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Holmium Laser Prostatectomy for Primary Bladder Neck Obstruction (PBNO): Comparative Efficacy and Safety Outcomes versus Benign Prostatic Hyperplasia (BPH)

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Abstract

Introduction: Holmium laser prostatectomy (HoLEP) is widely used for benign prostatic hyperplasia (BPH), though primary bladder neck obstruction (PBNO) is less commonly recognized despite similar symptoms. Treatment outcomes can vary, especially when diagnosis is delayed, but the condition is sometimes not very different from BPH. The purpose of this study was to compare PBNO patients with those undergoing surgery for BPH, even though PBNO is not always treated surgically.

Methods: A total of 79 men from three hospitals in Jordan (PBNO = 30, BPH = 49) were reviewed retrospectively. They all received HoLEP regardless of individual suitability or prior diagnostic clarity. Data were collected through symptom scoring (IPSS, OABSS), but not all patients completed the follow-ups equally.

Results: While patients with PBNO showed symptom improvement after surgery, the improvements were not always significant or clearly linked to the procedure itself. Interestingly, PBNO patients had shorter surgeries (27.2 vs. 60.5 minutes, $P<0.01$), though it is unclear whether that impacted recovery. Despite reporting fewer complications, their satisfaction was lower (64.3% vs. 93.8%, $P=0.09$), perhaps due to reasons not directly assessed in the study. Repeated Measures ANOVA revealed a statistically significant improvement in IPSS scores over time in both groups: PBNO ($F(2.1, 58.4)=16.8$, $P<0.001$) and BPH ($F(2.4, 116.8)=21.3$, $P<0.001$). Similarly, OABSS scores showed a significant improvement over time for both PBNO ($F(2.6, 74.0)=8.9$, $P<0.001$) and BPH ($F(2.8, 134.2)=9.7$, $P<0.001$).

Conclusion: HoLEP appears effective for PBNO, though it may not be the most suitable approach in all cases. Since PBNO differs from BPH, further studies might be needed, or perhaps not, depending on patient variability.

Keywords: Primary bladder neck obstruction; Urodynamics; Benign prostatic hyperplasia; Prostatectomy; Holmium laser; Unclear outcomes.

Introduction

Benign prostatic hyperplasia (BPH) is known to be the most common reason for lower urinary tract symptoms (LUTS) in older men,[1] but not always the only one. Urinary frequency, urgency, and difficulty starting urination are usually reported, though some patients say they also feel pain, which complicates things. Although people often assume it is BPH, other conditions actually cause similar symptoms.

PBNO, or primary bladder neck obstruction, is one of those causes, but it is not talked about as much and many do not consider it right away. It happens without prostate enlargement, but it still gives similar troubles to patients trying to urinate. The condition is tricky because its symptoms imitate BPH and some others like overactive bladder or even urethral issues.[1-3]

Historically, the gold standard to confirm PBNO has been videourodynamic studies (VUDS), which give insights into what happens when someone is trying to urinate. However, the equipment is not always available,

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and some doctors do not use it due to radiation or cost problems.[4-6] Therefore, diagnosis is sometimes made without it, or with cystoscopy, which we have been using more frequently since 2022.

Actually, the literature about PBNO is not enough. There are very few solid studies explaining how it happens or what to expect when treating it.[5,6] People still get it misdiagnosed a lot, ending up with BPH surgeries or meds that might not help at all.

Alpha-blockers are usually prescribed first because they reduce pressure and help urine flow, yet that doesn't always work, especially if the case is already severe.[1,6] In such cases, surgical options like transurethral incision of the bladder neck (TUIBN) are considered, although it has its own problems such as bleeding or retrograde ejaculation.[6–12]

We started using holmium laser prostatectomy (HoLEP) for PBNO, even though it is originally used for BPH. It is precise and clean, and since patients with BPH respond well to HoLEP, we hypothesized that it might also be effective for PBNO. However, there is limited literature on its use for PBNO.

Symptoms in PBNO vary, and many patients show both voiding and storage issues — like straining, urgency, or even pelvic pressure, which may not always fit the textbook definitions.[7] That is why diagnosis gets even harder, and in a clinical setting, where BPH is usually assumed first, PBNO tends to be missed.

In this study, we aimed to assess how effective and safe HoLEP is for PBNO and to compare it to outcomes in BPH patients who underwent the same procedure. Hopefully, this will give better ideas to doctors who deal with LUTS and open up new directions for treating PBNO correctly.

Even if PBNO does not get the attention it should, recognizing it early can make a big difference. Misdiagnosis can lead to an incorrect treatment pathway, a frequently observed yet preventable occurrence.

Methods

Setting

This study took place across three private hospitals located in Jordan, which are known mostly for their expertise in urology. Each hospital is equipped with advanced technologies, including cystourethroscopy (a procedure where a scope is inserted into the bladder through the urethra to look for obstruction or abnormalities) and HoLEP, which was key for this research.

These hospitals were selected mostly because they already had the equipment and staff who regularly perform such surgeries, which saved time. All three facilities claim to have high clinical care standards and proper documentation systems, but still, it was not always clear how consistent the protocols were between them, which may have affected data collection a bit.

The hospitals' urology departments are staffed with trained surgeons and nurses. Coordination among them was helpful, though a bit informal at times, and allowed us to get records for comparison.

Design

We used a retrospective comparative study design. That means we looked backward at cases that had already happened between 2018 and 2023. The idea was to compare outcomes between two different diagnoses—PBNO and BPH—even though the surgeries were the same: HoLEP.

Since the same surgical method was used in both groups, this helped control for technique-based variability. However, the natural differences between PBNO and BPH may have introduced other differences we did not fully account for.

Sample

The study involved 79 male patients. Thirty (n = 30) of them had PBNO and forty-nine (n = 49) were diagnosed with BPH. All participants were aged 50 years and above and experienced moderate to severe LUTS.

As this was a retrospective study, the sample included all eligible patients who met the inclusion criteria between 2018 and 2023 across the three participating hospitals. Therefore, a priori sample size calculation was not conducted. However, based on a post-hoc power analysis using G*Power 3.1, assuming an effect size (Cohen's d) of 0.8 for the difference in operative duration (primary outcome), a power of 0.80, and an alpha of 0.05, the minimum required sample size was 52 patients (26 per group).

We excluded people who had prior genitourinary surgeries, cancers, urethral narrowing (urethral strictures), active urinary infections, interstitial cystitis, or neurological disorders affecting the bladder (neurogenic bladder).

Instruments

We used several tools to diagnose and assess the patient's condition. Cystourethroscopy was used to look directly at the bladder neck for signs of narrowing or abnormal movement. TRUS was used to estimate the prostate volume and view the bladder neck shape.

Patients filled out two symptom-based questionnaires: The International Prostate Symptom Score (IPSS) and the Overactive Bladder Symptom Score (OABSS), which helped us understand their subjective complaints.

We also recorded uroflowmetry (a test that measures the flow of urine), checked post-void residual urine volume using a bladder scan, tested blood for prostate-specific antigen, and performed urodynamic studies (UDS) to measure how well the bladder and urethra are storing and releasing urine. Not every patient had a urodynamic study due to resource availability.

In this study, PBNO was diagnosed without VUDS due to resource limitations. Instead, clinicians relied on cystourethroscopy, symptom profiles, and prostate volume under 40 mL to distinguish it from BPH. However, the distinction was not always precise, as detrusor function varied and some BPH cases showed borderline prostate enlargement. While this diagnostic approach deviates from the gold standard, it reflects real-world clinical practice in resource-limited settings and underscores the interpretive nature of PBNO diagnosis when structural clarity is lacking.

Surgical Procedure

Although bladder neck incision is often suggested for smaller prostates or PBNO, it was not performed in this study—not out of oversight, but more due to routine. Enucleation was used across all cases, regardless of gland size, including those under 40 mL. The choice leaned less on anatomy and more on consistency—something the teams were comfortable with and had likely streamlined in their practice. In smaller prostates, the procedure was less about lobar removal and more about easing resistance at the bladder neck, even if that was not always explicitly stated. Customization was not avoided intentionally; it just did not seem to override the value of familiarity and procedural flow.

All patients were placed in the lithotomy position (legs up and supported) under either spinal or general anesthesia, depending on the anesthetist's choice and patient condition. The holmium laser used was either VersaPulse® PowerSuite™ 100 W or Lumenis Pulse™ 120H. The energy settings were typically 80 W (2 J at 40 Hz).

We mostly used the three-lobe enucleation technique, which separates the lobes of the prostate from the capsule. First, the median lobe was removed with cuts at 5 o'clock and 7 o'clock positions near the bladder neck, extending towards the verumontanum (a landmark in the urethra). If the lateral lobes were harder to isolate, the resection started closer to the verumontanum and continued toward the bladder until only a thin bridge of tissue remained. Hemostasis (bleeding control) was done carefully. Morcellation (removing tissue pieces) was carried out using a 26-French nephroscope with the VersaCut™ morcellator. A 22-French three-way Foley catheter was inserted for continuous irrigation. Usually, it was removed the next day. Most patients were discharged within 24 hours after surgery.

Data Collection

Preoperative evaluations included detailed histories, physical examinations, and diagnostic tests mentioned earlier. The patients were briefed about the surgical risks and gave informed consent, although some forms were more detailed than others depending on the hospital.

Outcomes were recorded at multiple time points: pre-surgery (baseline), right after surgery, two weeks later, three months later, and at six months postoperatively. We collected data on surgical duration, catheterization time, hospital stay length, complications, symptomatic improvement, urinary flow rate changes, and overall patient satisfaction.

Even though we tried to standardize data collection across the hospitals, some inconsistencies in follow-up documentation were observed.

Data Analysis

Data were analyzed using IBM SPSS Statistics for Windows, Version 29.0 (IBM Corp., Armonk, NY, USA). We began with descriptive statistics to summarize such things as age, symptom scores, and other basic variables. Then, to balance the unequal group sizes and adjust for possible confounding, we used propensity score matching.

Paired t-tests were used to compare numerical variables like symptom scores and uroflowmetry results, and chi-square (χ^2) tests were used for categorical variables such as the presence or absence of complications. Repeated Measures ANOVA was used to evaluate within-group changes in IPSS and OABSS scores over time. A P value less than 0.05 was considered statistically significant.

Some results had borderline significance, but we included them because they were clinically relevant.

Results

Patient Demographics and Operative and Perioperative Outcomes

In total, 79 male participants were included—30 had PBNO, and the other 49 were diagnosed with BPH (Table 1). Most of the patients were in their late 60s, more or less. Specifically, the average age was about 67.4 years in the PBNO group with a standard deviation of ± 6.2, while the BPH group had a slightly older average of 69.5 years (± 6.9). However, this difference was not statistically significant ($P = 0.79$), indicating that age did not distinguish between the two conditions. Interestingly, even though symptoms felt similar at first, the prostate sizes were quite different. The average total prostate volume in PBNO patients was around 31.5 milliliters (± 9.0 mL), which is noticeably smaller compared to the BPH group, which had a mean volume of 64.8 mL (± 26.7 mL). This difference was statistically significant ($P < 0.01$), meaning it likely was not just by chance. As for symptoms, when looking at both the IPSS and the OABSS, the initial values were pretty close in both groups. It seems that despite the different causes, patients in both groups started out feeling similarly uncomfortable. There was not a significant difference in those scores at baseline (IPSS $P = 0.45$ and OABSS $P = 0.39$), which made comparing their post-treatment outcomes more valid.

When it comes to comorbidities, both groups had almost the same health background—there were not any

Table 1. Patient Demographics and Operative/Perioperative Outcomes

Characteristics	PBNO (n = 30)	BPH (n = 49)	*P* Value
Mean age (y)	67.4 (±6.2)	69.5 (±6.9)	0.79 (Non-significant)
Total prostate volume (mL)	31.5 (±9.0)	64.8 (±26.7)	<0.01 (Significant)
Baseline IPSS total	21.4 (±8.2)	20.1 (±7.1)	0.45 (Comparable)
Baseline OABSS total	6.9 (±3.8)	6.1 (±2.7)	0.39 (Comparable)
Diabetes mellitus (%)	20.0%	19.5%	0.44 (Non-significant)
Hypertension (%)	26.7%	28.6%	0.37 (Non-significant)
Cardiovascular disease (%)	6.7%	4.1%	0.21 (Non-significant)
Detrusor underactivity (%)	77.0%	59.0%	<0.01 (Significant)
PdetQmax (cmH2O)	42.5 (±14.2)	54.8 (±13.6)	<0.01 (Significant)
Bladder contractility index	72.1 (±18.4)	95.9 (±17.7)	<0.01 (Significant)
Operation duration (minutes)	27.2 (±8.9,)	60.5 (±30.8)	<0.01 (Significant)
Enucleation/resection time (min)	13.5 (±5.2)	37.2 (±16.9)	<0.01 (Significant)
Morcellation Time (min)	2.6 (±2.1)	12.5 (±9.1)	<0.01 (Significant)

Values are presented as mean (±SD) or %. Independent samples t-test was used for continuous variables; Chi-square test was used for categorical variables.

major differences worth noting. For instance, diabetes mellitus was seen in 20% of patients with PBNO, while 19.5% of those with BPH had it too ($P = 0.44$), so basically equal. Hypertension was reported in 26.7% of PBNO cases and in 28.6% of the BPH group ($P = 0.37$), which again does not really tell us much. Cardiovascular conditions were present in 6.7% of PBNO and 4.1% of BPH patients ($P = 0.21$), with no statistically significant difference between groups.

However, things got more interesting with the urodynamics. Preoperative UDS—used to test how well the bladder and urethra hold and release urine—showed that detrusor underactivity was clearly more common in PBNO (77.0%) than in BPH patients (59.0%), and that difference was actually significant ($P < 0.01$). That might explain why their bladder behavior was off compared to the BPH group. Also, PBNO patients had lower pressure during peak urinary flow (PdetQmax) and a weaker bladder contractility index—again, both statistically significant ($P < 0.01$). These numbers reflect that the bladder is not contracting as it should in PBNO cases, and not just because of obstruction.

From the surgical side, PBNO cases were quicker to deal with. The total average operation time was 27.2 minutes (±8.9) for PBNO, while BPH surgeries took a lot longer—about 60.5 minutes (±30.8), which was a big difference ($P < 0.01$). That makes sense, though, since PBNO patients had smaller prostates and did not need as much tissue removed. The resection/enucleation and morcellation steps were also faster in PBNO cases ($P < 0.01$), which again lines up with the smaller prostate volume and simpler anatomy in these patients.

Efficacy

After surgery, both groups showed better IPSS scores already at two weeks ($P < 0.01$), so symptoms definitely got better early, but for the OABSS, not much really changed at that point. The PBNO group had a p-value of 0.29, and the BPH group was 0.34—so no real improvement there yet (Table 2).

By three and six months after surgery, both groups showed solid improvements. The total IPSS, voiding subscores, OABSS, maximum urinary flow rate (Qmax), and post-void residual volumes all improved compared to before surgery ($P < 0.01$ for everything). Still, patients with PBNO did not improve as much on the voiding part of the IPSS. At three months, the difference was statistically significant ($P = 0.03$), and at six months, it was close but not quite ($P = 0.07$).

At the six-month mark, the PBNO group's total IPSS score was still higher (10.5 ± 7.5) than the BPH group (6.4 ± 5.1), also nearly significant ($P = 0.07$). However, when it came to OABSS, there was no meaningful difference between the two groups at that point.

Repeated measures ANOVA revealed a statistically significant improvement in IPSS scores over time in both groups: PBNO ($F(2.1, 58.4) = 16.8$, $P < 0.001$) and BPH ($F(2.4, 116.8) = 21.3$, $P < 0.001$). Similarly, OABSS scores showed a significant improvement over time for both PBNO ($F(2.6, 74.0) = 8.9$, $P < 0.001$) and BPH ($F(2.8, 134.2) = 9.7$, $P < 0.001$). These findings confirm a time-dependent reduction in urinary symptoms within both groups across all measured follow-up points.

More BPH patients reported being satisfied with the outcome—93.8% versus 64.3% for the PBNO group. Even though it looks like a big difference, it was not statistically significant ($P = 0.09$). The same pattern showed up in the overall response assessment, with 93.0% of BPH patients responding positively compared to 83.3% from PBNO, but again, no significant difference ($P = 0.55$) was observed. When asked about willingness to undergo the surgery again, 89.8% of BPH patients said yes, compared to just

Table 2. Postoperative Efficacy and Safety Outcomes

Outcome Measures	PBNO (n = 30)	BPH (n = 49)	*P* Value
IPSS improvement at 2 weeks	-11.6	-9.9	< 0.01 (Significant)
OABSS improvement at 2 weeks	-0.6	-0.7	0.01 (Non-significant)
IPSS improvement at 3 months	-9.1	-12.7	< 0.01 (Significant)
IPSS improvement at 6 months	-10.9	-13.7	< 0.01 (Significant)
OABSS improvement at 3 months	-1.5	-2.1	< 0.01 (Significant)
OABSS improvement at 6 months	-3.5	-2.8	< 0.01 (Significant)
IPSS voiding improvement at 3 months	-5.6	-10.3	0.03 (Significant)
IPSS voiding improvement at 6 months	-7.9	-10.7	0.07 (Non-significant)
Total IPSS at 6 months	10.5 (±7.5)	6.4 (±5.1)	0.07 (Non-significant)
IPSS over time		• PBNO: $F(2.1, 58.4) = 16.8$, $P < 0.001$ • BPH: $F(2.4, 116.8) = 21.3$, $P < 0.001$	
OABSS over time		• PBNO: $F(2.6, 74.0) = 8.9$, $P < 0.001$ • BPH: $F(2.8, 134.2) = 9.7$, $P < 0.001$	
Patient satisfaction (%)	64.3%	93.8%	0.09 (Non-significant)
Positive overall response assessment (%)	83.3%	93.0%	0.55 (Non-significant)
Willingness to undergo surgery again (%)	56.7%	89.8%	0.09 (Non-significant)
Recatheterization (%)	3.3%	0%	Non-significant
Blood transfusion (%)	0%	0%	Non-significant
Transurethral coagulation (%)	0%	0%	Non-significant
Bladder neck contracture (%)	0%	0%	Non-significant
Urethral stricture (%)	0%	0%	Non-significant

For continuous variables, independent samples t-tests were used to compare PBNO and BPH groups at each time point. Categorical variables were analyzed using Chi-square tests. Repeated Measures ANOVA was used to evaluate within-group changes in IPSS and OABSS scores over time.

56.7% of PBNO patients—close, but still not statistically significant ($P = 0.09$).

Safety

As for safety, the outcomes were good overall. One patient from the PBNO group needed recatheterization at the two-week follow-up (3.3%), and none in the BPH group needed it. No one in either group needed a blood transfusion or extra procedures like transurethral coagulation. Also, during the entire six-month follow-up, there were no cases of bladder neck contracture or urethral strictures. That shows HoLEP was a safe option in both groups.

Discussion

PBNO is a bit of a gray area in urology—the bladder neck does not open well during urination, which makes it hard for patients to empty their bladders properly, even though there is no clear structural blockage like in BPH or urethral narrowing.[1,6,7] The problem is that even though clinicians acknowledge PBNO, there still is not one agreed-upon way to define it. This makes it tricky to approach consistently in practice and research.[5,8,13]

Traditionally, diagnosis has leaned heavily on UDS, especially video-urodynamics, which help map out how the bladder and urethra behave during urination. These tests can show whether the bladder neck is resisting flow or if the bladder itself is struggling to contract properly.[13-16] Nitti et al tried to simplify things by splitting PBNO into three patterns—some people generate a lot of pressure but still have weak flow, others show narrowing without much pressure buildup, and a few have delayed opening at the bladder neck.[4] This functional classification makes sense, but it has not made its way into widespread practice yet.[13-18]

Even where video-urodynamics would be ideal, they are not always realistic. Cost, equipment, and radiation exposure are all barriers, especially outside of academic or specialized settings.[17-20] That is why some researchers started looking into MR-based voiding studies—which avoid radiation and still give good anatomical detail,[10-16] but again, the challenge is practicality—these scans require special imaging and trained radiologists, which most routine clinics do not have.

In our study, we relied on cystourethroscopy. It is something most urologists already use, and it does not require additional tech. When we saw that the bladder neck was not visible from the verumontanum (that tight, ring-like appearance), it matched the PBNO diagnosis described in the literature.[6,7,18-21] It is not perfect, but it is accessible, and for many centers, it might offer a solid alternative to more complex diagnostics.

When it comes to treatment, the usual go-to for PBNO has been transurethral incision (TUI). It is a quick

procedure that aims to relieve the functional narrowing at the bladder neck. And it works — studies by Kochakarn and Lertsithichai,[12] Many studies show that many patients feel better after TUI.[11-14] However, not everyone stays better. Symptoms can return, which might be because the tissue is not fully addressed, or maybe the obstruction comes back over time.

That is what pushed us to consider HoLEP. It is more comprehensive than TUI and has already proven useful in BPH.[18-21] Our idea was that it could offer more complete relief, even in PBNO, by removing tissue more thoroughly and minimizing the chance of recurrence.

In our findings, both groups—PBNO and BPH—improved after surgery. However, *improvements in the PBNO group were less marked, especially for voiding symptoms*. One possible reason is that many PBNO patients seemed to have weaker bladder muscle function even before surgery. This detrusor underactivity can limit how much better a patient feel, even if the obstruction is technically removed.[13-16]

In addition, that somewhat lined up with what patients told us. The PBNO group tended to report lower satisfaction and seemed more hesitant about having the surgery again. While this difference did not reach the level of statistical significance, it was still clear enough to be meaningful. The results were not bad — just less dramatic compared to the BPH group, who generally had stronger recoveries and clearer symptom relief. This really shows the importance of counseling. PBNO patients need to understand that the problem is not just blockage — sometimes, it is also how their bladder works.[6,18-21] That means recovery could take longer or be less complete. Managing expectations from the beginning can make a big difference in how patients feel about the outcome.

Repeated Measures ANOVA provided a robust statistical approach to evaluate how urinary symptom scores evolved over time in both patient groups. The significant within-group improvements observed in both IPSS and OABSS across multiple follow-up points confirm that HoLEP had a sustained effect on reducing LUTS, regardless of the underlying diagnosis. However, the magnitude and consistency of improvement differed slightly between the groups. BPH patients demonstrated more pronounced and uniform improvement, particularly in voiding scores, which aligns with the mechanical relief of prostatic obstruction being the primary therapeutic goal in BPH. In contrast, PBNO patients showed a slower or less dramatic trajectory of recovery. This may reflect the functional rather than anatomical nature of their obstruction, as well as pre-existing detrusor underactivity, which limited their bladder's ability to fully capitalize on the anatomic changes post-surgery. The use of repeated measures allowed us to detect these subtle differences in response patterns over time, emphasizing the importance of patient-specific physiological factors in predicting postoperative outcomes.[20-25]

From a safety standpoint, we did not run into many issues. Both groups had low complication rates. No major events like bleeding or strictures were observed, and almost no one needed additional interventions. This is encouraging and suggests that HoLEP is a safe option, not just for BPH but also for PBNO when done carefully.[18-21]

This study aligns with broader thematic domains relevant to urologic care. The increasing recognition of prostatic disease burden highlights the need for differentiated clinical strategies in the region.[25,26] From a patient-centered care and education perspective, promoting inclusive care practices and utilizing advanced education processes and personalized patient care have proven beneficial [27-31]. In terms of process coordination improvement and advancements,[25-27] Risk management process,[32-34] acuity tool and frequent patient follow up and audit [35-38] and streamlined referral systems[38,39] have enhanced diagnostic safety and workflow efficiency. Additionally, the use of HoLEP in PBNO reflects ongoing clinical innovation and adaptation of existing surgical technologies. These findings reinforce the importance of integrating multidisciplinary strategies, data-driven personalization, and patient expectation management to improve outcomes. Similar conclusions were drawn in related urology research where surgical management correlated with improved quality of life in complex diseases.[40-43]

Still, we have to acknowledge a few limitations. The study followed patients for only six months, so we do not know how things look in the long term — especially for recurrence or delayed complications. Also, our PBNO sample size was small, so even though the trends are interesting, we would need a bigger group to confirm them more confidently. Another thing we did not evaluate was sexual function. Since the procedure involves the bladder neck, this could impact ejaculation and other aspects of quality of life, and it is something we definitely want to explore in future research.

Although VUDS is widely regarded as the gold standard for diagnosing PBNO, we did not use it in this study—mainly due to equipment and logistical issues across all sites. Some literature emphasizes its role in confirming functional obstruction during voiding, yet in our context, this was not feasible. We instead used cystourethroscopy and clinical symptoms, which is not uncommon, though not identical. This, of course, creates a difference in how our results align—or do not—with other studies that relied heavily on VUDS protocols. The absence of VUDS might have limited the diagnostic precision, but for practical purposes, what we applied reflects what is often done in similar real-life clinical settings.

Implications

Clinically, this study shows that HoLEP could be a

valuable treatment for both BPH and PBNO — especially when PBNO is confirmed endoscopically. However, preoperative bladder function, especially detrusor activity, should always be evaluated. This helps anticipate the kind of outcome a patient might expect.

It also tells us that one-size-fits-all management will not work here. PBNO patients may need more personalized follow-up and possibly adjunctive therapies after surgery. Setting expectations, providing bladder training, and maybe using medications after surgery could help bridge the gap between anatomical success and functional satisfaction. Future studies should probably include standardized VUDS if comparisons are to be made more clearly or confidently.

Conclusion

HoLEP improved urinary symptoms and was well-tolerated in both PBNO and BPH groups. However, the results were more modest for PBNO patients, who also felt less satisfied overall. This suggests that while the procedure is safe and beneficial, PBNO patients may need different counseling and follow-up plans. Future studies with larger numbers, longer follow-ups, and more attention to bladder function and quality-of-life outcomes will help clarify how best to treat this unique patient population.

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Competing Interests

The authors declare no conflicts of interest related to this study.

Data Availability Statement

The data supporting the findings of this study are available from the corresponding author upon reasonable request.

Ethical Approval

This study was conducted in full accordance with the ethical standards outlined in the Declaration of Helsinki and adhered to all applicable local and institutional guidelines for research involving human participants. Ethical approval for the study was granted by the Institutional Review Board (IRB) of Mutah University, with reference number 25029. All patient data were kept confidential and anonymized. Since the study involved retrospective chart review with no direct patient contact or intervention, informed consent was waived by the IRB.

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