

Research Article

A Comparative Study on Outcome of Holmium Laser Enucleation of Prostate and Transurethral Resection of Prostate in Prostatic Hyperplasia

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Abstract

Objective: To compare the frequency of hematuria and mean length of stay as outcome of holmium laser enucleation of prostate (HoLEP) and transurethral resection of prostate (TURP) group with benign prostatic hyperplasia.

Methodology: Study was randomized trial, conducted in Urology department of General hospital, Lahore, for Six months. Sampling technique was consecutive. Those who were willing, randomly allocated in two groups by using lottery method. In Group A, patients undergone HoLEP and in Group B, TURP. After surgery, irrigation started with normal saline solution. Irrigation time was noted. Patients were shifted in ward and followed for next 24 hours. If blood was present in urine grossly, then hematuria was labeled. Clinically and vitally stable patients were discharged from wards and hospital stay was also noted. Data was collected on preformed Performa and analyzed on SPSS.

Results: Total 108 patients fulfilling the inclusion criteria participated. Main outcome variables in this study were frequency of hematuria and length of stay (LOS) in hospital of patients in both treatment groups. Statistical significance was calculated using two-tailed test. As per findings of this study it was seen that patients frequency of hematuria was significantly higher in patients who were treated with TURP (HoLEP: 3.7% vs. TURP: 29.6%, p-value=0.000) while LOS in hospital was also significantly higher for patients who were treated with TURP (HoLEP: 41.65±10.63 vs. TURP: 54.02±10.44, p-value=0.000).

Conclusion: Holmium laser enucleation is better than transurethral resection of prostate in terms of shorter hospital stay and low frequency of hematuria postoperatively. HoLEP can replace TURP but more studies required with long term effects.

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Introduction

Prostatic hyperplasia is a benign cellular hyperplasia, which is related to proliferative changes

in connective tissue, smooth muscle and glandular epithelium of prostate. It is commonly known as benign prostatic hyperplasia (BPH).¹ Most common risk factors which play vital role in etiology

include age, diet, genetics and ethnicity. The worldwide prevalence of BPH is 45% in fifth decade of age, 80% or more in men older than 80 years.²

Complication of BPH primarily includes urinary obstruction known as bladder outlet obstruction (BOO). This leads to secondary effects such as lower urinary tract symptoms (LUTS), recurrent urinary tract infection (UTI), hematuria, calculi, urinary retention and renal failure.^{3,4}

Management of BOO because of BPH, ranges from watchful waiting to surgical removal. Known modalities are medical, phytochemical and surgical. First line of treatment on presenting complaints with BPH is pharmacologic treatment. Many randomized control trials proved effectiveness of alpha-adrenergic blockers and 5-alpha reductase inhibitors (5ARIs).^{5,6} While phytotherapist claimed the effectiveness of herbal agents like *arecernilton* and *serenoarepens* in BPH. But conclusive results on these agents are awaited due to limited trials.^{7,8}

Surgical options for the management of BPH evolved from customary open prostatectomy. Now surgeries are diversified as minimally invasive and invasive. Minimally invasive surgeries are transurethral needle ablation (TUNA) also known as radiofrequency ablation, transurethral microwave thermotherapy (TUMT), transurethral incision of prostate (TUIP), high intensity focused ultrasound (HIFU), prostate stents and chemical ablation. Modern invasive surgical options are transurethral electrovaporization of the prostate (TUEVP), transurethral resection of prostate (TURP), photoselective vaporization of the prostate (PVP) also known as KTP laser vaporization of prostatectomy and holmium laser enucleation of prostate (HoLEP).^{9,10}

Gold standard treatment for bladder outlet obstruction (BOO) secondary to benign prostatic hyperplasia (BPH) is still transurethral resection of prostate (TURP) because of lower rate of clinical complications. In the last decade gold standard technique have been challenged to replace with holmium laser enucleation of prostate (HoLEP).¹¹ An extensive review on randomized control trial comparing the effectiveness of treatment conducted in 2015. Scie-

ntific evidence from the studies suggest that HoLEP is better to other surgical techniques in cases of huge prostate. HoLEP is a new technique which has difficult handling of laser fiber, more cost of equipment and needs more expertise to do. It has potential to replace gold standard treatment.^{12,13} Commonly large size prostate operated by open or staged TURP, but studies on HoLEP suggest success in it too and patients remain catheter free post-operatively. Studies compared irrigation time, hematuria and mean hospital stay in HoLEP and TURP group.^{14,15}

Rationale of this study was to compare the outcome of HoLEP and TURP for management of patients presenting with symptomatic BPH. TURP was opted as gold standard decades ago. Huge size prostate had been treated with staged TURP or open prostatectomy. More evidence required to search alternative. We intended to compare the outcome of HoLEP and TURP for the management of BPH to find more effective method to be used in future.

Methods

This randomized controlled trial was conducted at Department of Urology, Lahore General Hospital. Non-probability, consecutive sampling technique adopted and randomization was done by lottery method. Sample size was calculated by considering the prevalence of BPH 80% in older men.² Confidence level of 99%, absolute precision required 0.10. Sample size of 107 calculated by using following formula:

$$n = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

Total of 108 samples included considering the study design and previous studies as well. Patients included in this study who fulfilled the inclusion criteria and gave informed consent. Group A had 54 patients allocated by randomization and same in Group B. Inclusion criteria was male patients of age more than 60 years presenting with BPH. While patients excluded who had urinary bladder or upper tract stones, neurogenic bladder due to BPH (on clinical examination), Patients with bladder neck contract-

ure, urethral stricture and previously operated for Prostate (on medical record), Patients with Carcinoma of Prostate (diagnosed on pre-operative TRUS biopsy) and deranged renal function (urea>20mg/dl, creatinine>1.3mg/dl). Demographic details i.e. age, diagnosis of BPH, and prostate size was noted.

In Group A, patients underwent HoLEP. A 550µm laser fiber, 12° optics, 26F resectoscope (Karl Storz) with laser fiber stabilizing bridge and an endoscopic camera were used. The 100 W Versa Pulse holmium laser (Lumenis) with setting at 2 J/50 Hz employed. Morcellation was performed using 26F rigid nephroscope (Storz) and the Versacut morcellator (Lumenis). Fluid normal saline solution 0.9 % double inflow was used for irrigation throughout the procedure. Irrigation fluid was hanged at the height of 30 cm above the operating table during enucleation while height was increased during morcellation for distension of urinary bladder. And in Group B, patients underwent TURP. It was performed using the standard 26F resectoscope (Karl Storz). No special modification done during TURP. Normal saline was used as irrigation fluid at the height of 30 cm above operation table. Both procedures were performed under spinal anesthesia. After surgery, irrigation was done by using saline solution. Irrigation time was noted on study Proforma. Then patients were shifted in post-surgical urology ward and were followed there for 24 hours to assess the presence of blood in urine on urine examination. If gross blood was present, then hematuria was labeled. Patients were discharged from ward and hospital stay was also noted.

Data collected was entered and analyzed through SPSS version 23. Quantitative variables age, prostate size, irrigation time and hospital stay was described by Mean± S.D. Qualitative variable, hematuria which was gross described as frequency and percentage. Both groups were compared for irrigation time and hospital stay by using independent sample t-test and for hematuria by using chi-square test. Data was stratified for age, diagnosis of BPH, and prostate size. Post stratification, independent sample t-test for irrigation time and hospital stay done. But chisquare test for hematuria was applied

to compare both groups. P-value ≤ 0.05 was considered significant.

Results

The mean age of patients in Group A and in Group B was 70.54 (±6.73) yrs and 70.50 (±5.85) yrs. Mean prostate size of patients in Group A and in Group B was 74.76 (±15.54) grams and 74.65 (±14.69) grams respectively.

Mean irrigation time of patients in Group A and in Group-B was 16.00 (±2.41) hrs and 24.70 (±3.86) hrs respectively. Hematuria was significantly higher in Group-B patients then that of Group-A patients. Group-A 3.7% vs. Group-B 29.6%, p-value=0.000. Hospital stay in hours was significantly higher in Group-B patients. Group-A, 41.6 vs. Group-B, 54.0, p-value = 0.000. (**Table-1**)

Table-1: Comparison of Study Variables

	Group-A (n=54)	Group-B (n=54)
Irrigation time in hours	16.0 hr (±2.41)	24.7 (±3.86)
Hospital Stay in hours	41.6 (±10.64)	54.0 (±10.44)
Hematuria (%)	3.7%	29.6%
	p-value=0.000	

Mean hospital stay was significantly shorter for patients in Group-A for both age groups. i.e. 60-70 years and 71-80 years. i.e. 60-70 years (p-value) = 0.012 & 71-80 years (p-value) =0.000. (**Table-2**)

Table-2: Study Variables Stratified for Age of Patients

	Age	Group-A	Group-B	P-value
Hematuria	60-70	1(3.8%)	7(29.2%)	0.015
	71-80	1(3.6%)	9(30%)	0.008
Hospital stay	60-70	44.42±10.54	52.29±10.65	0.012
	71-80	39.07±10.23	55.40±10.23	0.000

Hematuria was significantly higher in Group-B patients with prostate size 50-60 grams (p-value=0.055) and patients with prostate size >80 grams (p-value=0.008). However, patients with prostate size 71-80 grams, no patients had hematuria. (**Table-3**)

Table-3: Study Variable in Treatment Groups Stratified for Prostate Size

Prostate size	Variable	Group-A	Group-B	p-value
50-60	Hematuria	2(13.3%)	6(46.2%)	0.055
	Hospital Stay	44.73±9.19	55.46±12.30	0.014
61-70	Hematuria	0(0%)	4(30.8%)	0.081
	Hospital Stay	31.38±7.26	51.77±11.81	0.000
71-80	Hematuria	0(0%)	0(0%)	-
	Hospital Stay	40.22±10.74	54.00±10.43	0.029
>80	Hematuria	0(0%)	6(27.3%)	0.008
	Hospital Stay	43.86±10.70	54.50±8.84	0.001

Hospital stay among patients in Group-B was significantly higher as that of patients in Group-A in prostate size group. i.e. 50-60, p-value= 0.014, 61-70, p-value=0.000, 71-80, p-value=0.029 & >80 p-value= 0.001 (Table-3). No other complication occurred during study period.

Discussion:

In this study comparison of two treatment modalities was done for management of Male patients of age >60 years presenting with BPH. These two modalities were HoLEP and TURP. Main outcome variables in this study were onset of hematuria and hospital stay of patients in both treatment groups.

As per findings of this study it was seen that patients frequency of hematuria was significantly higher in patients who were treated with TURP (HoLEP: 3.7% vs. TURP: 29.6%, p-value=0.000) while length of stay in hospital was also significantly higher for patients who were treated with TURP (HoLEP: 41.65±10.63 vs. TURP: 54.02±10.44 hours, p-value=0.000). Recently in 2017 Liu Suo in his study showed that there were no statistical differences in hospital stay for both treatment modalities. i.e. HOLEP and TURP.¹⁶ Contrary to findings of Liu Suo, Samuel H. Eaton in his study showed that average length of hospital stay was significantly less for patients undergoing HoLEP as that of patients undergoing TURP. i.e. (0.43 vs. 1.25 days, p-value<0.05).¹⁷ A recent study by Ankur Jhanwar also showed that total postoperative stay was significantly higher in TURP group in comparison to HoLEP. i.e. 54.58 (±12.36) and 41.81 (±9.17) hours.¹⁸ Results of this study was consistent with the findings of Samuel H. Eaton and Ankur Jhanwar while opposite to the findings of Liu Suo in terms of hospital stay for patients undergoing HoLEP as compared to that of TURP.

R.M. Mavuduru showed in study that TURP group suffered from hematuria caused catheter blockage which required clot evacuation while HoLEP group had not such complication with p value 0.01.¹⁴ HoLEP has potential to replace TURP with less morbidity, reduced catheterization, hospital stay and the moreover removal of increased volume of prostate tissue.¹⁹⁻²¹

Limitations of the study were that it was a short term study considering two variables. There is a need to know patient quality of life improvement and surgeons ease during procedure. We suggest to conduct more clinical trials on this technique.

Conclusion:

HoLEP is safe and effective procedure for surgical treatment of prostatic benign hyperplasia in terms of hematuria and hospital stay as compared to TURP. HoLEP has the potential to become the standard for surgical management of BPH.

Ethical Approval: Given

Conflict of Interest: The authors declare no conflict of interest

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