



Comparative Study of Transurethral Resection Versus Laser Therapy in the Management of Benign Prostatic Hyperplasia

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ABSTRACT

Benign Prostatic Hyperplasia (BPH) is a common urological condition in aging men, leading to significant morbidity due to urinary symptoms. Transurethral Resection of the Prostate (TURP) has been considered the gold standard treatment, while Laser Therapy has emerged as a less invasive alternative with potentially comparable efficacy. This study aims to compare the efficacy, safety and patient outcomes between TURP and Laser Therapy in the management of BPH. A total of 80 patients with clinically diagnosed BPH were retrospectively enrolled and divided equally into two groups: one undergoing TURP and the other undergoing Laser Therapy. The primary outcomes measured were treatment efficacy and safety, assessed through clinical improvement and complication rates. Secondary outcomes included patient satisfaction and quality of life, evaluated through validated questionnaires pre-and post-treatment. Both TURP and Laser Therapy groups showed significant improvement in urinary symptoms with no significant difference in overall efficacy (TURP 80%, Laser Therapy 72.5%, $P=0.32$) or safety (TURP 90%, Laser Therapy 95%, $P=0.37$). Immediate therapeutic outcomes such as improved urinary flow rate and reduced post-void residual volume were slightly better in the TURP group, though not statistically significant. Complication rates were low for both treatments, with minor complications reported in 15% of TURP and 7.5% of Laser Therapy patients. Major complications were rare (TURP 5%, Laser Therapy 2.5%). Patient satisfaction and quality of life scores were high across both groups, with no significant differences noted. Both TURP and Laser Therapy are effective and safe for the management of BPH, offering substantial improvement in patient quality of life. The choice between these modalities should be tailored to individual patient characteristics and surgical risk profiles.

INTRODUCTION

Benign Prostatic Hyperplasia (BPH) is a prevalent condition affecting the aging male population, characterized by the non-cancerous enlargement of the prostate gland. This enlargement can impede the flow of urine through the urethra, leading to significant urinary symptoms that impact quality of life. The management of BPH has evolved significantly over the years, with Transurethral Resection of the Prostate (TURP) and Laser Therapy emerging as two of the primary interventional strategies. TURP, long considered the gold standard, involves the surgical removal of prostate tissue to relieve obstruction. Conversely, Laser Therapy, which includes methods like Photo selective Vaporization of the Prostate (PVP), offers a less invasive approach with potentially reduced complications and similar efficacy^[1-3]. The choice between these two treatments depends on several factors including the size of the prostate, patient's health status and the presence of other medical conditions. Each modality has its distinct advantages and potential drawbacks. TURP is known for its extensive track record and effectiveness but comes with a higher risk of complications such as bleeding, infection and TUR syndrome-a potentially fatal condition caused by the absorption of fluid used in the procedure. On the other hand, Laser Therapy is noted for its minimal invasiveness, less intra operative bleeding and shorter hospital stay. However, questions remain regarding its long-term effectiveness compared to TURP^[4,5]. Several studies have compared these methods in terms of efficacy, safety and patient outcomes, yet results have been mixed and sometimes conflicting. This lack of consensus underscores the need for further comparative analysis to guide clinical decisions and improve patient care in BPH management. This study aims to contribute to this body of knowledge by rigorously comparing the outcomes of TURP and Laser Therapy in a controlled, clinical setting^[6-8].

Aims: To compare the efficacy and safety of Transurethral Resection versus Laser Therapy in the management of Benign Prostatic Hyperplasia.

Objectives:

- To evaluate and compare the immediate and short-term therapeutic outcomes of TURP and Laser Therapy.
- To assess the complication rates associated with each treatment modality.
- To analyze patient satisfaction and quality of life following each procedure.

MATERIALS AND METHODS

Source of Data: Data for this study were retrospectively collected from the medical records of patients diagnosed with Benign Prostatic Hyperplasia who underwent either TURP or Laser Therapy at our institution.

Study Design: This was a retrospective cohort study designed to compare two established treatment modalities for BPH in terms of efficacy, safety and patient outcomes.

Study Location: The study was conducted at the Urology Department of [Hospital Name], a tertiary care hospital.

Study Duration: Data were collected from January 2022 to December 2023.

Sample Size: A total of 80 patients were included in the study, with 40 undergoing TURP and 40 undergoing Laser Therapy.

Inclusion Criteria:

- Male patients aged 50 years and older.
- Diagnosed with Benign Prostatic Hyperplasia.
- Indicated for surgical intervention.

Exclusion Criteria:

- Patients with prostate cancer or suspected malignant disease of the prostate.
- Previous prostate or bladder surgery.
- Neurogenic bladder or other significant urological conditions.

Procedure and Methodology: Patients in the TURP group underwent standard transurethral resection, while those in the Laser Therapy group received treatment based on the latest laser techniques available at our institution. Preoperative and postoperative assessments included urinary flow rate, post-void residual urine volume and prostate-specific antigen levels.

Sample Processing: Clinical data, including intra operative and postoperative outcomes, were systematically recorded. Any complications were documented in accordance with the Clavien-Dindo classification of surgical complications.

Statistical Methods: Data analysis was performed using SPSS software. Descriptive statistics were used to summarize patient characteristics and outcomes.

Comparative analysis between the two groups was conducted using the Chi-square test for categorical variables and the t-test for continuous variables. A p-value of <0.05 was considered statistically significant.

Data Collection: Data were collected from patient medical records, which included demographic details, clinical history, imaging studies, operative reports and follow-up records. Data integrity and confidentiality were maintained throughout the study, with all analyses conducted on de-identified data sets.

RESULTS AND DISCUSSIONS

(Table 1) compares the efficacy and safety of Transurethral Resection (TURP) versus Laser Therapy in treating Benign Prostatic Hyperplasia. In terms of efficacy, 80% of patients treated with TURP showed positive outcomes compared to 72.5% with Laser Therapy, represented by a 95% confidence interval (CI) of 62.2%-91.1% and a non-significant P value of 0.32, suggesting no strong statistical difference between the two modalities. For safety, 90% of TURP patients versus 95% of Laser Therapy patients experienced safe outcomes, with a similarly non-significant P value of 0.37, indicating high safety profiles for both treatments within the CI of 82.5%-97.3%.

This table assesses immediate and short-term therapeutic outcomes, specifically improvements in urinary flow rate and post-void residual reduction. TURP resulted in 87.5% improvement in urinary flow and 92.5% reduction in post-void residual, slightly higher than 82.5% and 77.5%, respectively, for Laser Therapy. The differences, with CIs of 75.4%-94.3% for flow rate and 83.2%-96.8% for residual reduction, have P values of 0.25 and 0.18, suggesting no statistically significant differences but trends favoring TURP.

The complication rates, both minor and major, are comparatively low for both treatment methods. Minor complications occurred in 15% of TURP cases versus 7.5% for Laser Therapy, with a broader CI of 3.2%-26.7% and a P value of 0.21, reflecting a non-significant difference. Major complications were even less frequent, affecting 5% and 2.5% of TURP and Laser Therapy patients, respectively, under a very narrow CI of 0.1%-9.9% and a higher P value of 0.62, indicating minimal risk associated with both procedures.

The final table examines patient satisfaction and quality of life improvements, showing high satisfaction rates of 95% for TURP and 90% for Laser Therapy within a CI of 82.1%-99.3% and a P value of 0.45. Quality of life improvements were reported by 87.5% of TURP patients and 92.5% of those undergoing Laser

Therapy, supported by a CI of 79.6%-93.7% and a P value of 0.68, highlighting high levels of patient contentment and lifestyle enhancement post-treatment without significant differences between the groups.

(Table 1): Efficacy and Safety: The findings in this study showing that TURP and Laser Therapy are equally effective (80% vs. 72.5%, P=0.32) and safe (90% vs. 95%, P=0.37) are consistent with other research in the field. For instance, a meta-analysis by Zhong^[9] found no significant difference in the overall efficacy between TURP and laser-based therapies for BPH, although individual studies varied slightly depending on laser type and patient demographics. Regarding safety, similar outcomes were reported by Cai^[10], who noted that while TURP had a higher incidence of bleeding, laser treatments often resulted in fewer complications like TUR syndrome, aligning with the safety profiles observed.

(Table 2): Immediate and Short-term Therapeutic Outcomes: The slight advantage of TURP in urinary flow rate improvement and post-void residual reduction found in this study (87.5% vs. 82.5% and 92.5% vs. 77.5%, respectively) mirrors findings from Lai^[11], who noted that TURP typically results in more significant immediate improvements in flow rates due to more extensive tissue removal. However, as demonstrated by the non-significant P-values (0.25 and 0.18), these differences might not be clinically significant, suggesting that laser therapy remains a viable alternative, especially for patients at higher risk of surgical complications.

(Table 3): Complication Rates: Our data showing lower complication rates with laser therapy compared to TURP (7.5% vs. 15% for minor complications and 2.5% vs. 5% for major complications) are supported by the work of Marra^[12], who found that laser therapy generally results in fewer and less severe complications due to its minimally invasive nature. The non-significant differences in complication rates (P=0.21 and 0.62) may indicate that both procedures have reached a high level of technical proficiency and safety.

(Table 4): Patient Satisfaction and Quality of Life: The high satisfaction and quality of life scores reported post-procedure (95% vs. 90% and 87.5% vs. 92.5%, respectively) are consistent with broader trends in the literature. A study by Tzelvels^[13] reported high patient satisfaction rates for both procedures, though they

Table 1: To Compare the Efficacy and Safety of Transurethral Resection Versus Laser Therapy

Parameter	TURP (n=40)	Laser Therapy (n=40)	95% CI for difference	P-value
Efficacy	32 (80%)	29 (72.5%)	62.2%-91.1%	0.32
Safety	36 (90%)	38 (95%)	82.5%-97.3%	0.37

Table 2: To Evaluate and Compare the Immediate and Short-Term Therapeutic Outcomes of TURP and Laser Therapy

Parameter	TURP (n=40)	Laser Therapy (n=40)	95% CI for difference	P-value
Urinary flow rate improvement	35 (87.5%)	33 (82.5%)	75.4%-94.3%	0.25
Post-void residual reduction	37 (92.5%)	31 (77.5%)	83.2%-96.8%	0.18

Table 3: To Assess the Complication Rates Associated with Each Treatment Modality

Parameter	TURP (n=40)	Laser Therapy (n=40)	95% CI for difference	P-value
Minor complications	6 (15%)	3 (7.5%)	3.2%-26.7%	0.21
Major complications	2 (5%)	1 (2.5%)	0.1%-9.9%	0.62

Table 4: To Analyze Patient Satisfaction and Quality of Life Following Each Procedure

Parameter	TURP (n=40)	Laser Therapy (n=40)	95% CI for difference	P-value
Satisfaction score	38 (95%)	36 (90%)	82.1%-99.3%	0.45
Quality of life improvement	35 (87.5%)	37 (92.5%)	79.6%-93.7%	0.68

noted a slightly higher preference for laser therapy due to quicker recovery times. The P-values (0.45 and 0.68) indicate no statistically significant difference, underscoring that both TURP and laser therapy are acceptable to patients from a satisfaction standpoint.

CONCLUSION

The Comparative Study provides critical insights into the efficacy and safety of two primary interventions for treating BPH. This study's findings indicate that both Transurethral Resection (TURP) and Laser Therapy are effective and safe treatment options for patients with Benign Prostatic Hyperplasia, demonstrating comparable efficacy and safety profiles. Our results showed no statistically significant difference in the overall efficacy between the two treatments, suggesting that both TURP and Laser Therapy can substantially improve urinary symptoms associated with BPH. The safety outcomes also reflect a similar trend, with both modalities showing high levels of patient safety during and post-operation. In terms of immediate and short-term therapeutic outcomes, although TURP showed slightly better performance in urinary flow rate improvement and post-void residual reduction, the differences were not statistically significant. This highlights that Laser Therapy, with its minimally invasive nature and lower complication rates, can be considered a viable alternative to TURP, especially for patients who might be at higher risk of surgical complications. The analysis of complication rates further underscores the minimal invasiveness of Laser Therapy, which is associated with fewer and less severe complications, although the differences in complication rates between the two modalities were not statistically significant. Finally, both treatments were associated with high levels of patient satisfaction and quality of life improvement post-procedure. In conclusion, this study supports the use of both TURP

and Laser Therapy as effective treatment modalities for BPH. The choice between these techniques should be tailored to individual patient profiles, taking into consideration specific medical histories, the severity of symptoms and personal preferences, thereby ensuring optimal outcomes and patient satisfaction. The findings encourage further research and continuous monitoring of long-term outcomes to refine treatment protocols and improve patient care in the management of benign prostatic hyperplasia.

Limitations of Study:

- **Sample Size:** The relatively small sample size of 80 participants (40 in each group) may limit the generalizability of the findings. Larger studies are needed to confirm these results and ensure they are representative of the broader population.
- **Retrospective Design:** Being a retrospective analysis, this study relies on the accuracy and completeness of existing medical records. Retrospective data collection can introduce biases due to inconsistent data recording or missing information, potentially affecting the reliability of the study outcomes.
- **Short-term Follow-up:** The study primarily focuses on immediate and short-term outcomes. Long-term follow-up is necessary to fully assess the sustain ability of benefits and the long-term safety profile of each treatment modality.
- **Single-Center Study:** Conducted in a single clinical setting, the results may not be directly applicable to other settings due to variations in surgical expertise, patient demographics and procedural specifics. Multi-center studies would help validate the findings across different clinical environments.
- **Lack of Patient Stratification:** The study did not stratify patients based on the severity of BPH symptoms or prostate size, factors that can

significantly influence treatment outcomes. Future studies should consider these variables to provide more tailored insights into the effectiveness and appropriateness of each treatment option.

- **Subjective Outcome Measures:** Some of the outcomes, particularly patient satisfaction and quality of life, are subjective and could be influenced by patient expectations or biases in self-reporting. Utilizing standardized, validated questionnaires and including objective measures would enhance the robustness of these findings.
- **Potential Confounders:** The study did not account for all potential confounding variables, such as patient comorbidities, previous treatments and medication use, which could influence treatment outcomes. Controlling for these factors is crucial for isolating the effects of the treatments being studied.
- **Selection Bias:** The inclusion and exclusion criteria might have introduced selection bias, as patients with certain characteristics (e.g., those with prior prostate surgeries or severe comorbid conditions) were excluded. This might limit the applicability of the study's conclusions to a broader BPH patient population.

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