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EFFECTIVENESS OF TRANSPUBIC URETHROPLASTY FOR RECURRENT URETHRAL STRUCTURE IN PELVIC FRACTURE URETHRAL DISTRACTION DEFECT

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ABSTRACT: AIM OF THE STUDY: Effectiveness of Transpubic urethroplasty in recurrent (failed) urethral strictures due to pelvic fracture urethral distraction defects. **INTRODUCTION:** Urethral distraction injuries occur upto 10% of pelvic fracture cases. The principle indication of Transpubic urethroplasty is length >3cms, recurrent (failed) repairs of posterior urethral stricture. Though other procedures like primary anastomotic urethroplasty, rerouting of the urethra under the corporal body, urethral substitution with tubularised flaps, two stage urethroplasty are described, Transpubic urethroplasty is said to produce the best results especially when repeat procedures are required. **MATERIALS & METHODS:** This is a prospective study from 2004 to 2014 consisting of 17 patients having recurrent stricture urethra secondary to pelvic fracture urethral distraction defects (PFUDD). All the patients were males and their age ranged from 15year to 45 years. Pre-op evaluation included X-ray KUB, Ultrasound abdomen & pelvis, retrograde urethrogram (RGU), micturating cystourethrogram (MCU), up and down Cystoscopy, urine culture and renal biochemical parameters. Urethra was approached through progressive perineal and abdominal approach with total pubectomy, followed by excising fibrosed stricture and tension free end to end anastomosis. Post operatively pericatheteral RGU was carried out after 4 weeks and Catheter removed if there was no leak. RGU, MCU uroflowmetry and PVR were done one month after removal of catheter. Subsequently UFR, PVR and obstructive symptoms were assessed periodically. **RESULTS:** All 17 Cases were followed up for a period of 3-11 years. Out of 17patients, 14(80%) patients maintained good uroflow (UFR) and insignificant PVR and procedure was considered successful. In 3 patients procedure failed, of which 2 patients had pericatheter leak and reduced urinary flow with significant PVR and were followed up with CIC and 1 patient remained on permanent SPC. Overall stricture free rate was 80%. **CONCLUSION:** Transpubic urethroplasty appears to be superior substitute for recurrent stricture due to pelvic fracture urethral distraction defects (PFUDDs). Pericatheteral leak, fibrosis, fistulae seems to be an important factor in determining the successful outcome.

KEYWORDS: Urethra, Pelvic fracture, PFUDD, Pubectomy.

INTRODUCTION: PFUDD is the most difficult surgery among the urological reconstructive surgeries. Perfect technique is said to be more important, hence its importance can not to be under estimated. Common problems in this procedure are awkward retropubic position of the posterior urethra and psychosexual problems.

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Urethral distraction injuries occur in upto 10% pelvic fracture cases.¹ Despite of best surgical skills, proper judgment redo urethroplasty is often required in 10%to 20% of PFUDD patients.³ 10% of pelvic fracture are complex which hinder the tension free anastomosis.

Fractured displaced pelvic bone, retro-pubic huge hematoma, bladder neck injury, type of injury (prostate-membranous, trans-prostatic, supra prostatic), associated recto-vesical fistula, failed (10%-20%) urethroplasty and excessive fibrosis are important factors which govern successful urethral surgery.² in these patients management is always challenging.

Though other procedures like primary anastomotic urethroplasty, rerouting the urethra under the corpora, urethral substitution with tabularised flaps, two stage urethroplasty are described, trans-pubic urethroplasty pioneered by water house & colleagues preceded by progressive perineal approach(bulbar urethral mobilisation up-to peno-scrotal junction, inter-crural separation, bilateral inferior pubectomy) said to be the only option.^{3,13} Omental wrapping will have the added advantage in Transpubicurethroplasty.¹⁰

MATERIALS AND METHODS: This is a prospective study from 2004 to 2014. Of the 25 patients who had undergone elaborated perineal approach, 17 patients landed up in TPU. All the patients were males and their age ranged from 15 year to 45 years. Procedures were carried out by single surgical unit. Aetiological factors include RTA, fall from height and bull gore injury.

All the patients were admitted with trocar SPC for retention and primarily under went anastomotic urethroplasty. Failed means not able to void either by self-dilatation or VIU after prior urethroplasty surgery.

Complex stricture defined as failed urethroplasty, fistulae, false passage, closed bladder neck and >3cms stricture.

All the 17 patients were divided into four groups.

Group A-11 cases had failed urethroplasty, among them 7 cases underwent VIU twice and 4 cases undergone repeated dilation.

GroupB- 2 cases had failed progressive perineal approach once and VIU once.

GroupC- 2 cases had failed urethroplasty and developed periurethral abscess and fistula

GroupD- 2 cases had failed urethroplasty twice and developed post-operative cellulitis.

On clinical examination, all are on SPC, suprapubic and Perineal scar present. ED and incontinence were addressed before surgery.

Pre-op evaluation included X-ray KUB, RGU, MCU, urine culture, renal biochemical parameters, complete Blood Count and Blood grouping.¹¹ 11 patients had strictured segment 3-5cms, rest of the pts had 4-6cms in MCU, RGU and Bougie urethrogram. Bougie urethrogram was indicated in those (five) patients whose bladder neck not opened in MCU. All patients were submitted for up and down Cystoscopy. Penile doppler study and MRI were not done.

Operative Procedure: Patient placed in exaggerated lithotomy position under combined epidural and spinal anaesthesia.⁴ Standard plastic surgery principles were followed. Urethra was approached through progressive perineal and abdominal approach with total pubectomy, followed by excising fibrosed stricture and tension free end to end anastomosis.

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Progressive Perineal & Abdominal Approach: Isolation of distal normal urethra followed by strictured segment was done (fig -1). Careful dissection of distal urethral segment from perineal body avoiding trauma to the crura was carried out. Excision of strictured segment done, followed by isolation of proximal segment (fig-2). Crura were separated and the inferior pubis was defined (fig -3).

Later abdominal approach was carried out by lower midline incision with separation of rectus from pubic symphysis.¹⁰ Elevation of periosteum and pubectomy of one inch on either side of pubic bone in the midline was done (fig -4) followed by excision of strictured segment. Excessive fibrotic tissue and obstructing bony segment were excised (fig -5). End to end, tension free anastomosis of non strictured healthy urethral segment was done.

Omental wrapping was done in 3 patients who had prior fistula (1) and cellulitis (2). Group A patients had less fibrosis, whereas Group B patients had more fibrosis, bony scarring and retropubic scarring. Blood loss was more in patients with excessive fibrosis, fistulae and cellulitis. Per Urethral silicon catheter (16 Fr) was inserted and retropubic tube drain kept.

Suprapubic catheter was changed. Pressure bandage was applied. Mean operative time was 4-5 hours, hospital stay was 2-3 weeks and blood loss was 500ml to 1500ml. Antibiotics were continued till per urethral catheter was removed.

Post operatively pericatheter RGU (fig-6) was done at 4 weeks & catheter was removed if there was no anastomotic contrast leak.⁵ when leak was seen, the catheter was continued for 2 more weeks. RGU, uroflowmetry and PVR were done one month after removal of catheter.

Subsequently UFR and PVR were done at 3rd month and 6th month, once in 6 month for 1 year and yearly upto 5 years (fig 7). After 5 years it was done once in 2-3 years as and when needed or when obstructive symptoms developed. RGU was done in patients who developed obstructive LUTS with significant PVR and poor UFR results.

RESULTS: All 17 cases were followed up for a period of 3-10 years. Out of 17 patients, 14(80%) patients maintained good uroflow (UFR) and insignificant PVR and procedure was considered successful. In 3 patients procedure failed, of which 2 patients had pericatheter leak and reduced urinary flow with significant PVR and were followed up with CIC and 1 patient from Group D remained on permanent SPC. Overall stricture free rate was 80%.

2 patients from group C and 1 patient from group D had developed ED and were treated with Phosphodiesterase 5 Inhibitors who responded partially. No patients were treated with penile prosthesis.

Incontinence was observed in 2 patients from group D and were advised pelvic exercises. One patient responded for exercises and the other is on penile clamp. Group B, C and D received blood transfusion 1000 to 1500ml. Group A receives 500 to 1000ml. Infection was observed in 3 pts and treated with antibiotics according to culture sensitivity. No patient developed fistula.

All patients had waddling gait initially which improved later. In our study, restenosis rate and waddling gait is high, but incontinence, fistulae and infection rates are low when compared to study done by Raj kumar Mathur et.al.² (Table 1, Fig 8). Podesta ML et al.⁸ and Koraitim MM et.al.⁷ studies had 100% stricture free rate and none had ED, whereas our study had less stricture free rates (80%) and 10% patients had ED. Incontinence was more in Podesta ML et al. study than present study (Table 2).

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DISCUSSION: Gold triad of successful urethroplasty includes complete excision of scarred tissue, fixation of healthy mucosal ends and creation of tension free anastomosis. Achieving this completely is not possible in any other surgeries than TPU. Gold triad is achieved in TPU because of elaborated perineal approach.^{6,12} and total pubectomy. Exact length of strictured urethra cannot be estimated properly with available investigations. None of the pre-op evaluation techniques predicts periurethral fibrosis. Out of 17 patients in 12 patients bladder neck was opened and 5 patients underwent bougie urethrogram who had closed bladder neck. Up and down cystoscopy was carried out in all the patients to know the proximal and distal urethra.

Trimming of the fibrotic tissue resulted in loss of urethral length as well loss of original elasticity of the bulbar urethra. In 12 patients who had open bladder neck on MCU, 2 patients had incontinence. In 5 patients bladder neck was found to be closed and all were continent. Bladder neck repair was done in none of our patients. Omental wrapping is possible in TPU only. In complex stricture this is the procedure of choice. ED is usually due to old trauma. Previous surgery, bony spicule, dilatation, CIC aggravated the stricture and periurethral scar. Fistulae, periurethral abscess, cellulitis cases demanded more time and more blood transfusion.

In patients of PFUDD who have Fractured displaced pelvic bone, retro-pubic huge hematoma, bladder neck injury, type of injury (prostatic-membranous, trans-prostatic, supra prostatic) associated recto-vesical fistula, failed (10%-20%) urethroplasty, excessive fibrosis management is always challenging.

Though other procedures like primary anastomotic urethroplasty, rerouting the urethra under the corpora, urethral substitution with tubularised flaps, two stage urethroplasty are described, trans-pubic urethroplasty preceded by progressive perineal approach (bulbar urethral mobilisation up-to peno-scrotal junction, inter-crural separation, bilateral inferior pubectomy) said to be the only option. Omental wrapping will have the added advantage in Transpubic urethroplasty.

CONCLUSION: Transpubic urethroplasty appears to be a superior substitute for recurrent stricture due to pelvic fracture urethral distraction defects (PFUDDs).

Pericatheter leak seems to be an important factor in determining the successful outcome. It depends on the previous procedures, individual response to wound healing (scar formation) and surgeon expertise. Direct Transpubic urethroplasty is not advisable and to be carried out only after progressive perineal approach.

Transpubic urethroplasty has added advantage of simultaneous repair of bladder neck injuries and excision of fractured, displaced bony spicules. Omental wrapping for better vascularity of anastomotic site can also be done in this procedure.

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Sl. No.	Complication Rate	Rajkumar Mathur et. al. 2014 No. of Patients (%)	Present study No. of Patients (%)
1.	Infection	3 (18.75%)	3 (17.64%)
2.	Restenosis	2 (12.5%)	4 (23.53%)
3.	Incontinence	5 (31.25%)	2 (11.76%)
4.	Impotence	4 (25%)	3 (17.64%)
5.	Fistulae	Nil - Nil	Nil - Nil
6.	Pubectomy related waddling gait	Nil - Nil	100%

Table 1: Complication Rates

	No. of Patients	Follow up in years	Stricture free rate in %age	Incontinence % age	ED in %age
Podesta ML et al, 1998	15	2-17	100	20	0
Koraitim. MM. et al 2003	40	2-20	88	0	0
Koraitim MM et al , 2005	39	22	100	0	4.5
Our Study	17	3yrs – 10 yrs	80	10	10

Table 2: Review of literature

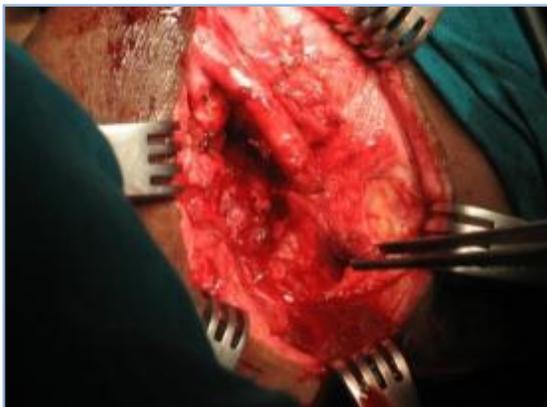


Fig. 1: Stricture & Fibrosis



Fig. 2: Proximal Segment

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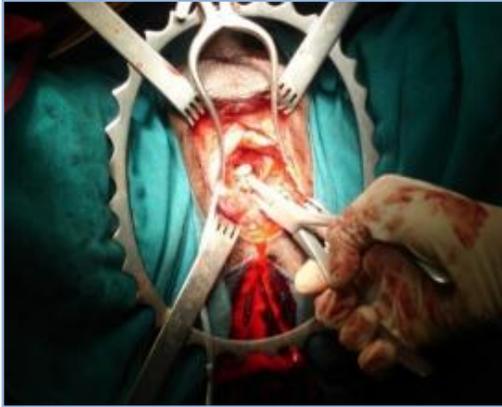


Fig. 3: Inferior Pubectomy



Fig. 4: Pubectomy



Fig. 5: After Total Pubectomy



Fig. 6: Post OP RGU

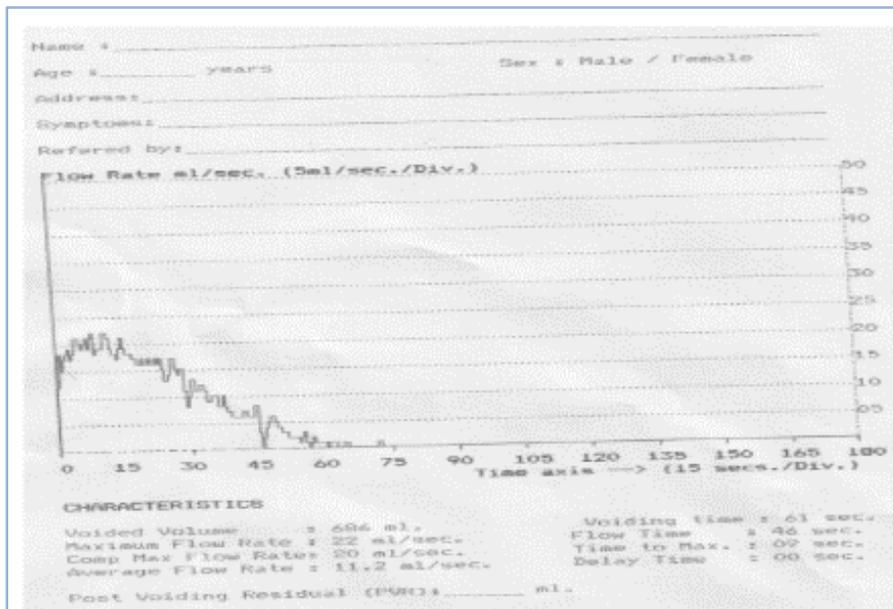


Fig. 7: UFR AFTER 2 Years

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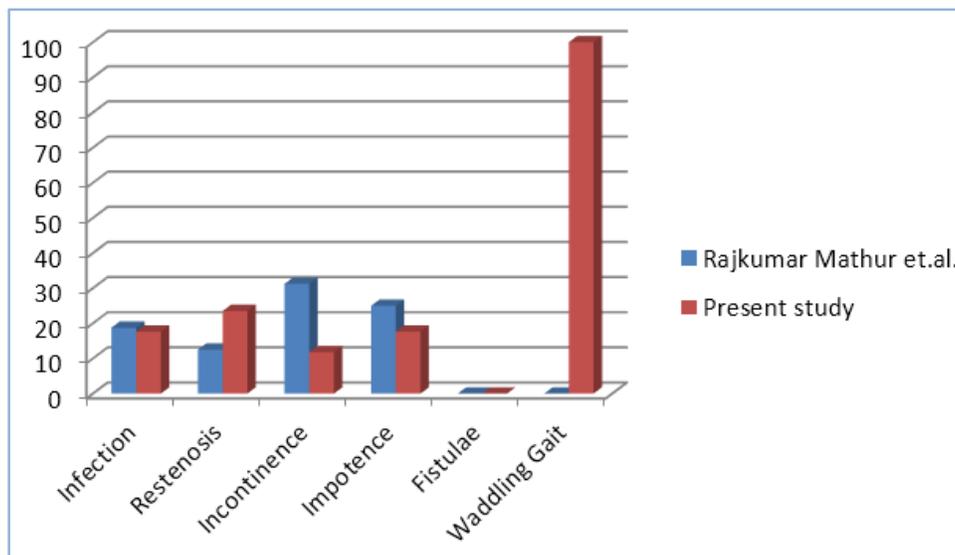


Fig. 8: Complication Rates

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