

“Primary” bulbar urethral ischemic necrosis following pelvic fracture urethral injury: A rare surgical challenge

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ABSTRACT

Ischemic necrosis of the bulbar urethra in a patient with pelvic fracture urethral injury without a prior history of surgical intervention is extremely rare and results in long-segment obliterative strictures that are difficult to manage. Instead of the more traditional approach of vascular reconstruction followed by transpubic end-to-end urethroplasty, these patients are better managed by up-front urethroplasty with a tubed flap or as a staged procedure with grafting and tubularization. Herein, we report a case of primary bulbar urethral ischemic necrosis due to pelvic fracture managed with tubularized preputial flap (McAninch flap) urethroplasty.

INTRODUCTION

Ischemic necrosis of the bulbar urethra is rarely reported after the failed surgical management of pelvic fracture urethral injuries. Of all the patients who undergo surgical repair, around 9% develop ischemic necrosis of the bulbar urethra.^[1] The primary urethral injury at the bulbomembranous junction, following the pelvic fracture, results in the disruption of the antegrade vascular supply of the bulbar urethra. Ischemic necrosis occurs when the retrograde supply from the dorsal penile artery is also compromised, either because of a congenital defect such as hypospadias, or more commonly due to the iatrogenic injury to the circumflex arteries, or the dorsal penile arteries resulting from either an overzealous urethral mobilization, or from the inferior pubectomy during the surgical repair.^[2] Very rarely, the ischemic necrosis of the bulbar urethra can result from the primary pelvic fracture associated with vascular injury itself.^[1] Here, we report a case of ischemic necrosis of the bulbar urethra in a young male with pelvic fracture urethral injury without prior

surgical intervention managed by Mc-Aninch preputial tube to bridge the long segment defect.

CASE REPORT

A 24-year-old male met with a road traffic accident, following which he developed acute urinary retention with blood at the urethral meatus. There was no direct injury to the perineum or any other open wounds or fractures. On evaluation, he was found to have a pelvic fracture (bilateral superior and inferior pubic rami fracture) and underwent suprapubic catheterization as initial management, and the pelvic fracture was managed conservatively. Eight weeks postinjury, he presented to the outpatient department of our hospital with a suprapubic catheter *in situ* and on specific questioning complained of erectile dysfunction postinjury. He underwent a retrograde urethrography and micturating cystography, which revealed a long segment defect involving the bulbar urethra, with normal penile and prostatic urethra suggestive of ischemic bulbar urethral necrosis [Figure 1a]. On examination, he was not circumcised, and the external

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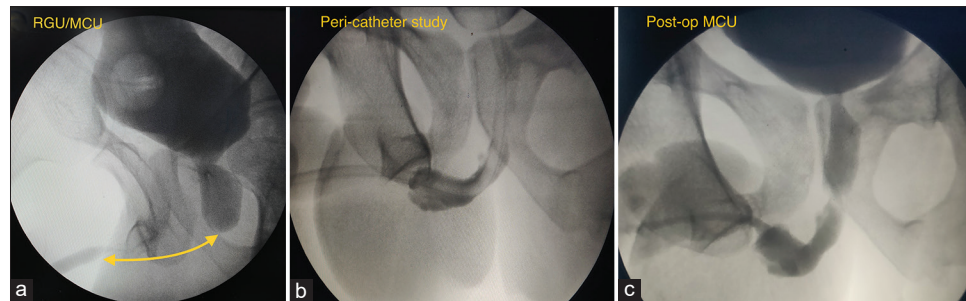


Figure 1: (a) Combined retrograde urethrogram and micturating cystourethrography depicting the length of the defect. (b) Pericatheter study depicting no leakage from the tubularized flap. (c) Postoperative micturating cystourethrography delineating the tubularized flap

genitalia was normal. An antegrade/retrograde urethroscopy was performed before the surgical management with a 17 Fr rigid cystoscope which revealed a normal anterior urethra till 12 cm from the external urethral meatus with complete obliteration proximally, whereas the antegrade urethroscopy revealed a normal bladder neck with multiple small stones in the posterior urethra and the verumontanum was visualized.

The patient was planned for progressive perineal urethroplasty, and a midline incision was used. After urethral mobilization, there was a 10 cm long defect extending from the bulbo-membranous junction to the penobulbar junction, and the whole of the bulbar urethra had undergone ischemic necrosis [Figure 2a]. As further mobilization of the penile urethra would have aggravated the ischemic insult and resulted in chordee, a decision to bridge the defect with a tube was taken. A crural separation was performed to ease the suture placement on the membranous urethra, but an inferior pubectomy was not performed as it was deemed that pubectomy would not lead to a further gain in length. A 3 cm wide transverse preputial flap was harvested over the dartos fascia and was raised till the penoscrotal junction. The flap and the dartos fascia were then split longitudinally in the dorsal midline, preserving the blood supply, and then were transposed ventrally and delivered into the perineum through a tunnel created at the penoscrotal junction. The flap was tubularized over a 16Fr silicone Foley catheter passed through the meatus and the flap was then anastomosed to the penile urethra in a continuous fashion [Figure 2b and c]. The proximal end of the tube was anastomosed to the membranous urethra with 10 interrupted sutures using the parachute technique [Figure 2d and e]. A suprapubic catheter was also kept. The postoperative recovery was uneventful and the patient was discharged on postoperative day 7. A pericatheter dye study was performed after 3 weeks which showed no leak, and per-urethral catheter was removed [Figure 1b and c]. He underwent uroflowmetry at 4th week which showed a maximum flow rate of 14 mL/s with voided volume of 150 mL. At the last visit, the patient was doing well.

DISCUSSION

Urethra has a dual blood supply and although the antegrade blood supply through the bulbourethral arteries is frequently

damaged in patients with pelvic fracture urethral injuries, the robust retrograde blood supply through the dorsal penile arteries maintains vascularity.^[2] Very occasionally, surgical insult damages this retrograde blood supply and results in long obliterative strictures of the bulbar urethra, called bulbar urethral ischemic necrosis. Rarely, the primary pelvic injury itself results in the disruption of the antegrade as well as the retrograde blood supply and the patient presents with primary bulbar urethral ischemic necrosis postpelvic fracture. In a large series of pelvic fracture urethral injuries, of 1700 patients, only three patients had bulbar urethral ischemic necrosis due to the primary injury itself.^[1]

Posttraumatic erectile dysfunction, can suggest a vascular compromise of the distal urethra and merits evaluation with a penile Doppler scan and vascular reconstruction before progressive perineal urethroplasty, as surgical mobilization can disrupt the tenuous blood supply and result in bulbar urethral ischemic necrosis in the postoperative period.^[1] Contrary to this, patients who present with primary bulbar urethral ischemic necrosis do not gain much by such an approach as they are not benefited by vascular reconstruction. The very long defect precludes an end-to-end anastomosis, even with a transpubic approach and is best managed by limited mobilization of the distal urethra along with flaps or graft to bridge the defect.

In uncircumcised patients, a preputial tubed flap is the preferred method, as in this case, and can provide acceptable option in a single procedure.^[1] This avoids any type of vascular reconstruction as the flap is raised on the dartos fascia with intrinsic blood supply. The other option would be using a combination of graft on the dorsal side and a flap on the ventral side.^[3] In circumcised patients, a two-stage procedure, with a perineal urethrostomy along with dorsal grafting and tubularization in the second stage is the preferred option, although gracilis and forearm flaps, described for complex strictures, can also be used.^[4,5]

CONCLUSION

Primary bulbar urethral ischemic necrosis, resulting from pelvic fracture, is extremely rare. Instead of a progressive perineal urethroplasty, which can further jeopardize the

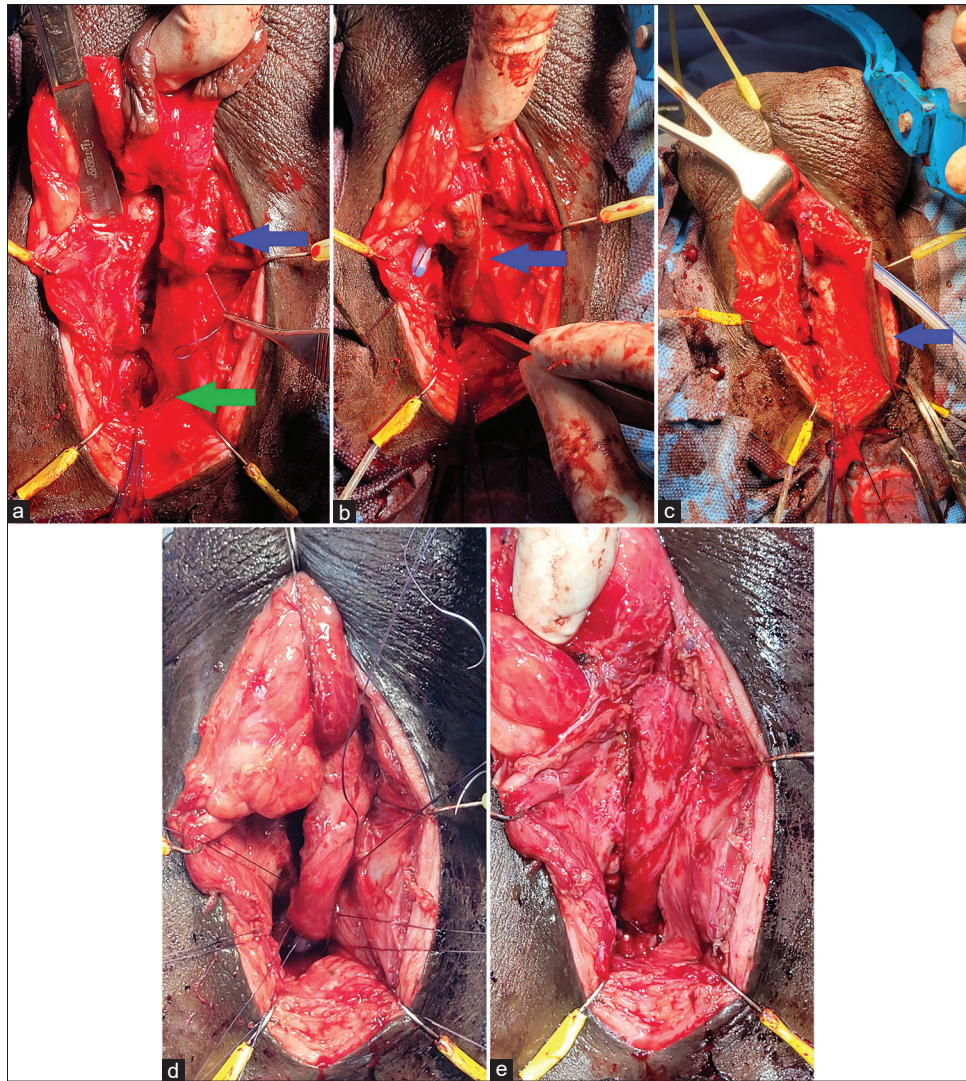


Figure 2: (a) Intraoperative image showing the long segment defect (Blue arrow-distal end at proximal bulbar urethra, Green arrow: Proximal end at bulbomembranous junction). (b) Preputial flap of adequate length harvested and transposed into the perineum (Blue arrow-preputial graft). (c) Preputial graft anastomosed to a distal end and being tabularized over a 16Fr silicone Foley catheter (Blue arrow). (d) Tubularized flap being anastomosed to the proximal end by parachute technique. (e) Completed anastomosis

vascularity, a tubularized pedicled preputial flap is a feasible option to bridge the long defect while avoiding a vascular reconstruction.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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