

## Case Report

# Tri-tubular penile fracture: A case of complete rupture of urethra and bilateral corpus cavernosa

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**Introduction:** Tri-tubular penile fracture is a very rare subset of penile fractures, typically due to high-energy trauma to the erect penis.

**Case presentation:** A 26-year-old healthy man presents with a triad of audible crack, immediate detumescence, and hematoma formation, following blunt trauma sustained during vaginal sexual intercourse. A diagnosis of penile fracture is made, with intraoperative finding of a complete traumatic transection of the urethra with total bilateral corpus cavernosa disruption. Both corpora cavernosa were repaired using 2/0 polydioxanone sutures, with the dartos fascia placed in between. The urethra was repaired with interrupted 5/0 polyglactin braided absorbable suture. At 5 weeks, patient reported normal erections and sexual activity with no physical or psychological issues. The literature on management was reviewed.

**Conclusion:** Current evidence of surgical management of tri-tubular penile fractures remains predominantly expert opinion, due to difficulties of conducting prospective trials for a rare condition.

**Key words:** corpus cavernosa, penile fracture, tri-tubular, urethra rupture.

## Keynote message

A rare case of tri-tubular penile fracture, involving both corpus cavernosa and urethra. Though surgical repair has become the gold standard of treatment, the exact method of how to repair, using what to repair, and what follow-up should be provided remains uncertain, as level of evidence in the literature continues to be primarily expert opinion.

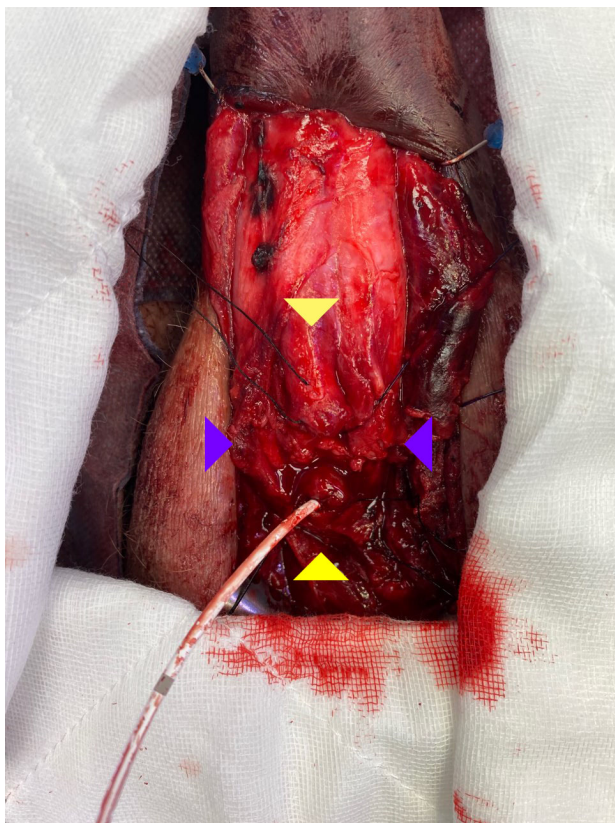
## Case presentation

A 26-year-old fit and healthy man presented to the Emergency Department with sudden onset penile pain during vaginal sexual intercourse. He had been attempting to repenetrate his erect penis, when he thrust against his partner's perineum and felt his penis "bend and pop." This was associated with extreme pain and immediate detumescence, followed by penile swelling and an inability to void. He had no past history of previous penile deformity or urethral injury. Consent has been obtained from the patient for the publication of the case.

On examination, he had normal vital signs and a soft nontender abdomen. Penoscrotal examination revealed a flaccid uncircumcised penis with significant swelling, ecchymosis ("eggplant deformity") and mild penile curvature to the right side. There was blood at the meatus. Bladder scan found 465 mL in his bladder.

A clinical diagnosis of penile fracture with urethral injury was made and he was taken to emergency operating room for surgical repair.

On table flexible urethroscopy revealed a urethral injury 12 cm from the urethral meatus. A midline penoscrotal incision was made, and the corpus spongiosum and both corpora cavernosa were exposed. A complete traumatic transection of the urethra was encountered with total bilateral corpus cavernosa disruption (Fig. 1). Hematoma was evacuated, and both corpora cavernosa were closed using 2/0 polydioxanone sutures, with the dartos fascia placed in between. The urethra was repaired with interrupted 5/0 polyglactin braided absorbable suture. Artificial erection and leak test confirmed a watertight closure of the corpora.



**Fig. 1** Intraoperative photograph of the ventral penile shaft and scrotum. The penile shaft has been retracted cephalad (top of image) and skin edges of the midline penoscrotal incision have been retracted laterally (left and right of image) for exposure. The corpus spongiosum (yellow arrows) can be seen completely transected with a white urethral catheter marking the proximal opening of the transected urethra. The transected corpus cavernosa with the distal jagged ends are in view (purple arrows).

A 14-Fr indwelling catheter was placed. The wound was irrigated and surgical incision was closed in layers.

The patient was discharged home on postoperative Day 2 and was advised to abstain from sexual intercourse for at least 6 weeks. Postoperative reviews in the clinic on Days 5 and 29 were unremarkable and his wounds were healing well. At 4 weeks, he underwent a retrograde pericatheter urethrogram which showed no extravasation from the urethral repair and the indwelling catheter was removed. At 5 weeks, through telehealth, the patient reported that he was doing well with usual erections and had resumed normal sexual activity without any physical or psychological issues. Patient did not attend any further follow-up appointments.

## Discussion

Tri-tubular penile fracture with complete urethral and bilateral corpora rupture is a rare urological condition. So far only 61 cases have been reported in the literature over the last two decades, which have all occurred due to the erect penis sustaining high-energy trauma during vaginal or anal sexual activity.<sup>1–8</sup> Notably, bilateral corpus injury is inevitably associated with urethral injury.<sup>8</sup> Clinical history typically presents with the full triad of an audible crack, immediate

detumescence, and hematoma formation. Presence of urethral bleeding, blood at meatus, and urinary retention are highly suggestive of urethral injury, though absence of these features does not exclude urethral injury.<sup>2</sup>

Retrograde urethrogram or other radiological imaging modalities were historically utilized to assess and diagnose urethral injury preoperatively, as it was an indication for surgical repair at a time when penile fractures were still being managed conservatively. Currently, radiological imaging is recommended if the presentation is atypical or there is a need to rule out urethral injury. Otherwise clinical assessment has become the mainstay of diagnosing penile fractures with urethral injuries.<sup>3,7</sup>

Early surgical repair with primarily urethroplasty is the current standard of care, as it results in significantly fewer complications compared to conservative treatment and produces more favorable outcomes with regard to long-term complications such as erectile dysfunction, penile curvature, and painful erections.<sup>2,3,9,10</sup> Intraoperative flexible urethroscopy may be performed to visualize the urethral defect. This is easily available and avoids delay to surgical repair compared to preoperative radiological imaging.<sup>2,6,7</sup>

Due to the rarity of tri-tubular penile fracture, there is a significant lack of multicenter or prospective trials, and thus management options are primarily derived from expert opinion and case studies.<sup>2</sup> Choice of incision depends on surgeon preference.<sup>2</sup> The traditional subcoronal degloving approach provides excellent anatomical exposure along the penile shaft, though at the expense of (i) greater tissue trauma, (ii) likely need for circumcision, and (iii) possibly greater postoperative penile edema.<sup>3,6–8</sup> More recent publications have begun advocating a penoscrotal incision for proximal urethral injuries in uncircumcised patients as it provides better access to the urethra while minimizing tissue dissection and trauma.<sup>6,7</sup>

Choice of suture material is again based on surgeon preference and experience.<sup>2</sup> The corpus cavernosum is commonly repaired with interrupted absorbable polyglactin sutures, ranging from 2/0 to 4/0.<sup>6,7</sup> Nonabsorbable sutures are generally avoided as they are associated with pain and palpable nodule formation.<sup>4</sup> The urethra is uniformly repaired with end to end, mucosa to mucosa, tension-free interrupted absorbable sutures, ranging between 4/0 and 5/0.<sup>1,6,7</sup> Kamdar *et al.* described additional placement of a sub-dartos flap between the corpora cavernosa and spongiosum repair to prevent fistula formation.<sup>6</sup> All repairs should be leak tested with artificial erection by engorging the corpora. Indwelling catheter has been placed in all cases of penile fracture with urethral injury, which were left for a variable duration of 7 to 21 days.<sup>1,3–7,10</sup> There is currently no consensus on the use of medications to suppress erections.<sup>6</sup>

Patients in these case reports were followed up at variable times of 1, 3, 6, or 12 months after injury.<sup>7</sup> Uroflowmetry and International Prostate Symptom Score are used to monitor patient outcomes. A retrograde urethrogram is performed if urine flow rates are <15 mL/s or there are significant symptoms which suggest the presence of a urethra stricture.

In conclusion, we reported a rare case of tri-tubular penile fracture with complete rupture of bilateral corpus cavernosa and urethra, who had a textbook clinical presentation.

## Conflict of interest

The authors declare no conflict of interest.

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## Editorial Comment

### Editorial Comment to Tri-tubular penile fracture: A case of complete rupture of urethra and bilateral corpus cavernosa

Penile fracture is a rare urological trauma caused by high-energy blunt penile injury, such as striking a female partner's perineum during sexual intercourse, accompanied by the rupture of the tunica albuginea of the corpora cavernosa.<sup>1</sup> Patients often notice a rupture sound immediately after the injury, followed by rapid pain and penile deformation. Approximately two-thirds of penile fractures occur on the proximal part of the penis (the so-called penoscrotal junction), and 80% of ruptures are on the ventral side.<sup>2</sup> A recent systematic review reported that bilateral rupture of the tunica albuginea of the corpus cavernosum occurs in 5–26% of penile fractures and is accompanied by urethral injury in 15% of the cases.<sup>2</sup> In addition, the rupture of the bilateral penile cavernous tunica albuginea is more likely to be associated with urethral injury.<sup>3</sup> Young *et al.* reported a case of complete rupture of the urethra and bilateral corpus cavernosa, which could be the most severe type of penile fracture.<sup>4</sup> The gold standard management for penile fractures is immediate surgical repair.<sup>2</sup> The ruptured tunica should be closed with interrupted absorbable sutures via circumcising or a penoscrotal midline incision. An accompanying urethral injury should also be repaired immediately by tension-free anastomotic urethroplasty, which is a common procedure for short bulbar urethral strictures.<sup>2</sup> The case of a tri-tubular penile fracture presented here was treated successfully by immediate reconstruction and achieved an excellent functional outcome.

This case report suggests an ideal treatment for a severe penile fracture, and general urologists should be aware of this treatment strategy.

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