

A comparative study of post-TURP outcomes and complications between BPH patients presenting with and without acute urinary retention

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Abstract

Background: Benign prostatic hyperplasia (BPH) is a common age-related condition causing lower urinary tract symptoms (LUTS) and bladder outlet obstruction. Acute urinary retention (AUR) represents an important complication and may indicate advanced obstruction, impaired bladder function and increased perioperative morbidity. Transurethral resection of the prostate (TURP) remains an established surgical treatment. This study compared postoperative outcomes and complications following TURP in BPH patients presenting with and without AUR.

Methods: A prospective observational comparative study was conducted at a tertiary care medical college and hospital in Maharashtra from April 2024 to March 2026. Seventy-four patients were studied, with 37 patients in the AUR group and 37 in the non-AUR group. Eligible men were aged 55–75 years, had moderate-to-severe LUTS, prostate size >30–110 g and Qmax <10 mL/s. Patients with urethral stricture, neurogenic bladder, previous prostate/urethral surgery, prostate cancer or unwillingness to participate were excluded. All patients underwent TURP under regional anaesthesia and were followed at 1 week, 2 weeks and 1 month. Outcomes included IPSS, Qmax, PVR, postoperative complications and hospital stay.

Results: The AUR group was older (67.8 ± 5.4 vs 64.9 ± 5.8 years; $p=0.032$), had larger prostates (70.6 ± 8.9 vs 53.2 ± 7.5 g; $p<0.001$), higher PSA (5.82 ± 1.21 vs 4.36 ± 0.98 ng/mL; $p<0.001$), higher preoperative IPSS (24.6 ± 3.2 vs 19.8 ± 2.9) and poorer baseline urinary flow with greater PVR. Operative duration was longer in AUR patients (62.4 ± 8.6 vs 54.1 ± 7.3 min). Postoperative UTI (29.7% vs 13.5% ; $p=0.048$) and recatheterization (21.6% vs 8.1% ; $p=0.046$) were significantly more frequent in AUR patients. Mean hospital stay was longer (5.8 ± 1.4 vs 4.2 ± 1.1 days; $p<0.001$). At one month, AUR patients had higher IPSS (7.8 ± 1.9 vs 6.5 ± 1.6 ; $p=0.004$), lower Qmax (16.2 ± 2.8 vs 18.5 ± 3.1 mL/s; $p=0.002$) and higher PVR (42.6 ± 12.3 vs 28.4 ± 9.7 mL; $p<0.001$).

Conclusion: TURP produced functional improvement in both groups. However, patients presenting with AUR had greater baseline disease burden, higher infection and recatheterization rates, longer hospitalization and relatively slower early functional recovery. AUR should therefore be regarded as an important marker of advanced disease and a factor requiring careful perioperative optimization and counselling.

Keywords: Benign prostatic hyperplasia, acute urinary retention, TURP, IPSS, Qmax, post-void residual, urinary tract infection, recatheterization

Introduction

Benign prostatic hyperplasia is a progressive, age-associated proliferation of stromal and epithelial elements, predominantly in the transition zone. Clinically, BPH may produce storage, voiding and post-micturition LUTS and may progress to recurrent infection, bladder stones, chronic retention, renal dysfunction and AUR. AUR is a particularly important clinical event because it may represent failure of bladder compensation in the setting of established outlet obstruction.

The pathophysiology of BPH involves both static obstruction from increased prostatic tissue and a dynamic component related to prostatic and bladder-neck smooth muscle tone. With prolonged obstruction, detrusor hypertrophy may progress to altered compliance, impaired contractility and increased residual urine. Thus, patients presenting with AUR may differ biologically and clinically from patients undergoing elective TURP for LUTS alone. TURP relieves obstruction by endoscopic resection of obstructing adenomatous tissue and remains a widely used definitive procedure. Although newer laser and minimally invasive techniques are available, TURP continues to provide a practical benchmark, particularly in tertiary-care

settings. The present study was undertaken to determine whether AUR before TURP is associated with different postoperative complication profiles, hospital stay and early functional recovery.

Aims and Objectives

The study aimed to compare postoperative outcomes and complications following TURP in BPH patients presenting with AUR versus those without AUR. The primary objective was comparison of postoperative Qmax and PVR. Secondary objectives included changes in LUTS and quality of life, early complications (UTI, hematuria, transfusion, recatheterization and TUR syndrome), delayed complications, hospital stay and overall recovery.

Materials and Methods

Study design and setting: Prospective observational comparative study conducted at a tertiary care institute/medical college and hospital in Maharashtra over two years (April 2024–March 2026).

Study population: Patients undergoing TURP for BPH were classified into Group A (BPH with AUR) and Group B (BPH without AUR). The final study population comprised

74 patients, 37 in each group. The thesis reports simple random sampling and a sample-size calculation based on postoperative UTI data from a prior comparative study, with 95% confidence and 80% power.

Eligibility: Men aged >55 and <75 years with moderate/severe LUTS, prostate size >30–110 g and Qmax <10 mL/s were eligible. Patients with urethral stricture, neurogenic bladder, previous prostate/urethral surgery, prostate cancer or unwillingness to participate were excluded.

Procedure and follow-up: All patients underwent preoperative clinical and laboratory assessment, including IPSS, prostate volume, PSA, Qmax and PVR, followed by TURP under regional anaesthesia. Operative time, intraoperative blood loss/complications and postoperative events were recorded. Follow-up was performed at 1 week, 2 weeks and 1 month. Data were entered into Microsoft Excel and analysed using appropriate statistical tests; $p < 0.05$ was considered statistically significant. Ethical approval and written informed consent were obtained as described in the thesis.

Results

A balanced cohort of 74 patients was analysed. Baseline and disease-severity measures consistently indicated a greater disease burden in the AUR group.

Parameter	AUR (n=37)	Non-AUR (n=37)	p value
Age (years)	67.8±5.4	64.9±5.8	0.032
Prostate volume (g)	70.6±8.9	53.2±7.5	<0.001
Serum PSA (ng/mL)	5.82±1.21	4.36±0.98	<0.001
Pre-op IPSS	24.6±3.2	19.8±2.9	—
Pre-op Qmax (mL/s)	6.8±1.4	9.2±0.6	—
Pre-op PVR (mL)	148.5±28.4	82.3±21.7	—
Operative time (min)	62.4±8.6	54.1±7.3	—
Hospital stay (days)	5.8±1.4	4.2±1.1	<0.001

Comorbidities were more frequent in the AUR group. Hypertension was present in 48.6% versus 35.1% and diabetes mellitus in 37.8% versus 27.0% of patients, although these individual differences were not statistically significant. Patients without comorbidity were more frequent in the non-AUR group (43.2% vs 24.3%; $p = 0.048$).

Postoperative Complications

Complication	AUR n (%)	Non-AUR n (%)	p value
UTI	11 (29.7)	5 (13.5)	0.048
Hematuria	9 (24.3)	6 (16.2)	0.384
Recatheterization	8 (21.6)	3 (8.1)	0.046
TUR syndrome	2 (5.4)	1 (2.7)	0.554
Sepsis	3 (8.1)	1 (2.7)	0.303

UTI and recatheterization were significantly more frequent in the AUR group. Hematuria, TUR syndrome and sepsis were numerically higher but did not reach statistical significance.

Postoperative Functional Outcomes

Outcome at 1 month	AUR (n=37)	Non-AUR (n=37)	p value
IPSS	7.8±1.9	6.5±1.6	0.004
Qmax (mL/s)	16.2±2.8	18.5±3.1	0.002
PVR (mL)	42.6±12.3	28.4±9.7	<0.001

Both cohorts demonstrated improvement following TURP. Nevertheless, the AUR group retained a higher symptom burden, lower urinary flow and greater residual urine at one month. These findings are consistent with the thesis interpretation that TURP remains effective after AUR, but early functional recovery may be slower or less complete when preoperative bladder dysfunction and prolonged obstruction are present.

Discussion

The central finding of this study is that BPH patients presenting with AUR represented a clinically more advanced cohort than those without retention. The AUR group was older and had substantially larger prostate volume, higher PSA, higher IPSS, lower Qmax and higher PVR. These differences provide a coherent clinical pattern: greater anatomical obstruction and poorer bladder emptying were present before surgery in patients who progressed to retention.

The mean prostate volume was 70.6 g in the AUR group compared with 53.2 g in the non-AUR group ($p < 0.001$). An enlarged transition-zone adenoma increases the static component of outlet obstruction, while chronic obstruction can progressively compromise detrusor reserve. The higher preoperative PVR in the AUR group (148.5 versus 82.3 mL) further supports impaired bladder emptying. The higher IPSS (24.6 versus 19.8) indicates that retention was generally associated with more severe symptomatic disease rather than being an isolated event.

The higher postoperative UTI rate in AUR patients (29.7% versus 13.5%) is clinically relevant. Patients presenting with AUR commonly undergo catheterization before definitive treatment, creating an opportunity for bacteriuria and infection. Catheter exposure, urinary stasis and delayed bladder recovery may therefore contribute to postoperative infection. The significant difference in recatheterization (21.6% versus 8.1%) similarly suggests delayed restoration of effective spontaneous voiding in a proportion of AUR patients.

The mean hospital stay was 5.8 days in the AUR group versus 4.2 days in the non-AUR group ($p < 0.001$). Longer admission is plausibly related to infection, recatheterization, catheter management and the need to observe recovery of bladder function. From a health-system perspective, this represents additional bed occupancy and resource utilization and is important for counselling patients and planning postoperative care.

Comparison with Previous Studies

The direction of the present findings is consistent with comparative studies cited in the thesis. Chelliah and Kumar reported that patients with AUR were generally older, had larger prostates and higher PSA, and experienced more postoperative UTI, recatheterization and longer hospital stay. Ramachandraiah *et al.* similarly reported a greater overall complication burden in AUR patients. Pogula *et al.*, in a cohort of 126 patients, found significant differences in postoperative UTI, recatheterization and hospital stay, while hematuria, transfusion, sepsis, TUR syndrome, stricture and reoperation did not differ significantly. A population-based study by Chen *et al.* also reported increased recatheterization, UTI and hospital stay following TURP among patients with AUR.

The present study therefore adds prospective single-centre data with standardized early follow-up. Importantly, the findings do not support viewing AUR as a contraindication to TURP. Rather, AUR appears to identify patients who require more careful preoperative optimization, infection control, catheter management and postoperative surveillance.

Interpretation of functional recovery

At one month, both groups improved after TURP, confirming the effectiveness of surgical relief of bladder outlet obstruction. However, the AUR group had a postoperative IPSS of 7.8 versus 6.5, Qmax of 16.2 versus 18.5 mL/s and PVR of 42.6 versus 28.4 mL. The between-group differences were statistically significant. A plausible explanation is that obstruction is only one component of voiding dysfunction. In patients with prolonged obstruction or retention, detrusor contractility and bladder compliance may already be impaired before the obstructing tissue is removed.

This distinction is important when counselling patients. TURP can successfully remove the anatomical obstruction, but postoperative bladder function depends partly on the preoperative condition of the detrusor. Thus, patients presenting with AUR should be counselled that spontaneous voiding and symptom improvement may occur but can be slower and may require temporary recatheterization or closer follow-up.

Clinical Implications

The study supports several practical implications. First, men with progressive LUTS, enlarged prostate, high PVR and poor Qmax constitute a higher-risk clinical profile and warrant timely assessment. Second, once AUR occurs, catheter management and treatment of infection should be carefully addressed before definitive surgery. Third, TURP remains an effective definitive option after appropriate optimization; the presence of AUR should not by itself preclude surgery. Fourth, postoperative monitoring should pay particular attention to UTI, recatheterization and delayed restoration of bladder function.

The thesis emphasizes a proactive approach to BPH. Earlier recognition of high-risk patients and appropriate referral before progression to retention may potentially reduce morbidity, although the present observational design cannot establish that earlier surgery itself prevents AUR or improves outcomes. Such causal questions require larger prospective or multicentre studies with adjustment for baseline disease severity.

Strengths of the Study

The study used a prospective observational design, included equal numbers of patients in the two comparison groups, applied predefined eligibility criteria and assessed both objective and patient-reported outcomes. Qmax and PVR provided objective measures of voiding function, while IPSS captured symptom burden. The study also assessed clinically relevant perioperative complications and hospital stay rather than relying on a single outcome.

Limitations

The principal limitations identified in the thesis are the modest sample size of 74 patients, single-centre design and one-month follow-up. The absence of randomization

permits selection bias and the two groups had important baseline differences that may confound outcome comparisons. Comprehensive urodynamic testing was not performed, limiting assessment of detrusor underactivity. AUR duration, catheterization duration and number of retention episodes were not stratified. The influence of comorbidities was not independently modelled, and differences in operative technique or surgeon-related factors may also have influenced outcomes.

Because delayed outcomes such as urethral stricture, bladder-neck contracture, durable symptom control, reoperation and long-term Qmax/PVR could not be adequately evaluated, the results should primarily be interpreted as early postoperative findings.

Conclusion

In this prospective comparative study of 74 men undergoing TURP for BPH, patients presenting with AUR had greater baseline disease burden, including older age, larger prostate volume, higher PSA, more severe LUTS, poorer urinary flow and greater residual urine. They also experienced significantly higher rates of postoperative UTI and recatheterization and a significantly longer hospital stay. At one month, both groups improved following TURP, but the AUR group had higher IPSS, lower Qmax and higher PVR. The findings indicate that AUR is associated with greater perioperative morbidity and slower early functional recovery, while TURP remains beneficial in both groups. AUR should therefore be considered an important marker of advanced BPH requiring meticulous optimization, counselling, infection prevention, catheter management and structured follow-up. Larger multicentre studies with longer follow-up and urodynamic assessment are required to clarify the independent contribution of AUR to long-term surgical outcomes.

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