International Journal of Medical and Health Research
ISSN: 2454-9142
www.medicalsjournals.com
Volume 2; Issue 3; March 2016; Page No. 71-74

Pelvic fracture urethral distraction defects: Early outcome of progressive perineal repair

[1] Dr. Chethan JV, [2] Dr. Rajendra B Nerli, [3] Dr. Abhijith Musale, [4] Dr. Shankar K, [5] Shridhar Ghagane, [6] Dr. Murigendra B Hiremath

[1, 2, 3, 4] Department of Urology KLES Kidney Foundation KLES Dr. Prabhakar Kore Hospital & M.R.C, Nehru Nagar, Belagavi, Karnataka, India.

[5, 6] Department of Biotechnology & Microbiology Karnataka University Dharwad Karnataka, India.

Abstract
Purpose: Controversy still exists regarding timing and approach for pelvic fracture urethral distraction defects. We review our experience with 1-stage 4-step progressive perineal approach for urethral reconstruction.
Materials and Methods: All patients presenting with urethral distraction injuries associated with pelvic fractures were initially assessed, stabilized and managed with suprapubic-catheter insertion. Progressive-perineal-urethral repair was performed at least 3-months following injury. Post-operative complications and early outcome was assessed in all these patients.
Results: During the study period Jan 2010-Jan 2014, 26 male patients with a mean age of 34 years presented with pelvic fracture and posterior urethral distraction defects. Progressive-perineal repair was performed at least 3 months later. The repair needed spongiosal mobilisation alone in 10 cases, additional corporal separation in 13 and inferior pubectomy in 3 cases. 2 patients failed to void following urethral catheter removal and developed recurrent strictures at the repair site. 24 patients voided well after catheter removal and are voiding adequately at a mean follow up of 31 months
Conclusion: Using the perineal approach and several manoeuvres, it is virtually possible to repair urethral distraction injuries through a perineal approach even with a long defect. Short term outcomes are good.

Keywords: progressive perineal urethroplasty, pelvic fracture urethral distraction defect, reconstruction of urethra.

Introduction

Pelvic fracture urethral injuries are the result of blunt pelvic trauma and accompany about 10% of pelvic fracture injuries [1]. Distraction injuries are for all intents unique to the bulbo-membranous urethra [2]. The surgical management of pelvic fracture urethral distraction defects (PFUDD) has evolved in the last five decades from a 1-staged Badenoch pull through procedure for stricture less than 2cm [3], multistaged substitution urethroplasty for longer strictures [4, 5] to a single staged perineal repair involving progressive use of up to 4 steps to achieve a tension free anastomosis in both short and long distraction defects [6].

The treatment of posterior urethral distraction injuries is controversial and a technically difficult issue [7, 8]. Most urologists prefer against immediate surgical repair of post traumatic posterior urethral distraction injuries owing to potentially increased morbidity [7, 8]. Immediate supra-pubic cystostomy with delayed urethral reconstruction is believed to be the safest [8, 14]. Erectile dysfunction and abnormal urination is attributed to injury itself as demonstrated by some investigators.

The timetable for the reconstruction of pelvic-fracture-urethral injuries is determined by the type and extent of associated injuries. If possible, it is desirable to proceed between 3 to 6 months after trauma. We retrospectively analyzed our experience with treatment which consist of immediate suprapubic cystostomy and delayed progressive perineal urethroplasty for pelvic fracture urethral distraction-injuries presenting to us in the last 4 years and report the early outcome and complications.

Materials and Methods

Patients

A total of 28 males underwent single stage progressive perineal urethroplasty at KLES Kidney foundation, J N Medical College, Belgaum between January 2010 and January 2014. All these patients had complete posterior urethral distraction injuries after pelvic fracture secondary to road traffic accidents. Of these, 1 patient had previous history of catheterisation prior to the injury and another patient had previous instrumentation for lower ureteral calculus. These two patients were excluded from the review. The rest 26 patients form the cohort of focus in our review.

Initial Management and Preoperative Evaluation

At referral, all patients were assessed, resuscitated and stabilised. No patients voided normally and all underwent suprapubic cystostomy (SPC). Urethral reconstruction was planned at least 3 months from the time of injury with frequent change of suprapubic cystostomy tube until soft tissue of the pelvis and perineum had healed, all other bony injuries had been corrected and the patient could be positioned for perineal approach.

Preoperatively all patients underwent retrograde urethrography and voiding cystourethrography (VCUG) (Figure.1a and 1b). Length of distraction defect is noted. In all patients during VCUG, bladder neck opening is looked for. They were also

subjected to retrograde urethroscopy and antegrade cystourethroscopy through the suprapubic cystostomy site. In each patient, anterior urethral patency and prostatic urethra were documented.
A detailed history about quality and frequency of penile erections before and after the injury was obtained in all patients.

Reconstruction of the Urethra
All patients were placed in an exaggerated lithotomy position. A midline perineal incision taken and layers dissected till corpus spongiosum (Figure. 2).

Urethral Mobilisation and excision of scar: Circumferential mobilization of the urethra was done distally till the penoscrotal junction. Mobilization beyond the penoscrotal junction was avoided to prevent chordee formation postoperatively. A Haygrove staff was introduced through the meatus and the urethra transected just distal to the stricture Figure.3). The same staff was introduced through the SPC site and midline scar incision taken till the distal end of the staff felt. The entire scar tissue excised until a healthy normal posterior urethra is exposed for anastomosis (Figure. 4).

Corporal Separation: If the proximal and distal urethrotomies are wide apart and for tension free anastomosis corporal bodies are separated starting from the crus progressing distally in the relatively avascular midline for a distance of approximately 5 cm. This separation allows the urethra to lie between the corporal bodies so as to shorten the distance between the urethrotomies.

Inferior Pubectomy: After corporal separation if the tension still persists, the dorsal vein is displaced laterally or ligated and a wedge of bone of the pubis is chipped out. This manoeuvre allows cephalad redirection of urethra and adds to 2-3 cms reduction in the distance between both the arthrotomies.

Supracrural Rerouting: It involves rerouting the urethra around the corporal body through a bony defect created by additional pubectomy. This manoeuvre gives an additional 2 cms.
No matter how many manoeuvres used to bridge the gap between the two urethrotomies, the distal and proximal urethrotomies were spatulated at 12 o'clock and 6 o'clock positions respectively. A direct mucosa-to-mucosa, end- to-end anastomosis was performed with 8-10 radially placed 3-0 polyglactin sutures over a 16-18Fr silicone urethral catheter secured into the bladder through the meatus. A 14Fr suprapubic catheter was re-secured. Drain was rarely used. After closure, compressive dressing applied over the perineum.
Suprapubic cystostomy was kept insitu for 3-4 weeks and was removed after the patient voided successfully.

Follow Up
The follow up consisted of periodic visits every 3 months during the first postoperative year and annually thereafter. An uroflowmetry profile, post-void residual urine and a urine analysis was done at each visit. Erectile function was evaluated by questionnaire at each visit. Retrograde urethrography and urethroscopy were done if stricture recurrence was suspected. The clinical outcome was considered failure if the patient developed re-stricture requiring re-do surgery or repeated self-calibrations.

Table 1: Patient demographics

Total number of patients	**26**
Duration of study	4 years
Mean age	34 years (range 18-53)
Mean length of the defect	2.7 cm (range 0.5-7)
Mean time between injury and repair	4 months (range 3-8)
Perineal anastomosis alone	10 cases
Corporal separation	13 cases
Inferior pubectomy	3 cases
Average hospital stay	3.5 days (range 3-6)
Mean duration of urethral catheterisation	3.5 weeks
Mean follow up time	31 months (range 6- 47)
Failures	2

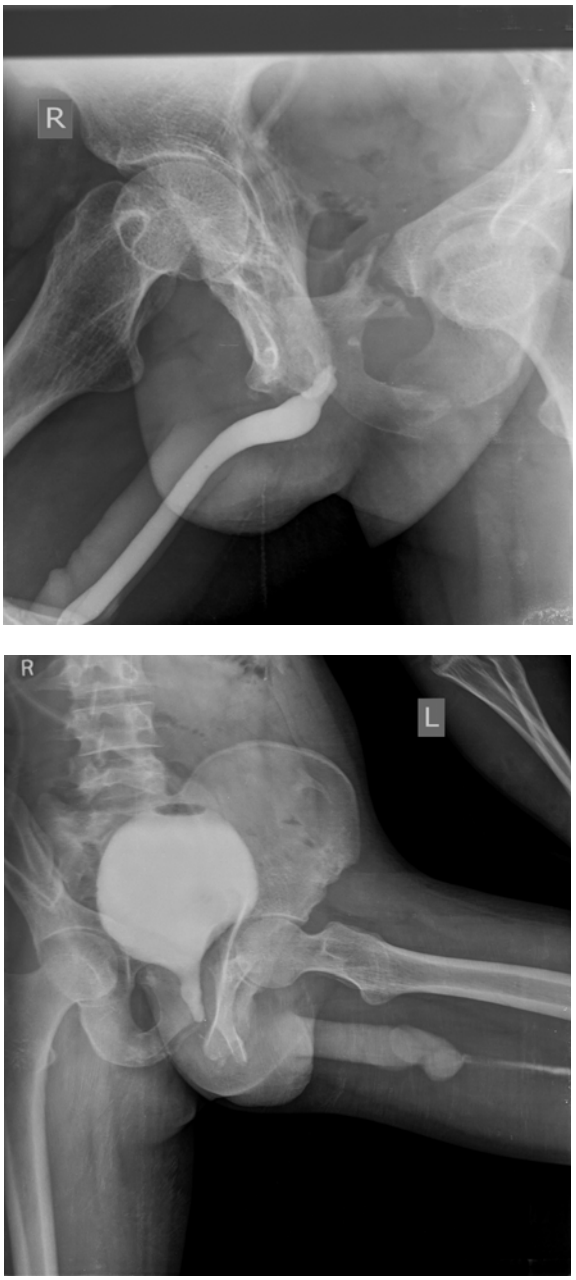

Fig 1: Retrograde urethrography and voiding cystourethrography

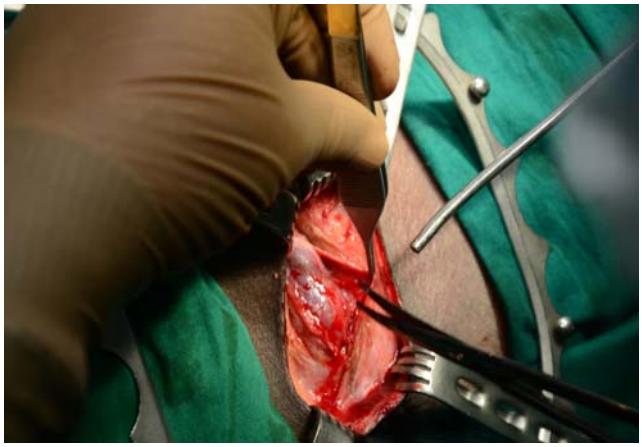

Fig 2: Midline perineal incision with dissection till corpus spongiosum

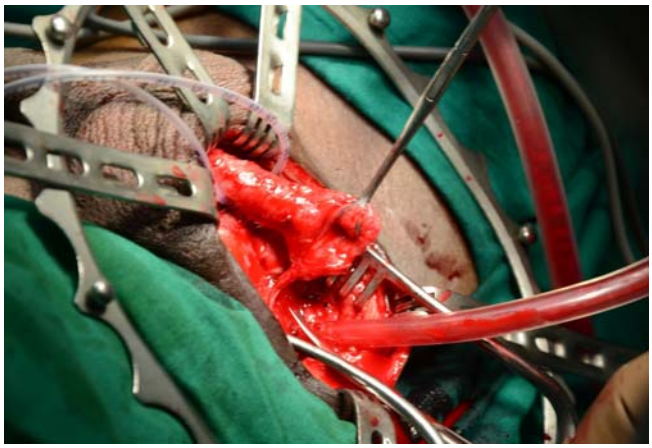

Fig 3: Distal urethrotomy

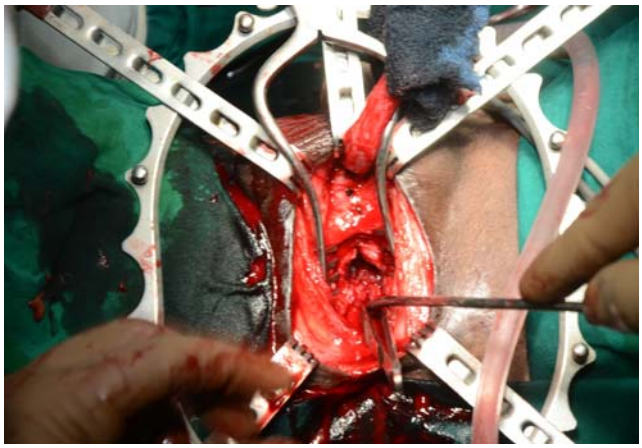

Fig 4: Proximal urethrotomy

Results

A total of 26 perineal urethral reconstructions for PFUDD were performed using progressive approach in a 4 year period (Table). Single stage reconstruction was performed using midline perineal approach in all patients. Mean age of the patients was 34 years (range 18 to 53) and the mean time between injury and surgery was 4 months (range 3 to 8). Mean length of the defect was 2.7 cm (range 0.5 to 7).

In 10 patients, spongiosal mobilisation alone was sufficient for tension free anastomosis. 13 patients required additional corporal separation. Another 3 patients required inferior pubectomy to accomplish tension free anastomosis.

Average hospital stay was 3.5 days (range 3 to 6). Mean duration of urethral catheterisation was 3.5 weeks. These patients have been followed for a mean of 31 months (range 6 to 47).

Perineal urethral reconstruction was successful in 24 of 26 patients (92.3%). Both the patients who had failure were identified within the first 3 postoperative months. In both patients, failures were at the site of anastomosis. Out of the 2 failures one underwent optical urethrotomy and continues to require self-calibrations while the other was lost to follow up. None of the patients had postoperative incontinence. 25 out of 26 patients stated that they were sexually active before injury and 7(28%) patients had significant erectile dysfunction after the trauma. Out of the 18 who were potent preoperatively 3(16.6%) lost their potency after the urethral reconstruction. One patient reported that he regained potency postoperatively.

Discussion

The timing (early versus delayed) and the choice (endoscopic versus open surgical) of approach has still not come to consensus despite extensive clinical experience. There are three available treatment modalities on which the arguments are centered on, stenting catheter or immediate urethral realignment or suprapubic cystostomy alone at the time of surgery with delayed repair of the ensuing distraction defect [7, 9]. There are three circumstances in which immediate surgical exploration with pelvic hematoma evacuation and urethral realignment is generally indicated. These include concomitant bladder neck injury, severe prostatomembranous dislocation or injury to the rectum [10-12].

When these situations arise, which are not common in day to day practice, and are subjected to immediate primary realignment, there is high morbidity associated with that including high incidence recurrent strictures (69%), urinary incontinence (20%) and problems related to potency (40%) [12].

The majority of urethral defects can be resolved through a perineal approach using the progressive 4-step technique which can be performed in defects upto 10 cm. A limiting factor in this approach is concomitant anterior urethral stricture or hypospadias, which may compromise blood flow to the distal based urethral flap due to bulbar urethral transection and mobilisation.

In our institution, patients undergo suprapubic cystostomy initially and urethral reconstruction is planned atleast 3 months later. In this series the mean interval between the injury and the surgery was 4 months (range 3-8). This was to allow patients to recover completely from the associated injuries so that reconstruction can be done in a controlled environment. This is the advantage of delayed urethral reconstruction [7]. Complete excision of the scar is the pivotal part of this procedure. Corpus spongiosum mobilization till the peno-scrotal junction is another important step so as to achieve a tension free anastomosis. Corporal separation reduces the curvature of the urethral tract and also reduces the distance between the two urethrotomies. Inferior pubectomy further shortens this distance [13]. In our series, spongiosal mobilisation alone was sufficient for tension free anastomosis in 38.4% of the patients, 50% required additional corporal separation and 11.5% patients required inferior pubectomy. None of the patients required corporal rerouting.

Delayed urethral reconstruction with progressive perineal approach has success rates from 80% to 95% [7, 8, 14, 18]. In our

series, urethral reconstruction was successful in 92.3% which was comparable. Failure of the procedure can be attributed to technical problems or to the pathogenesis of urethral injury per se [16]. Most failures are short in length and occur at the anastomotic site. Fibrotic scar tissue develops between the separated ends. These are generally responsive to optical urethrotomy.

Conclusions

Single stage 4-step progressive perineal approach for urethral reconstruction in pelvic fracture urethral distraction defects (PFUDD) has excellent outcomes and with reduced morbidity. This approach enables tension free anastomosis even in long defects. Moreover most of the defects are not long and necessity beyond 2 steps is rarely required.

References

1. Glass RE, Flynn JT, King JB, Blandy JP. Urethral injury and fractured pelvis. Br J Urol, 1978; 50:578.
2. Koraitim MM, Marzouk ME, Atta MA. Risk factors and mechanisms of urethral injury in pelvic fractures. Br JUrol 1996; 77:876-880.
3. Badenoch AW. A pull-through operation for impassable traumatic stricture of the urethra. Br J Urol, 1950; 22: 404.
4. Morehouse DD. Current indications and technique of twostage repair for membranous urethral strictures. Urol Clin North Am, 1989; 16:325.
5. Blandy JP, Singh M, Tresidder GC. Urethroplasty by scrotal flap for long urethral strictures. Br J Urol. 1968; 40:261,
6. Webster GD. Repair of the difficult posterior urethral stricture. World J Urol. 1987; 5:30.
7. Koraitim MM. Pelvic fracture urethral injuries: the unresolved controversy. J Urol. 1999; 161:1433-1441.
8. Webster GD, Mathes GL, Selli C. Prostatomembranous urethral injuries: a review of the literature and a rational approach to their management. J Urol 1983; 130:898-902.
9. Koraitim MM. The lessons of 145 posttraumatic posterior urethral strictures treated in 17 years. J Urol. 1995; 153:63-66.
10. Turner-Warwick R. Complex traumatic posterior urethral strictures. J Urol. 1977; 118:564.
11. Turner-Warwick R. A personal view of the management of traumatic posterior urethral strictures. Urol Clin North Am, 1977; 4:111,
12. Webster GD, Mathes GL, Selli C. Prostatomembranous urethral injuries: a review of the literature and a rational approach to their management. J Urol. 1983; 130:898.
13. Gupta NP, Gill IS. Core-through optical internal urethrotomy in management of impassible traumatic posterior urethral strictures. J Urol 1986; 136:1018-1021.
14. Koraitim MM. Pelvic fracture urethral injuries: evaluation of various methods of management. J Urol, 1996. 156:1288-1291.
15. Griebling TL, Kreder KJ. Urethral reconstruction after pelvic fracture with urethral disruption: the gold standard. Semin Urol 1995; 13:45-55,
16. Morey AF, McAninch JW. Reconstruction of posterior urethral disruption injuries: outcome analysis in 82 patients. J Urol 1997; 157:506-510.
17. Webster GD, Ramon J. Repair of pelvic fracture posterior urethral defects using an elaborated approach: experience with 74 cases. J Urol. 1991; 145:744-748.
18. Husmann DA, Wilson WT, Boone TB. Prostatomembranous urethral disruptions: management by suprapubic cystostomy and delayed urethroplasty. J Urol. 1990; 144:76-78.