

Efficacy and Safety of Transurethral Enucleation of Prostate

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ABSTRACT

Background: Benign Prostatic Hyperplasia (BPH) is one of the most common urological diseases seen in aging men. Surgical treatment is recommended for patients unresponsive to medical therapy or those who have developed BPH-related complications. Enucleation procedure distinguished itself as a successful treatment option in large BPH patients, mimics open prostate enucleation, characterized by good surgical efficiency, reduced complications, faster postoperative recovery, similar prostatic tissue ablation capabilities and satisfactory follow-up results compared with the open technique.

Objectives: To assess the safety and efficacy of transurethral enucleation of prostate.

Methods: Patients aged above 45 years with symptoms of bladder outlet obstruction due to BPH, with maximal urinary flow rate (Q_{max}) of <15 ml/s, failure to relieve symptoms by medications or acute urinary retention failing at least one trial without catheter or recurrent gross hematuria due to prostatomegaly or upper urinary tract changes due to bladder outlet obstruction due to BPH and patient willing to undergo Transurethral Resection of the Prostate (TUEP) were included in this study.

Results: In our study patients aged between 55-90 years were enrolled. Most common presenting complaints were frequency and acute urinary retention. Mean preoperative prostate size was 102.9 ± 10.90g with a range of 84-126 g. Mean operative time was 86.71 ± 5.24 minutes. The mean postoperative ID catheter was 2.1+1.63 days. Postoperative uroflowmetry and International Prostate Symptom Score (IPSS) improved significantly.

Conclusion: TUEP represents a promising endoscopic approach in large Benign Prostate Enlargement (BPE) cases, mimics conventional open method of enucleation of the prostate while having all the advantages of a minimally invasive surgery.

Keywords:

Benign Prostatic Hyperplasia (BPH), Urological, Diseases, Surgical treatment, Patients, Medical therapy, Enucleation procedure, Postoperative recovery

Introduction

Benign Prostatic Hyperplasia (BPH) is one of the most common urological diseases seen in aging men. The objectives of most of the methods used in the treatment of BPH are to eliminate Lower Urinary Tract Symptoms (LUTS), prevent disease progression, and reduce any complications that may emerge in the long-term. Surgical treatment is recommended for patients unresponsive to medical therapy or those who have developed BPH-related complications. BPH is affecting ~50% of men older than 50 years, 75% of men older than 70 years, and 90% of men older than 80 years [1]. Since 1990s Transurethral Resection of the Prostate (TURP) was the method of choice for the operative treatment of LUTS in prostate with an estimated weight of less than 100 grams. TURP with regard to their clinical effectiveness is considered as the "gold standard" of surgical therapy of BPH. However it is associated with major problems, including high reoperation rate, blood loss, TUR syndrome. As prostate volume increases, the rate of these complications also increases [2]. In order to reduce these complications many other minimally

invasive treatment modalities like bipolar resection and bipolar enucleation, laser enucleation, laser vaporisation have been developed. Open prostatectomy was often recommended in patients with large BPH, despite increased morbidity and long recovery. According to the EAU Guidelines 2019, large size BPH cases (>80 mL) continue to have open prostatectomy as the first line treatment alternative, despite the substantial peri-operative morbidity and extended catheterization and convalescence periods related to this undoubtedly invasive approach. Bipolar enucleation of the prostate was introduced as a novel endoscopic approach in cases of large prostates. The enucleation procedure distinguished itself as a successful treatment option in large BPH patients, characterized by good surgical efficiency, significantly reduced complications, faster postoperative recovery, similar prostatic tissue ablation capabilities and satisfactory follow-up results compared with the open technique. Enucleation procedures mimic open prostatic enucleation and allow for a more complete anatomical removal of the adenoma. In bipolar enucleation technique a specially designed loop is used to enucleate the adenoma. The median and the lateral prostatic lobes are dissected away in a retrograde fashion from the prostate apex towards the bladder using a spatula to lift the adenoma from the surgical capsule all around. Bipolar energy is used for resection and hemostasis. It

has advantage over the open procedure in being a minimally invasive procedure with minimal blood loss and in having an expeditious recovery allowing patients to be sent home early. It would also be easier to convert a Transurethral Enucleation with Bipolar (TUEB) procedure to TURP if nonprogress or complications are encountered during the initial learning curve.

Materials and Methods

After obtaining the ethical clearance from the Institutional Ethical Committee, the present observational study was conducted in the Postgraduate Department of General Surgery, Government Medical College, Srinagar over a period of two years. Patients aged above 45 years with symptoms of bladder outlet obstruction due to BPH, failure to relieve symptoms fully by medications, acute urinary retention failing at least one trial without catheter or recurrent gross hematuria due to prostatomegaly or upper urinary tract changes due to bladder outlet obstruction due to BPH and patient willing to undergo TUEP were included in this study. Maximal urinary flow rate (Qmax) and International Prostate Symptom Score (IPSS) were also considered before going for surgery.

A consecutive sample of 35 patients fulfilling inclusion and exclusion criteria underwent TUEP performed by a single urologist were observed during the study period. Following observations were recorded (i) mean operative time (min, SD), (ii) mean change in hemoglobin (g/dl, SD), (iii) enucleated tissue weight, (iv) mean postoperative catheter (d, SD), (v) mean hospital stay (days), (vi) Qmax and IPSS after bipolar TURP, (vii) PVRU after bipolar TURP.

Statistical Analysis

Descriptive statistics such as mean, standard deviation was used to describe the study sample. Categorical data were compared by Fischer exact test and numerical data were compared by independent samples Mann–Whitney U-test. P<0.05 was considered statistically significant. Statistical Package for

Table 1: Pre-operative parameters.

		No. of Patients	Percentage
Complaints	Frequency	14	40%
	Urgency	6	17%
	Acute urinary retention	13	37%
	Nocturia	12	34%
	Straining at micturition	13	37%
	Poor urinary stream	9	26%
	Hematuria	5	14%
	Incomplete emptying	7	20%
Prostate size (g)	80-89	3	9%
	90-99	11	31%
	100-109	11	31%
	110-119	7	20%
	120-130	3	9%
	Mean ± SD (Range)=102.9 ± 10.98 (84-126) g		
Uroflowmetry Qmax value (ml/s)	>15 ml/s	0	0%
	10-15 ml/s	4	18%

Social Sciences version 21 (International Business Machines Corporation, New York, USA) was used for data analysis.

Results

In our study patients aged between 55 to 90 years were enrolled with mean age of 70 ± 7.84 years. Most common presenting complaints were frequency, acute urinary retention, straining, nocturia, poor urinary stream, incomplete emptying, urgency, haematuria. Prostate size was 90-109 g in majority of patients i.e. 22 (62%), 07 (20%) patients had 110-119 g prostate size, 3(9%) patients had 80-89 g and 120-130 g each. Mean preoperative prostate size in our study was 102.9 ± 10.98 g with a range of 84-126 g. Uroflowmetry was done in 22 (62%) patients in which <10 ml/s Qmax value (ml/s) was observed in 18 (82%) patients, 10-15 ml/s Qmax value was seen in 4 (18%) patients while as no patient had Qmax value >15 ml/s. Indications for TUEP included failed medical therapy in 14 (40%) patients, refractory urinary retention in 13 (37%) patients, persistent gross haematuria in 5 (14%), BPH with BOO with HDN was observed in 3 (9%) patients. IPSS score was >19 in 28 patients and 8-19 in 7 patients.

Mean operative time was 86.71 ± 5.24 minutes. Postoperative hemoglobin change was 0.62 ± 0.126 g/DL, with maximum patients in 0.5-1 g/dl range. Weight of enucleated prostate tissue was 50-70 grams in majority of patients i.e. 22 (63%) patients followed by <50 grams in 11 (31%) patients. >70 grams prostate tissue was resected in 2 (6%) patients. The mean weight of enucleated prostate tissue was 57.57 ± 9.06 g. postoperative ID catheter was retained for 2 days only in majority of patients 33 (94) and 3 days in 2 (6%). Postoperatively 01 patient developed urine incontinence which was temporary and resolved after 2 months. At the 3-month followup, all the studied patients had normal uroflowmetry with a Qmax value of >15, mean PVRU (ml) was 27.28 ± 12.20 ml and mean IPSS score of 6.0 ± 1.236 (Tables 1,2).

	<10 ml/s	18	82%
Indications for TUEP	Refractory Urinary retention	13	37%
	Failure of medical therapy	14	40%
	BPH with BOO with HDN	3	9%
	Persistent gross hematuria	5	14%

Table 2: Post-operative parameters.

		No. of Patients	Percentage
Operative time (Minutes)	<80	7	20
	80-90	21	60
	>90	7	20
	Mean ± SD (Range)=86.7 ± 5.24 (77-96)		
Change in hemoglobin (g/dl)	<0.5 g/dl	6	17
	0.5-1.0 g/dl	28	80
	>1.0 g/dl	1	3
	Mean ± SD (Range)=0.62 ± 0.126 (0.3-1.2)		
Post-op IPSS Score	≤ 7	33	94
	8-19	2	6
	>19	0	0
	Mean ± SD (Range)=6.01 ± 1.236		
Weight of enucleated prostate tissue (grams)	<50 grams	11	31
	50-70 grams	22	63
	>70 grams	2	6
	Mean ± SD (Range)=57.57 ± 9.06		
I/D catheter in situ (days)	2 Days	33	94
	3 Days	2	6
	Mean ± SD (Range)=2.06 ± 0.126 (2-3 Days)		
Hospital stay (Days)	2 Days	33	94
	3 Days	2	6
	Mean ± SD (Range)=2.06 ± 0.126 (2-3 Days)		
Complications in study patients at 6 months follow-up	Early- urine incontinence	1	2.9
	Late	0	0
Postoperative uroflowmetry Qmax value (ml/s)	>15 ml/s	35	100
	10-15 ml/s	0	0
	<10 ml/s	0	0
	Mean ± SD (Range)=23.74 ± 2.50		
Postoperative PVRU	≤ 25 ml	14	40
	26-50 ml	18	51
	51-75 ml	3	9
	76-100 ml	0	0
	>100 ml	0	0
	Mean ± SD (Range)=27.28 ± 12.20 ml		

Discussion

In our study patients aged between 55-90 years were enrolled in which majority belonged to 71-80 years age group i.e. 14 (40%), 12 (34%) patients aged between 61-70 years, 7 (20%)

patients belonged to age group of <60 years while as only 2 (6%) patients aged >80 years. The mean age in our study patients was 70+7.84 years. Our study results are comparable with the findings of Mohamad Abdulwahab (2021) [3] wherein the mean

(SD) age of the patients was 71.88 years. He conducted a study to analyze the efficacy and safety between bipolar transurethral enucleation of the prostate (BipoLEP) and B-TURP. In our study, most common presenting complaint was Frequency seen in 14 (40%) patients, followed by acute urinary retention seen in 13 (37%) patients, Nocturia in 12 (34%), Straining at micturition in 13 (37%), poor urinary stream was seen in 09 (26%) patients, hematuria was the presenting complaint in 5 (14%) patients, 7 (20%) had incomplete emptying, 6 (17%) patients had urgency. Abdallah MM and Badreldin MO (2014) [4] conducted a study in which 70% had moderate to severe LUTS. Acute urinary retention was present in 30% of their patients. Prostate size was 90-109 g in majority of patients i.e. 22 (62%), 07 (20%) patients had 110-119 g prostate size, 3 (9%) patients had 120-130 g, while as prostate size of 3 (9%) patients was 80-89 g. The mean prostate size in our study was 102.9+10.98 g with a range of 84-126 g, in the study conducted by Mohamad Abdulwahab (2021) had 99.14 ± 9.5 as the preoperative prostate size. Out of a total of 35 patients, uroflowmetry was done in 22 patients preoperatively in which abnormal (<10 ml/s) uroflowmetry Qmax value (ml/s) was observed in 18 (82%) patients, equivocal uroflowmetry Qmax value (10-15 ml/s) were seen in 4 (18%) patients while as no patient had normal (>15 ml/s) uroflowmetry Qmax value. The mean Qmax in our study was 7.8. Malakarjuna Reddy (2018) [5] conducted a study in which mean Qmax was 5.8 ml. Geavlete Bogdan (2013) [6] had Qmax <10 ml in his study.

The operative time was 80-90 minutes in 21 (60%) patients followed by >90 minutes in 7 (20%) patients and <80 minutes in 7 (20%) patients. Mean operative time was 86.71+5.24 minutes. Malakarjuna Reddy (2018) conducted a study in which mean operative time was 87.5 minutes with average prostate size 99 g. Similar operative time was also observed by Prasant Reddy (2018) [7], the mean operative time was 83 mins. In our study mean postoperative hemoglobin change was 0.62+0.126. Our results are comparable with the findings of Malakarjuna Reddy, mean postoperative haemoglobin change observed in their study was 0.6. Weight of enucleated prostate tissue was 50-70 grams in majority of patients i.e. 22 (63%) patients followed by <50 grams in 11(31%) patients. >70 grams prostate tissue was enucleated in 2 (6%) patients. The mean weight of enucleated prostate tissue was 57.57+9.06 grams. Chi Fai Khan (2014) [8] conducted a study comparing bipolar enucleation with bipolar resection, there was more prostate tissue resected in enucleation (61.4 vs 45.7 g). In our study, postoperative ID catheter was retained for 2 days in majority of patients i.e. 33 (94%) and 3 days in 2 (6%) patients. The mean postoperative ID catheter was 2.06+0.126 days. Same results were observed by Gaevlete Bogdan (2013). They conducted a study to compare bipolar enucleation of the prostate with open trans-vesical prostatectomy in cases of large prostates with regard to surgical efficacy and peri-operative morbidity to compare the medium-term follow-up parameters specific for the two methods. The TUEP and open techniques emphasized similar mean operating duration (91.4 vs 87.5 min) and resected tissue weights (108.3 vs 115.4 g). The postoperative haematuria rate (2.9% vs 12.9%) as well as the mean haemoglobin drop (1.7 vs 3.1 g/dL), catheterization period (1.5 vs 5.8 days) and hospital stay (2.1 vs 6.9 days) were significantly improved for TUEP.

Postoperatively uroflowmetry was done at 3 month follow up. All the studied patients had normal uroflowmetry with a Qmax value of >15 with a mean postoperative uroflowmetry of 23.74+2.50 ml/s. The results are comparable to Malakarjuna Reddy (2018) obtained by Yong Wei, et al. (2016) [9] in their study. Postoperatively PVRU (ml) was 26-50 ml in 18 (51%) patients, <25 in 14 (40%), >50 ml in 3 (9%) patients with a mean postoperative PVRU being 27.28+12.20 ml, comparable to KY Zhang (2011) [10]. In our study none of the studied patients developed any intraoperative complications, while 1 patient developed postoperative urine incontinence which was temporary and resolved within 2 months.

Conclusion

TUEP is a safe and effective technique in treating symptomatic BPE, allows near complete enucleation of a prostate adenoma. It represents a promising endoscopic approach in large BPE cases, mimics conventional open enucleation of the prostate while having all the advantages of a minimally invasive surgery. It is characterized by good surgical efficiency, reduced complications, faster recovery and satisfactory follow up results.

Conflict of Interest

The authors declare no competing financial interest.

Funding

No.

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