

# Pediatric pelvic fracture urethral distraction defect causing complete urethrovaginal avulsion

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## ABSTRACT

Pelvic fracture with urethral injury in girls is an uncommon entity that is usually associated with concomitant vaginal lacerations. Management options vary from immediate exploration and urethral anastomosis to delayed urethroplasty. We report our experience of managing a 10-year old girl presenting 6 months after a pelvic fracture with urethrovaginal injury and a completely obliterated urethral meatus managed successfully with a single-stage bladder tube repair.

## INTRODUCTION

Female urethral injuries are uncommon and are associated with concurrent vaginal laceration in 75%–87% cases<sup>[1]</sup> and concurrent rectal injuries in 33% cases.<sup>[2]</sup> Complete avulsion or disruption of the vagina along with urethral injury is extremely rare. Blood at the vaginal introitus or the presence of a rectal injury in combination with a pelvic fracture should prompt the physician to consider a diagnosis of a female urethral injury. If expertise is available, immediate exploration is advocated as delay compromises the already short female urethra due to fibrosis, limiting the options.<sup>[3]</sup> The management is poorly defined, and the timing of repair is controversial with limited options. We report a case of complex urethrovaginal avulsion in a girl with a delayed presentation and discuss the challenges faced in restoring her urethral function and future sexuality.

## CASE REPORT

A 10-year-old girl presented to our outpatient department as a neglected case of pelvic fracture

with urethrovaginal injury with complaints of inability to pass urine per urethra. Following trauma, 6 months earlier, pelvic fracture fixation and urinary diversion in the form of suprapubic cystostomy was performed. The patient had no associated systemic injuries. On examination, the introitus was narrow to the extent that it did not admit even the tip of the little finger. The urethral meatus was found to be completely obliterated with just a pit at the site. Ultrasound revealed features of cystitis with normal upper tracts. Cystogram and computed tomography scan [Figure 1 a and b] revealed complete obliteration of the urethra beyond the level of bladder neck and communication with a cavity-an avulsed proximal portion of the vagina. On vaginoscopy, obliterated vagina was found.

Exploration was performed in lithotomy position with a lower midline incision given for ease of access to both bladder and vagina. A partial transpubic approach for access to the bladder neck and urethra was planned. Upon performing a cystotomy, the bladder was found to be normal. The obliterated proximal end of the urethra [Figure 2a] was identified by inserting a dilator through the bladder neck and dissecting the area of fibrosis. It was communicating with proximal vaginal cavity and was found to be dilated

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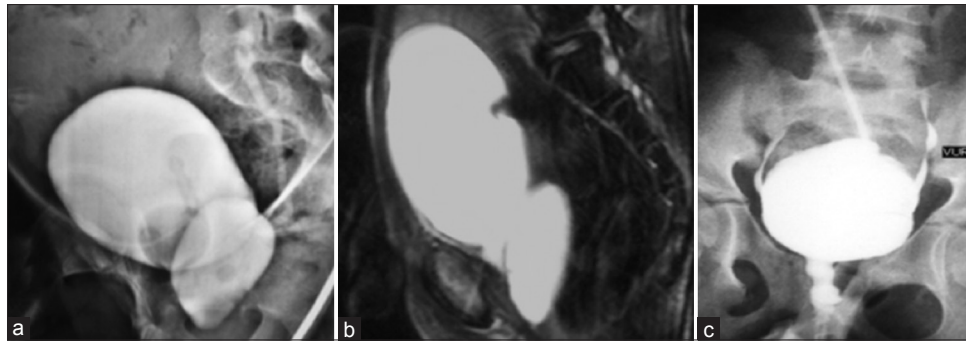
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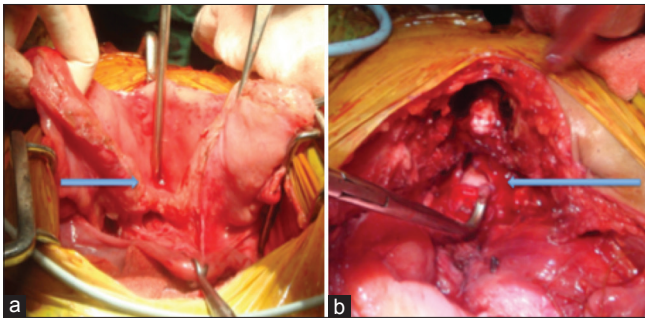
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**Figure 1:** (a and b) Preoperative cystogram and computed tomography films showing complete obliteration of the urethra beyond the level of bladder neck and communication with proximal obliterated vaginal cavity. (c) Postoperative Micturating Cystourethrogram at 6-month follow-up



**Figure 2:** (a and b) Intact bladder neck, obliterated proximal urethra, no communication found with uterus. The vaginal cavity identified communicating with the proximal urethra

and completely obliterated [Figure 2b]. The obliterated distal vagina was then approached perineally; the proximal vaginal cavity pulled through and anastomosed circumferentially to the introitus with 3–0 interrupted vicryl sutures. A space was created behind the pubic arch using blunt dissection with a right angle forceps up to the base of clitoris where obliterated urethral meatus was situated. The defect measured 4 cm in length. A rectangular bladder mucosal strip was harvested as a free graft through the prior cystotomy [Figure 3a] and tubularized over a 14Fr Foley catheter to create a neourethra [Figure 3b]. Its distal end was wrapped with omentum and brought through a new opening in the introitus [Figure 3c]. Postoperative recovery was uneventful and the catheter was removed after 4 weeks. The patient was continent and voiding well at 2 years [Figure 1c]. She required vaginal dilatation twice before vaginal anastomosis became stable.

## DISCUSSION

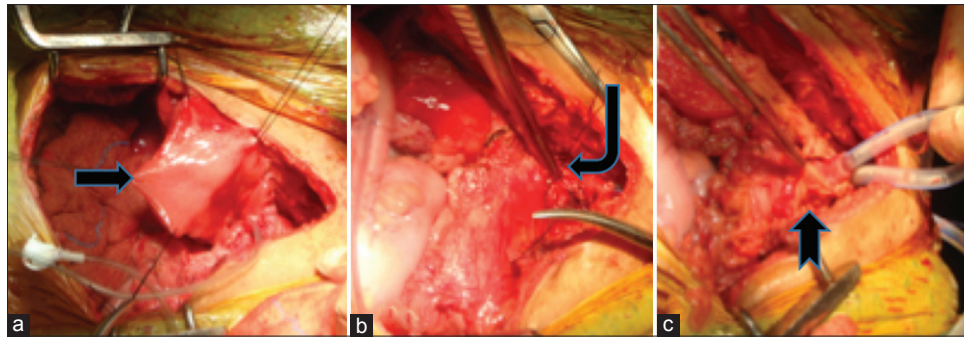
Incidence of urethral injuries in females with pelvic fracture is about 4.5%–6%. Concomitant vaginal laceration/tear occurs in 75%–87%<sup>[1]</sup> of the cases, and urethrovaginal fistula is a very rare presentation. Preliminary diversion with a suprapubic cystostomy without any treatment of the urethra will invariably result in either a urethral stricture, urinary fistula, or both. Delayed urethral repair and establishment of urinary continence by bladder neck reconstruction, sling, or artificial urinary sphincter placement can be associated

with incontinence, urethral erosion with fistula formation, or proximal urethral obliteration. It is usually feasible to provide a single-stage reconstruction with optimal outcomes in most patients.<sup>[4]</sup>

The procedure for urethral reconstruction must be carefully selected based on clinical limitations. End-to-end anastomosis is considered the gold standard wherever feasible. We used an anterior bladder mucosal tube to construct the entire urethra as sufficient labial and vaginal tissue were scarce and the opened bladder was readily available for graft retrieval. Knowledge of the facts that tubularized free buccal mucosal graft, devoid of any muscular backing, has been successfully used in the past for replacing fibrotic female urethra and formation of supple neourethra<sup>[5]</sup> and that bladder mucosa tube has been successfully used in anterior urethral strictures in males<sup>[6]</sup> encouraged us to use bladder mucosal tube in this case. The tube was covered as low as possible with omentum as it has a rich vascular and lymphatic supply which contributes to healing despite infection.<sup>[7]</sup> Blaivas and Heritz<sup>[8]</sup> have reported the use of bladder tube in one patient who presented with anatomical damage to the urethra or vesical neck. Tanhago anterior bladder flap has been described as a reasonable option wherein continence is achieved without suspension and the whole urethra can be created; we did not consider it because our patient had an intact proximal urethra. Modified Young-Dees repair and vaginal flaps are other options that have been used for continent female urethral reconstruction. Transpubic approach has been recommended for patients with complete urethral disruption and severe urethral stricture, especially when associated with urethrovaginal fistula.<sup>[9]</sup> In difficult complicated posttraumatic urethral injuries, very limited options are available and bladder mucosal tube should be recommended when extensive urethral tissue is lost.

## CONCLUSION

Preservation of continence, urethral patency, and sexual function are the long-term challenges in females with complex urethral injuries. The surgeon should be familiar with multiple reconstructive options to provide the most



**Figure 3:** (a) Bladder mucosa selected for tubularized free graft. (b) Tube being stitched to the proximal urethra. (c) Distal end of tube being brought down and wrapped with omentum

suitable procedure. Bladder tube is an excellent choice for complete urethral loss in young girls where end-to-end anastomosis is not possible and vaginal and labial tissue is inadequate to raise a flap.

#### ***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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