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Post Operative Urethral Stricture Following Transurethral Resection of Prostate with Otis Urethrotomy and Without Otis Urethrotomy

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ABSTRACT

Background: Transurethral resection of the prostate (TURP) is widely used for treating benign prostatic hyperplasia (BPH) but is associated with postoperative complications such as urethral strictures, especially in patients with narrow urethral anatomy. In Indian populations, the urethra is often anatomically narrower, increasing the risk of mechanical and ischemic trauma from standard 26 Fr resectoscopes. This study compares the incidence of urethral stricture formation in patients undergoing standard TURP versus those receiving a prophylactic OTIS urethrotomy prior to surgery.
Methods: A prospective comparative observational study was conducted from January 2024 to June 2025 at the Urology Department of Ruby Hall. The study included 50 patients (aged 54–82 years) presenting with BPH and lower urinary tract symptoms, divided equally into two groups of 25 each. Group A underwent standard TURP without prior OTIS urethrotomy, while Group B underwent OTIS urethrotomy—dilating the urethra upto 28 Fr at the 12 o'clock position—immediately before TURP. Postoperative follow-ups were conducted at 1, 3, and 6 months, utilizing uroflowmetry (Qmax) and cystoscopy for stricture confirmation where indicated.
Results: The mean patient age was 68 years, with a mean prostate size of 47.5 grams. Postoperative assessments revealed that 4 patients in Group A developed urethral strictures, whereas 0 patients in Group B experienced stricture formation. Uroflowmetry results demonstrated a superior outcome for the intervention group at the 6-month mark; Group B maintained a mean Qmax of 17 ml/sec, compared to a decreased mean Qmax of 12.5 ml/sec in Group A. Complications were manageable across both groups, with the most common being postoperative bleeding (8%) and clot retention. No cases of incontinence or erectile dysfunction were reported.
Conclusion: Performing an OTIS urethrotomy prior to TURP is a safe and highly effective technique that significantly reduces the incidence of postoperative urethral stricture formation compared to TURP alone.

Keywords: *OTIS urethrotomy, Transurethral Resection of Prostate (TURP), urethral stricture, benign prostatic hyperplasia (BPH), uroflowmetry.*

INTRODUCTION

Transurethral resection of the prostate (TURP) remains one of the most commonly performed surgical procedure in urology for benign prostatic hyperplasia (BPH). The standard working elements used for this procedure is a 26 French (Fr) resectoscope. However, in the Indian population, the urethra is often anatomically narrower than in Western men, which frequently demands dilation of the urethral meatus and navicular fossa to accommodate the instrument[1].The outer sheath of the resectoscope features fenestrations for continuous irrigation, but repeated in-and out movement during the procedure can lead to mucosal trauma. Such trauma, particularly when combined with the ischemic insult caused by large and rigid instruments, contributes significantly to the development of urethral strictures. These strictures commonly occur at the meatus, and bulbar urethra-regions most vulnerable to mechanical injury and reduced blood supply[2]. Despite advancements in surgical techniques and instrumentation, postoperative urethral strictures continue to affect

approximately 6%-8% of patients, leading to urinary obstruction, discomfort, and a considerable impact on quality of life (QOL). Various methods have been explored to reduce the risk of stricture formation following TURP. One such intervention is an OTIS urethrotomy, a mechanical dilation technique designed to expand the anterior urethra, allowing for a smoother passage of the resectoscope. Although earlier studies have reported mixed results regarding its effectiveness, some have demonstrated a modest reduction in urethral stricture incidence when OTIS urethrotomy was performed before TURP[4]. OTIS urethrotomy is also performed before the use of resectoscopes (>26 Fr) in a too narrow urethra to prevent ischemic damage. However, in < 10 % of patient the urethra heals by forming scar tissue that causes narrowing of urethra. This complication is treated with dilatation or transurethral incision to treat the urethral stricture[4].

This study compares the incidence of urethral stricture formation in patients undergoing TURP with or without using OTIS urethrotomy before surgery.

Although effective, it may be associated with certain complications. The most common are bleeding in about 6-8% of cases due to injury to the corpus spongiosum or cavernosum, and penile edema seen in 5-7%. Less frequent complications include urinary incontinence (0.5-1%) from external sphincter injury, scrotal abscess (0.3%), and rarely erectile dysfunction (0.1)[5]

MATERIAL AND METHODS

It is comparative study conducted from JAN 2024 to JUNE 2025 in the department of urology Ruby Hall. The patients, who met inclusion criteria, were divided into two group. Group A consisted the patients who underwent TURP without OTIS and group B consisted those who underwent OTIS urethrotomy before TURP.

Inclusion Criteria

All patients who underwent Transurethral resection of prostate gland in Ruby Hall between JAN 2024 to JUNE 2025 were included in the study.

Exclusion Criteria

- Patients who had previous history of urethral manipulation or trauma.
- Patients with previous history of urethral stricture.
- Patients with previous history of meatal stenosis.
- Patients with previous history of urethritis any urethral discharge.
- Patients with previous history of passage of stone from urethra.
- Patients who needed additional procedure during TURP like per urethral cystolithotripsy or litholapaxy.
- Patients with malignant prostate.
- Patients with prostate size >100gms.
- Patients not willing for follow up & not giving consent to take part in the study.

All patients were examined with routine investigation such as Ultrasonography, urine for routine, culture and sensitivity, prostate specific antigen. Routine laboratory test for operation were done.

Before start of procedure Rigid cystoscopy done followed by OTIS urethrotome was introduced inside the urethra. Instrument inserted up to bulbar part of urethra. After opening the instrument to 28 fr , the cut was made by moving the roof like knife from the resting position and pulling it back at the 12’o clock position before TURP done. 26 fr karl storz TURP sheath with resectoscope and normal saline used as a continuous irrigating fluid to cut prostate. At the end of procedure 22 fr 3 ways foley's catheter placed with 30 ml. distil water inflated balloon which was kept for 24 hours. Catheter removed after 48 hours, patient discharged on third or fourth post operative day. All patients were followed up. Uroflowmetry performed at 1 month, 3 months and 6 months. Patients who complained of lower urinary tract syndrome (LUTS) underwent Ultrasonography (USG), urine test, cystoscopy to confirm urethral stricture formation. All the patients in follow up who diagnosed with urethral stricture were treated with urethral dilatation or optical internal urethrotomy.

Statistical Analysis

Data analysis was performed with the program statistical package for social science (SPSS version 17.0) .The qualitative variables were presented as frequency and percentage. For the parametric test of two independent group data, independent ttest was used. A p–value less than 0.05 was considered 5 statistically significant.

RESULT

Total number of patients were 50, 25 in each group. The age ranged from 54–78yrs. In both groups of patients having complain with lower urinary tract syndrome (LUTS) and clinically enlarged prostate were included. All require investigation are done such as Ultrasonography (USG), uroflowmetry urine test, cystoscopy to conform the diagnosis.

Table 1: Baseline Demographic and Perioperative Characteristics of the Study Population

AGE	54-82Yrs	Mean 68 yrs
PROSTATE SIZE (gm)	30-65 gm	Mean 47.5 gm

RESECTION TIME (min)	20-45 Min	32 Min
TIME OF REMOVAL OF CATHETER (in days)	3-4 days	3.5 days

Table 2: Postoperative Complications Observed in the Study Population

Complication (in both grp)	Frequency	Percentage
Excessive bleeding	4	8
Penile oedema	0	0
Turp syndrome	0	0
Clot retention	1	2
Incontinence	0	0

Table 3: Comparison of Postoperative Outcomes Between Group A (TURP without OTIS Urethrotomy) and Group B (TURP with OTIS Urethrotomy)

Findings	Group A (Turp without OTIS)	Group B (Turp with OTIS)
Avg Qmax at 1 month after surgery	16-24	15-25
Avg Qmax at 3 month after surgery	14-24	14-25
Avg Qmax at 6 month after surgery	9-16	14- 20
Urethral stricture formation	4	0

The age of patients in the study ranged from 54 to 82 years, with a mean age of 68 years. The prostate size varied between 30 and 65 grams, with a mean size of 47.5 grams. Among the 50 patients, The most common postoperative complication was bleeding, observed in 4patients (8%), followed by , clot retention in 4 patine (8%). Other complications such as, stricture urethra, incontinence and erectile dysfunction were not reported.

Patients were followed up at 1, 3, and 6 months after surgery, and their maximum urinary flow rate (Qmax) was assessed. The mean preoperative Qmax was 8 ml/sec, with values ranging from 6 to 10 ml/sec. A significant improvement was observed postoperatively, with the mean Qmax increasing to 15 ml/sec at 1 month, which was maintained consistently at 3 and decrease in group A (TURP without OTIS) mean Qmax OF 12.5, as compare to group B (TURP with OTIS) mean Qmax 17.

DISCUSSION

Transurethral resection of the prostate (TURP) is most common performed surgery for the treatment of benign hyperplasia of the prostate (BPH). Urethral stricture after TURP is a well-known late complication. Main causes of urethral strictures are: 1. Resectoscope Size: Using larger resectoscope sheaths (e.g., 26 Fr or 28 Fr). 2. Operating Time: Longer resection times. 3. Surgical Technique: Trauma during the procedure, mucosal damage, the "cheese grater" effect). 4. Patient Factors: Older age, comorbidities and preoperative urinary tract infection (UTI). According to the literature, the incidence of urethral stricture after TURP varies between 2.2% and 9.8%.

Shrestha et al., performed study from 2014 to 2016 on 100 patients and divided them into two groups. In group A, all patients underwent TURP without OTIS urethrotomy and in group B, after doing OTIS Urethrotomy. In Group A, 20 patients out of 100 (20%) developed urethral stricture whereas in Group B, 8 patients out of 100 (8%) developed urethral stricture. The rate of Urethral Stricture in Group A was significantly more than in Group B[6]. The genesis of post-TURP strictures is primarily attributed to ischemic and mechanical injury inflicted by the large-bore resectoscope sheath during its insertion and subsequent manipulation[7].

To further understand the predictive factors for these strictures, Wan Mokhter et al. developed a nomogram model identifying five independent risk factors: patient age, prostate size, preoperative indwelling catheterization, preoperative urethral dilation, and postoperative indwelling catheter time[2]. Their study emphasized that patients with larger prostates undergo prolonged and repeated manipulation of the electroscope, which significantly increases the likelihood of mucosal damage and stricture formation, particularly in narrower urethras[2].

Al-Hammouri and Abu-Qamar's clinical experience supports proactive surgical measures in these scenarios[3]. In their evaluation of monopolar TURP for large prostates (80–120 grams), they routinely performed Otis urethrotomy alongside the use of a continuous-flow resectoscope[3]. This modified approach successfully accommodated the large instruments and prevented significant late complications, recording an exceptionally low urethral stricture rate of just 1.7%[3]. This reaffirms that the preliminary expansion of the urethra is highly beneficial when larger gland sizes mandate thicker scopes and longer resection times.

The pathophysiological necessity for techniques like Otis urethrotomy is detailed by Hampson et al., who explained that mechanical and ischemic urethral injuries cause the normal pseudostratified columnar epithelium to be replaced by squamous metaplasia[5]. When the urethra is subjected to the rigid, large-bore sheath of a resectoscope without adequate prior dilation, small tears occur in the tissue[5]. This leads to urinary extravasation, triggering an underlying fibrotic reaction within the corpus spongiosum (spongiofibrosis) and an ultimately narrowed urethral lumen[5].

These structural tissue changes validate the routine application of prophylactic interventions. As Hon and Li's research on prophylactic internal urethrotomy suggests, initiating the TURP procedure with a controlled, clean incision to widen the urethral caliber actively diminishes the ischemic and frictional damage inflicted by the resectoscope[7]. Ultimately, the integration of an OTIS urethrotomy prior to TURP directly addresses the anatomical constraints frequently seen in the local demographic, thereby systematically lowering postoperative stricture morbidity and improving long-term quality of life.

CONCLUSION

This study revealed that performing OTIS urethrotomy before TURP can reduce the incidence of urethral stricture formation significantly than TURP alone.

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