

Monopolar vs bipolar transurethral resection in benign hyperplasia of prostate

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Background: Benign prostate hyperplasia (BPH) is characterized by an unregulated proliferation of smooth muscle, glandular epithelium, and connective tissue within the prostate. Males with BPH are found to be at risk for developing lower urinary tract symptoms. These symptoms include urgency, nocturia (awakening at night for voiding), hesitancy, and incomplete emptying of bladder (voiding and require voiding again almost immediately. These symptoms among patients negatively affect quality of life and over time, can have serious consequences including acute retentions of urine and urinary tract infections. The present study was thus framed to compare monopolar and bipolar transurethral resection of the prostate (M-TURP and B-TURP) gland for benign prostatic hyperplasia and to know which procedure was superior to the other.

Results: About one-third of patients of M-TURP (36.6%) and 33.9% of B-TURP group were between 61 and 70 years of age. The mean age of patients of M-TURP and B-TURP was 62.08 ± 10.80 and 61.27 ± 10.46 years, respectively. Retention of urine was present in 18 (30.5%) patients in the M-TURP group and 10 (16.9%) patients in B-TURP group. Hematuria was present in 15 patients (25.4%) in M-TURP group and 13 patients (22%) in B-TURP group. The post-operative median value of International Prostate Symptom Score (IPSS) score in M-TURP and B-TURP was 13 and 12, respectively, which was significantly improved in both the groups as pre-operative median value was 24 and 23, respectively. The post-operative median value of quality of life (QOL) index was 1 in both the groups, which was significantly improved. Hence, IPSS score and QOL index were equally improved in both the groups. There was significant ($P = 0.0001$) difference for IPSS score and QOL index in both the groups, and there was no significant ($P > 0.05$) difference between the two groups

KEY WORDS: Benign prostate hyperplasia, Bipolar-transurethral resection of the prostate, Monopolar-transurethral resection of the prostate

INTRODUCTION

Benign prostate hyperplasia (BPH) is characterized by an unregulated proliferation of smooth muscle, glandular

epithelium, and connective tissue within the prostate.^[1] Males with BPH are found to be at risk for developing lower urinary tract symptoms (LUTS). These symptoms include urgency, nocturia (awakening at night for voiding), hesitancy, and incomplete emptying of bladder (voiding and require voiding again almost immediately.^[2]

These symptoms among patients negatively affects quality of life (QOL) and over time, can have serious consequences including acute retentions of urine and urinary tract infections.^[3,4]

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BPH prevalence rises significantly with age; around 50% of men demonstrate histopathological evidence of BPH by 60 years, increasing to 90% by 85 years.^[5] Considering the present aging population, it is evident that this condition will increasingly become a center piece of urological surgical care while continuing to exert a substantial cost pressure on healthcare services. Therefore, it is important that any interventions used to treat BPH are effective with the minimal risk of complications. Initially, patients with a suspicion of BPH are clinically examined. A digital rectal examination is performed. These patients then undergo simple bedside investigations, urine analysis, and a validated symptom questionnaire, the International Prostate Symptom Score (IPSS).^[6]

Most commonly used drugs in BPH are alpha blockers. Prior systematic reviews have shown that alpha blockers can reduce IPSS scores by 20–50% and increase flow rates by 15–45%.^[7] However, they have a considerable adverse side effect profile including postural hypotension (sudden drop of blood pressure while standing), dizziness, headache, syncope (fainting), peripheral edema (fluid accumulate in the limbs), and retrograde ejaculation.

As a result, 10% of men are forced to withdraw from medical therapy. Surgical therapy is usually considered once a lack of medical therapy efficacy has been established; increasing symptoms bother and rising post void residual urine are documented. Further, if a patient cannot tolerate medications due to side effects, surgery may be the only viable option for symptom relief.^[8,9]

Surgical intervention ranges from transurethral resection of the prostate (TURP) to prostatectomy; the most common surgical technique currently used for BPH is TURP. Even with the rise of new technologies which are minimally invasive, till now TURP is a benchmark of surgical treatment for BPH.^[10,11]

Although efficacy of monopolar TURP (M-TURP) in prostate resection is accepted, complications in the perioperative period and associated costs are a concern.^[12,13]

The present study was thus framed to compare M-TURP and Bipolar TURP (B-TURP) gland for benign prostatic hyperplasia and to know which procedure was superior to the other.

Aim and Objectives

The aim of the study was to compare the clinical efficacy and safety of M-TURP and B-TURP for treating patients of benign prostatic hyperplasia.

MATERIAL AND METHODOLOGY

Study Design

The study design was randomized controlled study.

Study Settings

The study was conducted in the Department of Surgery, Rohilkhand Medical College and Hospital, Bareilly.

Study Duration

The study was done between November 1, 2019, and October 31, 2020.

Ethical Aspects

Informed consent was obtained from all the participants. Ethical approval for the study was obtained from the Institutional Ethical Committee.

Subjects

All patients diagnosed as benign prostatic hyperplasia who underwent TURP.

Inclusion Criteria

All patients of BPH who underwent TURP were included in the study.

Exclusion Criteria

The following criteria were excluded from the study:

- Prostatic cancer
- Urethral stricture,
- Neurogenic bladder
- Prostatitis
- Active urinary infection
- History of the previous prostate surgery
- Coagulopathy

Randomization Criteria

Patients were randomly divided into two groups, those who underwent M-TURP and those who underwent B-TURP and this randomization was done using the website www.random.org.

Procedure

All patients of BPH admitted in the indoor department of surgery in Rohilkhand Medical College and Hospital, Bareilly between November 1, 2019, and October 31, 2020, and who underwent TURP gland were randomized into two groups, one which underwent M-TURP and the other which underwent B-TURP.

A complete clinical history and physical examination including a focused neurological examination with genital and rectal examination was done for all the patients.

The following diagnostic tests were performed:

- Hemoglobin, total leukocyte count, and differential leukocyte count
- Blood urea, serum creatinine, serum sodium, and potassium levels
- Urine routine and microscopic examination, and urine culture and sensitivity
- Ultrasonography of kidney, ureter, and bladder with prostate volume and post-void residual volume.
- Uroflowmetry

- Serum prostate-specific antigen (PSA) (PSA level <4 ng/ml) was considered normal)
- Coagulation profile
- Fasting, random, and post-prandial blood sugar level.

Abnormal PSA or digital rectal examination findings were triggers for a transrectal USG-guided prostate biopsy.

All patients underwent M-TURP or B-TURP. Spinal anesthesia was used for all patients and patients underwent the procedure in a lithotomy position. Preliminary cystourethroscopy was done to assess the anterior urethra verumontanum, prostate gland, bladder mucosa and ureteric orifices. A 26-F Karl Storz continuous flow resectoscope with Baum Rucker type of active working element was used for resection with glycine as irrigant for M-TURP and saline as an irrigant for B-TURP.

For all patients, resection time, intraoperative complication was noted and 3-way Foley’s catheter was inserted at the end of the procedure and irrigation started and continued postoperatively till clear urine was seen. After the procedure, the specimen was kept in a formalin filled jar and sent to the pathology department for histopathological examination.

All patients were monitored in the post-operative period for hematuria.

Hemoglobin (gm/dl), serum sodium (mmol/L), and packed cell volume (%) were done on post-operative day 1. Foley’s catheter was removed on the day when clear urine was seen. All patients were followed up and reviewed with post-operative IPSS and QOL index were recorded after uroflowmetry. Changes in pre-operative and post-operative findings were analyzed.

IPSS score consists of seven questions related to symptoms commonly seen in BPH patients,

1. Incomplete emptying
2. Frequency
3. Intermittency
4. Urgency
5. Weak stream
6. Straining
7. Nocturia

Every question has 0–5 points and added together gives a score between 0 and 35. More the score signifies more the severity.

- 0–7 - Mild symptoms
- 8–19 - Moderate symptoms
- 20–35 - Severe symptoms

In QOL index, a single question system was assessed together with the AUA symptom index and considered as a part of the IPSS score. Response ranged from 0 to 6.

All participants were explained about the objectives of the study and an informed and written consent was obtained. Face to face interviews, history and physical examination were conducted. The purpose, benefits, risks, anonymity,

and confidentiality of the study were clearly explained to the patients. All the data were entered in a predesigned case record form.

Sample Size

Sample size was 118 as per PS2 (Alpha is.05; power is 0.7; sigma is 6.5; delta is 3; and m is 1).^[14]

Statistical Analysis

The results are presented in frequencies, percentages, and mean ± SD. All the data were analyzed using SPSS version 23. Unpaired *t*-test and Chi-square test was used to calculate the *P* value for the categorical and non-categorical data and the significant *P* value was considered when below 0.05. Odds ratio was calculated for the post-operative complications.

RESULTS AND OBSERVATIONS

About one-third of patients of M-TURP (36.6%) and 33.9% of B-TURP group were between 61 and 70 years of age. The mean age of patients of M-TURP and B-TURP was 62.08 ± 10.80 and 61.27 ± 10.46 years, respectively. Retention of urine was present in 18 (30.5%) patients in the M-TURP group and 10 (16.9%) patients in B-TURP group. Hematuria was present in 15 patients (25.4%) in M-TURP group and 13 patients (22%) in B-TURP group. Figure 1 shows the distribution of patients undergoing TURP according to severity of IPSS score and QOL index. IPSS score was between (0 and 7) in no patients in both the groups, between (8 and 19) in three patients in M-TURP and two patients in B-TURP, and between (20 and 35) in 21 patients in M-TURP and 33 patients in B-TURP groups. The median and mean IPSS were 24 and 23.17, respectively, in M-TURP and 23 and 22.53 in B-TURP groups. The median and mean QOL index was 4 and 4.23, respectively, in both M-TURP and B-TURP groups.

Table 1 shows the distribution of patients undergoing TURP according to severity of IPSS score and QOL index. IPSS score was between (0 and 7) in no patients in both the groups, between (8 and 19) in three patients in M-TURP and two patients in B-TURP, and between (20 and 35) in 21 patients in M-TURP and 33 patients in B-TURP groups. The median and mean IPSS was 24 and 23.17, respectively, in M-TURP and 23 and 22.53 in B-TURP groups. The median and mean QOL index was 4 and 4.23, respectively, in both M-TURP and B-TURP groups.

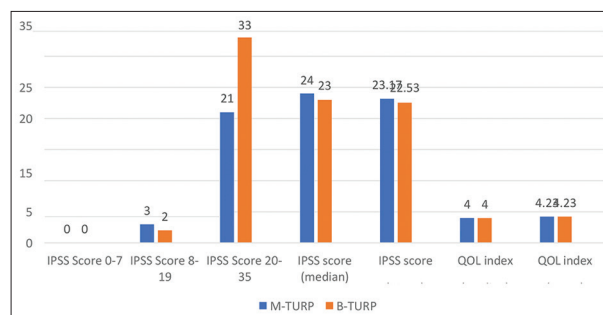


Figure 1: Distribution of patients undergoing TURP according to severity of IPSS score and QOL index

Table 1: Distributions of patients undergoing TURP according to severity of IPSS score and QOL index

IPSS Score	Number of patients (M-TURP)			Number of patients (B-TURP)		
0-7	0			0		
8-19	3			2		
20-35	21			33		
Parameters	M-TURP			B-TURP		
	Range	Mean±SD	Median	Range	Mean±SD	Median
IPSS score	19-27	23.17±2.06	24	19-26	22.53±1.76	23
QOL index	3-5	4.23±0.7	4	4-5	4.23±0.7	4

TURP: Transurethral resection of the prostate, IPSS: International prostate symptom score, QOL: Quality of life, M-TURP: Monopolar transurethral resection of the prostate, B-TURP: Bipolar transurethral resection of the prostate

Table 2: Post-operative IPSS score and QOL index

Post-operative	M-TURP		B-TURP		P-value
	Median	Mean±SD	Median	Mean±SD	
IPSS Score ¹	13	12.59±1.54	12	12.54±1.54	0.0001*
QOL index ²	1	1.49±0.57	1	1.49±0.57	0.0001*

P-value¹ 0.64, P-value² 0.24. IPSS: International prostate symptom score, QOL: Quality of life, M-TURP: Monopolar transurethral resection of the prostate, B-TURP: Bipolar transurethral resection of the prostate

Table 2 shows that the post-operative median value of IPSS score in M-TURP and B-TURP was 13 and 12, respectively, which was significantly improved in both the groups as pre-operative median value was 24 and 23, respectively. The post-operative median value of QOL index was 1 in both the groups, which was significantly improved. Hence, IPSS score and QOL index was equally improved in both the groups. There was significant ($P = 0.0001$) difference for IPSS score and QOL index in both the groups, and there was no significant ($P > 0.05$) difference between the two groups.

DISCUSSION

In this study, about one-third of patients of M-TURP 36.6% and 33.9% of B-TURP group were between 61 and 70 years of age. The mean age of patients of M-TURP and B-TURP was 62.08 ± 10.80 and 61.27 ± 10.46 years, respectively. The findings of this study in regard to age of patients were almost similar to the study by Raghuvanshi *et al.* (2019) in which the patient's age ranged from 51 years to 88 years, with a comparable mean age of 67.68 years in the M-TURP group and 70.82 years in the B-TURP group ($P = 0.07$).^[15]

This study found that retention of urine was present in 30.5% patients of M-TURP and in 16.9% of B-TURP group. Hematuria was present in 25.4% patients of M-TURP and 22% patients of B-TURP. The retention of urine was higher in this study than the study by Ketabchi *et al.* (2013) in which urinary retention (need for catheterization) was seen in only 6.4% patients of M-TURP.^[16] Most patients in our study ignored their LUTS for a long time and only consulted us when they developed acute urinary retention, thus the high incidence of the same in our study.

In this study, post-operative median value of IPSS score in M-TURP and B-TURP was 13 and 12, respectively, which

was significantly improved in both the groups as pre-operative median value was 24 and 23, respectively, and post-operative mean value was 12.59 and 12.54, respectively. The post-operative median value of QOL index was 1 in both the groups, and mean value was 1.49 in both the groups which was significantly improved as the median and mean pre-operative QOL index was 4 and 4.23, respectively, in both M-TURP and B-TURP groups. Hence, IPSS score and QOL index were equally improved in both the groups. There was significant ($P = 0.0001$) difference for IPSS score and QOL index in both the groups, and there was no significant ($P > 0.05$) difference between the group. The findings of this study in regard to IPSS was in agreement with the study by Pradiptha *et al.* (2020) who showed that post-operative mean IPSS was 8.10 in M-TURP and 7.57 mean IPSS in B-TURP, there was no statistically significant difference in terms of IPSS between M-TURP and B-TURP resections, mean QOL was 2.53 in M-TURP and 2.73 in B-TURP groups.^[17] Erkoç and Beşiroğlu (2020) observed that post-operative mean IPSS was 6.4 in M-TURP and 6.3 in B-TURP. There was significant difference in the mean values of IPSS in both the group from pre-operative to post-operative. However, there was no significance difference between M-TURP and B-TURP.^[18] Compared with above studies, post-operative IPSS score was significantly higher in our study but QOL was lower to above studies.

CONCLUSION

Overall, the results of M-TURP and B-TURP are generally similar. IPSS and resection time was similar in both the groups. The complication rate was low in both the group but TUR syndrome occurred only in M-TURP patients. Both methods can be used safely in BPH surgery, but B-TURP is safer in long duration surgery.

REFERENCES

1. Roehrborn CG. Pathology of benign prostatic hyperplasia. *Int J Impotence Res* 2008;20 Suppl 3:S11-8.
2. McVary K, Roehrborn CG, Avins AL, Barry MJ, Bruskewitz RC, Donnell RF, *et al.* Update on AUA guideline on management of benign prostatic hyperplasia. *J Urol* 2011;185:1793-803.
3. Kozminski MA WJ, Nelson J, Kent DM. Baseline characteristics predict risk of progression and response to combined medical therapy for benign prostatic hyperplasia. *Br J Urol Int* 2015;115:308-16.
4. Martin S LK, Haren MT, Taylor AW, Wittert G. Risk factors for progression or improvements of lower urinary tract symptoms in a prospective cohort of men. *J Urol* 2014;191:130-7.
5. Egan KB. The epidemiology of benign prostatic hyperplasia associated with lower urinary tract symptoms: Prevalence and incident rates. *Urol Clin North Am* 2016;43:289-97.
6. Gratzke C, Bachmann A, Descazeaud A, Drake MJ, Madersbacher S, Mamoulakis C, *et al.* EAU guidelines on the assessment of non-neurogenic male lower urinary tract symptoms including benign prostatic obstruction. *Eur Urol* 2015;67:1099-109.
7. Shapiro E, Hartanto V, Lepor H. Quantifying the smooth muscle content of the prostate using double-immunoenzymatic staining and color assisted image analysis. *J Urol* 1992;147:1167-70.
8. Cornu JN, Cussenot O, Haab F, Lukacs B. A widespread population study of actual medical management of lower urinary tract symptoms related to benign prostatic hyperplasia across Europe and beyond official clinical guidelines. *Eur Urol* 2010;58:450-6.
9. Gacci M, Ficarra V, Sebastianelli A, Corona G, Serni S, Shariat SF, *et al.* Impact of medical treatments for male lower urinary tract symptoms due to benign prostatic hyperplasia on ejaculatory function: A systematic review and meta-analysis. *J Sex Med* 2014;11:1554-66.
10. Xie CY, Zhu GB, Wang XH, Liu XB. Five-year follow-up results of a randomized controlled trial comparing bipolar plasmakinetic and monopolar transurethral resection of the prostate. *Yonsei Med J* 2012;53:734-41.
11. Al-Rawashdah SF, Pastore AL, Salhi YA, Fuschi A, Petrozza V, Maurizi A, *et al.* Prospective randomized study comparing monopolar with bipolar transurethral resection of prostate in benign prostatic obstruction: 36-month outcomes. *World J Urol* 2017;35:1595-601.
12. Karadeniz MS, Bayazit E, Aksoy O, Salviz EA, Tefik T, Sanli O, *et al.* Bipolar versus monopolar resection of benign prostate hyperplasia: A comparison of plasma electrolytes, hemoglobin and TUR syndrome. *Springerplus* 2016;5:1739.
13. Bozzini G, Albersen M, Otero JR, Margreiter M, Cruz EG, Mueller A, *et al.* Delaying surgical treatment of penile fracture results in poor functional outcomes: Results from a large retrospective multicenter European study. *Eur Urol Focus* 2018;4:106-10.
14. Gupta P, Singh N. In: Batra B, editor. *How to Write a Thesis and Thesis Protocol*. 1st ed. New Delhi: Jaypee Publications; 2014. p. 89-90.
15. Raghuvanshi K, Raval A, Jain DK, Vartak KP, Patil S, Iqbal S, *et al.* Comparative assessment of monopolar versus bipolar transurethral resection of prostate for the management of benign prostatic enlargement. *Urol Sci* 2019;30:262-5.
16. Ketabchi AA, Ketabchi M, Barkam M. The effect of modified TURP (M-TURP) in intra and postoperative complications. *Nephrourol Mon* 2013;5:758-61.
17. Pradiptha NT, Duarsa GW, Mahadewa TG. Prospective cohort study comparison of bipolar and monopolar transurethral resection of prostate for benign prostatic hyperplasia: Haemoglobin, sodium levels, and urethral catheter traction application. *Int J Res Med Sci* 2019;7:95207.
18. Erkoç M, Beşiroğlu H. Comparison of bipolar TURP and monopolar TURP patients who underwent surgery due to BPH. *Eur Arch Med Res* 2020;36:8-11.