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“Z” Anatomical Needle Cut Leads Ejaculation (ZANCLE): Unilateral incision for bladder neck obstruction with ejaculation-sparing intent: A single-surgeon experience

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Abstract

This study aimed to evaluate functional outcomes and antegrade ejaculation rates in patients undergoing monopolar, unilateral transurethral incision of the prostate (TUIP) with “Z” shaped incision with ejaculatory sphincter sparing for primary bladder neck obstruction (PBNO) in a case series performed by a single surgeon. Between December 2018 and July 2023, data from patients who underwent monopolar, unilateral TUIP were prospectively collected. Patients with a prostate volume of less than 30 mL were included. Functional outcomes, including maximum flow rate (Q_{max}, mL/s), post-void residual volume (PVR, mL), International Prostate Symptom Score (IPSS), and IPSS Quality of Life (IPSS QoL) score, were assessed preoperatively and at 1, 6, and 12 months postoperatively. A total of 106 patients met the inclusion criteria, with a median age of 42 years (range: 37–57) and a median prostate volume of 27 mL (range: 20–29). The median hospital stay was 1 day, and the median catheterization time was 3 days. At 1-month follow-up, the mean Q_{max} increased from 10.2 ± 2.5 mL/s to 22.8 ± 3.9 mL/s, while the mean IPSS score and IPSS QoL score decreased from 16 ± 2.7 to 6.9 ± 1.5 and from 4.3 ± 0.9 to 1.9 ± 1.6, respectively ($p < 0.001$). The mean PVR volume decreased from 125.5 ± 16.1 mL to 27.7 ± 7.3 mL ($p < 0.001$). Uroflowmetry results remained statistically significant at 12 months of follow-up (each $p < 0.001$). Antegrade ejaculation was preserved in all cases. Unilateral monopolar TUIP confirms to be a feasible and safe procedure for the treatment of BNO in young and sexually active patients.

Keywords

TUIP, trans-urethral incision of the prostate, ejaculation sparing, antegrade ejaculation, IPSS, QoL

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Introduction

Primary Bladder Neck Obstruction (PBNO) is a condition characterized by urine-flow obstruction due to incomplete opening of the smooth sphincter during voiding, resulting in obstructive symptoms, including voiding and storage symptoms. In a prospective study involving men aged 18–45 years with lower urinary tract symptoms (LUTS) Nitti et al. observed a 47% incidence of PBNO.¹ According to the European Association of Urology (EAU) guidelines, trans-urethral incision of the prostate (TUIP) is the gold standard treatment for those patients with obstructive

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symptoms either with absolute indications for surgery, lack of response to medical treatment, or a preference to forego medical treatment while requesting active intervention, and a prostate volume of <30 mL.² TUIP is conventionally performed with a Collins knife using monopolar or bipolar energy, with unilateral or bilateral deep incisions of the bladder neck and prostate or between the right lateral lobe and the prostatic mid lobe without tissue resection.³ One of the major drawbacks of the conventional bilateral TUIP technique is represented by retrograde ejaculation, which has been documented in 27% to 80% of men undergoing bilateral bladder neck incision.^{4,5} Conversely, when a unilateral incision is performed, the occurrence of retrograde ejaculation is notably reduced, with rates reported in the range of 0%–35% of patients.⁶ Aim of our study is to evaluate functional and Quality of Life (QoL) mid-term outcomes in patients undergoing TUIP, based on a large case series performed by a single surgeon.

Materials and methods

Study population

In this retrospective study, patients were enrolled from December 2018 to July 2023. A preoperative cystoscopy was performed in all patients. Moreover, uroflowmetry with postvoid residual urine volume, and International Prostate Symptom Score (IPSS) questionnaires (IPSS total vs IPSS-QoL) were assessed preoperatively and at 1, 6, and 12 months postoperatively.

Inclusion criteria were the following: prostate volume <30 mL based on suprapubic or transrectal ultrasound; uroflow with a maximum flow rate <15 mL/s; IPSS score >8 (moderate symptoms); no acceptable response to medical therapy (alpha 1-blockers); no previous prostate surgery; bladder neck hypertrophy confirmed by flexible cystoscopy.

Exclusion criteria included a prostate volume >30 mL, a history of previous prostate surgery, urethral strictures, bladder stones, prostate or bladder cancer, the presence of an indwelling catheter, neurogenic bladder dysfunction or urinary incontinence, and absent or compromised ejaculatory function.

Pre-operatively, all patients self-reported anterograde ejaculation and underwent preventive sperm cryopreservation. The procedures were performed by the same surgeon in all cases (A.C.). All patients signed an informed consent preoperatively.

Surgical technique

All procedures were performed under spinal anesthesia. A 26-Fr monopolar resectoscope with a monopolar Collins knife was used to perform the incision. The bladder neck

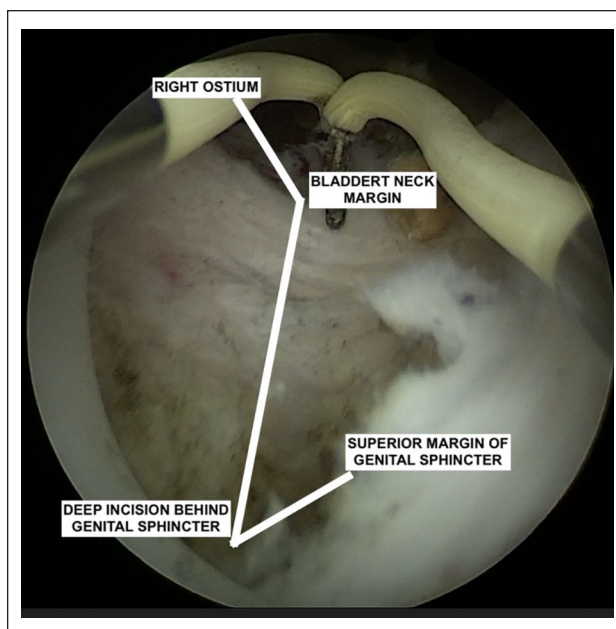


Figure 1. [AQ: 3]

was incised at 7 o'clock and extended above the veru montanum Figure 1. The incision was made superficially in the initial tract, whereas a deep incision was made in the prostate tissue above the veru montanum, to obtain an acceptable opening of the bladder neck and the sparing of the genital sphincter miming a "Z" shaped incision. Specifically, an ejaculation-sparing approach was adopted in all cases by preserving the paracollicular and supramontanal tissues, maintaining approximately 1 cm of tissue above the verumontanum, and identifying the ejaculatory duct orifices whenever possible. Finally, a 24 Ch. Dufour catheter was placed with continuous bladder washing.

Statistical analysis

Means and standard deviations (SD) or medians and interquartile range (IQR) were reported for continuous variables while frequencies and percentages were reported for categorical variables. A Mann–Whitney U Test was used to evaluate continuous variables, while Chi-square test and Fischer's exact test was used for categorical variables analysis. Statistical analysis was carried out with Statistical Package for Social Sciences (SPSS) software v.26.0 (IBM Corp, Armonk, NY, USA), and statistical significance was set at <0.05 .

Results

A total of 106 patients were enrolled, with a median age of 42 years and a median prostate volume (PV) of 27 mL (range 20–29). Overall, 78 (73.6%) patients took a daily alfa 1-blocker therapy which was discontinued before the

Table 1. Baseline and perioperative characteristics.

Variable	N = 106
Age at surgery, median (IQR)	42 (37–57)
Prostate volume, mL, median (IQR)	27 (20–29)
ASA score, n (%)	
1–2	97 (91.5)
3–5	4 (3.7)
Patients on alfa-blocker therapy before surgery, n (%)	78 (73.6)
Preoperative PSA, ng/mL, median (IQR)	1.6 (0.9–2.2)
Operative time, min, median (IQR)	19 (16–26)
Catheterization time, days, median (IQR)	3 (2–4)
Hospital stay, median (IQR)	1 (1–2)
Incontinence rate, n (%)	0 (0)
Complication rate, n (%)	
No complications	43 (93.5)
Clavien (1–2)	3 (2.8)
Transient AUR requiring re-catheterization	3 (2.8)
Clavien (3–5)	0 (0)

IQR: interquartile range; ASA: American Society of Anesthesiologists; PVR: post-void residual; PSA: prostate-specific antigen; AUR: acute urinary retention.

surgery. Each patient underwent an outpatient follow-up visit at 1, 6 and 12 months after surgery. Preoperative characteristics are described in Table 1.

Median operative time was 19 min (IQR 16–26; Table 1). None of the patients required blood transfusion during postoperative period. The median hospital stay, and catheterization time were 1 and 3 days, respectively. On catheter removal, continence was preserved in all patients. Three (2.8%) Clavien 1–2 complications were recorded, without any major complication (Clavien 3–5). All patients reported anterograde ejaculation preservation after surgery, evaluated at 1-, 6-, and 12-months outpatient visit.

At 1 month follow-up 1 month, the mean maximum flow rate (Qmax) increased from 10.2 ± 2.5 mL/s to 22.8 ± 3.9 mL/s. The mean IPSS score and IPSS QoL decreased from 16 ± 2.7 to 6.9 ± 1.5 and from 4.3 ± 0.9 to 1.9 ± 1.6 (p -value < 0.001), respectively. The mean Post-Void Residual (PVR) volume of urine decreased from 125.5 ± 16.1 mL to 27.7 ± 7.3 mL (p -value < 0.001). These

results remained statistically significant at 12 months follow-up (each $p < 0.001$; Table 2).

Discussion

PBNO is characterized by inadequate or incomplete opening of the bladder neck during voiding. The etiology of PBNO is subject to multiple theories, including muscular and neurologic dysfunction, as well as fibrosis.^{7,8} Treatment options for both men and women with PBNO are uniform and encompass watchful waiting, pharmacotherapy, and surgical intervention. Watchful waiting is suitable for patients whose symptoms are tolerable and exhibit no clinical or urodynamic evidence of upper and/or lower urinary tract decompensation.

Alpha-1 blockers are considered the preferred non-surgical treatment for relieving symptoms. However, they often lead younger patients with PBNO to ejaculation disorders. Capogrosso et al. reported a high incidence of anejaculation (70%) in PBNO patients treated with silodosin, with retrograde ejaculation and other adverse effects often prompting therapy discontinuation.⁹ Similarly, Yamanishi et al. found a 75% discontinuation rate of silodosin monotherapy at a 6-year follow-up, largely due to adverse effects.¹⁰

TUIP is considered the optimal surgical choice for younger, sexually active individuals. However, when TUIP involves bilateral incisions of the bladder neck, permanent retrograde ejaculation may occur in up to 35% of patients.⁴ In 1994, Kaplan et al. published outcomes from a study involving 31 men who underwent unilateral incision.⁵ Among these patients, 30 reported a subjective improvement in symptoms, with the mean Boyarsky symptom score decreasing from 16.4 to 6.4, and the mean maximum flow rate (Qmax) increasing from 9.2 to 15.7 mL/s.⁵ Importantly, no cases of retrograde ejaculation were reported in this series following unilateral incision. Moreover, outcomes of unilateral bladder neck incision were also published by Kochakarn and Lertsithichai, assessing IPSS, flow rate, and sperm count.⁶ Patients were followed up at 3, 6, and 12 months post-surgery. Notably, there was a consistent improvement in IPSS and flow rates up to 1-year post-surgery. By the 1-year mark, there was a mean 55% reduction in IPSS and a mean 95% increase in flow rate. However, postoperative sperm counts showed a

Table 2. Preoperative versus 1 month versus 6 months functional outcomes.

Variable	Preoperative	1 month	6 months	12 months	p-Value
IPSS, mean $\pm$ SD	16 ± 2.7	6.9 ± 1.5	6.3 ± 1.2	6.4 ± 1.6	< 0.001
IPSS-QoL, mean $\pm$ SD	4.3 ± 0.9	1.9 ± 1.6	1.5 ± 1.1	1.5 ± 1.1	< 0.001
Qmax, mL/s, mean $\pm$ SD	10.2 ± 2.5	22.8 ± 3.9	21.5 ± 3.4	20.2 ± 4.1	< 0.001
PVR, mL, mean $\pm$ SD	125.5 ± 16.1	33.7 ± 5.3	27.7 ± 7.3	30.7 ± 8.6	< 0.001

SD: standard deviation; PVR: post-void residual; IPSS: International Prostatic Symptoms Score; SD: standard deviation; QoL: quality of life; Qmax: maximum flow rate.

decline at 6–12 months (with a mean decrease of 70% from preoperative levels); yet, the authors were unable to provide a satisfactory explanation for this decrease, as it did not appear to be correlated with ejaculatory volume.

We present a single-surgeon case series of patients who underwent unilateral incision of the prostate. Patients had median prostate volume (PV) of less than 30 mL, with a median age of 42 years. All patients were discharged after a single day. Both subjective and objective voiding parameters (International Prostate Symptom Score (IPSS), maximum flow rate (Q_{max}), post-void residual (PVR)) improved at follow-up outpatient visits. Additionally, no secondary procedures were required during our 6-month follow-up period. Of utmost significance is the observation of 100% antegrade ejaculation post-surgery.

While laser technology (Holmium or Thulium) undoubtedly marks a surgical advancement in treating urological conditions, we maintain that comparable results can be attained using monopolar energy.^{11–15} This approach not only delivers similar outcomes but also mitigates the costs associated with the procedure.

We acknowledge several limitations for this study. First, a consolidated experience of the single surgeon involved in the study. Second, the lack of randomization with a control group (e.g. other energy sources), third the retrospective nature of the study and lastly the post-operatively ejaculatory function was assessed during outpatient visit using just a simple **yes/no** question; therefore, details such as changes in ejaculatory volume and force are not available.

Conclusions

The preservation of antegrade ejaculation is of upmost importance in young and sexually active patients who undergo surgery for PBNO. In this single-surgeon series, unilateral “Z” shaped incision confirms to be both safe and effective in alleviating LUTS among men with small prostate volumes.

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Declaration of conflicting interests

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Data availability statement

Data will be provided upon request.

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