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ORIGINAL ARTICLE

Outcomes of Urethral Strictures Managed with Endoscopic Urethrotomy versus Urethroplasty: A Retrospective Comparative Analysis of 80 Cases

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ABSTRACT

Objective: To compare the clinical outcomes of urethral strictures treated with endoscopic urethrotomy and urethroplasty in terms of urinary flow rates, recurrence, and overall success.
Study Design: Retrospective comparative study
Methods: Eighty male patients with urethral strictures were retrospectively analyzed. After obtaining informed consent, demographic and clinical characteristics (age, BMI, and comorbidities) were documented. Patients were allocated into two groups: Group I (n=40) underwent urethroplasty, while Group II (n=40) received endoscopic urethrotomy. Follow-up ranged between 4–6 months, with treatment success, recurrence, and maximum urinary flow rate (Qmax) as primary outcomes. Statistical analysis was performed using SPSS v22.
Results: The mean age of patients was 51.2 ± 12.8 years in Group I and 52.1 ± 11.3 years in Group II, with mean BMI of 24.9 ± 3.1 and 25.5 ± 2.8 kg/m², respectively. Dysuria, urinary retention, and frequency were the predominant presenting complaints. Infection was the most frequent etiology (61.2%), followed by trauma (22.5%) and iatrogenic causes (16.3%). The membranous urethra was the most common site of involvement. Postoperatively, mean Qmax improved significantly in the urethroplasty group (16.4 ± 5.2 mL/s) compared to the urethrotomy group (9.6 ± 4.7 mL/s, p=0.03). Treatment success was achieved in 85% of urethroplasty cases compared with 52.5% in the urethrotomy group. Recurrence was observed in 10% of urethroplasty patients versus 27.5% of urethrotomy patients.
Conclusion: Urethroplasty demonstrated superior functional outcomes and a lower recurrence rate compared with endoscopic urethrotomy. The findings reinforce urethroplasty as the preferred treatment for definitive management of urethral strictures.
Keywords: Urethral stricture, Urethroplasty, Urethrotomy, Qmax, Recurrence

INTRODUCTION

Urethral stricture is a prevalent urological disorder characterized by fibrotic narrowing of the urethral lumen due to scarring of the urethral epithelium and surrounding spongiofibrous tissue. It remains a significant cause of obstructive lower urinary tract symptoms in men, with an estimated incidence of 200 per 100,000 males in their 20s, rising to nearly 900 per 100,000 in the elderly population[1]. In the United Kingdom alone, urethral strictures account for approximately £10 million in annual healthcare costs, with over 17,000 admissions and 12,000 surgical interventions reported annually[2].

The etiology is multifactorial, including infections, trauma, iatrogenic instrumentation, and idiopathic causes[3]. Clinical presentation typically includes poor urinary stream, frequency, dysuria, retention, and recurrent urinary tract infections. Diagnosis is confirmed with uroflowmetry, retrograde urethrography, and cystoscopy.

Management of urethral stricture has evolved considerably. Endoscopic urethrotomy (direct visual internal urethrotomy, DVIU) is frequently performed as an initial treatment due to its simplicity and low morbidity[4]. However, its long-term efficacy is limited, with recurrence rates reported as high as 50–70%[5]. Urethroplasty, though technically demanding, offers superior long-term results with durable cure rates exceeding 80% in most series[6,7].

Controversy persists regarding optimal treatment, particularly for strictures less than 2 cm in length. This study compares the outcomes of urethroplasty versus endoscopic urethrotomy in 80 patients managed at our institution.

MATERIALS AND METHODS

This retrospective study was conducted at Institute of kidney diseases, Hayatabad, Peshawar from June 2022 to May 2023 and included 80 male patients aged 20–75 years diagnosed with urethral stricture. Exclusion criteria included active perineal infection, fistula, inability to tolerate anesthesia exceeding 3 hours, and patients unwilling to consent.

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Group Allocation:

- **Group I (n=40):** Underwent urethroplasty (end-to-end anastomosis or substitution technique depending on stricture length).
- **Group II (n=40):** Underwent endoscopic urethrotomy using cold knife incision at the 12 o'clock position.

Data Collection: Baseline demographics, comorbidities (diabetes, cardiovascular disease, chronic pulmonary disease), stricture site, etiology, and preoperative Qmax were recorded. Patients were followed for 6 months with serial uroflowmetry and urethrography.
Statistical Analysis: Quantitative data were expressed as mean ± SD and analyzed using Student's t-test, while qualitative variables were compared using chi-square or Fisher's exact test. A p-value <0.05 was considered statistically significant.

RESULTS

The mean age was 51.2 ± 12.8 years in Group I and 52.1 ± 11.3 years in Group II. Mean BMI was 24.9 ± 3.1 and 25.5 ± 2.8 kg/m², respectively. Dysuria was the most common symptom (58%), followed by urinary retention (25%) and pollakiuria (17%). Diabetes mellitus was present in 18 patients, COPD in 14, and cardiovascular disease in 6.

Table 1: Baseline Characteristics of Patients (n=80)

Variables	Group I (Urethroplasty, n=40)	Group II (Urethrotomy, n=40)
Mean Age (years)	51.2 ± 12.8	52.1 ± 11.3
Mean BMI (kg/m²)	24.9 ± 3.1	25.5 ± 2.8
Diabetes mellitus	9 (22.5%)	10 (25%)
Chronic pulmonary disease	7 (17.5%)	7 (17.5%)
Cardiovascular disease	3 (7.5%)	3 (7.5%)
Smoking history	8 (20%)	7 (17.5%)

Infection was the predominant cause (49 cases, 61.2%), followed by trauma (18 cases, 22.5%) and iatrogenic injury (13 cases, 16.3%). The membranous urethra was most commonly affected, followed by bulbar and penile segments.

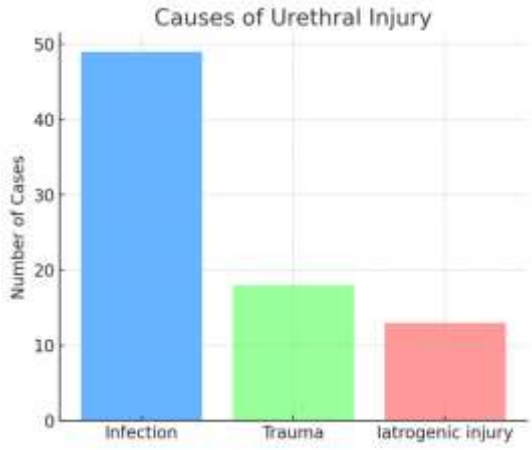

Figure 1: Etiology of Uretheral Strictures

Preoperative Qmax was similar between groups (Group I: 5.8 ± 2.9 mL/s vs. Group II: 6.3 ± 3.1 mL/s, p=0.27). At 6 months, postoperative Qmax was significantly higher in the urethroplasty group (16.4 ± 5.2 mL/s) compared with the urethrotomy group (9.6 ± 4.7 mL/s, p=0.03).

Table 2: Pre- and Postoperative Maximum Flow Rate (Qmax)

Variables	Group I (Urethroplasty)	Group II (Urethrotomy)	p-value
Preoperative Qmax (mL/s)	5.8 ± 2.9	6.3 ± 3.1	0.27
Postoperative Qmax (mL/s)	16.4 ± 5.2	9.6 ± 4.7	0.03*

*Significant at p < 0.05

Treatment success was achieved in 34 patients (85%) in Group I compared with 21 patients (52.5%) in Group II. Recurrence occurred in 4 (10%) urethroplasty patients and 11 (27.5%) urethrotomy patients.

Table 3: Treatment Success and Recurrence

Variables	Group I (n=40)	Group II (n=40)
Success	34 (85%)	21 (52.5%)
Failure	6 (15%)	19 (47.5%)
Recurrence	4 (10%)	11 (27.5%)

DISCUSSION

The management of urethral strictures has long been a challenge in reconstructive urology. Our study adds to the growing body of evidence confirming that urethroplasty offers superior functional outcomes and durability compared to endoscopic urethrotomy.

Our recurrence rates (10% for urethroplasty, 27.5% for urethrotomy) are consistent with earlier reports. Santucci and Eisenberg[5] found success rates for urethrotomy below 50%, while urethroplasty yielded 80–90% durable results. Similarly, Meeks et al.[6] in a systematic review reported significantly lower recurrence following urethroplasty. Our findings align with these studies, strengthening the case for urethroplasty as first-line management in strictures longer than 1 cm or recurrent cases.

A study by Anger et al.[9] highlighted underutilization of urethroplasty in the United States, with a majority of patients undergoing repeated endoscopic procedures despite poor long-term outcomes. This reflects treatment patterns in resource-limited settings where endoscopic urethrotomy is often preferred due to ease, availability, and shorter hospital stay.

Infection accounted for over 60% of cases in our series, which is higher than Western data where iatrogenic causes dominate[10]. This discrepancy may be explained by higher rates of untreated sexually transmitted infections and recurrent urinary tract infections in South Asian and African cohorts[11]. The membranous urethra was most commonly involved in our patients, consistent with the literature citing bulbar and membranous urethra as the primary sites of involvement[12].

Clinical Implications: Our study reinforces that endoscopic urethrotomy, while minimally invasive, should be reserved for carefully selected patients with very short (<1 cm) bulbar strictures or those unfit for open repair. Urethroplasty, though technically demanding, offers a definitive cure in the majority of cases, sparing patients from repeated interventions.

Strengths and Limitations: Strengths of this study include a clear comparative design, standardized follow-up, and consistent operative techniques. However, limitations include the relatively short follow-up period (6 months), retrospective nature, and single-center setting. Longer follow-up is required, as strictures often recur within 1–2 years after urethrotomy. In addition, patient-reported quality-of-life outcomes were not assessed, which are increasingly recognized as critical in evaluating success[7].

Future Directions

Future research should focus on:

- Randomized controlled trials comparing urethroplasty and urethrotomy in different stricture subgroups.
- Long-term follow-up (>2 years) to assess durability.
- Incorporating patient-reported outcomes, sexual function scores, and cost-effectiveness analysis.
- Evaluating novel adjuncts, such as laser urethrotomy and tissue engineering grafts[13,14].

CONCLUSION

Urethroplasty demonstrated significantly better outcomes compared to endoscopic urethrotomy, with higher urinary flow rates, improved success, and lower recurrence. Given its durability, urethroplasty should be considered the gold standard for strictures longer than 1 cm or recurrent cases, while urethrotomy may remain a reasonable option for selected short strictures.

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