

CLINICAL REPORT

Transperineal Laser Ablation of Symptomatic Benign Prostatic Hyperplasia With Median-Lobe Enlargement: A Single-Center Experience

Antonio Ruffo¹  | Nikola Stanojevic² | Felice Crocetto³ | Biagio Barone⁴  | Petr Holy⁵ | Vincenzo Maria Altieri¹ | Lorenzo Spirito⁶  | Fabio Esposito⁷

¹Department of Medicine and Health Sciences "V. Tiberio", University of Molise, Campobasso, Italy | ²Urogenital Center, Belgrade, Serbia | ³Department of Neurosciences and Reproductive Sciences and Odontostomatology, University of Naples Federico II, Naples, Italy | ⁴Department of Urology, Ospedale San Paolo, ASL NA1, Naples, Centro, Italy | ⁵Urosante, Prague, Czech Republic | ⁶Department of Woman, Child and General and Specialized Surgery, Unit of Urology, University of Campania "Luigi Vanvitelli", Napoli, Italy | ⁷Casa di Cura Nostra Signora di Lourdes, Napoli, Italy

Correspondence: Antonio Ruffo (antonio.ruffo7@gmail.com)

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ABSTRACT

Objectives: Benign prostatic hyperplasia (BPH) with median-lobe enlargement (MLE) is a distinct and challenging clinical entity contributing to lower urinary tract symptoms (LUTS). Minimally invasive treatments, such as transperineal laser ablation (TPLA), offer potential advantages in treating this subgroup, but limited data exist regarding their outcomes. The aim of this study is to evaluate the efficacy and safety of EchoLaser TPLA of symptomatic BPH with MLE.

Methods: This study retrospectively evaluated 31 patients with symptomatic BPH and MLE who underwent EchoLaser TPLA at a private clinic. EchoLaser TPLA was performed with a proprietary 1064-nm continuous-wave diode laser. Baseline and 6-month follow-up assessments included International Prostate Symptom Score (IPSS), quality of life (QoL), prostate volume (PV), postvoid residual (PVR), peak urinary flow rate ($Q_{\max}$), and International Index of Erectile Function (IIEF-15). Safety outcomes were categorized using the Clavien–Dindo classification system.

Results: EchoLaser TPLA significantly improved IPSS (median 22 to 6.5; $p < 0.001$), QoL (median 5 to 1; $p < 0.001$), PV (median 105 mL to 43 mL; $p < 0.001$), PVR (median 120 mL to 23.5 mL; $p < 0.001$), and $Q_{\max}$ (median 7.6 mL/s to 15.95 mL/s; $p < 0.001$) at 6 months. IIEF-15 scores remained stable, indicating preservation of erectile function. No intraoperative adverse events occurred; two mild periprocedural events (urinary tract infection, hematuria) were successfully managed conservatively. Nine of 10 catheter-dependent patients resumed normal voiding.

Conclusion: EchoLaser TPLA is an effective and safe minimally invasive treatment for BPH with MLE, offering significant symptomatic relief, functional improvement, and a favorable safety profile while preserving sexual function. These findings position EchoLaser TPLA as a promising alternative to conventional treatments for this challenging patient subgroup.

1 | Introduction

Benign prostatic hyperplasia (BPH) is one of the most prevalent conditions affecting aging men and is a major contributor to lower urinary tract symptoms (LUTS). Common manifestations of LUTS include a weak urinary stream, incomplete bladder

emptying, increased frequency of urination, and nocturia [1]. These symptoms not only diminish the quality of life but also have a significant economic and societal impact. The prevalence of BPH and its associated LUTS increases with age, making it a growing concern in healthcare systems worldwide, especially in

the context of aging populations. It is estimated that up to 50% of men in their 50s and 90% of men in their 80s exhibit histological evidence of BPH. Of these, a substantial proportion develop clinically significant symptoms requiring medical attention. The progressive nature of BPH-related LUTS, combined with the aging demographic trends, underscores the importance of effective and sustainable management strategies for this condition.

Management of BPH typically begins with pharmacological therapy. Guidelines recommend the use of alpha-blockers, 5-alpha reductase inhibitors (5-ARIs), or tadalafil, a phosphodiesterase 5 inhibitor [2, 3]. While these medications are effective for many patients, they are not without limitations. Some patients fail to achieve adequate symptom control, while others discontinue treatment due to bothersome side effects, such as orthostatic hypotension with alpha-blockers, sexual dysfunction with 5-ARIs, or gastrointestinal discomfort with tadalafil. In such cases, escalation to surgical or procedural interventions becomes necessary. For decades, transurethral resection of the prostate (TURP) has been considered the gold standard surgical treatment for symptomatic BPH. TURP involves the resection of prostatic tissue to relieve bladder outlet obstruction, leading to significant improvements in urinary symptoms and flow rates. However, the invasive nature of the procedure is associated with risks, including bleeding, urinary incontinence, and sexual dysfunction, particularly retrograde ejaculation. These complications can significantly affect patient satisfaction and quality of life, prompting the search for alternative treatment modalities.

Laser enucleation of the prostate using the Ho:YAG laser (HoLEP) is one of the primary choices for men with moderate-to-severe LUTS, recommended in the EAU guidelines as an alternative to TURP or open prostatectomy, including in patients with prostate volume > 80 mL [3]. As originally developed, this technique employs three longitudinal incisions, with removal of the median lobe and subsequent enucleation of both lateral lobes [4]. In a recent meta-analysis that evaluated the efficacy and safety of HoLEP in randomized trials vs other surgical techniques (bipolar TURP [B-TURP], bipolar transurethral enucleation of the prostate [BPEP] or Thulium laser enucleation of the prostate [ThuLEP]), HoLEP was found to have clinical advantages when used in men with prostate volume > 80 mL. These included significant improvements in Q_{max} , PSA and quality of life vs B-TURP, and significantly improved Q_{max} versus ThuLEP at 6-month follow-up [5].

In recent years, a variety of minimally invasive treatments have been developed to address the limitations of conventional surgical approaches. These include water vapor thermal therapy (Rezūm), robotic waterjet treatment (Aquablation), prostatic urethral lift (UroLift), and transperineal laser ablation (TPLA) [6]. Each of these techniques has distinct mechanisms and advantages. Rezūm delivers water vapor to the prostate tissue, inducing thermal necrosis. Aquablation uses high-pressure water jets under robotic guidance to precisely ablate prostatic tissue. UroLift employs small implants to mechanically retract the prostatic lobes, thereby widening the urethral lumen without tissue removal. Among these, EchoLaser TPLA is particularly notable for its organ-sparing approach. This technique

uses fine laser fibers inserted via transperineal needles, avoiding the need for urethral access. By delivering laser energy directly to the prostatic tissue, EchoLaser TPLA minimizes damage to surrounding structures, leading to a low risk of complications and preservation of sexual function. Recent studies, including two randomized trials comparing EchoLaser TPLA with TURP [7, 8], have demonstrated its efficacy and safety. Notably, Patelli et al. reported durable symptom relief and a favorable safety profile with TPLA at a median follow-up of 57 months, reinforcing its potential as a long-term treatment option [9]. In the 2026 update of the EAU guidelines on non-neurogenic male LUTS, TPLA has been included among alternative ablative techniques for benign prostatic obstruction [3].

A specific subset of BPH patients presents with median-lobe enlargement (MLE), which is observed in approximately 25%–33% of cases. Median-lobe hypertrophy often extends intravesically, where it acts as a ball-valve mechanism that exacerbates bladder outlet obstruction during voiding. This anatomical variation is associated with increased detrusor pressure, incomplete bladder emptying, and heightened LUTS severity. Management of BPH with MLE poses unique challenges. Conventional therapies, including TURP and minimally invasive techniques such as Rezūm and UroLift, may have limited applicability or effectiveness in these patients due to their specific anatomical considerations. Although TPLA's transperineal approach theoretically makes it well-suited for treating median-lobe BPH, limited data are available on its outcomes in this subgroup [10–12], leaving a gap in evidence regarding the technique's safety and efficacy in this population. The present study aimed to evaluate the clinical outcomes and safety of EchoLaser TPLA in a cohort of 31 patients with symptomatic BPH and MLE. By focusing on this distinct subgroup, the study seeks to provide valuable insights into the applicability of EchoLaser TPLA for addressing the anatomical and functional challenges posed by median-lobe hypertrophy.

2 | Materials and Methods

The reporting of this study conforms to the Strengthening the Reporting of Observation Studies in Epidemiology (STROBE) statement. Written informed consent was obtained from all patients. The patients that were included in this retrospective analysis had undergone routine treatment in a private clinic. Retrospective ethics approval was obtained from the local ethics committee for this study (Approval number 69/2025). The treatment period spanned from June 2023 to December 2023, during which all patients underwent thorough preoperative and postoperative assessments to ensure the safety and efficacy of the intervention. Patients were eligible for inclusion if they met the following criteria: male patient aged ≥ 45 years with a clinical diagnosis of symptomatic BPH; MLE confirmed through imaging, failure of or intolerance to medical therapy (alpha-blockers, 5-ARIs, or tadalafil) for at least 6 months. Exclusion criteria included: prostate cancer or high suspicion of malignancy; active urinary tract infection at baseline or positive urine culture; previous surgical or minimally invasive treatment for BPH; significant comorbidities such as uncontrolled diabetes, cardiovascular disease precluding local or general anesthesia, bleeding disorders; neurogenic bladder or other

non-BPH-related causes of LUTS. All patients underwent a comprehensive preoperative evaluation including urinalysis, urine culture and, when clinically indicated, urodynamic studies to rule out chronic prostatitis, neurogenic bladder or other conditions that could mimic BPH-related LUTS. Clinical success was defined as an IPSS score < 7 at 6-month follow-up, indicating mild or no symptoms.

Prior to undergoing treatment, patients underwent a urine test and urine culture. Preoperative antibiotic prophylaxis consisted of cefotaxime 2 g administered intravenously.

EchoLaser TPLA procedures were performed using a EchoLaser EVO device, which consists of a continuous wave multi-source (four-channels) laser system with a wavelength of 1064 nm in conjunction with an EchoLaser Smart Interface, which is a simulation device for safer insertion of 21 G introducer needles (Introducer; Elesta SpA, Calenzano, Italy), and optical fibers (Fibre Optic for PLA; Elesta SpA) into the prostatic tissue under ultrasound guidance. The planning of the procedure was carried out under ultrasound guidance. Baseline prostate volume was measured by transrectal ultrasound (TRUS) using the ellipsoid formula ($\text{length} \times \text{width} \times \text{height} \times 0.52$); the same formula was applied at 6-month follow-up using transabdominal ultrasound. EchoLaser TPLA was performed under conscious sedation and with local anesthesia of the perineal region and periprostatic anesthesia using lidocaine. One or two 21 G introducer needles for each lobe were inserted transperineally in the adenoma and placed on planes as parallel as possible to the longitudinal plane of the prostate. Subsequently, one bare flat-tip optical laser fiber per needle was introduced. At least one fiber per lateral lobe was placed, inserting the second fiber, according to our experience, in prostates larger than 45 mL, with a minimum distance of 10–15 mm from each other. Fibers were illuminated simultaneously. If a median lobe was present, another needle was placed for its ablation (Figure 1). EchoLaser TPLA was performed according to a standard protocol, which consists of delivering 1800 J energy per illumination and per fiber at a power of 5 W. When the prostatic tissue was mainly orientated in a longitudinal direction, the pull-back of the fibers allowed the ablation of the

distal half of the gland. A three-way catheter was always placed, allowing continuous saline irrigation of the urethra and bladder during the entire procedure. At the end of the procedure the Dufour catheter was replaced with a CH 16 Foley catheter.

Patients were discharged on the same day as the procedure, with an indwelling transurethral catheter that was kept in place for at least 5 days and then removed after a successful voiding trial. Postoperative medical therapy consisted of: (1) ceftriaxone 1 g/day for 7 days; (2) prednisone 25 mg/day for 7 days, then 12.5 mg/day for 7 days, then 12.5 mg every other day for 6 days; (3) tamsulosin 0.4 mg/day for 3 months, taken in the evening; and (4) dutasteride 0.5 mg/day for 3 months, taken in the morning. In patients with diabetes, prednisone was replaced by deflazacort 30 mg/day, using the same duration and frequency of dosing.

At baseline and 6-month follow-up, patients were asked to complete questionnaires for the International Prostate Symptom Score (IPSS), consisting of seven questions related to symptoms and one question on quality of life (QoL) [13] and the International Index of Erectile Function (IIEF-15) [14]. At the same timepoints, prostate volume (PV), postvoid residual (PVR) and peak urinary flow rate ($Q_{\max}$) were also measured. Adverse events were categorized according to the Clavien–Dindo system.

Statistical analysis was performed using SPSS version 28.0 (IBM, Armonk, NY). Quantitative variables were expressed as mean $\pm$ standard deviation (SD) or median and interquartile range (IQR); categorical variables were reported as frequencies. Clinical variables at 6-month follow-up were compared with corresponding baseline values using a one-way analysis of variance (ANOVA). Bonferroni correction for multiple comparisons was also performed. A p -value < 0.05 was deemed to be statistically significant.

3 | Results

Between June 2023 and December 2023, 31 patients with symptomatic BPH and median-lobe enlargement underwent

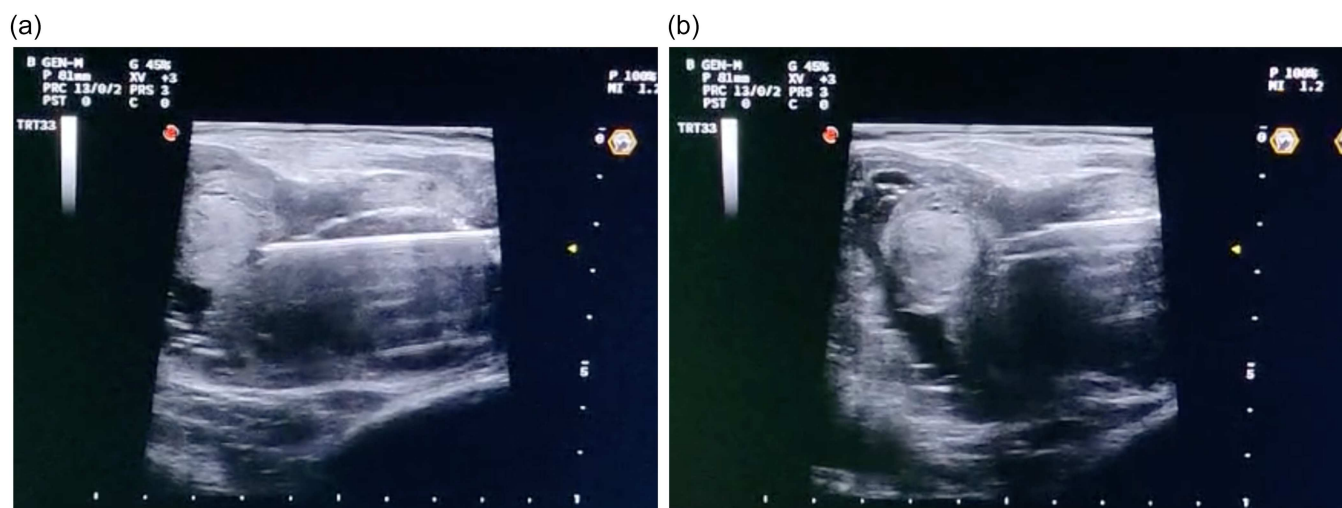


FIGURE 1 | Transrectal ultrasound images showing (a) insertion of the introducer needle in the median lobe; (b) insertion of two introducer needles in lateral lobes.

EchoLaser TPLA. All procedures were performed by the same operator (A.R.) and at the same clinic. Baseline patient characteristics and perioperative data are reported in Table 1. All patients had previously received medical therapy for BPH: 21 (67.7%) were on alpha-blocker monotherapy and 10 (32.3%) on combination therapy with an alpha-blocker and a 5-ARI. Clinical outcomes are shown in Table 2. At 6 months, IPSS and QoL were significantly reduced compared with preoperative values. Specifically, median IPSS was reduced from 22 (IQR: 18–25) to 6.5 (IQR: 4–8) (median [IQR] reduction: 14.5 [10–18]) and median QoL was reduced from 5 (IQR: 4–5) to 1 (IQR: 1–2) (median [IQR] reduction: 3 [2–4]). Similarly, PV and PVR were significantly reduced at 6 months: 105 mL (IQR: 84, 140 mL) versus 43 mL (IQR: 38–65 mL; median [IQR] reduction: 60 [43–69]) and 120 mL (IQR: 82–170 mL) versus 23.5 mL (IQR: 16–32 mL; median [IQR] reduction: 102 [59–152]), respectively. Median $Q_{\max}$ was increased from a preoperative value of 7.6 mL/s (IQR: 5.6–7.8) mL/s to 15.95 mL/s (IQR: 13–18.2 mL/s) at 6 months (median [IQR] increase: 9.85 [6.5–15.8]). Erectile function was similar at baseline (median IIEF-15 49.5 [IQR: 36–58]) and 6 months (54 [IQR: 37–63]; $p = 0.58$); median [IQR] increase: 4 [0–7]). One patient, who was a catheter carrier prior to EchoLaser TPLA, was sent to TURP after 4 months due to the impossibility to remove the catheter. The patient had a history of colorectal adenocarcinoma treated with surgery and radiotherapy, and penile cancer treated with partial penectomy. PSA was significantly reduced at 6 months after EchoLaser TPLA (1.85 [IQR: 1.2–3.8] ng/mL vs. 3.6 [IQR: 2.1–6.35] ng/mL; $p = 0.006$; median [IQR] reduction: 1.67 [0.6–2.8] ng/mL).

Figure 2 illustrates the anatomical effect of EchoLaser TPLA at 6 months in a 62-year-old patient with an initial prostate volume of 171 mL. At 6 month-follow-up, prostate volume was reduced by 52.4% to 81.3 mL. Figure 3 shows ultrasound images and uroflowmetry results at baseline and 6 months after EchoLaser TPLA for a representative 62-year-old patient with MLE.

Prostate and uroflowmetry data were as follows: prostate volume: baseline, 69.2 mL; 6 months, 22.1 mL (a 68.1% reduction); $Q_{\max}$: baseline, 6.4 mL/s; 6 months, 13.7 mL/s; voided volume: baseline, 216.7 mL; 6 months, 117.8 mL; flow time: baseline, 76.7 s; 6 months, 17.7 s; Q_{ave} : baseline, 2.8 mL/s; 6 months, 6.7 mL/s; time to $Q_{\max}$: baseline, 9.9 s; 6 months, 13.5 s.

There were no intraoperative adverse events; perioperative adverse events consisted of one case of urinary tract infection that resolved with antibiotic therapy (Clavien–Dindo grade I; 3.2% of patients) and one case of hematuria that resolved after conservative treatment (Clavien–Dindo grade I; 3.2% of patients). All patients were taken off BPH medications at 3 months post-TPLA.

4 | Discussion

BPH with MLE represents a particularly challenging clinical scenario due to its impact on LUTS and its anatomical complexities. Despite being a common occurrence, with an estimated prevalence of MLE in approximately one-quarter to one-third of BPH patients, this subgroup has been underrepresented in studies of minimally invasive surgical therapies. Previous studies examining EchoLaser TPLA have either excluded MLE patients or included them in insufficient numbers, limiting the generalizability of findings to this specific cohort. For example, Frego et al. included only five MLE patients out of 22 in their analysis [11], while van Kollenburg et al. and de Rienzo et al. had just three and one MLE patients, respectively, in their study populations [10, 12]. Importantly, these studies did not report outcomes specific to the MLE subgroup, making it difficult to draw conclusions about the efficacy and safety of EchoLaser TPLA in this population. Other studies on EchoLaser TPLA, such as those by Patelli et al. and Pacella et al., also included MLE patients but did not provide detailed data on their

TABLE 1 | Baseline patient characteristics and perioperative data.

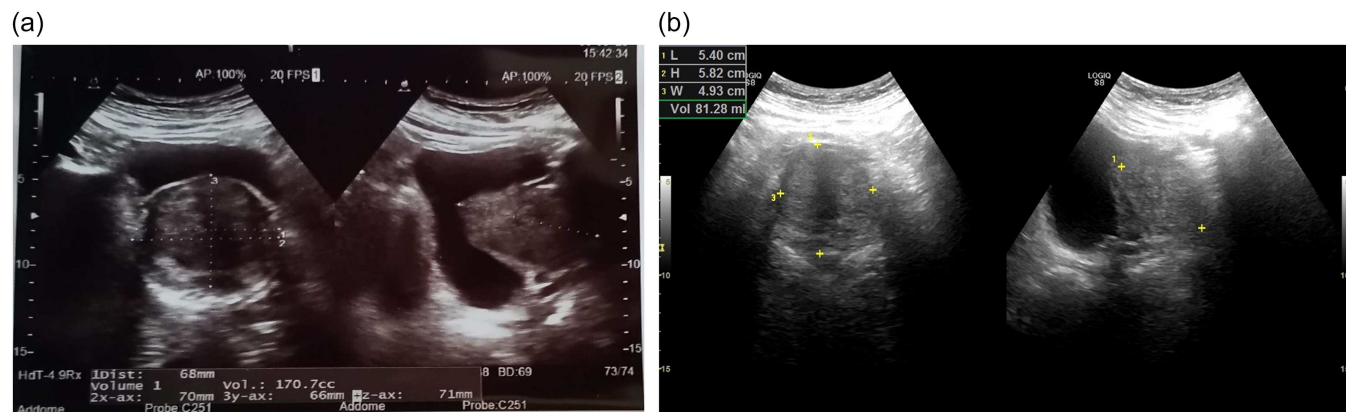
Variable	
Patient characteristics	
Age (years); median [IQR]	67 [64–73]
Prostate volume (mL); median [IQR]	105 [84–140]
PVR (mL); median [IQR]	120 [82–170]
Indwelling catheter; n (%)	10 (32.3%)
Alpha-blocker therapy; n (%)	21 (67.7%)
Alpha-blocker therapy + 5-ARI therapy; n (%)	10 (32.3%)
Perioperative data	
Total energy delivered (J); mean $\pm$ SD	13,798.4 $\pm$ 4852.3
Number of fibers used; mean $\pm$ SD	4 $\pm$ 0
Total procedure time (min); mean $\pm$ SD	36.2 $\pm$ 8.2
Laser time (min); mean $\pm$ SD	11.5 $\pm$ 4.0
Postoperative catheter time (days); mean $\pm$ SD	
Overall	8.1 $\pm$ 3.9
With catheter before TPLA	10.9 $\pm$ 5.1
Without catheter before TPLA	7.0 $\pm$ 2.5

Abbreviations: 5-ARI, 5 α -reductase inhibitor; IQR, interquartile range; PVR, postvoid residual; SD, standard deviation; TPLA, transperineal laser ablation.

TABLE 2 | Clinical outcomes.

Variable	Baseline	6 months	<i>p</i> value (one-way ANOVA)	Change vs. baseline
IPSS, median [IQR]	22 [18–25]	6.5 [4–8]	< 0.0001	–14.5 [10–18]
QoL, median [IQR]	5 [4–5]	1 [1–2]	< 0.0001	–3 [2–4]
IIIEF-15, median [IQR]	49.5 [36–58]	54 [37–63]	0.5832	+4 [0–7]
PV (mL), median [IQR]	105 [84–140]	43 [38–65]	< 0.0001	–60 [43–69]
PVR (mL), median [IQR]	120 [82–170]	23.5 [16–32]	< 0.0001	–102 [59–152]
$Q_{\max}$ (mL/s), median [IQR]	7.6 [5.6–7.8]	16.0 [13–18.2]	< 0.0001	+9.85 [6.5–15.8]
PSA (ng/mL), median [IQR]	3.6 [2.1–6.4]	1.9 [1.2–3.8]	0.006	–1.67 [0.6–2.8]

Abbreviations: ANOVA, analysis of variance; IIIEF-15, International Index of Erectile Function; IPSS, International Prostate Symptom Score; IQR, interquartile range; PSA, prostate specific antigen; PV, prostate volume; PVR, postvoid residual; $Q_{\max}$, peak urinary flow rate; QoL, quality of life.

**FIGURE 2** | (a) Prostate volume before the TPLA. (b) Prostate volume 6 months after TPLA. TPLA, transperineal laser ablation.

outcomes [15, 16]. In this context, the present study represents a significant contribution to the field, as it focuses exclusively on MLE patients and provides detailed analysis of their clinical outcomes. The cohort in this study had a median prostate volume of 105 mL (range: 84–140 mL), categorizing these patients as having “large prostates” according to the definitions published by the American Urological Association [17]. All patients had persistent LUTS despite at least 6 months of medical therapy and alternative causes of LUTS were systematically excluded, ensuring that the study population reflects real-world candidates for procedural intervention. This finding underscores the challenges associated with treating such patients, as larger prostate size and MLE are often associated with more severe LUTS and technical difficulties during treatment.

This study demonstrated significant improvements in functional outcomes, as evidenced by reductions in IPSS and improvements in $Q_{\max}$ and PVR. Specifically, median IPSS decreased from 22 (IQR: 18, 25) to 6.5 (IQR: 4, 8), and median QoL improved from 5 (IQR: 4, 5) to 1 (IQR: 1–2). These findings indicate a substantial alleviation of bothersome urinary symptoms and an enhanced quality of life. Objective measures of urinary function and prostate size corroborated these patient-reported improvements. Median PV was reduced from 105 mL (IQR: 84–140) to 43 mL (IQR: 38–65), while median PVR decreased from 120 mL (IQR: 82–170) to 23.5 mL (IQR: 16–32). $Q_{\max}$, a key indicator of urinary flow, increased markedly from 7.6 mL/s (IQR: 5.6–7.8) to 15.95 mL/s (IQR: 13–18.2). These changes align with the expected physiological outcomes of

EchoLaser TPLA, which targets and ablates hyperplastic tissue to reduce obstruction and improve bladder emptying. Erectile function, as assessed by the IIIEF-15, remained stable between baseline and follow-up (median score of 49.5 [IQR: 36–58] vs. 54 [IQR: 37–63]; $p = 0.58$). This finding highlights the organ-sparing nature of EchoLaser TPLA, which avoids damage to the neurovascular structures critical for erectile function. The safety profile of EchoLaser TPLA in this study was favorable, with no intraoperative adverse events reported. Periprocedural adverse events were limited to two mild cases: one urinary tract infection (3.2%) resolved with antibiotics and one instance of hematuria (3.2%) managed conservatively. These findings align with the literature, where EchoLaser TPLA is associated with a low complication rate, further supporting its role as a minimally invasive and well-tolerated therapy for BPH.

Notably, among the 10 patients who were catheter-dependent prior to EchoLaser TPLA, nine were successfully decatheterized and maintained normal voiding function at 6 months. Only one patient required subsequent TURP. This patient underwent TURP 4 months after EchoLaser TPLA due to persistent obstruction and inadequate symptom relief. The low conversion rate to TURP underscores the efficacy of EchoLaser TPLA in resolving severe urinary retention and restoring voiding function in this challenging subset of patients.

The reductions in IPSS, PV, and PVR observed in this study are comparable to those reported in other minimally invasive surgical therapies, including Rezūm and UroLift, both of which

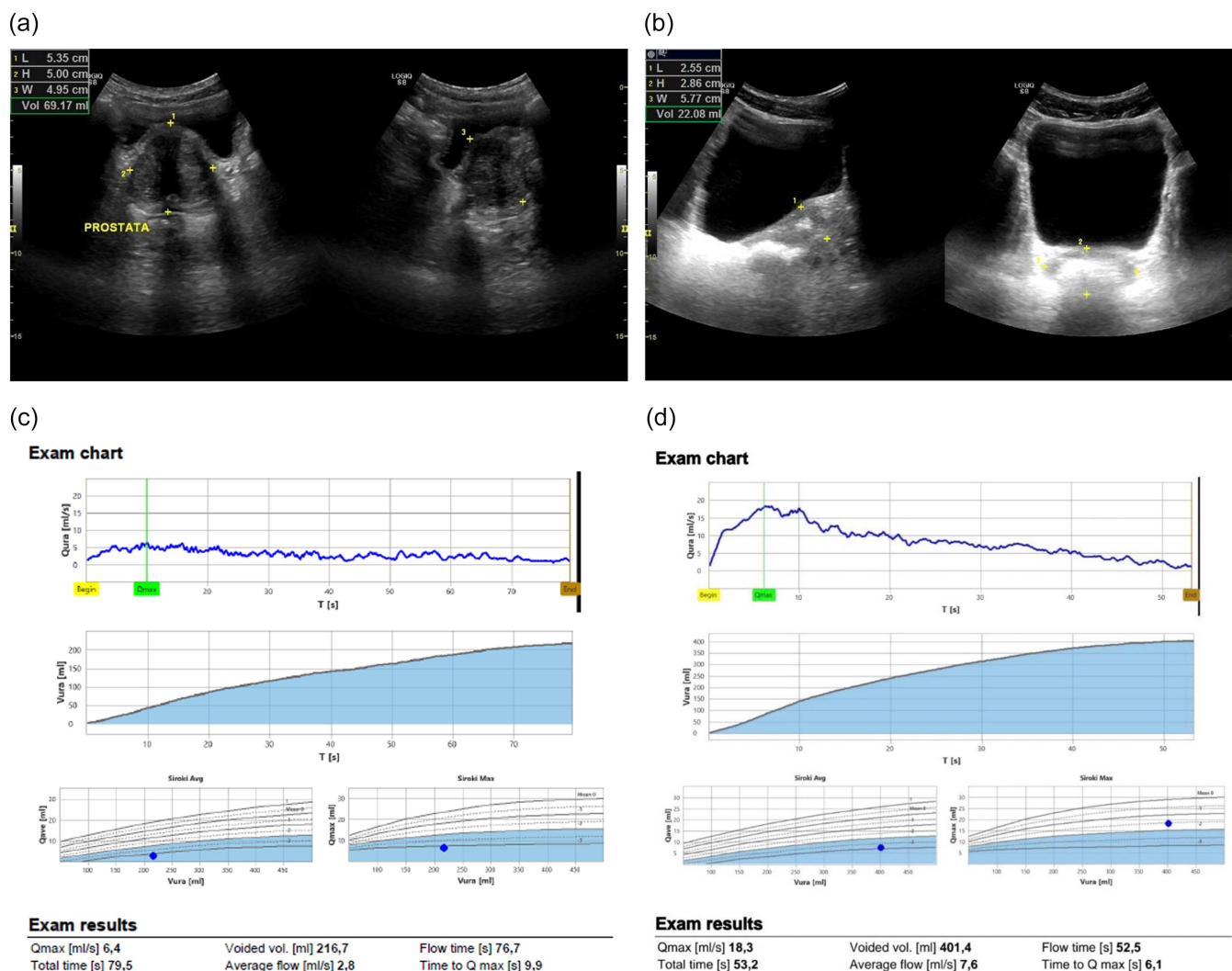


FIGURE 3 | Clinical outcomes at 6 months after TPLA in a 62-year-old patient with median-lobe enlargement. (a) coronal (left) and sagittal (right) ultrasound images at baseline; (b) sagittal (left) and coronal (right) ultrasound images at 6 months; (c) uroflowmetry results at baseline; (d) uroflowmetry results at 6 months. TPLA, transperineal laser ablation.

have demonstrated efficacy in addressing LUTS in patients with MLE. McVary et al. conducted a multicenter, randomized controlled trial evaluating the efficacy of convective water vapor thermal therapy (CWVT) in treating BPH-related LUTS, including patients with median-lobe obstruction [18]. The study showed a mean IPSS reduction of 11.2 ± 7.6 at 3 months, with improvements sustained through 12 months. This aligns with our findings, where the median IPSS decreased from 22 to 6.5 at 6 months, reflecting a significant and durable symptom reduction. $Q_{\max}$ increased by 6.2 mL/s in the Rezūm cohort, comparable to the median increase of 9.85 mL/s observed in our study. The degree of prostate volume reduction in our cohort (median 105 mL to 43 mL; median percent reduction 52%) deserves specific comment. While the magnitude of shrinkage is at the upper end of the range reported for nonresective thermal ablation procedures (typically 21%–45% in the literature), it directly reflects the volume of tissue ablated [9]. In all patients, four laser fibers were used, and a pull-back technique was employed in the majority of cases to create large, confluent zones of coagulative necrosis extending along the longitudinal axis of the prostate. Subsequent reabsorption of the devitalized

tissue leads to cavity formation and significant volume reduction, a process that has been well characterized histologically and radiologically [19]. Thus, the observed shrinkage is consistent with the intentional ablation of a substantial proportion of the adenoma, particularly given the large baseline volumes and the presence of a median lobe in every patient. Unlike Rezūm, which utilizes transurethral water vapor injections, EchoLaser TPLA avoids urethral instrumentation entirely, offering a distinct advantage in minimizing post-procedural irritative symptoms. Furthermore, while Rezūm was reported to cause no de novo erectile dysfunction, McVary et al. highlighted transient irritative symptoms and catheterization durations [18], which can burden recovery. In contrast, TPLA in our cohort showed no new cases of erectile dysfunction and required TURP in only one patient among 10 preoperatively catheterized, reflecting its ability to resolve obstruction with minimal morbidity. Rukstalis et al. evaluated the UroLift system in MLE patients through the MedLift study, observing a mean IPSS improvement of at least 13.5 points at all follow-ups [20], comparable to the reductions observed in our study. The significant improvements in QoL and flow rates reported in the

UroLift cohort further validate its efficacy in treating MLE-associated LUTS. However, limitations of the UroLift procedure in patients with larger prostates (> 100 mL) and pronounced median-lobe obstruction have been noted; indeed, the EAU guidelines recommend strongly that prostatic urethral lift should be restricted to patients with LUTs who are interested in preserving ejaculatory function, have a prostate volume < 70 mL, and do not have a median lobe [3]. In our cohort, with a median prostate volume of 105 mL, EchoLaser TPLA demonstrated efficacy in a population that might be less suited for UroLift. EchoLaser TPLA's ability to target larger prostate volumes and offer significant reductions in PV highlights its utility in this subgroup. As with UroLift, which preserves sexual function, our findings similarly showed stable erectile function post-TPLA, confirming the organ-sparing nature of the procedure.

Clinical evidence supports EchoLaser TPLA as a safe and effective minimally invasive treatment for BPH, with sustained improvements in urinary symptoms and flow parameters, along with preservation of sexual function [21]. Comparative data from randomized trials of TPLA versus TURP show that, while TURP provides greater immediate functional improvement, TPLA offers a more favorable safety profile and better preservation of ejaculatory function, with a similar improvement in terms of symptomatology [7, 8]. Similarly, a randomized trial of TPLA versus CWVT showed that both techniques provided significant improvements in urinary symptoms and flow parameters, with comparable functional outcomes at short-term follow-up. However, TPLA produced a faster improvement in patient-reported outcomes, particularly quality of life, while having a similar safety profile [22]. This study also showed that erectile function remained stable in both groups at 6 months, with a numerically greater improvement in ejaculatory function from baseline in the TPLA group versus CWVT (+ 51% vs. +33%) [23].

Our study has several notable strengths. To the best of our knowledge, it is the first study of EchoLaser TPLA that focuses specifically on a cohort of MLE patients. By providing detailed analyses of functional outcomes, quality of life, and erectile function, this study fills an important gap in the existing literature. Furthermore, the use of validated instruments such as the IPSS and International Index of Erectile Function (IIEF-15) enhances the reliability of the findings. However, the study is not without limitations. The single-center, retrospective design and the absence of a control group limit the strength of our findings relative to established surgical or minimally invasive treatments. Beyond the limited sample size, which may constrain the generalizability of our findings, the 6-month follow-up period—while sufficient to assess the resolution of coagulative necrosis and early clinical outcomes—does not capture longer-term efficacy and durability. Furthermore, intravesical prostatic protrusion (IPP), a key anatomical marker of the ball-valve effect in patients with MLE, was not systematically assessed in this retrospective series; consequently, we are unable to report objective changes in the intravesical component of the median lobe following TPLA. Future prospective studies with larger sample sizes, extended follow-up (including 12-month or longer data), standardized IPP measurements and a comparative design against established treatments

(e.g., TURP) are needed to validate these findings and more fully characterize the anatomical and clinical outcomes of TPLA in this patient subgroup.

5 | Conclusion

This study provides compelling evidence for the efficacy and safety of EchoLaser TPLA in patients with symptomatic BPH and MLE. The significant improvements in functional and patient-reported outcomes, combined with the low rate of adverse events, underscore the potential of EchoLaser TPLA as a minimally invasive alternative to traditional surgical approaches. By focusing on a cohort of MLE patients, this study addresses a critical gap in the literature and establishes a foundation for future research. Larger studies with longer follow-up periods are needed to confirm these findings and further refine the role of EchoLaser TPLA in the management of BPH with MLE. In the meantime, the results of this study suggest that EchoLaser TPLA should be considered a valuable option in the armamentarium of treatments for this challenging condition.

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The authors have nothing to report.

Ethics Statement

The patients that were included in this retrospective analysis had undergone routine treatment in a private clinic. Retrospective ethics approval was obtained from the local ethics committee for this study (Approval number 69/2025).

Consent

Written informed consent for participation in the study was obtained from all participants. Written informed consent for publication of the images included in this manuscript was obtained.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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