Urethral injury in children: Experience in a teaching hospital in Enugu, Nigeria

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Abstract

Background: Urethral injury in children is uncommon, and its treatment is challenging. This study evaluated our experience in the management of urethral injuries in children who presented at the paediatric surgical unit of a teaching hospital in Enugu, Nigeria.

Methods: The medical records of patients younger than 15 years old admitted to our centre with urethral injury from January 2008 and December 2017 were reviewed retrospectively.

Results: During the period of the study, 11 cases (all male) were managed. The mean age of the patients at presentation was 11 years. Road traffic accident was the most common mechanism of injury, and the bulbar urethra was the most injured part of the urethra. All the patients had urethroplasty through the perineal approach. There was 90% success at first instance. One patient required redo urethroplasty.

Conclusion: Urethral trauma is associated with considerable morbidity. Road traffic accident was the most common mechanism of injury, and the bulbar urethra was the part of the urethra most affected. Transperineal urethroplasty was an effective modality of treatment.

Keywords
Urethra, injury, trauma, children, experience

Introduction

Urethral injuries refer to trauma to the urethra, which varies from minor contusion to partial or complete rupture. Injury to the urethra is a relatively rare but serious event in children. The urogenital diaphragm divides the urethra into anterior and posterior portions. The anterior urethra consists of the bulb and penile urethra, while the posterior urethra is made up of membranous and prostatic urethra. Urethral injuries could result from blunt or penetrating trauma. Blunt injuries occur more frequently than penetrating trauma. Anterior urethral injuries commonly result from blunt trauma such as vehicular accidents, falling astride and blows or kicks to the perineum. The bulbar urethra is the most injured part of the anterior urethra because of its trapped anatomical position beneath the pubic bone, unlike the freely mobile pendulous urethra. The clinical presentation of urethral-injured patients may include blood at the urethral meatus with or without haematuria, inability to pass urine and a high-riding prostate on digital rectal examination. There is no established protocol for the management of urethral injuries in children due to the infrequency of these injuries. The management of urethral injuries has remained controversial. The aim of this study was to evaluate our experience in the management of urethral injuries in children at a teaching hospital in Enugu, Nigeria.

Methods

This was a retrospective study of paediatric patients who presented with urethral injury to the paediatric surgery unit of Enugu State University Teaching Hospital (ESUTH) Enugu, Nigeria. The medical records of the patients admitted...
between January 2008 and December 2017 were analysed. Diagnosis of urethral injury was made based on the history of trauma to the perineum/external genitalia, blood at the urethral meatus and inability to pass urine following trauma. Children who had had surgery for urethral trauma before referral to our centre were excluded from the study. Children older than 15 years and those who had hypospadias repair were also excluded from the study. ESUTH is a tertiary hospital located in Enugu, Southeast Nigeria. The hospital serves the whole of Enugu State, which according to the 2016 estimates of the National Population Commission and Nigerian National Bureau of Statistics has a population of about four million people and a population density of 616.0/km². The hospital also receives referrals from its neighbouring states.

The information extracted from the patients’ medical records included age at presentation, sex, mechanism of injury, age at surgery, surgical approach, number of surgeries, length of stricture and surgical outcome. Ethical approval was obtained from the Ethics and Research Committee of Enugu State University Teaching Hospital. IBM SPSS Statistics for Windows v23 (IBM Corp., Armonk, NY) was used for data entry and analysis. Data are expressed as percentages and means.

**Results**

**Demographic profile of the patients**

Of the 275 cases of paediatric trauma recorded during the study period, 11 cases had urethral injuries. This gives an incidence of 4%. The follow-up period was 1.2 years. All 11 patients were male, and their mean age at presentation was 10.2 years (range 6–15 years). The mean time interval from time of injury to presentation was 11.4 hours. The mean age of the patients at urethroplasty was 11 years. The mean interval from injury to repair was 7.5 months. The majority (65%) of the patients had their strictured urethra repaired within 12 months from the time of injury. The mean duration of hospital stay was 20 days (Table 1).

**Mechanism of injury**

Overall, 10 (90.9%) patients had blunt urethral trauma, while one (9.1%) patient had a penetrating injury. Six (54.5%) patient sustained urethral injuries through road traffic accidents (five were pedestrians and one was a passenger), four (36.4%) patients fell from height, while one (9.1%) patient was kicked in the perineum (Table 2).

**Investigations**

All the patients who developed urethral stricture from their urethral injury had a voiding cystourethrogram (VCUG) and retrograde urethrogram (RUG) at three months post injury (Figure 1). Mucosal disruption and contrast extravasation could not be determined because the stricture had fully formed at the time of VCUG. Other investigations included full blood count, serum electrolytes, urinalysis and urine microscopy, culture and sensitivity. Four (36.4%) patients who had abdominal symptoms underwent an abdominal ultrasound which was negative for associated intra-abdominal injury. None of the patients had a computed tomography scan or magnetic resonance imaging scan.

**Associated injuries and part of the urethra involved**

Two (18.2%) patients had an associated stable pelvic fracture, and there was a rectal injury in one (9.1%) patient. None of the patients had an associated bladder injury. Nine (81.8%) patients sustained injury to the bulbar urethra, while one (9.1%) patient each had injuries to the membranous and penile urethra (Table 3).

**Length of stricture**

The mean length of the strictured urethra was 2 cm. Seven (63.6%) patients had a stricture length of 2 cm, and two patients (18.2%) had a stricture length of 1 and 3 cm (Table 4).

**Treatment**

Management of all the patients followed the Advanced Trauma Life Support (ATLS) protocol for the care of injured patients. The patient who had associated rectal injury received a temporary colostomy to allow healing of the rectal injury. All the patients at presentation had a suprapubic cystostomy (SPC) as the initial treatment. After three months, a VCUG and RUG were done which showed the part and length of

### Table 1. Patients’ demographic profile.

| Mean age at presentation | 10.2 years |
|--------------------------|------------|
| Mean interval from time of injury to presentation | 11.4 hours |
| Mean age at urethroplasty | 11 years |
| Interval from injury to repair | 7.5 months |
| Duration of hospital stay | 20 days |

### Table 2. Mechanism of injury.

| Mechanism of injury       | n | %  |
|---------------------------|---|----|
| Road traffic accident     | 6 | 54.5 |
| Fall from height          | 4 | 36.4 |
| Kick to the perineum      | 1 | 9.1  |

### Table 3. Urethral part.

| Part of the urethra damaged     | n | %  |
|---------------------------------|---|----|
| Bulbar urethra                  | 9 | 81.8 |
| Membranous urethra              | 1 | 9.1 |
| Penile urethra                  | 1 | 9.1 |

### Table 4. Stricture length.

| Length of stricture | n | %  |
|---------------------|---|----|
| 1 cm                | 2 | 18.2 |
| 2 cm                | 7 | 63.6 |
| 3 cm                | 2 | 18.2 |
the urethra that was damaged. Through the transperineal approach, blunt and sharp dissections were used to mobilise both ends of the urethra. Due to the short length of the stricture, tension-free anastomotic urethroplasty was achieved. No skin/buccal graft/ flap was used. In each case, the silicon urethral catheter was left for 28 days, serving as a stent and diverting urine from the urethroplasty site. The SPC was also left in situ. The impact of urinary diversion was not assessed in the current study.

Postoperative progress and outcome

The patients were followed up for 18 months. A check VCUG was done at three months when there were urinary symptoms and at six months when there were no symptoms. Urinary symptoms assessed included urinary stream, frequency, calibre and dysuria. Three (27.3%) patients had transient urinary incontinence but recovered within six months. Uroflowmetry was not done because of the absence of the facility. There was no loss of erectile function. The patients were seen weekly for one month, monthly for six months and every three monthly for 18 months. Ten (90.9%) patients had a good urinary stream and flow, while one (9.1%) patient developed recurrent stricture and needed redo urethroplasty.

Discussion

Urethral injury causing urethral stricture is an uncommon but difficult urological problem, especially in children where consensus on optimal treatment is yet to be reached.8 Management of urethral injury entails urinary diversion (in the form of a SPC) or primary urethral realignment. Urethral contusion and mild urethral lacerations heal rapidly with a low stricture rate. Even when stricture occurs, the stricture is usually short or flimsy. Major or complete urethral lacerations usually heal by forming a urethral stricture.9 It is important to differentiate a urethral stricture where there is continuity of the outer wall of the urethra and urethral distraction where there is complete distraction of the urethra leaving a distraction defect.10

In the present study, urethral injuries accounted for 4% of all paediatric traumas. This is similar to the finding of Tarman et al.11 However, in adults, urethral injuries may account for up to 10% of urogenital injuries.12 Differences in anatomy between children and adults may explain this. Regarding the mean age of our patients at presentation, our finding is in agreement with that of other studies.13–15 However, Voelzke et al. recorded a mean age of 15 years in their study.16 This may be explained by the age groups recruited by the different authors; we used 15 years as our upper limit, while Voelzke et al. used 18 years as the upper limit. With respect to the time interval from the time of injury to the time of presentation to the hospital, our findings are comparable to those of Derouiche et al.7 The mean age of our patients at surgery was 11 years, and this is consistently seen in the reports of other studies.14,18 In their study, Herle et al. reported that their patients were on a SPC for a minimum of six months before urethroplasty.14 Similarly, our patients stayed on a SPC for a mean duration of 7.5 months. The duration of hospital stay of our patients is at variance with the report of Garg et al.19 However, Barratt et al. reported that the bladder neck and prostatic urethra were the most injured part of the urethra. This is in agreement with the findings of other series.9,25 However, Barratt et al. reported that early urethral realignment provides the same or better results as insertion of a SPC.26 In his paper, Philipraj documented that immediate urethral realignment is associated with a high incidence of incontinence and impotence.27 Primary urethral realignment can be done through open surgery or endoscopically. The technique to be adopted depends on the availability of appropriate instruments, a suitable patient and the skill of the surgeon.27

The majority of our patients had good results in terms of urinary stream and flow. The high success rate we recorded...
is comparable to the findings of other authors. The complication rate in our patients is similar to the reports of Satyagraha et al., while Herle et al. reported a 47.8% recurrent stricture rate that required redo urethroplasty. There are wide variations in outcome and complication rates following treatment of urethral stricture. The exact reason for this variation is not known but may be explained by the nature of the stricture, patient selection, available facilities and the skill of the surgeon.

This study has a number of strengths. It reports an uncommon clinical condition, especially in Southeast Nigeria where there is a paucity of data. The inclusion and exclusion criteria were clearly stated. This implies that the sample chosen is representative of the study population. However, a number of weaknesses and limitations should be acknowledged. This was a retrospective study. A prospective study would have provided an opportunity for better evaluation such as the effect of urinary diversion on outcome. The study is limited by the small number of cases. A larger number of cases would have availed better analysis and basis for critical comparison with other published larger series. Finally, this was a single institution experience which may not be generalisable to other institutions and other countries.

Conclusion

Eleven cases of children who had urethral injuries over a 10-year period were evaluated. Urethral trauma accounted for 4% of all paediatric traumas seen during the study period. Most (81%) patients had a bulbar urethral injury, and road traffic accident was the most common mechanism of injury. All the patients had VCUG and RUG. Using the perineal approach, urethroplasties were done. Ninety per cent of the patients had good urinary stream and flow. One patient had a recurrent stricture and required redo urethroplasty.

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None.

Authors’ contributions

All the authors took part in the formulation of the concept, data collection, data analysis and interpretation of results. All the authors reviewed and edited the manuscript and approved the final version of the manuscript.

Availability of data and materials

The data sets generated and/or analysed during the current study are available from the corresponding author.

Ethical approval

Ethical approval was obtained from the Enugu State University Teaching Hospital’s Research and Ethics Committee.

Informed consent

Not applicable.

Conflict of interest

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