



Original Article

# Management of complex and redo cases of pelvic fracture urethral injuries



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## KEYWORDS

Urethral reconstruction;  
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Bulbar necrosis;  
Long gap;  
Bladder neck injury;  
Rectourethral fistula

**Abstract Objectives:** Pelvic fracture urethral injuries (PFUI) result from traumatic disruption of the urethra. A significant proportion of cases are complex rendering their management challenging. We described management strategies for eight different complex PFUI scenarios.

**Methods:** Our centre is a tertiary referral centre for complex PFUI cases. We maintain a prospective database (1995–2016), which we retrospectively analysed. All patients with PFUI managed at our institute were included.

**Results:** Over two decades 1062 cases of PFUI were managed at our institute (521 primary and 541 redo cases). Most redo cases were referred to us from other centres. Redo cases had up to five prior attempts at urethroplasty. We managed complex cases, which included bulbar ischemia, young boys and girls with PFUI, PFUI with double block, concomitant PFUI and iatrogenic anterior urethral strictures. Bulbar ischemia merits substitution urethroplasty, most commonly, using pedicled preputial tube. PFUI in young girls is usually associated with urethrovaginal fistula. Young boys with PFUI commonly have a long gap necessitating trans-abdominal approach. Our success rate with individualised management is 85.60% in primary cases, 79.13% in redo cases and 82.40% in cases of bulbar ischemia.

**Conclusion:** The definition of complex PFUI is ever expanding. The best chance of success is at the first attempt. Anastomotic urethroplasty for PFUI should be performed in experienced hands at high volume centres.

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## 1. Introduction

Pelvic fracture may lead to urethral injury in about 10% of patients [1]. The common site of injury is at the bulbo-membranous junction. Rarely the site of injury in adults may be at the prostate-membranous junction as compared to children where this is commonly the case. Due to the nature of injury, the urinary bladder along with prostate and membranous urethra gets displaced cranially. The aim of surgery is to achieve a tension free bulbo-membranous anastomosis.

Anastomotic urethroplasty remains the gold standard management for pelvic fracture urethral injuries (PFUI). Stepwise elaborated perineal approach is the current preferred option. Transabdominal approach is used in selected cases. We discuss the management of complex PFUI in eight scenarios.

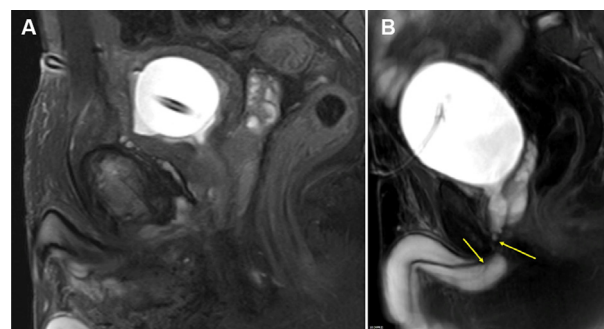
## 2. Patients and methods

Our institute is a tertiary referral centre for reconstructive urology cases. We retrospectively reviewed our prospective database from January 1995 to May 2016. Five surgeons including Society of Genitourinary Reconstructive Surgeons (GURS) fellows at our institute have performed 1062 surgeries for patients with PFUI. Complex PFUI cases were subdivided into eight groups. Patients were either followed up at our centre or with the referring urologist. Internet-based applications like email and WhatsApp were used to acquire follow-up uroflow and American Urology Association (AUA) symptom score data from patients.

All patients were evaluated prior to surgery with voiding cystourethrography (VCUG) through Suprapubic (SPC) tract and retrograde urethrography (RGU). Patients with recto urethral fistula, double block, false passage and bladder neck injury underwent Magnetic Resonance Imaging (MRI) prior to surgery.

We have developed a new protocol for MRI image acquisition in patients with PFUI [2]. We performed MRI with pre-administration of alpha-blocker, keeping a full bladder by clamping the SPC and instilling saline with lubricating jelly in the urethra. Urine in the bladder and saline in urethra act as a natural contrast on T2 weighted image (Fig. 1). Images acquired closely resemble traditional VCUG/RGU and are easy to interpret.

Preoperative penile doppler was performed in all male patients >18 years age. Flow velocity in the cavernosal arteries and deep dorsal penile artery was documented prior to and after injection of intracavernosal papavarine. All patients had an SPC on referral. Intraoperatively urethroscopy was performed to assess penile and bulbar urethra. Antegrade scopy was performed to assess the bladder, bladder neck, prostate and membranous urethra. Occasionally we found co-existent pathology — bladder stones; Retained catheter tip, which required endoscopic management. In all patients tension free anastomosis was performed using 4-0 Polyglactin/5-0 Polydioxanone sutures. Urethral catheter and SPC were kept for 4 weeks post-operatively. Pericatheter VCUG was performed in majority of our patients due to the complexity of reconstruction. In patients with an anastomotic leak the catheter was kept for an additional 2 weeks.



**Figure 1** MRI of pelvis with empty bladder (A) and with our protocol with full bladder and jelly in urethra (B). The left arrow means bulbar urethra; The right arrow means the injury is at the level of bulbo membranous junction.

Failure was defined as flow less than 12 mL/s and/or requirement of single postoperative dilatation, visual internal urethrotomy or a repeat urethroplasty. These interventions were indicated for symptomatic and objectively documented poor flow.

## 3. Results and discussion

We discuss our results in eight categories of complex PFUI.

### 3.1. Redo cases

Of 1062 PFUI cases, 541 were redo cases. Redo cases had undergone up to five prior attempts at anastomotic urethroplasty before being referred to us. The mean age of patients was 28.4 years (8–55 years) and the mean follow-up was 68 months (12–240 months). The overall success rate of redo cases was 79.13%. The success rate was slightly lower but comparable to that of primary cases, which was 85.60% ( $n = 521$ ) over the same period of time (Table 1).

We subclassified PFUI into three categories: primary, one failed urethroplasty, and  $\geq 2$  failed urethroplasties.

There were three distinct findings in cases of redo PFUI:

1. The scar tissue excision was inadequate. In most cases of previous failed urethroplasty there was an extensive scar that required excision. This scar tissue either prevented identification of normal healthy prostatic urethra or caused constriction resulting in narrowing at the site of bulbomembranous anastomosis.
2. The urethra was not adequately mobilized at prior surgery in 63% of cases (Fig. 2A). The bulbar urethra should be mobilised till penoscrotal junction to utilise the inherent elastic lengthening property of bulbar urethra in performing a tension free anastomosis. International Consultation on Urological Diseases (ICUD) defines bulbar urethra as the urethra that lies within bulbo-spongiosus muscle. If one mobilizes only this part of the urethra it cannot be stretched adequately. Hence, bulbar urethra should also include the urethra till the penoscrotal junction. Any dissection distal to the penoscrotal junction may result in chordee.

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