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**Original Article**

# End to End Anastomotic Urethroplasty in the Management of Posterior Urethral Distraction Defect

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## ABSTRACT

Posterior urethral distraction deficits are a difficult and complex clinical condition that necessitates specialized care in urological therapy. End-to-end anastomotic urethroplasty has emerged as a critical procedure for treating posterior urethral distraction abnormalities, providing a thorough and successful approach for restoring normal urethral function. **Objective:** To assess the outcome of end-to-end urethroplasty in posterior urethral distraction defects. **Methods:** This study was conducted at the departments of Urology, MTI LRH, and Peshawar from 1st November 2017 to 31st December 2021. It was a descriptive case-series study by design. Patients included were having blind urethral strictures. End to end urethroplasty was performed. Patients were followed for one year. Depending upon symptoms relief, uro-flowmetery studies, and radiographic findings at the end of one year, success was defined as good, fair, or poor. **Results:** The study included a total of 110 patients, with a majority being male (80%) and the remaining 20% being female. The mean age of the patients was 35 years, with the majority falling in the age group of 30-39 years (50.9%). Good outcomes were recorded in 79 patients (71.8%). 11 (10.0%) participants had poor outcomes. **Conclusions:** Urethroplasty is a gold standard treatment modality in terms of outcome for patients with posterior urethral distraction defects.

## INTRODUCTION

Posterior urethral distraction deficits are a difficult and complex clinical condition that necessitates specialized care in urological therapy [1]. These abnormalities, which are frequently caused by traumatic traumas or iatrogenic causes, can have a major influence on a patient's quality of life by impairing urine function [2]. One of the key goals in such circumstances is to restore urethral continuity through surgical treatments. End-to-end anastomotic urethroplasty has emerged as a critical procedure for treating posterior urethral distraction abnormalities, providing a thorough and successful approach for restoring normal urethral function [3]. The posterior urethra, a vital component of the male urinary system, is vulnerable to injury as a result of a variety of traumatic occurrences, including pelvic fractures and straddle injuries [4]. Iatrogenic factors, such as instrumentation or surgery, may also lead to the development of distraction abnormalities. These abnormalities frequently cause urethral wall disruption, resulting in a range of clinical manifestations ranging from partial blockage to full

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urethral discontinuity [5]. Because of the anatomical complexity and potential problems associated with these injuries, the management of posterior urethral distraction deficits presents special challenges [6]. Recognizing the influence on patients' well-being and the need for a customized approach, urologists have increasingly chosen end-to-end anastomotic urethroplasty as their preferred surgical procedure. This operation requires rigorous alignment and suturing of the proximal and distal urethral ends, with the goal of restoring urethral continuity [7].

We investigated the ideas, procedures, and outcomes of end-to-end anastomotic urethroplasty in the setting of posterior urethral distraction in this study. We hoped to provide a detailed overview of the function of this surgical intervention in managing these difficult urological disorders by reviewing the current literature and highlighting advances in surgical methods. Furthermore, we covered the parameters impacting treatment success, potential complications, and future directions in refining and improving the outcomes of end-to-end anastomotic urethroplasty for posterior urethral distraction abnormalities.

## METHODS

The study, which was designed as a retrospective case series, was carried out in the department of urology at MTI Leady Reading Hospital from 1st November 2017 till 31st December 2023. This study comprised a total of 110 patients who had a traumatic posterior urethral distraction defect. Patients having concomitant neurogenic bladder, enlarge prostate or bladder diverticulae were excluded from study. The outcomes were defined as: a) Good: patient with a patent urethra and satisfactory voiding, urine flow at the rate of 15 ml/sec or more, and no further intervention required. b) Fair: patients with a thin stream and difficulty voiding, urine flow at a rate of 10-15 ml/sec, and some irregularities in the retrograde urethrogram. Self-dilatation and a single endoscopic intervention are required. c) Poor: The patient could not form a urinary stream and had poor voiding with urine flow at a rate of less than 10 ml/sec. Post-operative complications were measured in terms of: 1) Wound Infection: It was confirmed clinically by the presence of redness and sero-sanguinous discharge from the surgical site. 2) Epididymo-orchitis: It was confirmed clinically by the examination of scrotum. Presence of swelling and tenderness on palpation of the testicle was considered diagnostic for epididymo-orchitis. Erectile dysfunction was diagnosed based on history based on DSM-V criteria when patient reported the recurrent inability to achieve an erection, the inability to maintain an adequate erection, and/or a noticeable decrease in erectile rigidity during partnered sexual activity. The patient who could not form a urinary stream and had poor voiding with urine flow at a rate of less than 10 ml/sec underwent re-do urethroplasty. Baseline information like age, gender, residence and underlying etiology was noted. All the patients had suprapubic cystostomies for urinary diversion. Urethroplasty was planned after an interval of 10 to 12 weeks of trauma. Patients were assessed in detail Blood Urea Nitrogen (BUN) and Creatinine test. The site and length of posterior urethral distraction defects were assessed by antegrade and retrograde urethrograms. Under spinal or general anaesthesia, the procedure was carried out in an extended lithotomy position with a midline perineal incision. By separating the bulbo cavernous muscle, the urethra was examined. The urethra was dissected proximally up to the distraction defect and distally up to the penoscrotal junction from the corpora cavernosa. Retrograde and antegrade cystoscopy were used to confirm the location of the lesion. The bladder neck was seen by antegrade cystoscopy. Healthy and viable tissues were reached after the excision of the structured segment. A silicone catheter was passed on to the bladder. Urethral mucosa is anastomosed in an end-to-end and tension-free fashion over the catheter with 3/0 polyglactin after spatulaion and eversion of the proximal segment of the urethral mucosa. Initially, at 12, 3, and 6 o'clock, sutures were placed symmetrically. To avoid jumbling, they were clearly demarcated. The rest of the sutures were placed at 4, 6, and 8 o'clock. In areas where the posterior urethral distraction defect was more than 3 cm, buccal mucosal grafts were placed or employed as inlays. The perineal body was anchored to the urethra. Drain was placed after closing the bulbo-spongiosus muscle. The patient's mobility was restricted to bed for 3 to 4 days. Anticholinergics, antiandrogens, and sedatives were prescribed for a week. The urethral catheter was withdrawn two weeks following the treatment, and the SPC was removed one week later. An antegrade urethrogram was promptly performed. At the time of discharge, all patients were instructed to return to the department in three months, six months, and one year. At each follow up visit the voiding status was assessed for evaluation of outcomes in terms of good, fair and poor outcomes. History and clinical examination was carried for assessment of post-operative complications like wound infection, epididymo-orchitis, erectile dysfunction and re-do urethroplasty. Data were analyzed using SPSS version 24.0. Categorical data was presented as frequencies and percentages. Continuous data were presented as mean±S.D or median (IQR). Tests of statistical significance included student t test for continuous data and chi square test for categorical variables, taking p value ≤0.05 as statistically significant.

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## RESULTS

The study included a total of 110 patients, with a majority being male (80%) and the remaining 20% being female. The mean age of the patients was 35 ± 2 years, with the majority falling in the age group of 30-39 years (50.9%). The next largest age group was 20-29 years (29.1%), followed by 40-49 years (18.2%) and a small number of patients in the age range of 50-59 years (1.8%). The study population was predominantly from urban areas (80%), with the remaining 20% being from rural areas. The age range of the patients was between 20-60 years, with the majority falling in the 2nd and 3rd decades of life (Table 1).

**Table 1:** Gender and Age Distribution

| Characteristics | Total Patients n (%) |
|---|---|
| **Gender** | |
| Male | 88 (80%) |
| Female | 22 (20%) |
| Mean age | 35±2 |
| **Age Group** | |
| 20-29 | 32 (29.1%) |
| 30-39 | 56 (50.9%) |
| 40-49 | 20 (18.2%) |
| 50-59 | 2 (1.8%) |
| **Urban Population** | 88 (80%) |
| **Rural Population** | 22 (20%) |

The most common etiological factor for the patients in this study was road traffic accidents, accounting for 54.4% of the total cases. This was followed by falls from height, which accounted for 30% of the cases. Firearm injuries were responsible for 4.54% of the cases, while instrumentation accounted for 10.90% of the cases. These findings suggest that road traffic accidents and falls from height are the leading causes of traumatic injuries in this population (Table 2).

**Table 2:** Etiological Factors Distribution.

| Etiological Factors | Total Patients n (%) |
|---|---|
| Road Traffic Accident | 60 (54.4%) |
| Fall from Height | 33 (30%) |
| Firearm Injury | 5 (4.54%) |
| Instrumentation | 12 (10.90%) |

The preoperative characteristics of the patients were also analyzed in this study. A majority of the patients (54.54%) underwent uroflowmetry, a diagnostic test used to measure the flow of urine. 22.73% of the patients had undergone urethral dilatation outside of the hospital, while 18.18% had undergone internal optic urethrotomy outside of the hospital. A small number of patients (4.55%) had a history of rail road catheterization. It was also noted that all patients had a suprapubic catheter for urinary diversion. The interval between the trauma and the surgery ranged from 2-5 years. These preoperative characteristics provide important information about the patients' medical history and previous treatments, which may have an impact on the surgical outcome shown in Table 3.

**Table 3:** Preoperative Characteristics

| Characteristics | Total Patients n (%) |
|---|---|
| Urinary Diversion (Suprapubic Catheter) | Yes |
| Interval After Trauma | 2-5 years |
| Urethral Dilatation Outside Hospital | 25 (22.73%) |
| Internal Optic Urethrotomy Outside Hospital | 20 (18.18%) |
| Rail Road Catheterization History | 5 (4.55%) |
| Uroflowmetry | 60 (54.54%) |

Table 4 illustrates the outcomes of end to end urethroplasty. The procedure was successful in 79 participants (71.8%) with good outcomes, fair outcomes were recorded for 20 participants (18.2%) while poor results were observed in 11 patients (10.0%).

**Table 4:** Outcomes of End to End Urethroplasty

| Outcomes | Total Patients n (%) |
|---|---|
| Good | 79 (71.8%) |
| Fair | 20 (18.2%) |
| Poor | 11 (10.0%) |

The surgical and postoperative outcomes of the patients were evaluated in this study. The average stricture length was found 3-5cm. A small number of patients (4.5%) experienced complications such as fistula, urethral stones, and erectile dysfunction. The average operation time was 2.5 hours, and the average hospital stay was 14 days. A small number of patients (3.6%) required blood transfusions during the surgery. Postoperative complications were observed in 10% of the patients, including minor wound infections, epididymo-orchitis, erectile dysfunction, and the need for re-do urethroplasty. (Table 5).

**Table 5:** Operative characteristics and post-op complications

| Outcomes | Total Patients n (%) |
|---|---|
| Stricture Length (cm) | 3-5cm |
| Fistula | 5 (4.5%) |
| Urethral Stones | 2 (1.8%) |
| Erectile Dysfunction | 5 (4.5%) |
| Operation Time (hours) | 2.5 hrs |
| Hospital Stay (days) | 14 days |
| Blood Transfusions | 4 (3.6%) |
| **Postoperative Complications** | |
| Minor Wound Infection | 11 (10%) |
| Epididymo-orchitis | 5 (4.5%) |
| Erectile Dysfunction | 5 (4.5%) |
| re-do urethroplasty | 11 (10%) |

## DISCUSSION

Strictures and defects of the posterior urethra in men are among the most serious clinical issues that urologists face.

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Previous research estimated that 5 to 10% of pelvic fractures resulted in posterior urethral injury. A healthy debate on large scale is going on about the early repair versus late anastomosis. Both the proponents and opponents have their own logics but after publication of 50 years data by Koratim et al., it is established that early surgery complications are more than late surgery in terms of incontinence of urine as well as erectile dysfunction [6]. Anastomosis is typically used to repair abnormalities in the posterior urethra. However, in rare situations, the urethral defect is so long that aggressive release of the urethra from surrounding tissue, inferior pubectomy, and even re-routing maneuvers are ineffective [8]. Many factors, such as the length, severity, and location of the stricture in the bulbar urethra, can influence the surgical outcome. The surgical approach should be chosen primarily based on the length of the stricture, but the aetiology of the stricture and the density of the spongiofibrosis tissue should also be considered [9]. According to Santucci et al., short bulbar strictures are often amenable to full excision with primary anastomosis via a perineal incision, with a 95% success rate [10]. Eltahawy et al., published a study of 260 individuals with bulbar stricture who underwent end-to-end anastomosis over a 50.2-month period. The stricture length ranged from 0.5 to 4.5 cm (mean, 1.9 cm), with a success rate of 98.8% reported [11]. On the basis of large series described in the literature, Jezior and Schlossberg summarized the surgical outcomes of excision and primary anastomosis for bulbar stricture in 2002. The success rate in these series was 93% in 443 patients, with a range of 65% to 100% amongst series [12]. In our study of 110 patients with posterior urethral distraction defects, 88 (80%) were from urban habitat and 22 (20%) were from rural habitat, which is comparable to Hussain et al. [13, 14]. The reason for high number of patients from urban habitat is the huge volume of road traffic accidents as well as open manholes mouths on the foot paths. The mean age of 35 years is in comparison to the data reported in the literature [15]. The presented patient with a post-urethral distraction defect attributed to pelvic fracture in our study is 60 (54.4%), which is also reported in another series. The duration of distracting defects and therapies in our study extends from 3 weeks to 5 years, which is consistent with the findings of many other urologists' investigations [12, 16]. Our study's mean operating time of 2.5 hours is one hour less than the international literature. Larger distraction defects have been covered by grafts from buccal mucosa in 8% of patients in our case series, which coincides with international literature where they have been using buccal mucosal grafts [17]. In our study, the etiological factors of distraction defects of RTA 60 (54.4%) and falling astride 33 (30%) matched the findings of other urologists [18]. Our study's success rate is 85%, which is comparable to another research [19]. According to Choudhary and Jha, out of 90 patients who underwent urethroplasty, 5 (4.54%) had a recurrence, whereas 38 (34.5%) were asymptomatic after an average follow-up duration of 32.8 months [20]. Our results are also consistent with the study, as after 1 year of follow-up, the percentage of patients who needed revision were 10%. A literature review of international studies shows de novo erectile dysfunction attributed to urethroplasty is equal to the incidence after circumcision, so our study reflects that cases of post-op erectile dysfunction after follow-up after 1 year were rare [21].

## CONCLUSIONS

In terms of outcome, urethroplasty is the gold standard treatment modality for posterior urethral distraction abnormalities

## Authors Contribution

Conceptualization: KF
Methodology: IZ, HH
Formal analysis: AA, NH, IAK
Writing-review and editing: KF, HH
All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

## Source of Funding

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