Case Report

Anterior urethral trauma in a 5-year-old boy

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Case

A 5-year-old boy presented to his local emergency department following a straddle injury after falling from the monkey bars at his school playground. Although he was able to void spontaneously, he experienced ongoing penile discomfort, dysuria, gross hematuria and several hours of persistent urethral bleeding. He was urgently transferred from the peripheral community hospital to our tertiary care centre for assessment of possible urethral trauma. He was otherwise healthy and on no medications.

At our centre, he had a normal appearing urinary meatus and minimal active bleeding. The exam was limited by his physiologic phimosis. His primary and secondary surveys were otherwise unremarkable, and his vitals were within normal range. An abdominal examination was benign, and his bladder was non-palpable. Testicular exam revealed normal testicles which were descended bilaterally with no obvious edema. No perineal bruising was appreciated. Bruising was noted on the left inner thigh.

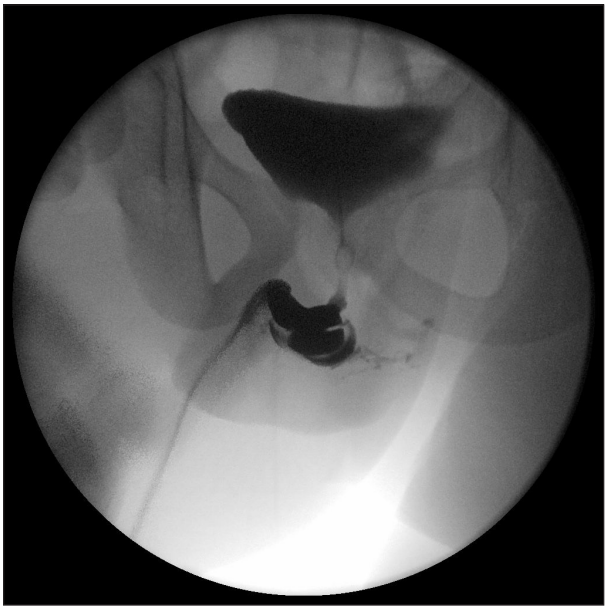

Figure 1. Voiding cystourethrogram at the time of presentation, demonstrating contrast extravasation around the membranous urethra in keeping with an incomplete tear of the bulbar urethra.

Due to ongoing bleeding per urethra, he was urgently brought to the operating suite for retrograde urethrogram (RUG) and cystoscopy to evaluate for a possible urethral injury. At that time, he was found to have extravasation of contrast at the membranous urethra on RUG (Figure 1). Contrast entered the bladder easily and a ventral defect was identified with urethroscopy at the bulbo-membranous urethral junction without any defect to the posterior urethra. Cystoscopy revealed a normal bladder. A 12-French suprapubic catheter was placed under direct visualization. An 8-French urethral catheter was inserted over a wire without difficulty to tamponade ongoing urethral bleeding. Antibiotics and an anti-spasmodic (oxybutynin) were initiated. His urethral catheter was removed the following day. He demonstrated no signs of infection or further urethral bleeding post-operatively and was discharged home with the suprapubic catheter in place to straight drainage.

A cystogram on post-operative day 14 revealed opacification at the ventral aspect of the bulbous urethra. This was interpreted by the radiologist to be an opacification of the Cowper's gland rather than a traumatic pseudodiverticulum (Figure 2). He voided without pain during the voiding cystourethrography. A trial of voiding was given by clamping the suprapubic catheter. However, the patient developed severe dysuria with voiding and required subsequent unclamping of his suprapubic catheter. Twenty-four days after his surgery, he was reassessed and found to have a normal voiding cystogram with no dysuria or discomfort. His suprapubic catheter was clamped, and he began voiding spontaneously without symptoms.

Two months post-operatively, the patient reported normal voiding without dysuria or hematuria. Uroflowmetry was performed which demonstrated a voided volume of 240 mL. He had a slightly flattened and prolonged voiding curve with a borderline obstructive picture. His post-void residual was 25 mL with a normal stream. Follow-up with repeat uroflowmetry and a post-void residual is booked.

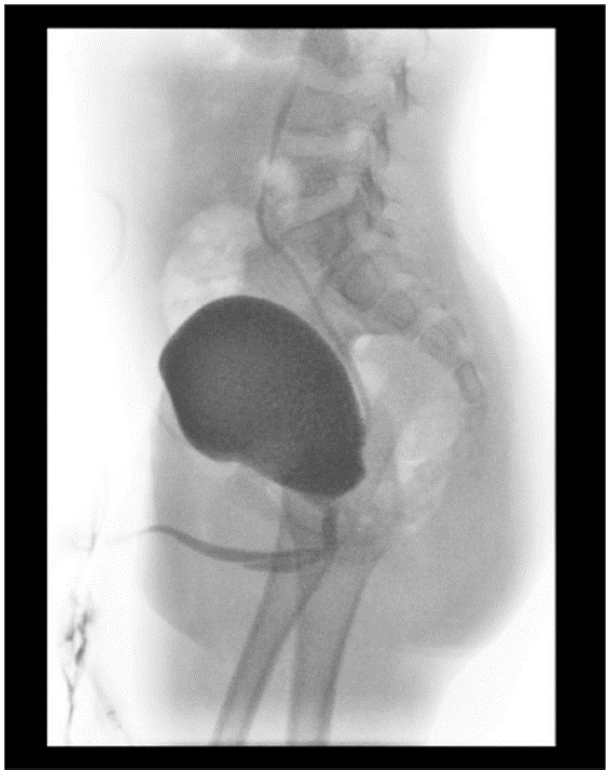

Figure 2. Voiding cystourethrogram on post-operative day 14 demonstrating a shuttle-shaped opacification at the junction between the pubis and membranous urethra which did not impede the flow of urine through the anterior urethra, thought to represent opacification of Cowper's Gland. Right vesicoureteral reflux was also noted.

Discussion

Urethral injuries are classified depending on their location. Anterior urethral injuries include the penile or bulbar urethra and are uncommon, accounting for one third of urethral injuries[1]. However, blunt trauma from straddle injuries often results in this type of crushing injury due to the proximity of the symphysis pubis in males. Posterior urethral injuries are frequently associated with pelvic fractures and have been reported to occur in 0.6-10% of pediatric pelvic fracture cases[2,3]. When urethral injury is suspected, physical exam often reveals blood at the urethral meatus or bruising of the perineal area, and a high riding prostate can be palpated in adult patients. The definitive diagnosis must be achieved by RUG as was done in our case[4-6].

The lack of literature and consensus guidelines for the treatment of straddle injuries in pediatric populations lead us to extrapolate treatment plans from adult data for our patient[1,4,5]. Moreover, posterior injuries are more common and treatment approaches often focus on posterior insults and pelvic fracture management, which was not applicable in this case. Our patient was managed with suprapubic catheterization, which is currently the recommended treatment approach for incomplete anterior urethral trauma cases[4,5]. The goal of this treatment is urinary diversion to promote healing, prevent abscesses or infection and primarily to decrease the likelihood of stricture formation. Stricture formation is very common from straddle injuries with urethral trauma and significant damage to the corpus spongiosum may require urethral reconstruction[1,5]. Urethroplasty for stricture repair has demonstrated good long-term success rates in 15 children investigated by Baradaran et al., including 7 straddle injuries to the bulbar urethra with no reported cases of urinary incontinence or erectile dysfunction[7].

Surveillance for stricture formation is vital and should be assessed three months after the initial injury to ensure adequate tissue healing[1]. Due to the ongoing urethral bleeding, we elected to leave a urethral catheter in overnight to tamponade the bleeding, but planned to use the suprapubic catheter for long-term diversion.

Primary realignment has also been a proposed treatment, and despite quicker times to symptom-free spontaneous voids having been documented with this approach, it appears to serve a better role for complete injuries or penetrating trauma[8,9]. While literature is scant for this type of injury, there is a growing consensus to avoid primary realignment due to worse outcomes, which are thought to be related to increased iatrogenic trauma at the time of the repair[10,11]. Small scale studies have documented suprapubic catherization to have lower rates of stenosis, with rates as low as 11% for incomplete disruptions compared to 67% when treated with primary realignment[10]. Although there remains a role for primary realignment, the higher rates

Figure 3. Normal Voiding cystourethrogram on post-operative day 24.

of impotence and incontinence observed with this treatment option make it less favorable than cystotomy, which has been shown to have satisfactory outcomes historically[12,13].

In summary, in treating incomplete anterior urethral trauma in pediatrics, we found that an approach mimicking the recommended treatment for the same injury in adults resulted in a good outcome in the early post-injury period. Our case highlights the role of short-term urethral catheterization to tamponade ongoing hematuria if necessary. Due to the rarity of pediatric urethral trauma, it is important to report approaches and outcomes in these patients to help guide clinical decision-making. Prolonged urinary diversion to ensure appropriate healing time may be longer for children in comparison to adults based on this case, however more evidence is needed to support this observation. Long-term follow up will require monitoring for complications such as incontinence, impotence and most importantly voiding dysfunction related to stricture formation from the urethral injury.

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