

Urethral pseudodiverticulum secondary to penile fracture and complete urethra dissection

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Abstract

A 22-year-old man reported cracking sound and acute pain during sexual intercourse followed by rapid penile detumescence and ecchymosis. He experienced more pain because he could not urinate and had a palpably full bladder. Moreover, his urethra was bleeding. Physical examination revealed swollen, ecchymotic and deviated penis and penis ultrasonography showed an injury of the tunica albuginea and Buck's fascia with an expanding hematoma. Suprapubic catheter was positioned. Surgical exploration revealed a tear of tunica albuginea of both corpora cavernosa and complete urethral dissection. End-to-end urethral anastomosis and suture of corpora cavernosa lesion were performed. Vesical catheter was maintained for 6 days and suprapubic catheter for 3 months to allow a complete urethral healing. A pseudodiverticulum was found at anastomosis level on the urethrocistography 1 month after surgery. It disappeared by allowing micturition via the suprapubic catheter. The patient presented regular urinary flow and physiological erections 30 days later. In our experience, prompt surgical repair preserved erectile function and keeping the suprapubic catheter protected the urethra; this was the correct management for repairing the urethral lesion.

Introduction

Penile fracture involves an erect penis and is caused by tearing or cracking the corpora cavernosa.¹ It may be associated with urethra rupture and injury of the dorsal nerve and vessels. Sexual intercourse is the most common cause, though masturbation has also been reported as a cause. At the time of injury, patients typically notice a cracking sound and penile pain, associated with a sudden loss of erection and/or hematuria.² Tunica albuginea is one of the strongest fascia in the human body, but it significantly stretches during erection (it is up to 2.4 mm thick in the flaccid state, but becomes as thin as 0.25 to 0.5 mm during erection).

An intracorporal pressure of 1500 mmHg or more during erection may tear the tunica albuginea.^{1,2}

Case report

A 22-year-old man presented to the emergency department with a history of sudden cracking sound and acute pain during sexual intercourse followed by rapid detumescence, penile swelling and ecchymosis. Pain was increased by the impossibility to urinate; therefore he had a palpably full bladder. Moreover, his urethra was bleeding. Physical examination revealed swollen, ecchymotic and deviated penis. Penis ultrasonography showed injury of the tunica albuginea and Buck's fascia and expanding hematoma.

Suprapubic catheter was positioned to empty the bladder. The patient underwent immediate surgical exploration and repair of the fracture. This repair was performed through circumferential subcoronal incision; degloving and hematoma evacuation were carried out showing a tear of the tunica albuginea of both corpora cavernosa and complete urethral dissection (Fig. 1, part a). After minimal debridement and mobilization of proximal and distal corpus spongiosum, the urethra was spatulated. Two 2/0 Vicryl interrupted sutures were used to repair the lesion, performing a T-T anastomosis on one single layer by tension-free fashion (Fig. 1, part b). A 18 Ch Foley catheter was inserted and maintained for 6 days. In the end, a containment bandage was positioned by Fisto-Blok. Patient was given antibiotic and anti-edema therapy. A simildiverticular formation was found at the T-T anastomosis level by dynamic and mictional ultrasonographic exam 1 month after surgery. This entity was confirmed by mictional urethrocistography like a ventral spreading of contrast (Fig. 2, part a). For this reason, the suprapubic catheter was maintained for an additional month and micturition was permitted with this device. Two months after surgery, the urethrocistography exam showed complete disappearance of contrast spreading and the development of a stricture at the T-T anastomosis level (Fig. 2, part b). During the subsequent follow-up, the patient presented

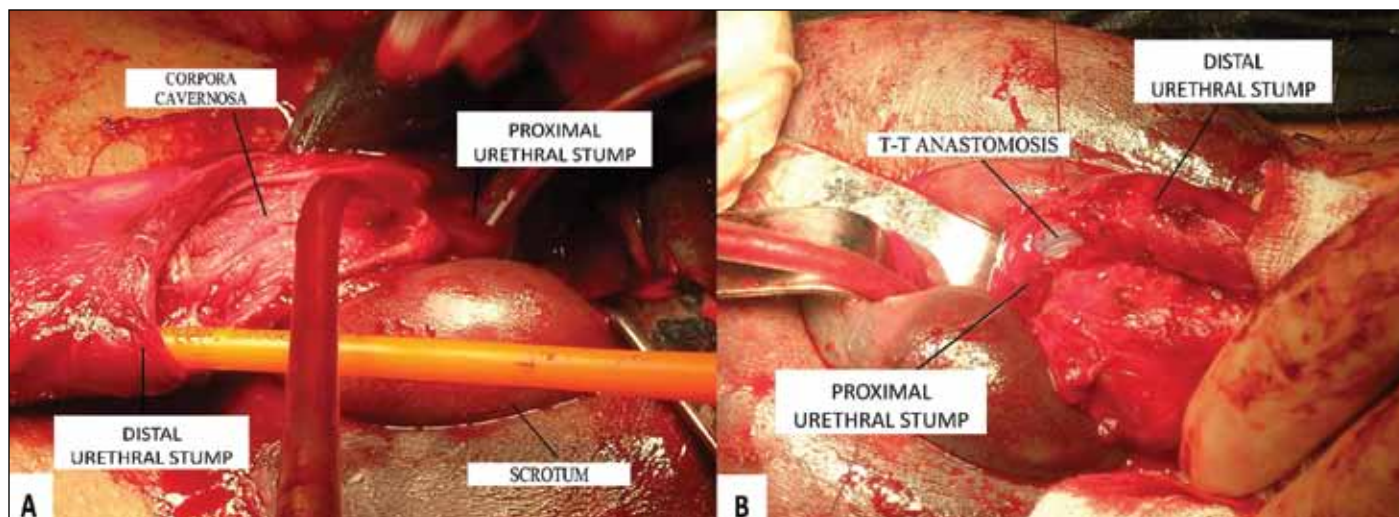


Fig. 1. A: Tear of the tunica albuginea of both corpora cavernosa and complete urethral dissection. B: Urethral end-to-end anastomosis performed by tension-free interrupted sutures.

normal uroflowmetry (QMax 17.4 mL/sec; Vcomp 250 mL) after restarting micturition “per uretram,” but the suprapubic catheter was maintained for other 20 additional days. The 3-month uroflowmetry showed a Qmax of 20.3 mL/sec and the patient reported normal spontaneous erections and he resumed sexual activity 4 months later.

Discussion

Erection converts the safe, flaccid penis into a vulnerable organ and the tunica thins out from 2.4 mm to 0.5

0.25 mm.^{1,2} It requires a pressure in excess of 1500 mmHg to achieve rupture.³⁻⁵ Sexual intercourse and penile manipulation are the most common causes of penile fracture.

Cavernosography may be performed to find the tear in the tunica albuginea, but it may present false negative results because of blood clot formation at the defect level. Penile ultrasound can be used to assist the diagnosis of penile fracture; it can be easily performed, is non-invasive and useful in determining localized sub-Buck’s fascia hematoma due to injury or to causes other than tunical tear.⁶ Also magnetic resonance (MR) imaging is potentially useful to assess the

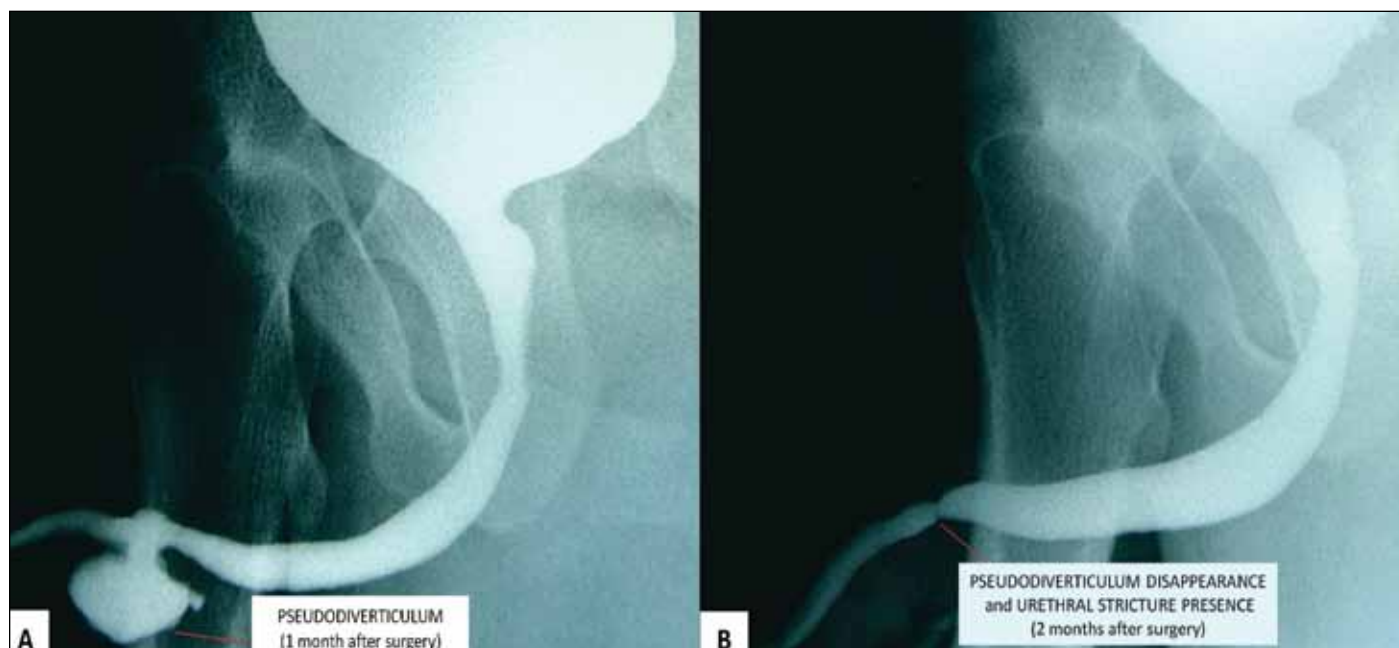


Fig. 2. A: Mintional urethrocinistography showing a ventral spreading of contrast. B: Urethrocinistography showing complete disappearance of contrast spreading and presence of a stricture at the anastomosis level.

penile rupture; the key finding is disruption of the low-signal intensity tunica albuginea, which is well-seen on both T1 and T2 weighted images, although T1 weighted sequences may detect more subtle fractures.⁷

Treatment may be either conservative or immediate surgery. The conservative management of penile fracture includes splinting, cold compresses and a combination of anti-inflammatory, analgesic medication and fibrinolytics. However, long-term outcomes for conservative management demonstrated significant complication rates, such as curved or painful erection, erectile dysfunction, artero-venous fistula, infection and plaque formation (like Peyronie's syndrome). Comparing surgery and conservative management in 42 patients, Yapanoglu and colleagues observed complications in 0.8% to 2% and 10% to 40.7%, respectively.⁸ Similarly, other authors suggest early surgical repair as standard treatment, observing different rates of urethral injuries.^{6,9-17} After immediately repairing 322 penile fractures, Derouiche and colleagues reported only 10 urethral sections.⁶ Zaargoshi, however, showed an incidence of urethral lesion with corpora cavernosa fracture of 38% and the absence of these features did not exclude the possibility of urethral involvement.⁹

Another study reported on 15 patients who underwent immediate surgical exploration; 4 of these had urethral injuries with no complications at 7.5 month follow-up. This underlines the fact that further evaluation beyond history-taking and a clinical examination are not necessarily useful.¹⁰ Moreno Sierra and colleagues claim that complementary tests, such as ultrasound, are helpful but not definitive in their experience with emergency surgical repair on 15 patients (only 1 case with complete urethral fracture).¹¹ In 14 patients with concomitant urethral rupture treated surgically, El-Assmy and colleagues reported no harmful long-term sequelae on urethral and erectile function in most patients and only one relative urethral narrowing post-surgery.¹²

Several techniques have been proposed, such as penile degloving (with circumferential or subcoronal incision); longitudinal incision over the haematoma; inguinoscrotal incision; high-scrotal midline incision on the raphe; and suprapubic incision. We preferred the subcoronal circumferential incision with penis degloving because of the excellent exposure of corpora cavernosa and urethra, which allowed to detect accidental urethral injuries (in our case the ultrasound did not detect urethral rupture).

In our experience (15 cases in 5 years), penile fracture occurred during vigorous sexual intercourse, but the urethra was never compromised. The latest may be suspected when voiding difficulty is present or with hamaturia and/or blood from the meatus. Moreover, our patient reported a pseudo-diverticulum formation on the uretrocistography showing a ventral contrast spreading. To our knowledge, this is the first

case to be reported in the literature. Functional rest allowed a complete disappearance of leakage and urethra healing with persistence of a slight stricture at T-T anastomosis controlled by uroflowmetry during the subsequent follow-up. This finding changed our management because it did not reveal a post-surgery diverticulum.

Conclusion

Penile fracture is a urological emergency. An effective diagnosis of penile fracture can be based on medical history, physical examination and imaging tests, such as ultrasound and magnetic resonance imaging. In our experience, prompt surgical repair preserved erectile function and keeping suprapubic catheter protected the urethra.

Competing interests: None declared.

This paper has been peer-reviewed.

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