Giant urethral stone presenting as a scrotal mass: Case report

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ABSTRACT

Primary urethral stones are a rare form of urolithiasis accounting for less than 0.3% of urinary stones. We are reporting a case of a giant primary urethral stone that developed in the penile urethra resulting from a post-surgical complication of urethral stricture. The patient presented with difficulty urinating, ejaculatory dysfunction, and a hard palpable scrotal mass.

CASE REPORT

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A 30-year-old male patient presented with difficulty urinating, ejaculatory dysfunction, and a palpable scrotal mass. He denied erectile dysfunction. The patient reported a history of penile reconstruction surgery approximately ten years prior following penile and perineal laceration injuries. During the patient's early post-operative course, he complained of difficulty urinating and urinary dribbling and was found to have a urethral stricture. This was initially managed with urethral dilatation procedures, but these did not improve the patient's symptoms. Therefore, six months later, he underwent another penile surgery including urethral reconstruction, which included a bypass of the native urethral stricture. This surgery relieved the patient's symptoms until only recently when he presented with difficulty urinating, ejaculatory dysfunction, and a hard palpable scrotal mass.

On physical exam, surgical scars were seen superficially over the penis. There were no signs of urethral discharge, penile or scrotal erythema, or inflammatory changes. Palpation revealed a hard, non-tender scrotal mass.

Ultrasound examination of the scrotum was obtained which identified a rounded, calcified extra-testicular mass measuring 17 mm (Fig. 1). A retrograde urethrogram was subsequently performed, which revealed an approximately 2 cm filling defect, most likely to represent a urethral stone, partially obstructing the distal aspect of the reconstructed urethra (Fig. 2). Contrast passed through the long segment stricture of the native urethra and within the reconstructed urethra only following high pressure injection. Voiding cystourethrogram demonstrated obstruction to urinary flow (Fig. 2-c). Ultrasound of kidneys and urinary bladder were negative for stones.

Perineotomy was later performed and the stone retrieved; the stone was composed predominantly of calcium oxalate. Patient was discharged three days following surgery. On the three month follow-up visit following surgery, the patient reported improvement in the urinary flow.

DISCUSSION

Primary urethral stones are a rare form of urolithiasis accounting for less than 0.3% of urinary stones, but with greater prevalence in developing countries [1]; they occur more commonly in males. Urethral stones in general, affect children more often than adults, due to the higher prevalence of bladder stones in this age group [2]. Predisposing factors for in situ development of urethral stones include the presence of urethral

diverticula, urethral strictures, hypospadias, and meatal stenosis [3, 4, 5, 6].

Long-term management of benign urethral strictures is challenging with a high incidence of recurrence. Difficulties which affect the success of urethral reconstruction following surgery include compromised blood supply, fibrosis, and tissue availability [7]. Reported complications following urethroplasty are as follows: recurrent stricture, infection, fistula, post-void dribbling, and rarely, the development of urethral stones [5, 8].

Following the initial penile reconstruction for traumatic injury, our patient underwent multiple unsuccessful treatments of internal urethrotomies and dilatations. He was ultimately treated surgically with urethral reconstruction which bypassed the stricture. A clinically non-significant narrowing at the level of the distal anastomosis developed which resulted in urinary stasis, and likely triggered the production of a large stone proximal to the stenotic segment. During the early stages of stone formation, two factors may have prevented its elimination. Slow and altered urinary flow proximal to the narrowed segment could not generate enough force to propel the stone distally. Secondly, gravity may have caused the stone to be retained within a dependent location in the pre-stenotic dilated segment of urethra not allowing it to pass. The possibility of stone migration from the upper urinary tract with it subsequently becoming trapped within the urethra was considered unlikely as the patient denied any history of urinary colic and he was found to have no renal stones.

Urethral imaging has not been widely covered in the radiological literature as this area is often studied by urologists with clinical or endoscopic examinations. Retrograde urethrography is considered the best initial study for anterior urethral and periurethral imaging in men for the evaluation of urethral injury, stricture, and fistula formation. It is also the best imaging study to detect urethral stones, usually seen as rounded filling defects [9,10]. On a pre-procedural scout image, the stone may also be seen prior to the administration of contrast as noted in our patient. The differential diagnosis of filling defects seen on retrograde urethrogram includes most commonly air bubbles introduced during contrast injection, soft tissue tumors or stones. Voiding cystourethrography is currently the most commonly used imaging modality to evaluate the female urethra and posterior male urethra [10].

Cross sectional imaging modalities, including MRI and CT, can be used as adjuncts to the studies described, but are most useful for evaluating periurethral structures. On CT scan, urethral stones will appear as calcific densities projecting along the course of the urethra; on MR urethrogram or standard MRI of the pelvis, they will appear as filling defects or signal voids, respectively. MRI is emerging as an important imaging technique for the urethra and periurethral soft tissues given its superb soft tissue contrast and multiplanar imaging capability; it has been utilized for the evaluation of urethral diverticula, urethral tumors, periurethral cysts, and for visualization of lesions outside the urethra, including the perineum [9]. Ultrasound is less commonly utilized, but it is able to evaluate the urethral mucosa and periurethral tissues with possible detection of strictures, diverticula, trauma, and tumors without the use of ionizing radiation [9].

TEACHING POINT

Although extremely rare, primary urethral stones frequently complicate urethral pathologies, including strictures and diverticula. Besides the usual urinary symptoms, long standing bulbous urethral stones can grow in size and be palpated as hard scrotal masses at the level of the penoscrotal junction, and the diagnosis can be confirmed by retrograde urethrogram.

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FIGURES

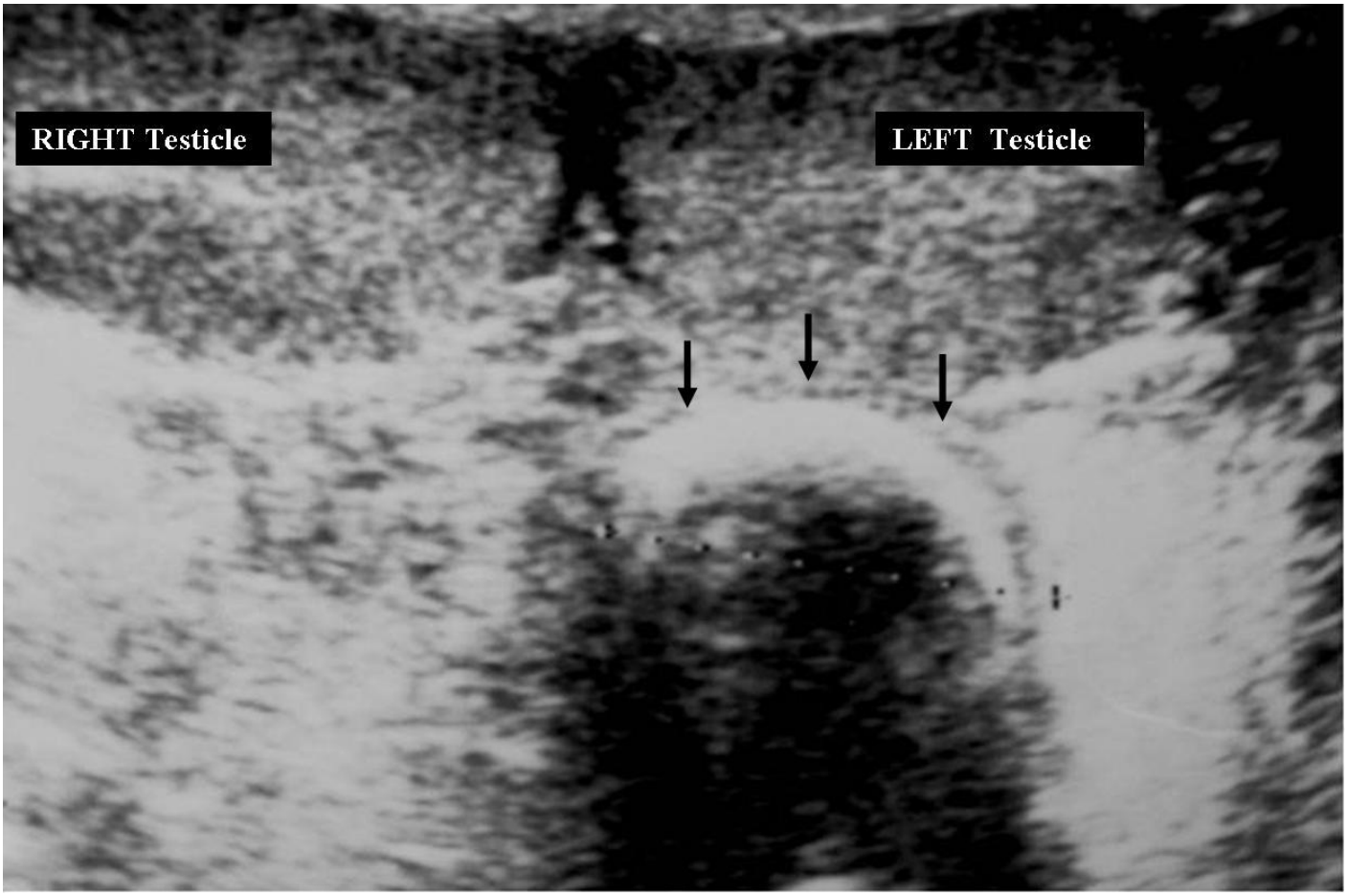

Figure 1. 30-year-old male patient presented with difficulty urinating, ejaculatory dysfunction, and a palpable scrotal mass which turned out to be a giant urethral stone. Grayscale ultrasound image of the scrotum shows a 17 mm extra-testicular, curvilinear, hyperechoic structure (black arrows), with associated posterior shadowing. Both testicles are unremarkable. (Transducer: 7.5 MHz, Linear)

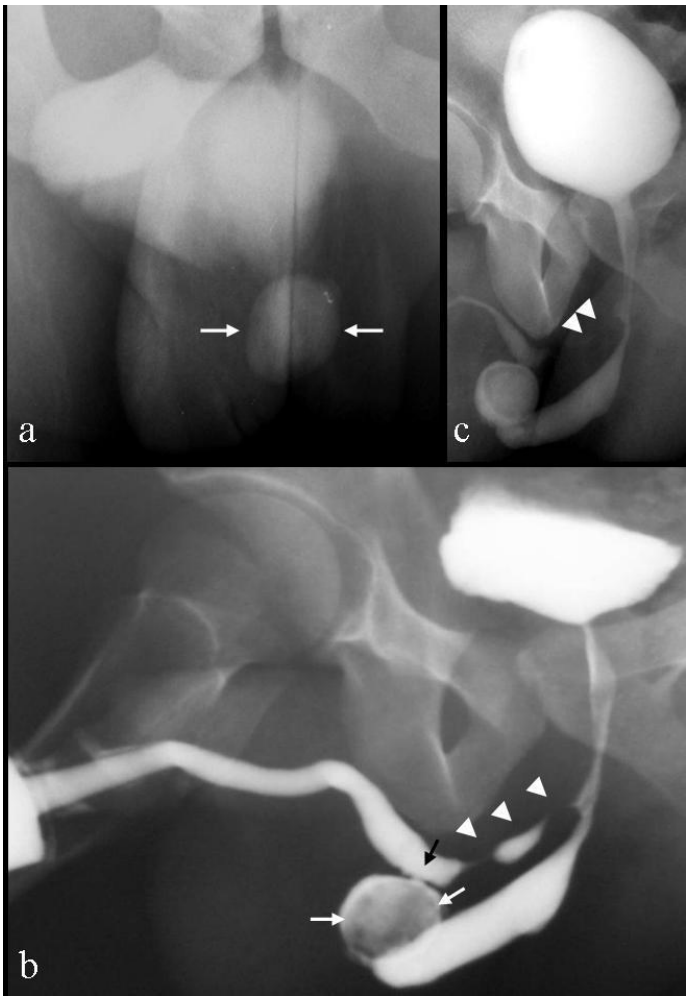

Figure 2. 30-year-old male patient presented with difficulty urinating, ejaculatory dysfunction, and a palpable scrotal mass which turned out to be a giant urethral stone. Retrograde urethrogram: (a): control radiograph shows a homogeneously calcified rounded mass projecting over the scrotum (white arrows). (b): during retrograde filling, a long segment stricture is demonstrated at the level of the native bulbous urethra (white arrowheads) and an approximately 20 mm round filling defect, that corresponds to the calcified mass, identified within the reconstructed urethra (white arrows), proximal to a narrowed anastomosis (black arrow). (c): voiding urethrogram shows partial obstruction to urinary flow with disproportionate dilatation of the urethral segments proximal and distal to the stone. Only trace contrast noted across the stricture (white arrowheads).

ABBREVIATIONS

cm: Centimeters
mm: Millimeters
CT: Computed tomography
MRI: Magnetic resonance imaging

KEYWORDS

Urethral stone, scrotal mass, urethral stricture, urethroplasty