ORIGINAL ARTICLE

Transurethral Resection of Prostate in Benign Prostatic Obstruction associated with Overactive Bladder: Outcome and Prognostic factors

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Abstract

Background: ***Enlargement of the prostate and other lower urinary tract symptoms are typical in older men with benign prostatic hyperplasia (BPH). Most treatments for LUTS/BPH have traditionally focused on relieving obstruction since bladder outlet obstruction (BOO) has long been thought to play a significant role in the process by which BPH generates LUTS.***

Aim and objectives: ***To evaluate the outcome of TURP in patients presented with benign prostatic obstruction (BPO) and overactive bladder (OAB), and to assess the predictive factors for improvement in OAB (storage symptoms).***

Patients and methods: ***This interventional, prospective, purposive, study was conducted on 50 adult male patients during the period from June 2022 to July 2024 at the Urology Department, Sayed Galal and Al-Hussien University Hospitals; Cairo; Egypt. The research ethics committee of our institution approved the study protocol and all participants signed an informed consent before inclusion.***

Results: ***There were notable improvements in the overall voiding function as measured by Qmax, PVR, and the International Prostate Symptom Score (IPSS). Similarly, there were notable improvements in storage symptoms as measured by OABSS, QOLS, and urodynamic findings.***

Conclusion: ***TURP is considered a reliable treatment option for patients with BPO and OAB with a significant improvement of their overactive bladder symptom score (OABSS) and quality of life score, also duration of symptoms is considered the only predictive factor for improvement of symptoms after TURP.***

Keywords: BPH; TURP; Overactive bladder; Outcome

1. Introduction

Most treatments for lower urinary tract symptoms (LUTS) or benign prostatic hyperplasia (BPH) have traditionally focused on relieving obstruction in the bladder outlet, which has long been thought of as a critical component in the process by which BPH generates LUTS.[1]

The intricate pathophysiology of LUTS/BPH has prompted researchers to focus on bladder anomalies; their findings provide credence to the idea that detrusor muscle abnormalities play a significant role in the development of this condition.[2]

The detrusor has a higher collagen content, according to studies comprising men with BOO/BPH. It has also been proposed that the severity of LUTS in males with BOO/BPH is related to the amount of detrusor collagen deposition.[3,4]

Overactive bladder symptoms secondary to BPH are considered to be more troublesome to the patient and harder to cure with medications, with the fear of urinary retention; also, some patients seek definitive treatment for their symptoms.

Detrusor hypertrophy, hyperplasia, and connective tissue accumulation inside the muscle bundles are possible complications for men with BOO resulting from BPH .[5]

The purpose of this research is to determine if patients who undergo transurethral resection of the prostate (TURP) for benign prostatic obstruction (BPO) and overactive bladder (OAB) have an improved prognosis and to identify the variables that are predictive of this improvement.

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2. Patients and methods

This interventional, prospective, purposive study was conducted during the period from June 2022 to July 2024 at the Urology Department, Sayed Galal, and Al-Hussien University Hospitals, Cairo, Egypt. The research ethics committee of our institution approved the study protocol, and all participants signed an informed consent before inclusion. The study included 50 adult male patients, requiring TURP for BPO associated with overactive bladder symptoms.

Inclusion criteria:

Adult male patients with BPO and symptomatic OAB who have not responded to medical treatment or sought definitive surgical intervention are indicated for TURP.

Exclusion criteria:

Uncorrectable coagulation disorders, active urinary tract infection, neurogenic bladder, and infra-vesical obstruction other than BPO (e.g., urethral stricture).

Preoperative Evaluation:

Comprehensive medical record, including OABSS, IPSS, and quality of life score, comprehensive physical evaluation, including digital rectal examination (DRE), laboratory studies (CBC, RBS, liver and kidney functions, coagulation profile, and PSA), imaging evaluation (ultrasound of the abdomen and pelvis) with measurement of the prostate volume and postvoiding residual (PVR) (if possible), and finally, complete urodynamic evaluation, including a pressure flow study (PFS), uroflowmetry, and Q max.

Surgical procedure and technique:

After a diagnostic cystourethroscopy, the patient may undergo a meatotomy or meatal dilatation if the external meatus is too narrow. The urethra was dilated before the resectoscope was introduced if it was determined that the urethra was narrow. To prevent TUR syndrome and other problems that can arise from monopolar TURP, all patients had bipolar TURP in saline. The 26 Fr. continuous irrigation sheath was employed to prevent the bladder from becoming overly full and to reduce the frequency of bladder emptying. [6]

Urodynamic studies:

All the patients underwent a preoperative urodynamic study with an assessment of all parameters of the filling and voiding phases. Any spontaneous detrusor overactivity (defined as the observation of detrusor contractions at varying durations and amplitude with or without urinary incontinence during filling cystometry)was recorded and provocation methods (increasing filling rate and coughing)were done in those who have not shown spontaneous overactivity.

Postoperative Evaluation:

OABSS, IPSS, and QOLs at 3 and 6 months postoperative, pelvi-abdominal U/S with estimation of PVR, and Qmax 3 months postoperative, and finally, urodynamic study 6 months postoperative.

Statistical analysis:

Data have been collected at the end of the study, and statistical analysis has been carried out using suitable tests and analytic programs. All continuous variables have been tested for significance using the paired-sample t-test and the Wilcoxon signed-rank test, while all categorical variables have been tested using McNemar's. It was deemed significant when the probability value was less than 0.05.

Outcome Measures:

1ry endpoint:

Clinical improvement in Overactive bladder symptom score, IPSS, and QOL score at three and six months postoperative. A decrease of 5 points or more in OABSS was considered a significant improvement. A decrease of 10 points or more in IPSS was considered a significant improvement. A decrease of 2 points or more in QOLS was considered a significant improvement.

2ry endpoint:

Improvement in PVR urine and Qmax three months postoperative, also Urodynamics six months postoperative. PVR urine of more than 50 cc was considered significant.

3. Results

The study initially included 58 patients, with BPO and symptomatic OAB. Five patients were excluded for one or more of the exclusion criteria. Two patients chose not to participate, and 1 patient lost follow-up, Finally, 50 patients completed the procedure and follow-up as shown in Figure (1).

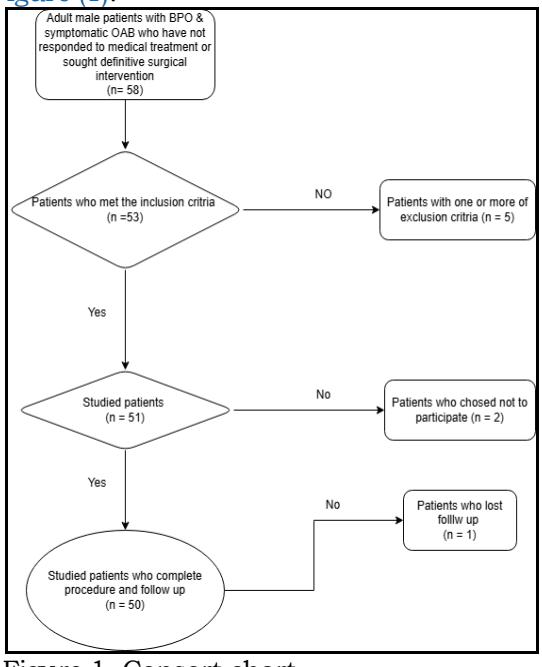

Figure 1. Consort chart.

Table 1. Demographic data and clinical data in all studied patients.

		ALL PATIENTS (N=50)
AGE	Mean±SD (Min-Max)	63.7±7.4 (46-75)
BMI	Mean±SD (Min-Max)	22.9±3 (17-28)
DM		17 34%
HTN		21 42%
DURATION OF SYMPTOMS (MONTHS) MEAN±SD (MIN-MAX)		18.7±15.9 (3-72)
PROSTATE SIZE MEAN±SD (MIN-MAX)		18.7±15.9 (3-72)
PREOPERATIVE FIXED URETHRAL CATHETER MEAN±SD (MIN-MAX)		12 24%

BMI: Body mass index DM: Diabetes mellitus HTN: Hypertension.

The mean age of the studied 50 patients was (63.7±7.4) years and ranged between 46-75 years. The mean BMI was (22.9±3) kg/m2 and ranged between 17-28 kg/m2. Seventeen patients (34%) were diabetic in all studied patients and 21 patients (42%) were hypertensive in all studied patients, (table 1).

Table 2. Comparison of OABSS (preoperative 3-months postoperative 6-months postoperative).

VARIABLE		PRE-OPERATIVE (N=50)	3 MONTHS POST-OPERATIVE (N=50)	6 MONTHS POST-OPERATIVE (N=50)	STAT. TEST	P-VALUE
OABSS	Median (IQR)	12(10-13)	7(6 – 10)	3(2-8)	H=77	<0.001 HS

HS: P<0.001 is considered highly significant.

H: Kruskal-Wallis H Test. S: P<0.05 is considered significant.

This table shows a statistically significant improvement in OABSS at 3, and 6 months postoperative when compared to the preoperative values (P<0.001).

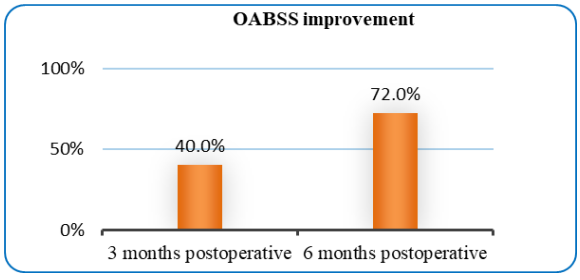

Figure 2. Comparision of OABSS improvement (3 and 6 months postoperative)

Twenty percent of the pateints showed improvement in their OABSS at 3 months , while this improvement reached up to 72% at 6 months as shown in figure 2.

Table 3. Comparison of IPSS (preoperative-3 months postoperative-6 months postoperative).

VARIABLE		PRE-OPERATIVE (N=50)	3 MONTHS POST-OPERATIVE (N=50)	6 MONTHS POST-OPERATIVE (N=50)	STAT. TEST	P-VALUE
IPSS	Median (IQR)	22(18 – 25)	13(11-16)	8(6-11)	H= 94	<0.001 HS
IPSS IMPROVEMENT AFTER 3 AND 6 MONTHS						
NOT IMPROVED	----	27	54.0%	17 34.0%	X2=4.1	0.04 S
IMPROVED	----	23	46.0%	33 66.0%		

X2: value of Chi-square test. HS: P<0.001 is considered highly significant.

H: Kruskal-Wallis H Test. S: P<0.05 is considered significant.

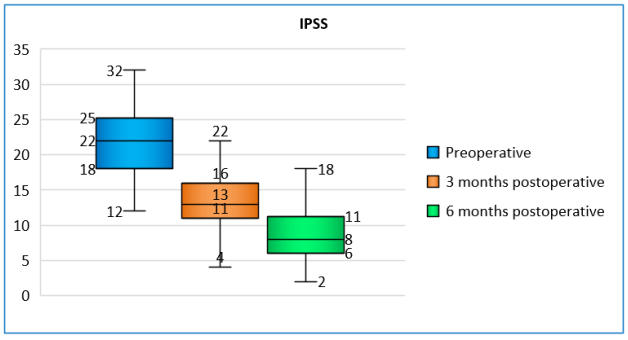

Figure 3. Comparison of IPSS (preoperative 3-months postoperative 6-months postoperative)

The evaluation of the IPSS during the study period is demonstrated in Table 3 and Figure 3. As noticed there was a statistically significant improvement in IPSS at 3 &6 months postoperative when compared to the preoperative values (P<0.001).

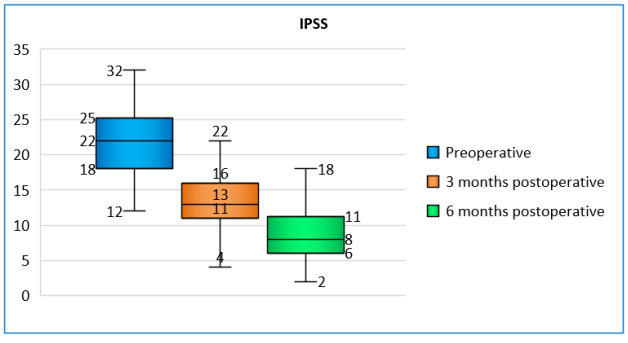

Figure 4. Comparison of PVR pre and 3 months postoperative

There was a high statistically significant (P<0.001) difference between the incidence of significant residual urine in patients preoperative and postoperative. Pre-operative significant in 16 patients (34%). While 3 months post-operative PVR was significant in 1 patient only(2%), also there was a high statistically significant (P<0.001) increased Q max (3 months postoperative) when compared with Q max (pre-operative) in all studied patients. (Figures 4 & 5)

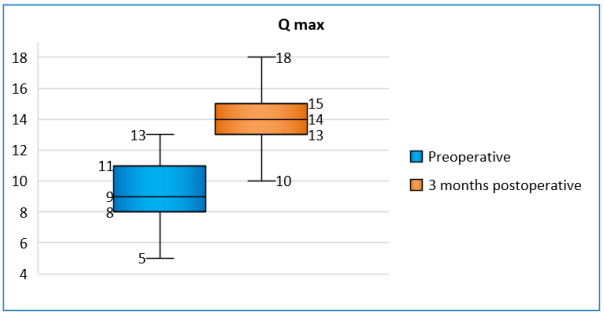

Figure 5. Comparison of Q max pre and 3 months post-operative.

Table 4. Comparison of DOA in UD pre and 6-months post-operative.

	PRE-OPERATIVE (N=50)		6 MONTHS POST-OPERATIVE (N=50)		X2	P-VALUE
DOA IN UD	21	42.0%	7	14.0%	9.7	0.002 S

X2: value of chi-square test. S: P-value < 0.05 is considered significant.

All patients underwent a urodynamic study preoperative, only 21 (42%) of them had Detrusor overactivity proved in urodynamic and therefore underwent urodynamic 6 months postoperative. There was a statistically significant (P=0.002) decreased number of patients with DOA in UD 6 months after operation (7 patients 14%) when compared with that preoperative (21 patients 42%) all studied patients, (table 4; Figure 6).

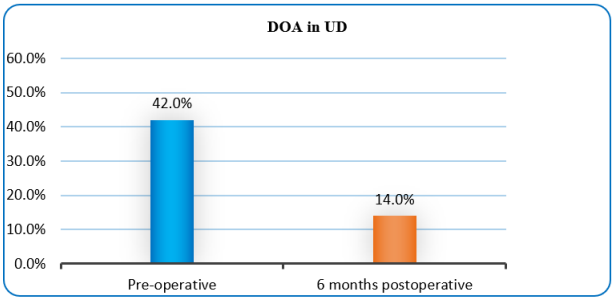

Figure 6. Comparison of DOA in UD pre and 6-months post-operative.

Regression analysis and prognostic factors:

Table 5. Univariate logistic regression analysis for OABSS improvement after 6-months.

	B	SE	P-VALUE	ODDS	95% CI	
AGE	-0.159	0.062	0.011	0.85	0.755	0.964
BMI	-0.211	0.118	0.075	0.81	0.642	1.021
DM	-2.009	0.722	0.004	0.12	0.03	0.504
HTN	-0.452	0.635	0.476	0.64	0.183	2.207
RBS	-0.026	0.008	0.001	0.97	0.959	0.99
PSA	-0.117	0.119	0.327	0.89	0.705	1.124
DURATION OF SYMPTOMS	-0.11	0.034	0.001	0.90	0.838	0.957
FIXED CATHETER	0.836	0.850	0.325	2.31	0.437	12.200
PROSTATE SIZE	0.016	0.015	0.298	1.02	0.986	1.046
PREOPERATIVE PVR	-0.001	0.003	0.826	1.00	0.993	1.006
PREOPERATIVE Q MAX	0.030	0.146	0.838	1.03	0.774	1.372
PREOPERATIVE DOA UD	-1.083	0.666	0.104	0.339	0.092	1.249

B: Regression coefficient, SE: Standard error, CI: Confidence interval.

By using Univariate logistic regression analysis, this table demonstrates that the following parameters were predictive factors for OABSS improvement (6 months after operation):

Age, increased age by one year leads to significantly decreased odds of OABSS improvement by 15%. DM., patients with Preoperative DM have significantly decreased odds of OABSS improvement by 88% lower than patients without Preoperative DM.

RBS., increased RBS by one mg/dl leads to significantly decreased odds of OABSS improvement by 3%. Duration of symptoms, increased duration of symptoms by one month leads to significantly decreased odds of OABSS improvement by 10%, (table 5).

Table 6. Multivariate logistic regression analysis for OABSS improvement after 6 months.

	B	SE	P-VALUE	ODDS	95% CI	
AGE	-0.118	0.079	0.137	0.889	0.761	1.038
DM	-0.410	2.246	0.855	0.664	0.008	54.170
RBS	-0.020	0.024	0.398	0.980	0.936	1.027
DURATION OF SYMPTOMS	-0.091	0.039	0.018	0.913	0.847	0.985

B: Regression coefficient, SE: Standard error, CI: Confidence interval.

By using Multivariate logistic regression analysis, this table demonstrates that the following parameter was an independent

predictive factor for OABSS improvement (6 months after operation):

Duration of symptoms, increased duration of symptoms by one month leads to significantly decreased odds of OABSS improvement by 9%, (table 6).

4. Discussion

In order to study the single effect of the procedure on the improvement of storage symptoms and the preoperative clinical parameters which influenced this improvement, this study selected patients with overactive bladder symptoms who did not take any medication for bladder overactivity, such as anticholinergics or B3 agonists. Additionally, none of the patients took any of these medications postoperatively.

The patients' ages varied from 46 to 75 years, with a mean age of 63.7±7.4 years. Seven patients, or 34% of the total, were diabetic, and 10 of those were on oral hyperglycemic medications. All 21 individuals (42%) with hypertension were able to keep their blood pressure under control by taking medication. The duration of symptoms varied from 3 months to 72 months, with an average of 18.7±14.9 months. Fixed urethral catheters were used by 12 patients, or 24% of the total, to treat acute or refractory urine retention.

The average operating time for all patients undergoing Bipolar TURP in saline was 46.1±21 minutes. A blood transfusion was not necessary for any of the patients either during or after the operation. It took an average of four and a half days for the patient to leave the hospital.

As markers for the improvement of voiding symptoms, we discovered statistically significant improvements in Qmax, PVR, and IPSS after the trial (P-value <0.001, <0.001, and 0.04, respectively). The indices of improvement in storage symptoms, OABSS, and QOLS showed a statistically significant improvement (P-value <0.001). Only one patient developed urge incontinence observed in the follow-up visit after 2 weeks of operation, which disappeared 3 months later at follow-up.

Even overall storage symptoms improved clinically in the first evaluation three months following surgery, this improvement only applies to twenty individuals or 40% of those who saw a drop of five points or more in their OABSS. After six months following TURP, however, that percentage rose to 72 percent, or 36 patients. The duration required for the inflammatory process to subside and the prostatic urethra to undergo full epithelization could account for this.

There was a 60% recurrence of storage symptoms following TURP, according to Thomas et al., who suggested that aging could be the reason in their long-term follow-up study.[7,8]

At the conclusion of our study, we identified predictive markers for storage-related symptoms persistence following TURP using univariate and multivariate logistic regression analysis. Storage symptom relief with TURP may depend on age, body mass index (BMI), random blood sugar (RBS), and length of time with symptoms.

The sole independent predictor for storage symptom improvement after TURP was the duration of symptoms, which was unaffected by patient age or other variables; a one-month increase in duration was associated with a 12% lower chance of OABSS recovery.

The bladder's compensatory mechanisms, which include smooth muscle cell hypertrophy, enlarged intracellular spaces, and interstitial collagen distribution (fibrosis), may account for this phenomenon as urethral resistance increases over time. A larger bladder is the end consequence of this.[9]

Recovery from the storage symptoms and the associated rise in bladder mass may take longer after TURP relieves the obstruction, since these effects are proportional to the severity and duration of the blockage.[9]

By the end of our study, at 6 months postoperative, 14 patients (28%) had persistent OAB symptoms in the form of frequency, nocturia, and urgency, and only one patient had urge urinary incontinence. These patients needed further follow-up and the possibility of added-on therapy for their overactive bladder symptoms.

Limitations: Despite we depended on clinical assessment questionaries as the primary outcome measure for improvement; the use of urodynamically proved overactivity may be more concise but this needs a larger sample size and more duration. Another limitation of this study was the no added medication protocol for the symptoms that persist postoperative which need more patience from the patients and their treating physicians.

4. Conclusion

Transurethral resection of the prostate (TURP) is regarded as a dependable therapeutic intervention for individuals with benign prostatic obstruction (BPO) and overactive bladder (OAB), resulting in notable improvements in their OAB symptom score (OABSS) and overall quality of life. Furthermore, the duration of symptoms is deemed the sole predictive variable for symptomatic improvement following TURP.

Disclosure

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Authorship

All authors have a substantial contribution to the article

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Conflicts of interest

There are no conflicts of interest.

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