

Anterior urethral trauma in childhood: presentation of two cases

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ABSTRACT

Introduction. The incidence of urethral trauma in children is low given that they have a short, mobile urethra, largely protected by the pubis.

Clinical cases. We describe two clinical cases illustrating the variety of presentations anterior urethral lesions can have. The first child had acute urinary retention two months after falling astride, with subsequent diagnosis of urethral stricture following serial voiding cystourethrogram (SVCU). The second child had urinary incontinence after falling off a horse. SVCU showed a urethral diverticulum, characterized through ultrasound imaging. Both were treated with deferred surgery.

Remarks. Urethral lesion should always be suspected after perineal trauma. SVCU is the gold standard diagnostic technique. Deferred urethroplasty is the treatment of choice, with good results, but there is a risk of incontinence and impotence.

KEY WORDS: Pediatric trauma; Urethral stricture; Urethral diverticulum; Deferred surgery.

TRAUMATISMOS URETRALES EN LA INFANCIA: PRESENTACIÓN DE DOS CASOS

RESUMEN

Introducción. La incidencia de traumatismos uretrales en niños es baja dado que su uretra es corta, móvil y está protegida en gran parte por el pubis.

Casos clínicos. Exponemos dos casos clínicos que ilustran la variedad de presentaciones de las lesiones en uretra anterior. Primer niño con retención aguda de orina dos meses después de sufrir una caída a horcajadas. Posterior diagnóstico de estenosis uretral con cistouretrografía miccional seriada (CUMS). Segundo niño con in-

continencia urinaria tras caída de un caballo. Hallazgo de divertículo uretral en CUMS y caracterización mediante ecografía. Ambos son tratados con cirugía diferida.

Comentarios. Es importante sospechar una lesión de uretra después de un traumatismo perineal. La CUMS es la prueba diagnóstica estándar. El tratamiento de elección implica uretroplastia diferida con buenos resultados aunque presenta riesgo de incontinencia e impotencia.

PALABRAS CLAVE: Traumatismo pediátrico; Estenosis uretral; Divertículo uretral; Cirugía diferida.

INTRODUCTION

Urethral lesions in childhood represent 3.4%⁽¹⁾ of genitourinary trauma only. Most occur in male individuals in the pre-puberty period as a result of falling astride or a direct blow, but they can also appear in both sexes following pelvic fracture⁽²⁾.

The male urethra is divided into two segments by the urogenital diaphragm: the anterior segment and the posterior segment. Lesions are more common in the anterior urethra, which consists of the bulbar portion and the penile portion⁽³⁾. Trauma of the bulbar urethra occur as a result of its anatomical position – when the perineum receives an impact, compression arises between the external blunt object and the inferior concave area of the pubic symphysis⁽⁴⁾.

Today, the most widely accepted classification is Goldman classification⁽⁵⁾, which establishes five types of urethral trauma according to serial voiding cystourethrogram (SVCU) results.

In this work, we present two clinical cases pertaining to type V, which is defined as a partial or complete lesion limited to the anterior urethra, so contrast extravasation will be present underneath the urogenital diaphragm.

Our objective is to illustrate the wide array of presentations anterior urethral lesions can have – which increases

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Figure 1. 7 mm bulbar urethral stricture.

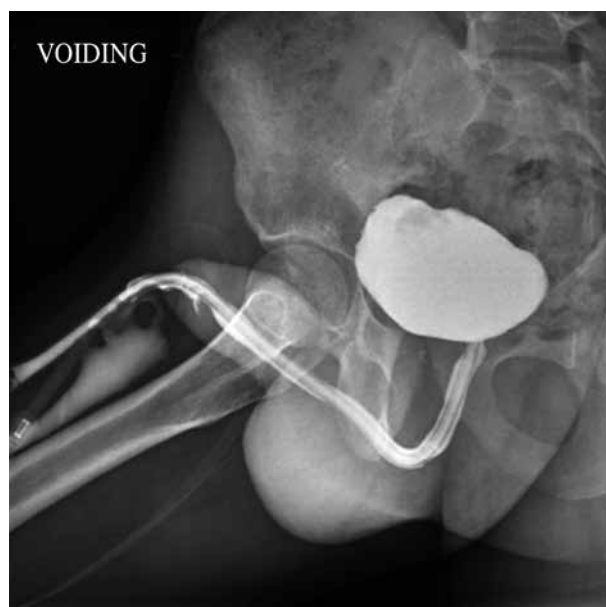


Figure 2. Postoperative control without leakage.

diagnostic difficulty – and to describe the best therapeutic management to reduce clinical repercussion.

CLINICAL CASE 1

A 15-year-old male child fell astride. He presented to the emergency department immediately, with pain and self-limited urethrorrhagia. At exploration, he had a superficial contusion injury in the perineum and the right groin without solution of continuity or hematoma. He had spontaneous voiding with clear urine and no voiding difficulty, so no further studies were carried out and he was discharged with outpatient follow-up.

Two months following his accident, he started to have voiding difficulty followed by an episode of acute urinary retention (AUR). Attempts to pass various probes – the smallest one with a 6 Ch caliber – were unsuccessful, so an ultrasound-guided suprapubic catheter was placed.

Given the suspicion of post-traumatic urethral stricture, a SVCU was carried out, which showed the presence of a 7 mm stenotic area in the bulbar urethra (Fig. 1).

In light of these results, an end-to-end urethroplasty was performed under general anesthesia. First, a guide was passed towards the bladder under direct cystoscopic vision. The urethra was then dissected layer by layer and freed. An approximately 1cm fibrous area was found at the level of the anterior bulbar urethra, which corresponded with the stricture. It was fully removed, with spatulation of urethral ends and end-to-end anastomosis. An 18 Ch Foley catheter was left in place once the procedure was over.

Postoperative period was uneventful, so the patient was discharged three days later. The pathological result of the resected urethra showed unspecific histologic changes consistent with subepithelial fibrosis.

Two weeks following surgery, SVCU was repeated (Fig. 2), with no evidence of stricture or urethral leakage, so the catheter was removed.

One year following surgery, the patient had a maximum flow of 23.7 ml/s and negative post-voiding residue. The patient was satisfied with the results.

CLINICAL CASE 2

An 11-year-old male child fell off a horse, with self-limited hematuria. He did not ask for immediate medical care, so post-trauma clinical exploration was not available. He started to have persisting urinary incontinence, so he ended up consulting his outpatient pediatrician.

One month following trauma, the SVCU showed contrast leakage at the junction between the bulbar urethra and the prostatic urethra, with formation of a small pseudo-diverticular pouch (Fig. 3).

Given the suspicion of urethral rupture with post-trauma diverticulum formation, decision was made to complete the study by performing a urethral ultrasound imaging test (Fig. 4). This confirmed the presence of a 25 x 6 mm diverticulum at the back of the bulbar urethra secondary to an 8 mm urethral mucosa disruption.

10 months following trauma, the urethral diverticulum was resected under general anesthesia. First, a guide was

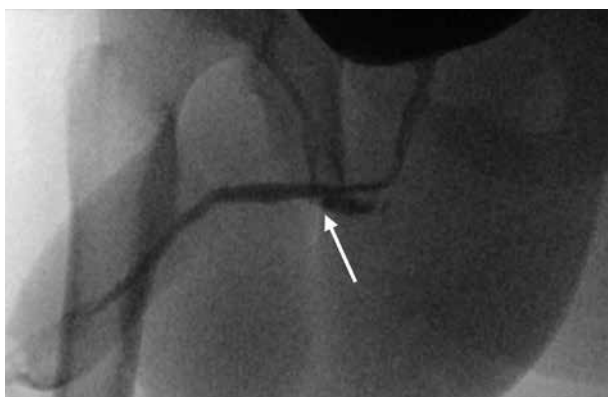


Figure 3. Contrast leakage at the junction between the bulbar urethra and the prostatic urethra, with pseudo-diverticular pouch formation.



Figure 4. Arrow (urethral diverticulum). Star (urethral mucosa disruption).

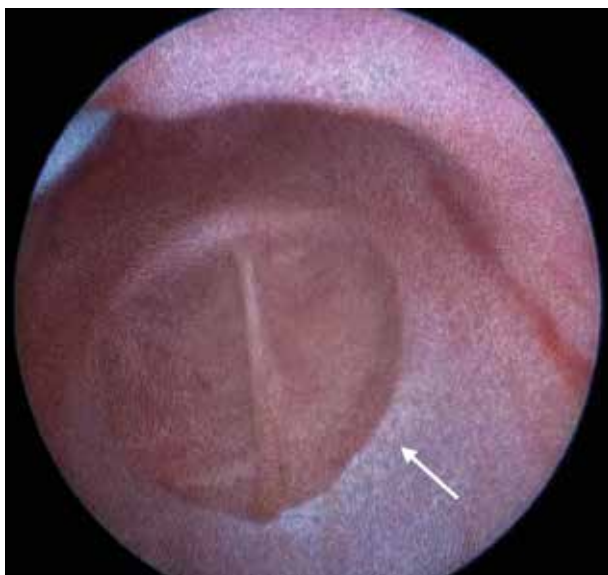


Figure 5. Urethral diverticulum.

passed towards the bladder under direct vision. An incision was then carried out in the middle perineal raphe and the tissues were dissected until reaching the bulbar urethra. The diverticulum was identified through cystoscopy (Fig. 5), and transillumination demonstrated it was placed on the bulbar spongy body. The procedure was completed by opening the diverticular wall, laying open and resecting the mucosal walls, and suturing the urethral gap. A 16 Ch Foley catheter was left in place.

Postoperative period was uneventful, so the patient was discharged and sent home two days later. The pathological analysis showed a highly vascularized fragment of diverticular wall, with urothelial lining and no histological alterations.

Three weeks following surgery, SVCU did not show any leakage signs, so the bladder catheter was removed.

Owing to a referral hospital change, no further follow-up data were available to us.

DISCUSSION

Anterior urethral lesions in childhood are rare. The two clinical cases recorded in our healthcare facility are quite representative of how important diagnostic suspicion is in spite of having a largely variable presentation.

Anterior urethral lesions can cause irritating (hematuria, dysuria, and urine escaping) and obstructive (retention and voiding difficulty) symptoms⁽⁶⁾. SVCU is the gold standard diagnostic technique. In addition, X-ray examination of the whole pelvis not only reveals the presence of pelvic branch fracture or pubic symphysis diastasis, but also of foreign bodies⁽⁷⁾. Flowmetry is barely useful when these lesions do not have an obstructive pattern, and cystoscopy may not be fully conducted, so establishing the exact length and location can prove particularly difficult⁽⁸⁾.

However, given that SVCU provides no information on soft tissues, urethral ultrasound imaging with saline solution insufflation distending the urethral lumen is indicated for diagnostic purposes⁽⁹⁾. In clinical case 2, ultrasound imaging helped fine-tune the initial diagnostic suspicion at SVCU by providing specific data on the urethral diverticulum, which allowed surgery to be scheduled with endo-urological instruments.

Once diagnosis has been achieved, freeing the urethra from stricture and avoiding incontinence, impotence, new diverticula, and urinary fistulas are the main objectives in the treatment of urethral lesions.

Suprapubic catheter placement and subsequent late urethral reconstruction have been widely adopted given the poor results achieved with immediate repair. There is no clear evidence regarding when specifically deferred surgery should be performed. 3- to 6-month periods following trauma could be more favorable than 1- or 2-month

periods, since urethral healing has demonstrated to take up to 6 months in hypospadias repair surgery⁽¹⁰⁾.

End-to-end urethral anastomosis following stricture or diverticulum removal, such as in our experience, is the most effective treatment as long as it is anatomically feasible. If the suture is not free from tension, Voelzke et al. recommend an oral mucosal graft is interpositioned to avoid subsequent penile shortening⁽¹¹⁾.

In adults, a study on deferred reconstruction success rates showed re-stricture in 11-30% of cases, incontinence in 90-95% of cases, and impotence in 62-68% of cases⁽¹²⁾. However, there is considerably less experience with children. The longest series, which consisted of 68 children treated with deferred surgery, demonstrated a 90% success rate⁽¹³⁾.

Data from recent studies are a cause for optimism. Baradaran et al.⁽¹⁴⁾ analyzed 15 patients treated with urethroplasty during childhood. They all were able to urinate through the urethra, they did not require catheters or medication (anticholinergics or alpha-blockers), and they had no erectile dysfunction. In Waterloos et al.'s series⁽¹⁵⁾, which consisted of 18 pediatric patients, erectile dysfunction was found in 33% of cases, while post-void dribbling was noted in 25% of cases. According to the authors, such urinary symptoms stem from the dissection of the bulbar spongy muscle during urethroplasty, which hinders urethral compression right after voiding.

In our two cases, deferred management apparently proved successful. No immediate complications were recorded, but a close patient follow-up will be required to learn about their functional situation at adulthood.

CONCLUSION

The aforementioned urethral trauma have a wide array of presentations and a low incidence.

Serial voiding cystourethrogram remains the gold standard diagnostic technique in urethral trauma, but the development of urethral ultrasound imaging helps characterize the lesion.

Deferred urethroplasty has satisfactory clinical results, but it is associated with a risk of incontinence and impotence.

REFERENCES

1. Tarman GJ, Kaplan GW, Lerman SL, et al. Lower genitourinary injury and pelvic fractures in pediatric patients. *Urology*. 2002; 59: 123-6.
2. Koraitim MM, Marzouk ME, Atta MA, et al. Risk factors and mechanism of urethral injury in pelvic fractures. *Br J Urol*. 1996; 77: 876-80.
3. Koraitim MM. Posttraumatic posterior urethral strictures in children: a 20-year experience. *J Urol*. 1997; 157: 641-5.
4. Pichler R, Fritsch H, Skradski V, et al. Diagnosis and Management of Pediatric Urethral Injuries. *Urol Int*. 2012; 89: 136-42.
5. Goldman SM, Sandler CM, Corriere JN, et al: Blunt urethral trauma: a unified, anatomical mechanical classification. *J Urol*. 1997; 157: 85-9.
6. Kaplan GW, Brock JW, Fisch M, et al. SIU/ICUD Consultation on Urethral Strictures: Urethral strictures in children. *Urology*. 2014; 83(3 Suppl): S71-3.
7. Pavlica P, Barozzi L, Menchi I. Imaging of male urethra. *Eur Radiol*. 2003; 13: 1583-96.
8. Angermeier KW, Rourke KF, Dubey D, et al. SIU/ICUD Consultation on Urethral Strictures: Evaluation and follow-up. *Urology*. 2014; 83(3 Suppl): S8-17.
9. Morey AF, McAninch JW. Sonographic staging of anterior urethral strictures. *J Urol*. 2000; 163: 1070-5.
10. Podesta M, Podesta M Jr. Delayed surgical repair of posttraumatic posterior urethral distraction defects in children and adolescents: long-term results. *J Pediatr Urol*. 2015; 11(2): 67.e1-67.e6.
11. Voelzke BB, Breyer BN, McAninch JW. Blunt pediatric anterior and posterior urethral trauma: 32-year experience and outcomes. *J Pediatr Urol*. 2012; 8(3): 258-63.
12. Elliott, DS, Barret DM. Long-term followup and evaluation of primary realignment of posterior urethral disruptions. *J Urol*. 1997; 157: 814.
13. Boone, TB, Wilson WT, Husmann DA. Postpubertal genitourinary function following posterior urethral disruptions in children. *J Urol*. 1992; 148: 1232.
14. Baradaran N, McAninch JW, Copp HL, et al. Long-term follow-up of urethral reconstruction for blunt urethral injury at a young age: urinary and sexual quality of life outcomes. *J Pediatr Urol*. 2019; 15(3): 224.
15. Waterloos M, Verla W, Spinoit AF, et al. Urethroplasty for urethral injuries and trauma-related strictures in children and adolescents: a single-institution experience. *J Pediatr Urol*. 2019; 15: 176.e1-176.e7.