21	0.13
Consultant/trainee	45/37	20/12	0.46
IOP	37 (100%)	0 (0%)	<0.0001
FUP	24 (96%)	1(4%)	0.0024
EOP	21 (40%)	31(60%)	<0.0001

EOP: external organ pathology; FUP: functional urological pathology; IOP: internal organ pathology.

No patients from this cohort were assessed as outcome 3 and only two had outcome 2 (the two mentioned above with EOP). One patient had a fistula after hypospadias repair and the second had a history of post-operative infection following circumcision and gave a history suggestive of meatal stenosis at the VC that necessitated an invitation to a face-to-face review.

From the 28 patients who had outcome 1, there were 20% discharges (6 of 30), 6.7% referred to other specialities (2 of 30). Out of the follow up group 30% were sent for further imaging (9 of 30), 23.3% had a change in their medication therapy (7 of 30) and 10% had routine check up with no change in plan (4 of 30).

**Figure 2.** Phase 2 - Pathology type (n=30).

We have calculated the travel distance for the patients in our study, which was ultimately saved by them not having to attend the hospital in person. This averaged 27 miles on return journeys, ranging from 1.4 to 156 miles.

## Discussion

Lessons learnt from the COVID-19 pandemic will resonate in all aspects of medicine. VC in paediatric surgery was established before the outbreak of COVID-19.<sup>5</sup> It however became a mainstay during the peak of the disease.<sup>6</sup>

Several studies in the past two years looked into patient and carer satisfaction with VCs in paediatric urology.<sup>7</sup> A good turnout of high satisfaction reported up to 90% in paediatric urology studies encouraged others on following the path of making VC the norm in some clinics.<sup>8</sup> VC wide implementation will also reduce the journey of a large number of patients without affecting their management plan. The time and expense of travel to the surgical centre constitute a burden on families in a time when the economy is already struggling to recover from the pandemic. In our cohort, we demonstrated that using VC can save an average of 27 miles per patient. This is of particular significance in centres that cover large catchment areas. Furthermore, this would appear to be a global finding with an obvious cost effect.<sup>9</sup> Add to this the reduction of the heavily scrutinised National Health Science carbon footprint, where travel constitutes 17% of the emission.<sup>10</sup>

We had 72% of the patients labelled as outcome 1 in the non-selective phase, a relatively higher percentage to the complete case management found in the paediatric population in Turcotte et al.<sup>4</sup> study.

Paediatric urology, in particular, relies, to a large extent, on reviewing imaging and laboratory results for the IOPs. It therefore stands to reason that this is a subspecialty for which VC could be suitably incorporated into its routine post-pandemic practice. Pathologies such as obstructive uropathy and reflux will almost invariably have the decision-making based on history, imaging and, commonly, multidisciplinary discussions.<sup>11</sup>

Follow-up patients would have been physically examined and face-to-face rapport previously established. Larger studies in adult practice have similarly shown that VC worked particularly well when patients were already

known to the clinician.<sup>12</sup> In our experience there was no statistical difference in outcomes between the new and follow-up patients who received VC, when assessed by the providing clinician. Similarly, Gunter et al.,<sup>13</sup> in a systematic review, demonstrated that telemedicine for post-operative follow-up yielded results as good as face-to-face, with no difference in complications.

Clinicians are significantly more likely to be able to make definitive diagnoses and management plans for patients with internal organ pathologies. This is a rather expected result. Most of these patients would have had a separate visit to the hospital for the investigations.

FUP, including patients with enuresis, is a rather challenging subject. Ninety-six per cent of the FUP patients in our cohort had outcome 1. In this separate group of patients, however, the behavioural aspect of the management can be lost. We had patients who were at school while the virtual consultations were carried out with their carers. In a study by Smith et al.<sup>14</sup> from Arkansas, USA, 61.9% of the patients responded well to the VC management and this was higher (though not significantly so) than with the face-to-face appointments. Their study, however, was for nocturnal enuresis patients explicitly.

In our study, 60% of patients who had EOP needed a further appointment for an examination. Results from Winkelman et al.<sup>1</sup> showed 14% of the patients from this group required a further appointment (outcomes 2 and 3 for us). The group was also able to make an appropriate judgment with the help of a video examination. Whereas this is considered an acceptable outcome during the pandemic, it is difficult to justify after the lifting of hospital-visit restrictions.

Intriguingly, there were no significant differences in arriving at outcome 1 when VC was carried out by consultants versus trainees, as well as consultations via telephone versus video. This suggests that the success of VC relies more on the characteristics of the patients than the clinician.

Phase 2 of our study investigated patients who received VC by choice. This was either by clinicians' or carers' request after mutual agreement at the end of the consultation. This is the first step from lessons learnt from the pandemic VC results. We accordingly had 94% outcome 1. Benefits of VC are widely discussed in a systematic review by Pettit et al.<sup>15</sup> looking into 17 recent publications. Cost-effectiveness and patients' satisfaction were demonstrated in more than 50% of the publications. We have not surveyed patients satisfaction but demonstrated an average saving of 27 miles per patient on the return journey with elective use of VC.<sup>15</sup>

There are a few logistical questions that are yet to be answered as VC becomes more widely embraced. For example, what is the burden of administrative time, the cost of the online systems necessary to make VCs work and the efficacy of web security?

Though other studies have investigated the benefits and barriers for VC in paediatric urology during the COVID-19

pandemic, there are only a few looking into the impact of patients' pathology on the outcome of the consultation.

## Conclusion

The ability to make a definitive management via VC varies with the variation of the pathology.

Patients with EOP (penile and scrotal pathologies) are less likely to receive definitive management with VC.

With appropriate choice of patients and clinician-carers mutual agreement, definitive management is more likely to be achieved saving the patients and families significant distance of travel.

## Declaration of conflicting interests

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