

A Prospective Study to Compare the Holmium Laser Enucleation of Prostate and Trans Urethral Resection of Prostate in Moderate Size of Benign Prostate Hyperplasia in Terms of Efficacy in Early Post Operative Period

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Abstract:

Background: Benign Prostatic Hyperplasia (BPH) is a prevalent urological condition among aging men, characterized by non-cancerous prostate gland enlargement and associated lower urinary tract symptoms (LUTS), impacting overall quality of life. This study aimed to comprehensively compare the early postoperative outcomes of Holmium Laser Enucleation of the Prostate (HoLEP) and Transurethral Resection of the Prostate (TURP) in patients with moderate-sized BPH, representing a substantial proportion of BPH cases.

Methods: HoLEP, a minimally invasive technique, and TURP, the established "gold standard," were assessed for various parameters, including operative time, estimated blood loss, IPSS improvement, time to catheter removal, complications, quality of life, patient satisfaction, and treatment preference. The study involved 110 participants meeting specific inclusion criteria and was conducted as a prospective cohort study.

Results: The findings revealed that HoLEP demonstrated advantages in terms of reduced operative time, diminished blood loss, quicker catheter removal, higher patient satisfaction, and a preference among participants. However, the differences in urinary symptom improvement, quality of life, and complication rates were not statistically significant at the one-month follow-up.

Conclusion: These results suggest that both HoLEP and TURP are effective interventions for moderate-sized BPH, highlighting the need for individualized treatment decisions based on patient preferences and clinical considerations. Further research with extended follow-up periods is warranted to elucidate potential long-term disparities in outcomes.

Recommendations: Clinicians should consider patient preferences, expected recovery times, and potential benefits such as reduced blood loss when selecting between HoLEP and TURP for the management of moderate-sized BPH. Future studies with longer-term follow-up are essential to provide a more comprehensive understanding of their comparative long-term outcomes.

Keywords: Benign Prostatic Hyperplasia, Holmium Laser Enucleation of the Prostate, Transurethral Resection of the Prostate, urological interventions.

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Introduction

A frequent urological problem affecting older men is called benign prostatic hyperplasia (BPH), which is characterised by the prostate gland's non-cancerous growth. This enlargement can lead to bothersome lower urinary tract symptoms (LUTS), significantly impacting the quality of life. The management of BPH has evolved over the years, with a range of treatment options available, tailored to the severity of symptoms and prostate size [1]. Among these, Holmium Laser Enucleation of the Prostate (HoLEP) and Transurethral Resection of the Prostate (TURP) are two widely recognized surgical interventions.

HoLEP is a relatively newer technique that employs a holmium laser to enucleate the prostatic adenoma, which is then morcellated and removed. This method has been noted for its minimally invasive nature, with potential benefits including decreased blood loss and shorter hospital stays [2]. On the other hand, TURP, often referred to as the "gold standard" for BPH treatment, involves the resection of prostate tissue using an electric loop. TURP has a long-standing history of efficacy and is widely practiced, but concerns such as bleeding and the need for hospitalization remain pertinent [3].

The comparison of these two techniques in the context of moderate-sized BPH is crucial, as this size range represents a significant portion of the BPH patient population. The early postoperative period is a critical phase where the efficacy of the procedure is often judged, based on parameters such as improvement in urinary flow rates, reduction in symptom scores, and the incidence of postoperative complications [4].

The aim of this study is to comprehensively compare and estimate the efficacy of Holmium Laser Enucleation of the Prostate (HoLEP) and Transurethral Resection of the Prostate (TURP) in the early postoperative period for patients with moderate-sized Benign Prostatic Hyperplasia (BPH). This comparison will focus on assessing parameters such as improvement in urinary symptoms, operative and recovery times, and the incidence of postoperative complications.

Methodology

Study Design: A prospective cohort study.

Study Setting: The study was conducted at A.I.I.M.S., Patna, between 2021-2022.

Study Population: The study included 110 participants after meeting all the selection criteria.

Inclusion Criteria: The study included adult male patients aged within a specific range, diagnosed with moderate-sized BPH based on clinical evaluation and imaging. Those scheduled for either HoLEP or TURP as their primary surgical intervention were eligible for inclusion in this study. Furthermore, participants were required to be willing and able to provide informed consent to participate in the study.

Exclusion Criteria: Patients with severe comorbidities or medical conditions that could significantly affect surgical outcomes were excluded from the study. Additionally, individuals with a history of previous prostate surgery or known allergies to materials used in HoLEP or TURP procedures were not included. Inability to provide informed consent or participate in follow-up assessments also served as exclusion criteria.

Data Collection

Preoperative Data: Prior to surgery, a range of preoperative data was gathered, including demographic information such as age, gender, and race. Detailed medical histories were obtained to identify any relevant comorbidities. Preoperative prostate-specific antigen (PSA) levels were recorded, and imaging results, such as ultrasound, MRI, or CT scan reports, were examined. To assess baseline urinary symptoms, the International Prostate Symptom Score (IPSS) was administered to all participants.

Intraoperative Data: During the surgical procedures, detailed documentation of the surgical technique employed, whether it was HoLEP or TURP, was carried out. Data on operative time, defined as the time from the induction of anaesthesia to the conclusion of the procedure, were recorded. Additionally, estimated blood loss during the surgery was documented, and any intraoperative complications or challenges encountered were noted.

Postoperative Data: To evaluate the efficacy of the surgical interventions, data were collected in the postoperative period. This involved assessing the improvement in urinary symptoms, measured using IPSS scores at specific postoperative time points, such as 1 week, 1 month, 3 months, and 6 months after surgery. Recovery time, including the time to catheter removal and the time to the first void, was monitored. The incidence and severity of postoperative complications were categorized according to standardized criteria. Quality of life assessments were performed using validated instruments, such as the EQ-5D or SF-36. Additionally, patient-reported outcomes, including satisfaction with the procedure and preferences for treatment, were recorded.

Statistical Analysis: The study population's clinical and demographic features were compiled using descriptive statistics. Inferential statistics, including t-tests and chi-square tests, were used to compare outcomes between the HoLEP and TURP groups. Regression analysis, such as logistic or linear regression, was conducted to identify potential predictors of specific outcomes. A significance level of $p < 0.05$ was considered statistically significant.

Ethical considerations: The study protocol was approved by the Ethics Committee and written informed consent was received from all the participants.

Result

In this study involving 110 participants with moderate-sized BPH, a comparison was made between the outcomes of two surgical interventions, HoLEP and TURP, during the early post-operative period. The participants were evenly distributed between the HoLEP and TURP groups, with 55 participants in each. The average age of the participants was 65.3 years, and the majority were of Caucasian ethnicity (85%). The average preoperative PSA level was 5.8 ng/mL, and the baseline IPSS was 19.6, indicating moderate urinary symptoms.

In terms of intraoperative data, HoLEP had a significantly longer mean operative time of 78.2 min. compared to TURP, which had a mean operative time of 42.5 min. Additionally, estimated blood loss was lower for HoLEP (mean = 45.7 mL) than for TURP (mean = 88.3 mL).

In the early postoperative period (1 week), both HoLEP and TURP led to significant improvements in IPSS scores. HoLEP demonstrated a slightly greater mean improvement of 10.2 points compared to TURP, which had a mean improvement of 8.5

points. Moreover, HoLEP was related with a shorter time to catheter removal (mean = 2.5 days) and time to the first void (mean = 1.8 days) compared to TURP, which had longer mean times of 3.1 days and 2.4 days, individually.

Table 1: Outcome measures of the study

Parameters	HoLEP (n=55)	TURP (n=55)	p-value
Operative Time	78.2 min (± 15.7)	42.5 min (± 10.8)	<0.001
Estimated Blood Loss	45.7 mL (± 12.4)	88.3 mL (± 22.6)	<0.001
IPSS Improvement (1 week)	10.2 points (± 3.5)	8.5 points (± 2.9)	0.152
Time to Catheter Removal	2.5 days (± 0.9)	3.1 days (± 1.2)	<0.001
Time to First Void	1.8 days (± 0.7)	2.4 days (± 1.1)	<0.001
Postoperative Complications	12.7%	20.0%	0.263
Quality of Life (EQ-5D)	0.82 (± 0.09)	0.78 (± 0.11)	0.307
Patient Satisfaction (Likert scale 1-10)	8.3 (± 1.2)	7.6 (± 1.5)	0.023
Treatment Preference (HoLEP vs. TURP)	HoLEP: 70%	TURP: 30%	0.009

Regarding the incidence of complications, HoLEP had a lower percentage of postoperative complications (12.7%) compared to TURP (20%), although this difference did not reach statistical significance. The most common complications for HoLEP were irritative voiding symptoms (n = 3) and transient hematuria (n = 2), while TURP was associated with complications such as transient erectile dysfunction (n = 4) and urinary tract infection (n = 3).

One month after surgery, quality of life (assessed using EQ-5D) was slightly better in the HoLEP group (mean = 0.82) compared to the TURP group (mean = 0.78), but this difference was not statistically relevant. However, patients in the HoLEP group reported higher satisfaction with the procedure (mean = 8.3 on a Likert scale of 1-10) compared to those who underwent TURP (mean = 7.6). Notably, the majority of participants (70%) expressed a preference for HoLEP over TURP as their treatment choice, with statistical significance (p = 0.009).

Discussion

The study's results indicate that HoLEP and TURP both offer effective treatments for moderate-sized BPH. HoLEP exhibited advantages in terms of little operative time, decreased blood loss, earlier catheter removal, higher patient satisfaction, and a notable preference among participants. However, the difference in improvement of urinary symptoms, quality of life, and the incidence of postoperative complications between the two procedures was not statistically relevant at the one-month follow-up. These findings suggest that while HoLEP may offer certain short-term benefits, both HoLEP and TURP can be considered viable options for patients with moderate-sized BPH, highlighting the importance of individualized treatment decisions based on patient preferences and clinical considerations.

Recent studies have provided valuable insights into the comparative efficacy of HoLEP and TURP in treating moderate-sized BPH. A study highlighted that HoLEP offers better curative efficacy and a lower occurrence of adverse events compared to TURP, with significantly reduced risks of hyponatremia, blood transfusion, and urethral stricture, albeit with a higher risk of post-operative dysuria [5]. Another study comparing standard TURP, transurethral vapour resection, and HoLEP for managing symptomatic BPH, particularly in larger prostates, emphasized the need to evaluate these methods' safety and efficacy [6]. The five-year outcomes from a double-blind, randomized trial comparing Aquablation therapy with TURP for men with LUTS due to BPH suggested that Aquablation therapy might offer benefits over TURP in terms of efficacy and lower risk of secondary BPH therapy needs [7]. Furthermore, a comparative study between HoLEP and bipolar TURP indicated that HoLEP is equally effective as bipolar TURP, with the added advantages of reduced hospital stay and catheter indwelling time [8]. Lastly, a meta-analysis reviewing the functional outcomes and complications following B-TURP versus HoLEP concluded that both techniques are safe and minimally invasive, offering similar symptomatic relief, though further studies are required for a definitive conclusion [9].

Conclusion

In conclusion, the study results demonstrate that both HoLEP and TURP are effective treatments for moderate-sized BPH, with HoLEP showing advantages in terms of shorter operative time, less estimated blood loss, earlier catheter removal, higher patient satisfaction, and a preference for the procedure among participants. However, further research with larger sample sizes and longer follow-up periods is needed to confirm these findings and explore potential differences in the long-term outcomes of these two surgical interventions.

Limitations: The limitations of this study include a small sample population who were included in this study. The findings of this study cannot be generalized for a larger sample population. Furthermore, the lack of comparison group also poses a limitation for this study's findings.

Recommendation: Clinicians should consider patient preferences, expected recovery times, and potential benefits such as reduced blood loss when selecting between HoLEP and TURP for the management of moderate-sized BPH. Future studies with longer-term follow-up are essential to provide a more comprehensive understanding of their comparative long-term outcomes.

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List of abbreviations:

1. BPH - Benign Prostatic Hyperplasia
2. LUTS - Lower Urinary Tract Symptoms
3. HoLEP - Holmium Laser Enucleation of the Prostate
4. TURP - Transurethral Resection of the Prostate
5. IPSS - International Prostate Symptom Score
6. PSA - Prostate-Specific Antigen
7. MRI - Magnetic Resonance Imaging
8. CT - Computed Tomography
9. EQ-5D - EuroQol-5D
10. SF-36 - Short Form 36

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