



NONTRANSECTING ANASTOMOTIC URETHROPLASTY FOR SHORT BULBAR URETHRAL STRICTURES: A SINGLE CENTER EXPERIENCE

Urology

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ABSTRACT

Background: Non-transecting anastomotic urethroplasty (NTAU) has been proposed as a vessel-sparing alternative to traditional transecting anastomotic urethroplasty for short bulbar urethral strictures, with the potential to reduce sexual morbidity while maintaining high success rates. **Objective:** To evaluate the functional and anatomical outcomes of nontransecting anastomotic urethroplasty in patients with short bulbar urethral strictures. **Methods:** A single centre study was conducted including patients who underwent NTAU for bulbar urethral strictures ≤ 1 cm between January 2024 and September 2025 at S.N. Medical College and Hospital, Agra. Primary outcomes included stricture recurrence and need for secondary intervention. Secondary outcomes included postoperative urinary flow rates, erectile function, ejaculatory function, and complication rates. **Results:** A total of 15 patients were included, with a median stricture length of 0.7 cm. At a median follow-up of 3 months, stricture-free survival was 88%. Mean maximum urinary flow rate improved from 10 mL/s preoperatively to 18 mL/s postoperatively ($p < 0.05$). Postoperative erectile dysfunction was reported in 3% of patients, with no cases of de novo severe erectile dysfunction. Overall complication rate was 5%, predominantly Clavien–Dindo grade I–II. **Conclusion:** Nontransecting anastomotic urethroplasty is a safe and effective surgical option for short bulbar urethral strictures, providing excellent stricture-free rates with favourable functional outcomes. Preservation of urethral vascularity may contribute to reduced sexual morbidity compared with transecting techniques.

KEYWORDS

Nontransecting, anastomotic, urethroplasty, bulbar, stricture

INTRODUCTION

Urethral stricture disease is a common urological condition associated with significant morbidity, including lower urinary tract symptoms, recurrent infections, and impaired quality of life. Anastomotic urethroplasty remains the gold standard for short bulbar urethral strictures due to its durable success rates (1). However, traditional transecting anastomotic urethroplasty requires complete division of the urethra and corpus spongiosum, raising concerns regarding disruption of urethral blood supply and neural pathways.

Nontransecting anastomotic urethroplasty was developed to preserve spongiosal vascularity while achieving complete excision of fibrotic tissue (2). Although early reports suggest comparable success rates with reduced sexual morbidity (3), real-world outcome data remain limited. This study evaluates our institutional experience with NTAU, focusing on both anatomical success and functional outcomes.

Materials and Methods

Study Design and Patient Selection

This observational study included all adult male patients who underwent nontransecting anastomotic urethroplasty for bulbar urethral strictures at S.N. Medical College, Agra, between January 2024 and September 2025. Informed signed consent was obtained from the patients before the start of the study.

Inclusion criteria were:

- Bulbar urethral stricture ≤ 1 cm
- Non-obliterative stricture on preoperative imaging
- Minimum follow-up of 3 months

Exclusion criteria included:

- Pelvic fracture urethral injury
- Completely obliterative strictures
- Prior radiation therapy to the pelvis
- Prior urethral surgery / dilatation

Preoperative Evaluation

All patients underwent uroflowmetry, retrograde urethrography, and/or voiding cystourethrography. Erectile function was assessed preoperatively using the International Index of Erectile Function-5 (IIEF-5).

Surgical Technique

All procedures were performed via a perineal approach by two experienced reconstructive urologists. The bulbar urethra was exposed without circumferential mobilization. A ventral longitudinal stricturotomy was performed to open the stricture without complete urethral transection (Fig.1) Unhealthy and fibrotic urethral mucosa was identified (Fig.2). Fibrotic tissue was excised while preserving the underlying spongiosal plate (Fig.3). Primary end-to-end anastomosis of the mucosa was achieved using absorbable interrupted sutures (Fig.4). The corpus spongiosum was reconstructed transversely (Heineke Miculicz principle) over the anastomosis (Fig.5). A 14 fr Foley catheter was maintained for 14 days.

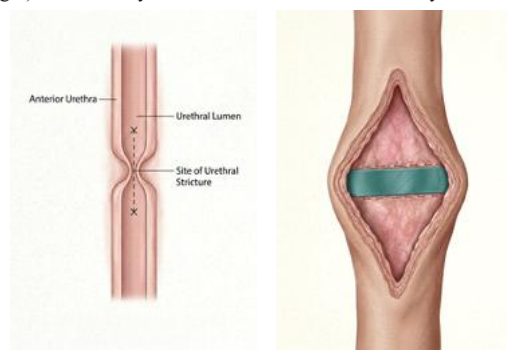


Fig. 1: Ventral Longitudinal Stricturotomy

Fig.2: Unhealthy fibrotic mucosa (Green strip)



Fig. 3: Fibrotic mucosa has been excised. **Fig.4:** Primary end-to-end anastomosis

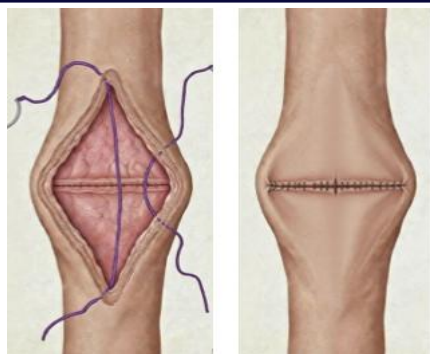


Fig. 5: Transverse closure of corpus spongiosum (Heineke Miculicz principle)

Outcome Measures and Follow-Up

Patients were followed at 3, 6, and 9 months postoperatively. Primary success was defined as absence of symptomatic recurrence and no need for secondary endoscopic or open intervention. Secondary outcomes included postoperative uroflowmetry, erectile and ejaculatory function, and perioperative complications graded by the Clavien–Dindo classification.

RESULTS

Patient Characteristics

Table 1. Baseline patient and stricture characteristics

Characteristic	Value
Number of patients	15
Median age, years (IQR)	37 (21–64)
Stricture length, cm (median, IQR)	0.7 (0.5–1.0)
Stricture etiology	
– Idiopathic	87%
– Iatrogenic	10%
– Inflammatory	3%
Preoperative Qmax, mL/s (mean ± SD)	10 ± 2.1
Preoperative IIEF-5 score (mean ± SD)	21 ± 3

Surgical and Functional Outcomes

Table 2. Surgical and functional outcomes following nontransecting anastomotic urethroplasty

Outcome	Result
Median follow-up, months (IQR)	5.4 (3–10)
Stricture recurrence, n (%)	1 (6.67%)
Stricture-free rate, %	93.4%
Postoperative Qmax, mL/s (mean ± SD)	18 ± 2.3
Improvement in Qmax, mL/s	+ 8
Preoperative IIEF-5 score (mean ± SD)	22 ± 3
Postoperative erectile dysfunction, n (%)	0(0%)
De novo severe ED	0
Preserved ejaculatory function, %	100%

Complications

Table 3. Postoperative complications according to Clavien–Dindo classification

Complication	Clavien–Dindo grade	n (%)
Wound infection	I–II	1 (6.67%)
Urinary tract infection	II	2 (13.5%)
Transient urinary retention	I	0 (0%)
Anastomotic leak	II	0 (0%)
Major complications (≥III)	—	0

Overall complication rate was 20%, with the majority being minor (Clavien–Dindo grade I–II). No major complications were observed.

DISCUSSION

Non-transecting anastomotic urethroplasty (NTAU) has emerged as a highly effective surgical option in the management of short bulbar urethral strictures, providing excellent long-term patency rates while potentially preserving native urethral vascularity and reducing functional morbidity. Traditionally, excision and end-to-end (transecting) anastomotic urethroplasty (EPA) was considered the gold standard for short bulbar strictures (<2–3 cm), showing high success

rates around 90–98% in numerous series. However, concerns have persisted about potential disruption to bulbospongiosus blood supply and associated sexual dysfunction due to complete transection of the spongiosum (4). NTAU was developed to mitigate such risks by preserving the corpus spongiosum and its vascular network while still allowing effective scar excision and reconstruction.

A systematic review of the literature across multiple institutions and patient cohorts demonstrates that NTAU achieves stricture-free success rates comparable to traditional EPA, with an average success of approximately 94.7% at mid-term follow-up. Complication rates in this review varied from 0% to 23.9% across studies, with most being mild (Clavien–Dindo I–II), including transient urinary symptoms or minor wound issues. Erectile dysfunction incidences ranged between 0% and 23%, averaging around 6.5%, suggesting that NTAU may also preserve sexual function better than its transecting counterpart (5).

These findings align with large cohort retrospective analyses. One multi-institutional comparative study involving 352 patients with short bulbar strictures reported an overall success rate of 94.9% at a mean follow-up of over five years. In that series, the NTAU group had a slightly higher success rate than the transecting group (97.9% vs 93.8%), though this difference was not statistically significant. Importantly, the non-transecting technique was associated with significantly lower rates of adverse changes in postoperative sexual function (4.3% vs. 14.3% in the transecting group) (6).

Additional institutional data further support the durability and safety of NTAU. In an 8-year experience from Liaquat National Hospital, Karachi, 358 patients with short bulbar strictures (mean length 1.2 cm) underwent non-transecting anastomotic repair with an initial success rate of 97.8%. Postoperative scrotal swelling, wound infection, and transient sexual dysfunction were uncommon, and there were no reports of permanent erectile deficits (7). Such outcomes underscore not only the efficacy of the approach in restoring urethral continuity but also its favourable complication profile.

From a guideline perspective, international recommendations acknowledge that urethroplasty should be offered for short bulbar strictures due to superior long-term success compared with dilatation or direct visual internal urethrotomy, which have significantly lower enduring patency rates. The American Urological Association's (AUA) guideline notes that non-transecting urethroplasty can reduce penile complications and may be preferable in appropriately selected patients, though clear superiority in erectile function preservation requires further study (8).

Mechanistically, the non-transecting approach preserves the bulbospongiosus blood supply by avoiding full transection of the corpus spongiosum. By maintaining this vascular network, there is less disruption of erectile tissue and potentially improved functional outcomes without compromising the structural success of the urethroplasty (9).

Limitations

This study is limited by its single-center twin surgeon setting and relatively small sample size. Lack of a direct comparison group undergoing transecting urethroplasty limits definitive conclusions regarding superiority.

CONCLUSION

In conclusion, non-transecting anastomotic urethroplasty represents a highly successful surgical strategy for short bulbar urethral strictures, combining excellent long-term patency with reduced risk of sexual dysfunction (10). With success rates in the mid-90% range and low complication profiles documented across numerous studies, this technique is increasingly supported as a primary option in reconstructive urology for suitable cases. Future prospective, randomized comparisons with traditional techniques may further clarify its role in optimizing both functional and quality-of-life outcomes.

Acknowledgments

None.

Conflicts of Interest

The authors declare no conflicts of interest.

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