

Erectile Dysfunction in PFUDD Patients after Progressive Perineal Urethroplasty

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Abstract: ***Background:** The incidence of pelvic fracture urethral distraction defect (PFUDD) is estimated at 1.54-10%.^{3, 4} It is associated with a high incidence of erectile dysfunction. **Objective:** To determine the effect of perineal urethroplasty on Erectile function using IIEF5 score. **Method:** A prospective follow-up study was planned on patients of pelvic fracture urethral distraction defect undergone for urethroplasty operation and followed for six months. Erectile function was evaluated via International Index of Erectile Function (IIEF) questionnaire pre and post operatively. **Results:** Total 22 participants were enrolled in study. Mean age of study participants was 46.4±12.6 years. Most common mode of injury was road traffic accident found in 14 (63.64%) participants. following pelvic trauma, 13 (59.09%) participants pre-operatively and 11 (50%) participants post-operatively shows erectile dysfunction. **Conclusion:** Pre-operatively and Post-operatively, no significant difference was observed in erectile function of subjects assessed by IIEF questionnaire (p=0.90).*

Keywords: Erectile dysfunction, IIEF, Urethroplasty

1. Introduction

Patients with severe pelvic trauma historically have high rates of in patient mortality. However, improvements in motor vehicle safety and interdisciplinary trauma management have resulted in significantly improved survival and thus increased numbers of patients surviving with lifelong complications.¹ The pelvic anatomy is made of intricate neurovascular structures which are prone to injury due to pelvic fracture or trauma. The intimate relation of the bony pelvis with the urethra and the neurovascular supply of the penis make these structures especially susceptible to pelvic trauma, presumably leading to an increased risk of post-injury erectile dysfunction (ED).² The incidence of pelvic fracture urethral distraction defect (PFUDD) is estimated at 1.54-10%.^{3, 4} It is associated with a high incidence of erectile dysfunction which is defined as inability to achieve or maintain an erection adequate for sexual satisfaction.² Erectile dysfunction is due to traumatic neurogenic, vasculogenic and direct crural or tunica albuginea injury, resulting in intracorporal fibrosis or venous leakage.^{5, 6} As such, urologic involvement in the care of these patients has become vital not only in the acute care of pelvic fracture urethral injuries but also the long-term management of the sexual and urinary dysfunctions that often follows.¹

At present, reconstructive surgery in the form of different types of urethroplasty is considered as “gold standard” in the treatment of these patients. Urethroplasty is associated with reproductively high success rates, when properly employed.⁷ Injuries to the posterior urethra particularly in complicated cases, surgeon’s accessibility is limited due to the specific anatomy of this region and so potential complications are more prevalent.⁸

ED is the result of a multifactorial process and its components can be affected by urethroplasty surgeries.⁹ Concerning erectile and ejaculatory dysfunction, potentially injured structures in the course of urethroplasty include several arterial structures, nerve branches and eventually myogenic components.⁷ It is difficult to differentiate between ED due to pelvic trauma or due to urethral alignment or delayed urethroplasty, unless

patients are assessed for ED at several times, ideally before and after injury, as well as before and after repair.¹⁰ Previous research¹¹⁻¹³ has attempted to determine whether it is the mechanism of injury or the means of management that has the greater effect on incidence of ED in this patient population but findings are not uniform.

Objectives:

To determine the effect of perineal urethroplasty on Erectile function using IIEF5 score.

Material and methods:

A prospective follow-up study was planned on patients of pelvic fracture urethral distraction defect undergone for urethroplasty operation at Urology department of SMS Medical College, Jaipur. Patients were enrolled in study from December 2018 to November 2019 and followed for six months. A predesigned, structured questionnaire was used to record all necessary information of enrolled participants. Patients underwent a thorough evaluation including a complete medical history, physical examination, urine analysis and culture, uroflowmetry, retrograde urethrography before surgery. Medical history also included information on medications, chronic diseases, previous pelvic fractures, previous pelvic surgeries, previous endoscopic interventions and failed urethroplasties. Before urethroplasty operation, erectile function was evaluated via a translated and culturally adapted version of the International Index of Erectile Function (IIEF) questionnaire, validated by various studies.^{8, 14, 15} Erectile function was reassessed by IIEF questionnaire post-operatively and at six months. The localization of the injury and technique of the surgery were also noted in individual cases proforma.

Inclusion criteria:

- Sexually active males (18-60 Years) with pelvic fracture urethral distraction defect undergone for urethroplasty.
- Willing to participate in study and given written consent.

Exclusion criteria:

- Prior erectile dysfunction including psychological erectile dysfunction.
- Neurological deficit.
- Medication affecting erectile function like anti-depressants or psychoactive drugs etc.
- Uncontrolled systemic diseases such as diabetes, hypertension, thyroid dysfunction etc.
- Prior anastomotic urethroplasty.

International Index of Erectile Function:

The IIEF is a validated multidimensional self-reported instrument widely used for evaluating male sexual function. The IIEF is divided into five domains of sexual function, including EF, orgasmic function (OF), intercourse satisfaction (IS), sexual desire (SD), and overall satisfaction (OS).

Based on the total score of 25 of the EF domain, the score was calculated for every patient and each patients were characterized into 5 categories: scores between 22-25: Normal, scores of 17-21: mild ED, scores of 12-16: mild to moderate ED, scores of 8-11: moderate ED, scores of 5-7: severe ED. Erectile dysfunction is defined as IIEF5 scores <21.

Ethical clearance:

The methods of the study were assessed and confirmed by the Institutional Review Board and the Ethics committee of SMS Medical College, Jaipur. Enrollment of patients was started after taking ethical clearance from both committees. The purpose, methods of the survey and its importance were thoroughly explained to the patients and an informed written consent was obtained from the subjects willing to participate.

Statistical analysis:

Statistical analysis was performed with SPSS 23.0 (trial version). Data were presented as mean and standard deviation for quantitative variables and as frequency and percentage for qualitative variables. Chi-square test and Fisher's Exact test were used for comparison of qualitative variables while quantitative variables were analyzed by paired t - Test and unpaired t - test. P value of <0.05 was considered statistically significant for all analysis.

Results:

Total 24 patients of pelvic fracture urethral distraction defect were enrolled for study. Among them, 2 patients were lost to follow up. Hence a total of 22 patients were analysed.

Table 1 depicts socio-demographic and clinical profile of stud participants. Mean age of stud participants was 46.4±12.6 years. Minimum age of participant was 23 years and maximum age was 52 years. All participants were sexually active. Married and unmarried participants were 16 (72.73%) and 06 (27.27%) respectively. Only 18.18%

participants were illiterate and rest were had education from primary to graduation. 08 (36.36%) participants had associated co-morbidities such as hypertension, diabetes or alcohol and tobacco abuse. Mode of injury was road traffic accident, fall from height and fall of heavy object among 14 (63.64%), 04 (18.18%) and 01 (4.55%) participants. Other causes were found among 03 (13.64%) participants. Only 06 (27.27%) patients had other associated organ injuries.

Among 22 participants, ED following trauma was found in 13 (59.09%) participants. Bulbar mobilization, crural separation, inferior wedge pubectomy was method of treatment for 07 (31.82%), 11 (50%) and 04 (18.18%) participants. **Duration between trauma and urethroplasty was 15.61±21.93 days. Length of defect 2.68±1.08 cm.**

Table 1: Socio-demographic and Clinical profile of study participants

Variables	Numbers (n=22)	Percentage (%)
Age		
≤ 40	13	59.09
>40	09	40.91
Marital status		
Married	16	72.73
Unmarried	06	27.27
Educated		
Illiterate	04	18.18
Literate	18	81.82
Co-morbidities		
Yes	08	36.36
No	14	63.64
Mode of injury		
Road Traffic Accident	14	63.64
Fall from height	04	18.18
Fall of heavy object	01	4.55
Others	03	13.64
Associated other organ injury		
Yes	06	27.27
No	16	72.73
ED following trauma		
Yes	13	59.09
No	09	40.91
Method of treatment		
Bulbar mobilization	07	31.82
Crural separation	11	50.00
Inferior wedge pubectomy	04	18.18

Table 2: Erectile function among study participants assessed by IIEF questionnaire Pre-operatively and Post-operatively (Six Months)

Erectile function	Pre-operatively Numbers (%)	Post-operatively Numbers (%)	P value
No ED	09 (36.36)	11 (45.45)	0.90
Mild ED	02 (31.82)	01 (22.73)	
Mild to moderate	07 (18.18)	05 (22.73)	
Moderate ED	03 (13.64)	04 (9.09)	
Severe ED	01 (0.00)	01 (0.00)	

* Chi-square test was used as test of significance and p value less than 0.05 was consider as significant.

Table 2 and figure 1 presents the association between erectile function and urethroplasty. Based on the results of analysis a no significant difference was observed in

erectile function of subjects assessed by IIEF questionnaire Pre-operatively and Post-operatively (p=0.90).

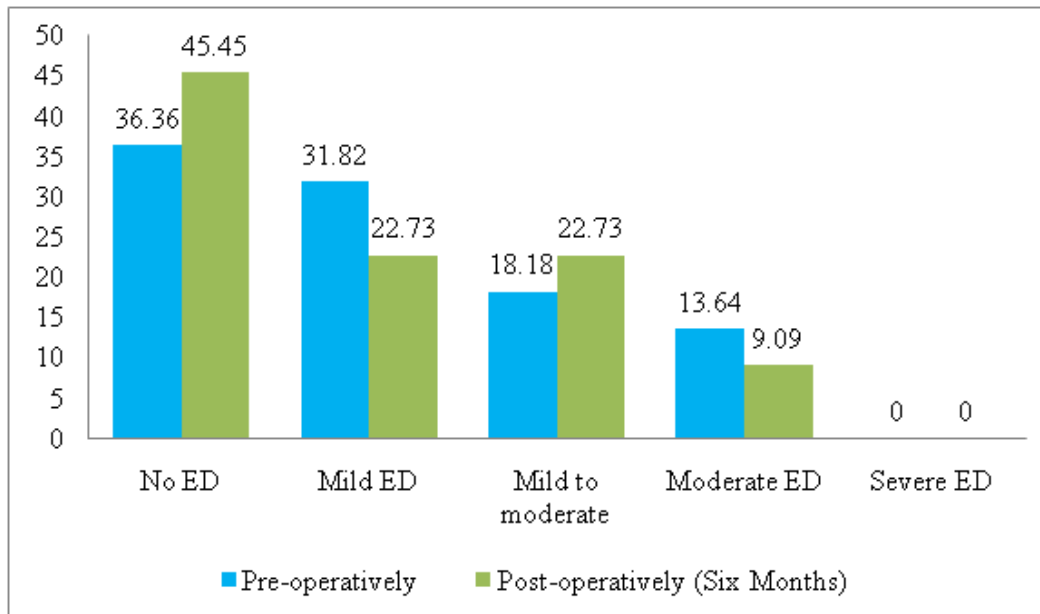


Figure 1: Erectile function among study participants assessed by IIEF questionnaire Pre-operatively and Post-operatively (Six Months)

Table 3: Cause of ED based on penile doppler among study participants

Cause of ED	Pre-operatively (n=13)	Post-operatively (n=11)
Normal	04 (30.77)	06 (54.55)
Arterial insufficiency	03 (23.08)	02 (18.18)
Veno-occlusive	01 (7.69)	01 (9.09)
Mixed	05 (38.46)	02 (18.18)

Causes of ED based on penile doppler was shown in table 3. After trauma 13 (59.09%) patients had ED. On penile doppler, 03 (23.08%) had arterial insufficiency, 01 (7.69%) had veno-occlusive, 05 (38.46%) had mixed etiology and 04 (30.77%) participants had normal penile doppler study. Following urethroplasty, arterial insufficiency, veno-occlusive, mixed etiology was found among 02 (18.18%), 01 (9.09%), 02 (18.18%) and 06 (54.55%) participants had normal penile doppler study.

Table 4: Change in Erectile function and penile doppler at Six Months Post-operatively

Change in Erectile function	ED category Numbers (%)	Penile Doppler Numbers (%)
Same	09 (69.23)	07 (63.64)
Improved	03 (23.07)	04 (36.36)
Deteriorate	01 (7.69)	00 (0)

Following urethroplasty, 09 (69.23%) of participants showed no change in IIEF while 03 (23.07%) participants reported improvement and 01 (7.69%) participant reported deterioration. In penile doppler study, 07 (63.64%) of participants showed no change while 04 (36.36%) participants found improvement and no participant found deterioration.

2. Discussion

With modernization, there is increase in incidence and severity of injuries including pelvic trauma. It occurs more commonly in males. Female patients with PFUI are rare and so is their management. Sexual dysfunction after urethroplasty is a very broad definition that also includes disorders of erectile dysfunction, ejaculatory disorders, penile curvature or chordee and genital sensitivity disorders.

Keeping in mind these factors, a prospective follow-up study was planned on patients of PFUDD undergone for urethroplasty operation between December 2018 to November 2019 and followed for six months. IIEF was used to assess erectile function before and after six months of urethroplasty operation.

In present study, 13 (59.09%) participants pre-operatively and 11 (50%) participants post-operatively shows erectile dysfunction. Sarah D. Blaschko et al¹⁰ found lower percentage of patients developed ED. After primary realignment, 16% of patients reported ED and after delayed urethroplasty 37% of patients reported ED while Jalil Hosseini et al⁸ shows higher percentage of ED before urethroplasty (84.61%) and 6 months after urethroplasty (83.07%). Anger et al¹⁶ study 25 patients for six months and found result similar to present study (Pre-operatively 62.6% and post-operatively 59.6%). Dogra et al¹⁷ found ED among 38% of post-operatively.

In present study, mean age of stud participants was 46.4±12.6 years with range of 23 years to 52 years. All participants were sexually active. Age of participants was between 19 and 75 years and mean age of the cases was 54.48 ± 13.34 in a study conducted by Ahmet Urkmez et al

on 60 patients. In the study of Anger et al¹⁶ Sharma et al¹⁸ and Dogra et al¹⁷ median age of participants was 39, 34 and 38 years.

In present study, following urethroplasty, 09 (69.23%) of participants showed no change in IIEF while 03 (23.07%) participants reported improvement and 01 (7.69%) participant reported deterioration. In penile doppler study, 07 (63.64%) of participants showed no change while 04 (36.36%) participants found improvement and no participant found deterioration. Murat Tunc et al¹⁹ in their retrospective analysis of 58 patients reported 15 (25.8%) had ED after trauma and 43 patients had normal erectile function. Following urethroplasty, 7 (16.2%) patients lost their potency and 1 patient had improved erection. In a study by El-Assmy et al²⁰ erectile function recovered in 13.5% after 12 months following urethroplasty. They found that severity of pelvic trauma as the most important predictor of recoverability of ED. Majeed et al in his study reported improvement in erectile function in 8% patients following anastomotic urethroplasty. In a study by Dhabuwala et al²¹ of 26 patients, 4 patients had improved erectile function after urethroplasty.

3. Limitations

Although this is one of the few prospective studies evaluating erectile dysfunction after urethroplasty simultaneously via color Doppler ultrasound of penile vasculature. This study may be limited by various factors. Although the total number of patients included in this study is considerable, the subgroup numbers are limited. As erectile dysfunction is multifactorial, neurogenic and other causes (co-morbid conditions) of ED should be considered.

4. Conclusion

Erectile dysfunction is common following pelvic injuries. RTA is most common cause of pelvic trauma. Our study suggests that urethroplasty surgery itself does not significantly affect erectile function.

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Conflict of interest

Nil

References

- [1] Johnsen N.V, Melissa R. Kaufman M. R. Erectile Dysfunction Following Pelvic Fracture Urethral Injury. *Sex Med Rev* 2018;6:114-123.
- [2] Harwood PJ, Grotz M, Eardley I, Giannoudis PV. Erectile dysfunction after fracture of the pelvis. *The Journal of Bone and Joint Surgery. British volume.* 2005 Mar;87 (3):281-90.
- [3] Latini JM, McAninch JW, Brandes SB, Chung JY, Rosenstein D. SIU/ICUD. Consultation on urethral strictures. Epidemiology, etiology, anatomy, and nomenclature of urethral stenoses, strictures, and pelvic fracture urethral disruption injuries. *Urology* 2014;83:S1-7.
- [4] Bjurlin MA, Fantus RJ, Mellett MM, Goble SM. Genitourinary injuries in pelvic fracture morbidity and mortality using the National Trauma Data Bank. *J Trauma* 2009; 67:1033-9.
- [5] Shenfeld OZ, Kiselgorf D, Gofrit ON, Verstandig AG, Landau D, Pode D, et al. The incidence and causes of erectile dysfunction after pelvic fractures associated with posterior urethral disruption. *J Urol* 2003; 169:2173-6.
- [6] Feng C, Xu YM, Yu JJ, Fei XF, Chen L. Risk factors for erectile dysfunction in patients with urethral strictures secondary to blunt trauma. *J Sex Med* 2008; 5:2656-61.
- [7] Luís Xambre et al. Sexual (Dys)function after Urethroplasty. *Advances in Urology. Volume 2016, Article ID 9671297, 10 pages.*
- [8] Hosseini J, Tavakkoli Tabassi K. Surgical repair of posterior urethral defects: review of literature and presentation of experiences. *Urol J.* 2008;5:215-22
- [9] Zuckerman JM, McCammon KA, Tisdale BE, et al. Outcome of penile revascularization for arteriogenic erectile dysfunction after pelvic fracture urethral injuries. *Urology* 2012; 80:1369-1373.
- [10] Blaschko S D, Sanford M T et al. The incidence of erectile dysfunction after pelvic fracture urethral injury: A systematic review and meta-analysis. *Arab Journal of Urology* (2015) 13, 68-74.
- [11] Brant WO, Hotaling JM. Is there still a role for primary realignment for stricture due to pelvic fracture? *J Urol* 2014; 192:1595-1596.
- [12] Sofer M, Mabeesh NJ, Ben-Chaim J, et al. Long-term results of early endoscopic realignment of complete posterior urethral disruption. *J Urol* 2010; 24:1117-1121.
- [13] Tausch TJ, Morey AF, Scott JF, et al. Unintended negative consequences of primary endoscopic realignment for men with pelvic fracture urethral injuries. *J Urol* 2014; 192:1720-1724.
- [14] Pakpour AH, Zeidi IM, Yekaninejad MS, Burri A. Validation of a translated and culturally adapted Iranian version of the International Index of Erectile Function. *J Sex Marital Ther.* 2014;40:541-51.
- [15] Rosen RC, Riley A, Wagner G, Osterloh IH, Kirkpatrick J, Mishra A. The International Index of Erectile Function (IIEF): a multidimensional scale for assessment of erectile dysfunction. *Urology* 1997; 49: 822-30.
- [16] J. T. Anger, N. D. Sherman, and G. D. Webster, "The effect of bulbar urethroplasty on erectile function," *The Journal of Urology*, vol. 178, no. 3, pp. 1009-1011, 2007.
- [17] P. N. Dogra, A. K. Saini, and A. Seth, "Erectile dysfunction after anterior urethroplasty: a prospective analysis of incidence and probability of recovery-single-center experience," *Urology*, vol.78, no. 1, pp. 78-81, 2011.
- [18] V. Sharma, S. Kumar, A. K. Mandal, and S. K. Singh, "A study on sexual function of men with anterior

urethral stricture before and after treatment,” *Urologia Internationalis*, vol. 87, no. 3, pp. 341-345, 2011.

- [19] Tunc HM, Tefekli AH, Kaplancan T, Esen T. Delayed repair of post-traumatic posterior urethral distraction injuries: long-term results. *Urology*. 2000 Jun;55 (6):837-41.
- [20] El-Assmy A, Harraz AM, Benhassan M, Nabeeh A, Ibrahim el H. Erectile function after anastomotic urethroplasty for pelvic fracture urethral injuries. *Int J Impot Res*. 2016 Jul; 28 (4):139-42.
- [21] Majeed SA. Neurologic deficits in major pelvic injuries. *Clin Orthop Relat Res*. 1992 Sep; (282):222-8