Comparative Evaluation of Post-TURP Complications in Patients with BPH Presenting with and Without Acute Urinary Retention

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Abstract

Background Benign prostatic hyperplasia (BPH) is a prevalent urological condition affecting men at an older age. Acute urinary retention (AUR) is a severe symptom of men who develop BPH. TURP is the gold standard as the management of BPH is concerned. Our study tried to compare the post-TURP complications between patients presented with and without AUR.

Materials and Methods We enrolled 126 patients, out of which 74 were in the AUR group and 52 in the non-AUR group. The mean age of patients with AUR was 62.51 years, and that for patients without AUR was 61.06 years. Statistical significance was noted in our study in patients with AUR and without AUR regarding the prostate's grading by DRE, the volume of gland, PSA level, post-TURP UTI, recatheterization post TURP, length of hospital stays with p-values 0.000, 0.000, 0.006, 0.004, 0.007, and 0.000, respectively. Statistical significance was not noted in patients with AUR and without AUR with regard to the grading of hypertension, diabetes mellitus, ischemic heart disease, post-op TURP syndrome, post-TURP hematuria, patients needing a blood transfusion, post-TURP sepsis, LUTS, post-TURP stricture, resurgery for clot retention with p values of 0.918, 1.000, 1.000, 1.000, 0.523, 0.642, 1.000, 0.319, 1.000, and 1.000, respectively.

Conclusion Our study shows that post-TURP complications such as hematuria, blood transfusion rate, post-op UTI, sepsis, recatheterization, lower urinary tract stricture, resurgery, TUR syndrome, and the length of hospital stay were higher in patients who presented with AUR than in those without AUR. Post-TURP UTI complications, recatheterization rate, and the length of hospital stay were statistically significant in the AUR group compared with the non-AUR group. Therefore, it is better to intervene earlier before the patients develop AUR to minimize the complications and maximize the outcomes.

Keywords

► acute urinary retention
► benign prostatic hyperplasia
► lower urinary tract symptoms
► postvoid residual

Introduction

Benign prostatic hyperplasia (BPH) is a prevalent urological condition affecting men at an older age. BPH remains one of the most common causes in men that can give rise to lower urinary tract symptoms, with or without bladder outlet obstruction (BOO). The pathological process in BPH is hyperplasia, which affects both the stromal and glandular elements of this gland. This condition affects the quality of life (QOL) significantly in many patients. Even though most seek medical intervention because of bothersome symptoms, BOO was found in 60% of symptomatic and 52% of asymptomatic patients.[1,2] Intervention may be needed for bothersome symptoms in around 30% of those older than 65 years.[3] For males older than 50 years, TURP is the second most common surgery performed next only to cataract surgery.[4] Even though many new management modalities for the BPH have been developed, transurethral resection of the prostate is still the gold standard as far as BPH management is concerned.[5] LASER development in endourology is gradually replacing TURP in BPH management. Holmium laser (HoLEP) is the gold standard[5,6] though many urologists have a reservation in accepting this as the gold standard. The major disadvantage is the prohibitive cost of these lasers. TURP has become a relatively safer procedure due to newer technologies in diathermy and visual scopes. But still, there is a chance of TURP syndrome and electrolyte imbalance, especially in high-risk cardiac patients. The risk is accentuated by the use of glycine for irrigation. The complication rates were decreased with the development of bipolar diathermy with normal saline as the irrigant fluid.

Acute urinary retention (AUR) is defined as a sudden and painful inability to void voluntarily.[7,8] Even though there are many causes of AUR, the most common cause is BPH. The prevalence rate of AUR in men with BPH is estimated to be as high as 53%.[9] AUR was the chief complaint in 20 to 42% of men who underwent TURP.[10] Escalating postoperative complications and more extended hospital stay in men with BPH who develop AUR have been reported.[10–12] Patients presented with AUR had a high mortality rate in the first 3 years after prostatectomy.[13] Our study compared the post-TURP complications between patients presented with and without AUR.

Materials and Methods

We compared the TURP (monopolar) outcomes and complications for BPH patients with and without AUR.

Patients admitted to our institute with lower urinary tract symptoms (LUTS) due to BPH with and without AUR were included in the study. This was a prospective observational study conducted from January 2019 to December 2020. The Ethics Committee of this institution approved to conduct of this study. All men who participated in this study provided written consent.

The patients with complaints suggestive of LUTS were thoroughly evaluated with history and physical examination, digital rectal examination (DRE), ultrasound KUB (Kidney, ureter, urinary Bladder), post-void residual (PVR) urine, and patients with BPH were selected. Patients who presented with and without AUR were assigned as Group A and Group B, respectively. Inclusion criteria were prostate size > 30 gm and less than 60 g, maximum flow rate (Qmax) less than 10 mL/s, men more than 45 years old and less than 70 years old, PVR urine exceeding 100 mL. The exclusion criteria were urethral stricture, neurogenic bladder, previous prostate or urethral surgery, prostate cancer, and unwilling patients.

Post-surgery Foleys catheter was removed on postoperative day 3 in all patients. Patients were discharged on their symptom-free comfort days as they had come from a very long distance and were from a rural background. Patients were reviewed 1-week post discharge for urine culture to look for postoperative urinary tract infection (UTI).

DRE grading was done by a single surgeon to avoid observer error. Classification-Grade I BPH on DRE was appreciated as easy accessibility of the upper limit of the prostate, about one finger width depth of the lateral sulcus; Grade II BPH as the accessibility of the upper limit of the prostate with little effort, > one but < two finger width depth of lateral sulcus, prominent median sulcus; Grade III as the accessibility of the upper limit of the prostate with marked difficulty, about two finger width depth of lateral sulcus, obliteration of median sulcus with a round posterior surface; and Grade IV as the inability to access the upper limit even with effort, deep depth lateral sulcus (> two finger width), obliteration of median sulcus with a round posterior surface.[14]

Statistical Analysis

Mean values, standard deviations, and percentage for the groups were computed. Results on continuous measurements are presented as mean and standard deviation (SD). Student's t-test was used to determine the statistical significance between the two group means. All analyses were two-tailed, and p < 0.05 was considered significant.

Results

We enrolled 126 patients, out of whom 74 were in the AUR group and 52 in the non-AUR group. Out of 126 patients, 34.9% were less than 60 years old, 34.1% were between 61 and 65 years of age, and 31% of patients were more than 65 years. In the non-AUR group, 36.50% of the patients were less than 60 years of age, 36.50% were between 60 and 65 years, and 26.90% were more than 65 years old. In the AUR group, 33.80% of the patients were below 65 years of age, 32.40% were between 60 and 65 years, and 33.80% were more than 65 years. The mean age of patients with AUR was 62.51 years and that of patients without AUR was 61.06 years. The p-value of 0.711 was insignificant (►**Table 1**).

In the current study, 21.6% of the patients with AUR had hypertension, and 19.2% of patients without AUR had hypertension. A p-value of 0.918 was insignificant (►**Table 1**).

In the current study, 23.0% of the patients who presented with AUR had diabetes as a co-morbid condition, and 23.1% of the patients without AUR had diabetes (both groups had

Table 1 Master table comparing all variables with *p*-values

Sr. no	Variables	With AUR (%)	Without AUR (%)	*p*-Value
1	HT	21.6	19.2	0.918
2	DM	23.0	23.1	1.000
3	IHD	10.8	9.6	1.000
4	Volume (mean)	53.20 mL	44.21 mL	0.000
5	PSA (mean)	3.357	3.094	0.006
6	TUR syndrome	1.4	0.0	1.00
7	Hematuria	10.8	5.8	0.523
8	Blood transfusion	4.1	1.9	0.642
9	UTI–post operative	24.3	3.8	0.004
10	Sepsis	1.4	0.0	1.000
11	Recatheterization	23.0	3.8	0.007
12	Irritative LUTS	24.3	15.4	0.319
13	Stricture	2.7	1.9	1.000
14	Resurgery	1.4	0.0	1.000
15	Length of stay (mean)	7	4.56	0.000
16	PVR (mean)	14.31	13.32	0.062
17	Qmax (mean)	19.22	19.20	0.947

Abbreviations: AUR, acute urinary retention, DM, diabetes mellitus; HT, hypertension; IHD, ischemic heart disease; LUTS, lower urinary tract symptoms; PVR, postvoid residual; PSA, prostate-specific antigen; Qmax, maximum flow rate; TUR, transurethral resection syndrome; UTI, urinary tract infection.

almost the same percentage) (*p*-value = 1.000). There was no statistical significance (►**Table 1**).

In the current study, 10.8% of patients with AUR suffered from ischemic heart disease, whereas 9.6% of patients without AUR had ischemic heart disease. If the patient was on an anti-platelet drug, we asked them to stop it 1 week before the procedure. There was no statistical significance (*p* = 1.000) (►**Table 1**).

Regarding the prostate grading by DRE, 9.5% of the patients with AUR and 40.4% without AUR had grade I enlargement. In addition, 89.2% of patients with AUR and 59.6% without AUR had grade II enlargement, 1.4% of patients with AUR and no patients without AUR had grade III enlargement. In our study, the *p*-value was 0.000; most patients with AUR had grade II enlargement of the prostate. In patients without AUR, they had grade I and grade II enlargement, with grade II outnumbered I (►**Table 2**).

The gland volume serum PSA level was statistically significant between the two groups (*p* = 0.000 and 0.006, respectively) (►**Table 1**).

Table 2 DRE grading

	Grade I	Grade II	Grade III	Total
With AUR (*n*)	7	66	1	74
Without AUR (*n*)	21	31	0	52
Total (*n*)	28	97	1	126

Abbreviations: AUR, acute urinary retention; DRE; digital rectal examination.

TUR syndrome occurred only in one patient in the AUR group at the end of surgery. Serum electrolytes were evaluated, which showed dilutional hyponatremia (*p* = 1.000) (►**Table 1**).

In the current study, 10.8% of patients presenting with AUR had hematuria after TURP, whereas 5.8% of patients without AUR had hematuria (*p* = 0.523, not statistically significant) (►**Table 1**).

In the present study, 4.1% of patients in the AUR group needed a blood transfusion due to persistent hematuria, whereas 1.9% of patients without AUR needed a blood transfusion (*p* = 0.642, not statistically significant) (►**Table 1**).

Sepsis was seen in only one patient in the AUR group, who was appropriately treated with higher antibiotics. There was no sepsis incident in patients without AUR (*p* = 1.000, which was not statistically significant) (►**Table 1**).

The recatheterization rate was 23.0% in the AUR group, whereas it was only 3.8% in the non-AUR group after TURP. This difference in recatheterization rate was statistically significant (*p* = 0.007) (►**Table 1**).

Eighteen patients in the AUR group developed irritative LUTS such as incontinence, increased frequency, and urgency. In the non-AUR group, only 8 patients developed irritative LUTS (*p* = 0.319, which was not statistically significant) (►**Table 1**).

In the current study, around one-fourth of the patients, that is 24.3% of patients in the AUR group, suffered from UTI after TURP. This was relatively low in patients without AUR, developed only in 3.9% (*p* = 0.004, which was statistically significant) (►**Table 1**).

In the present study, only one patient in the AUR group required resurgery for clot retention ($p = 1.000$, which was not statistically significant) (►**Table 1**).

The length of the hospital stay was statistically significant in our study, as evidenced by the p-value of 0.000 (►**Table 1**).

The mean PVR in AUR and non-AUR groups were 14.31 and 13.32 mL, respectively, it was not statistically significant. The Qmax was also almost the same between these two groups. We excluded the patients who developed recurrent retention (►**Table 1**).

In the current study, two patients in the AUR group and one patient in the non-AUR group developed stricture during 3 months of follow-up ($p = 1.000$, which was statistically insignificant (►**Table 1**).

Discussion

Benign prostatic hyperplasia is a common urological problem affecting men at an older age. Acute urinary retention may be the presenting symptom. The prevalence rate of AUR in men with BPH varies. In western countries, the incidence rate is lower, ranging from 20 to 40%, whereas in developing countries the rate is relatively higher, reaching more than 50%[15]. The increased incidence of AUR in men with BPH in developing countries is unawareness of BPH symptoms, fear of surgery, and cost factors. Chen et al[16] from Taiwan conducted a retrospective study and found that post-TURP complications were more in patients who presented with AUR than in those presented without AUR.

Our study enrolled 126 patients diagnosed as BPH with their symptoms, clinical examinations, uroflowmetry, and USG. Of these, 74 patients presented with AUR, and 52 presented without AUR. We compared the following factors of preoperative variables: age, presence of any comorbid illness, gland size, the gland's grade by DRE, and serum PSA. The following postoperative variables were compared: hematuria, need for blood transfusion, UTI, sepsis, recatheterization rate, PVR, length of hospital stay, lower urinary tract stricture, resurgery rate, TUR syndrome, and Qmax.

In the current study, men aged 40 to 70 years were included. Of these, the mean age for men presenting with AUR was 62.51 years, and that in men without AUR was 61.06 years. The p-value for the mean age was 0.164, which was not significant. So, both the groups were comparable in age. A study conducted by Kurita et al[17] also showed no statistical difference between these two groups based on age. In comparison, other studies such as those by Kaplan et al[18] and Lowe et al[19] showed that AUR occurred more commonly in older age groups.

Regarding comorbid factors, HT was present in 21.6% of patients with AUR and 19.2% of patients without AUR, and the p-value was 0.91, which was not significant. DM was present in 23% of patients with AUR and 23.1% of patients without AUR. The p-value here was 1.000, which was not significant. Next, 10.8% of the patients with AUR and 9.6% of patients without AUR had IHD with a p-value of 1.000. So, in our study, both groups were comparable in comorbid illness.

A few studies have shown that the presence of co-morbid factors might be confounding factors.

Only one patient in the AUR group developed TUR syndrome immediately at the end of the procedure. It was suspected clinically, and serum electrolytes were evaluated, which showed hyponatremia, and it was corrected. No patients in the non-AUR group developed this syndrome.

In our study, 10.8% of patients with AUR and 5.8% of patients without AUR had hematuria after TURP. The p-value was 0.523, which was not significant. Chen et al's[16] study showed hematuria in 8.1% of patients with AUR and 7.4% of patients without AUR. Our study was more or less similar to this study. Holtgrewe et al's[12] study showed hematuria and blood transfusion in 6.4% of patients, Rassweiler et al[20] showed hematuria and blood transfusion in 2% of patients, whereas it was 22% in a study done by Doll et al.[21]

Blood transfusion rate was 4.1% and 1.9% for patients with and without AUR, respectively, with a p-value of 0.642, which was not significant. Chen et al[16] showed a blood transfusion rate of 3.2% and 1.5% for patients presented with and without AUR, respectively.

Only one patient (1.4%) with AUR developed sepsis after TURP in our study. No patient without AUR had sepsis. The patient was treated intensively with IV fluids and higher antibiotics. Chen et al's[16] study reported sepsis in 1.4% of patients in the AUR group. Holtgrewe et al[12] and Haupt et al[22] showed urosepsis in 0.2% of patients after TURP. Doll et al[21] showed urosepsis in 3% of patients.

In the current study, 23% of patients with AUR developed urinary retention after catheter removal in TURP, which was quite higher when compared with 3.8% of patients without AUR. This was statistically significant with a p-value of 0.007. If the patient developed urinary retention, we catheterized the patient, placed him on an α-blocker, and provided a trial void after 1 week. All our patients responded well in trial voiding. Chen et al's[16] study showed a recatheterization rate of 13.8% and 0% for patients with and without AUR, respectively. Holtgrewe et al[12] showed recatheterization in 6.5% of patients, Doll et al[21] in 3%, and Borboroguli et al[23] in 7.1% after TURP. The increased rate of recatheterization in patients with AUR may be due to hypoactive detrusor after chronic obstruction, inadequate resection due to increased gland size, or early cessation of the procedure due to patient factors.

Eighteen (24.3%) patients in the AUR group developed irritative LUTS such as incontinence, increased frequency, and urgency. Only 8 (15.4%) patients developed irritative LUTS in the non-AUR group ($p = 0.319$). The difference between the two groups was not statistically significant, as evidenced by the p-value of 0.319.

We did urine culture and sensitivity for all our patients postoperatively. In our study, 24.3% of patients with AUR and only 3.9% of patients without AUR had UTI documented by urine culture. These patients were given a course of culture-specific antibiotics. UTI was higher in patients with AUR with a p-value of 0.004, which was significant. This increased occurrence of UTI may be due to prolonged catheterization and hospital stay in patients with AUR. Chen et al[16] reported a UTI rate of 18.6% in the AUR group and 15.6% in the non-

AUR group. Borboroglu et al[23] showed a UTI rate of 4%, whereas it was relatively higher in Doll et al's[21] study, which showed 25%.

In our study, three patients developed lower urinary tract stricture, 2 (2.7%) in the AUR group and 1 (1.9%) in the non-AUR group. This was diagnosed 3 months after TURP when the patient complained of a thin stream and straining to void. We did a urethrogram for these patients and diagnosed the stricture. We advised optical internal urethrotomy for these patients. These three patients were not willing to undergo urethrotomy. Hence, dilatation was done. The reasons for the stricture formation may be due to instrumental injury, diathermy injury during TURP, or due to prolonged catheterization. Chen et al's[16] study showed that patients with and without   AUR showed lower urinary tract stricture rate difference of 2.6% and 3.2%, respectively.

Only one patient (1.4%) in our study developed clot retention. Cystoscopic clot evacuation was done postoperatively.

The length of stay was 7 days and 4.56 days for patients with and without AUR, respectively. This was statistically significant ($p = 0.000$).

The mean postoperative PVR for patients with and without AUR was 14.31 mL and 13.32 mL, respectively. The p-value was 0.062, which was not significant statistically.

We did uroflowmetry for all patients who voided after TURP to compare urine flow patterns. The mean Qmax was 19.22 mL/sec and 19.20 mL/sec for patients with and without AUR, respectively. The p-value was 0.947, which was not significant.

Conclusion

Our study shows that post-TURP complications such as hematuria, blood transfusion rate, post-operative UTI, sepsis, recatheterization, lower urinary tract stricture, resurgery, TUR syndrome, and length of hospital stay were higher in patients who presented with AUR than in patients without AUR. Of these complications, post-TURP UTI, recatheterization rate, and the length of hospital stay were statistically significant in the AUR group compared with the non-AUR group. Therefore, it is better to intervene earlier before the patients develop AUR to minimize the complications and maximize the outcomes.

Conflict of Interest
None declared.

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