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Follow-Up of Post-Prostatectomy Patients with Persistent Lower Urinary Tract Symptoms

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ABSTRACT

Background Benign prostatic hyperplasia (BPH) is a prevalent condition that affects males. The prevalence rises with age; around 25% of men in their 40s and 50s are affected, compared to more than 80% of men in their 70s and 80s.

Objective: This study aimed to follow-up patients with persistent lower urinary tract symptoms (LUTS) following removal of the prostate and to find the best strategy to treat and to manage such conditions so the patients have a better outcome and quality of life.

Patients and Methods: This observational study was conducted between January 2021 and January 2022 in Urology Department, Al-Azhar university hospital, Assiut branch, Egypt. We recruited 40 Post-PBH operations patients complaining of LUTS. Files were initially read to identify eligible subjects. When a subject was deemed eligible, their notes were reviewed for baseline data. Baseline data included preoperative international prostate symptom score (IPSS), quality of life (QOL) score, Peak urinary flow rate (Qmax), voided volume (VV), and postvoid residual (PVR).

Result: The median IPSS is 21 and ranges from 5 to 35. The QOL ranged from 3 to 6 with a median of 4.00. The uroflowmetry ranged from 8 to 16 with a median of 12.00. The PVR ranged from 10-to 1000 with a median of 62.50. IPSS changed from 21 at baseline to 7 at follow-up, with an improvement of 66%. This is significant under Wilcoxon's signed-rank test ($P < 0.001$). Quality of life was improved from 4 at the baseline to 1.5 at follow-up, with an improvement of 62% ($P < 0.001$).

Conclusion: We found that B-TURP was the more effective therapy, had the least rate of postoperative complications, could minimize morbidity, and increase the quality of life.

Keywords: Benign prostatic hyperplasia, Lower urinary tract symptoms, International prostate symptom score, quality of life score.

INTRODUCTION

Benign prostatic hyperplasia (BPH) is a prevalent condition that affects males. The prevalence rises with age. Around 25% of men in their 40s and 50s are affected, compared to more than 80% of men in their 70s and 80s [(1)]. BPH is characterized by proliferation of the epithelial and stromal cells of the transition zone of the prostate around the prostatic urethra, resulting in bladder outflow obstruction (BOO), which can lead to lower urinary tract symptoms (LUTS) [(2)]. Pathogenesis of BPH is still unknown, however the role of the androgen is well defined in which its receptors are expressed and activated in BPH tissue. Recently, prostatic inflammation and metabolic parameters have been recognized to produce BPH [(3)]. Other risk factors for BPH include age, genetics, obesity, and geographical area [(2)].

BPH results in a group of symptoms known as LUTS. These symptoms are either storage or voiding. Voiding symptoms include weak stream, dysuria, intermittency, straining, hesitancy, incomplete emptying, and terminal dribble. Storage symptoms include urgency, frequency, and nocturia. LUTS may be in the form of distressing symptoms such as sexual dysfunction, depression, sleep disturbances, and lowering the capacity to carry out day-to-day tasks. BOO produces multiple complications due to urine retention. These complications include infection, stone formation, and hydronephrosis. These symptoms and complications affect the quality of life, so many patients seek treatment, which is ranging from conservative treatment and medical therapy to total prostatectomy [(1, 4-5)]. The conservative treatment includes decreasing alcohol and caffeine intake, adjusting the fluids intake, monitoring the symptoms, doing the relaxation exercise. Medical treatment includes $alpha_1$-receptor inhibitors, phosphodiesterase 5 (PDE5) inhibitors, and 5-alpha-reductase inhibitors. Indications of surgical treatment include failure of medical therapy and recurrence of symptoms. The surgical intervention includes transurethral incision of the prostate (TUIP), monopolar or bipolar transurethral resection of the prostate (M-TURP), bipolar transurethral resection of the prostate (B-TURP), Bipolar vaporization of the prostate (TUVP), open simple prostatectomy, endoscopic enucleation of the prostate and laparoscopic/robot-assisted simple prostatectomy [(6)]. Unfortunately, 20–50% of patients develop LUTS following surgery. These patients require extra care because the underlying cause of their LUTS may not have been fully treated by surgery, and their quality of life deteriorate [(7)].

The aim of this study was to follow up patients with persistent lower urinary tract symptoms following removal of the prostate and to find the best strategy to treat and manage such conditions, so the patients have better outcomes and quality of life.

PATIENTS AND METHODS

Study populations

This observational study was done between January 2021 and January 2022 in the Urology Department, Al-Azhar University Hospital, Assiut branch, Egypt. With a power of 80%, a sample size of 40 male patients was calculated.

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Inclusion criteria: Post-BPH operations patients complaining of LUTS.
Exclusion criteria: Patients with bladder mass and patients with stone bladder.

Data collection:

Files were initially read to identify eligible subjects. When a subject was deemed eligible, their notes were reviewed for baseline data. Baseline data included preoperative international prostate symptom score (IPSS), quality of life (QOL) score, Peak urinary flow rate (Qmax), voided volume (VV), and postvoid residual (PVR). Operation reports were read to confirm the operation date and that standard operating procedure had been followed. Patients were then invited to attend an interview, and an assessment was conducted. Assessment included complete medical history, physical examination, and neurological examination. All patients were subjected to the following investigations: Urine analysis, serum creatinine level, urine culture, pelvi-abdominal US, estimation of PVR and bladder wall thickness, peak urinary flow rate (Qmax), filing and voiding cystometry for some patients, international prostate symptom score (IPSS) and quality of life score (QOL).

The International Prostate Symptom Score (IPSS) is a questionnaire comprised of 8 items assessing symptoms with a total score between 0 and 35.5. The questionnaire denotes mild symptoms as < 8, moderate symptoms as 8-19, and severe symptoms as ≥ 20. QOL was independently evaluated with a score ranging from 0 to 6, with higher scores indicating a greater level of symptom bother and poorer QOL.

Follow-up: The follow-up ranged from 3 months to 3 years.

Ethical consent:
Our research adhered to the principles of the Helsinki Declaration. Ethical approval was obtained from the Institutional Review Board of Assiut Faculty of Medicine, Al-Azhar University. Every patient signed an informed written consent for acceptance of participation in the study.

Statistical analysis

Statistical analysis was performed with SPSS statistical software, version 25 (IBM, Chicago, Illinois, USA). The normality of the data was tested by Shapiro–Wilk test. Continuous data were expressed as mean ± SD or median (percentiles) and range or interquartile range. Categorical data were expressed as numbers and percent (N & %). The Wilcoxon signed ranks test was used for paired analyses. P ≤ 0.05 was considered significant.

RESULT

Forty patients were enrolled in our study.
Table (1) showed the baseline parameters. The mean age of patients was 64 years and ranged from 49 to 79 years.

Table (1): Demographic data of the patients

Parameters	**Total (N=40)**	
Age (years): range	49-79	
Smoking	**N**	**%**
Yes	30	75.0
No	10	25.0
Hypertension	**N**	**%**
Yes	25	62.5
No	15	37.5
Diabetes mellitus	**N**	**%**
Yes	24	60.0
No	16	40.0
Disease duration	**1-10Y**	
Median (IQR)	5 (3-6.75)	
Catheterization before operation	**N**	**%**
Yes	38	95.0
No	2	5.0
Type of operation	**%**	**N**
Open prostatectomy	20	50.0
Monopolar TURP	10	25.0
Bipolar TURP	10	25.0
Operation time	Min	
Open prostatectomy	30- 60 min	
Monopolar TURP	60 ≤min	
Bipolar TURP	60>min	
Indwelling catheter time	N	%
5 > days	15	37.5
≤ 5 days	25	62.5

Paired results were available in **Table (2)** for 40 men. For these, IPSS changed from 21 at baseline to 7 at follow-up, with an improvement of 66%. This is significant under Wilcoxon's signed-rank test (P < 0.001). Quality of life was improved from 4 at the baseline to 1.5 at follow-up, with an improvement of 62% (P < 0.001).The Uroflowmetry ranged from 8 to 16 with a median of 12.00. The voided volume ranged from 150 ml to 450 ml with a median of 300 ml The PVR ranged from 10 ml to 1000 ml with a median of 62.50 ml.

Table (2): Paired long-term outcome results.

Variable	**n**	**Baseline**	**Follow-up**	**Difference**	**P**
IPSS	40	21	7	14	<0.001
QOL	40	4	1.5	2.5	<0.001
Qmax	40	8	16	8	<0.001
Voided volume	40	150	450	300	<0.001
PVR	40	10	100	62.50	<0.001

Table (3) showed the long-term complications post prostate operation, such as burning in micturition, hematuria, incontinence, weak stream, and urine retention. The long term complications classified into 5 parts, burning in micturition 13 (32.5%), Incontinence included 5 (12.5%), Weak stream included 12 (30.0%), Urine retention included 4 (10.0%), Hematuria included 6 (15.00%).

Table (3): Long term complications post prostate operation

Parameters		N=40	%	Operation	N	%
LUTS	Burning in micturition &hematuria	13	32.5	Open prostate M.TURP B. TURP	8 3 2	61.54% 23.08% 15.38%
	Incontinence	5	12.5	Open prostate M.TURP B. TURP	4 1 0	80.00% 20.00% 0.00%
	Weak stream	12	30.0	Open prostate M.TURP B. TURP	9 2 1	75.00% 16.67% 8.33%
	Urine retention	4	10.0	Open prostate M.TURP B. TURP	3 1 0	75.00% 25.00% 0.00%
	Hematuria	6	15.0	Open prostate M.TURP B. TURP	4 1 1	66.67% 16.67% 16.67%

The patients were classified according to US findings into 5 parts mentioned in **table (4)** bladder wall thickening included 10 (25.0%) patients, hematoma included 6 (15.0%) patients, hematoma (6 = 15%), prostate regrowth (8 = 15%) and normal included 16 (40.0%) patients. To the best of our knowledge, this was the first study to assess the persistence of the LUTS post prostatectomy in Egyptian populations. We found that 30% of patients in our study developed recurrent LUTS due to obstructive cause such as urethral stricture (10%) and residual adenoma (20%). While, 40% of patients developed recurrent LUTS due to non-obstructive cause such as sphincter damage, over active bladder, weak bladder contractility and recurrent UTI. However, we found that 15% developed LUTS without unknown etiology.

Table (4): Long term follow up U/S findings post-prostate operation

U/S finding	N	%
Cystitis and bladder wall thickening	10	25.00
Hematoma	6	15.00
Prostate regrowth	8	15.00
Normal	16	40.00

DISCUSSION

BPH is a prevalent condition that affects males. The prevalence rises with age, around 25% of men in their 40s and 50s are affected, compared to more than 80% of men in their 70s and 80s [(1)]. Trans- urethral resection of the prostate (TURP) has been the "gold standard" surgical procedure for LUTS associated with BPH for decades. Despite the introduction of improved technology, classic diathermy endoscopic prostatectomy remains the preferred surgical treatment option for BPH [(8)].

Despite the intervention, up to 35% of patients may experience persistent or recurrent LUTS after surgery. These patients require extra care because the underlying cause of their LUTS may not have been fully treated by surgery, and their quality of life has deteriorate [(7)]. It is believed that patients will experience LUTS in the postoperative period following the removal of the urinary catheter, as assessed by validated questionnaires and objective flowmetry data with voided volume and postvoid residual when possible [(9)]. Because patients may suffer an exacerbation of LUTS in the first 4 to 6 weeks after surgery, proper preoperative counseling is required. However, voiding results are usually durable after three months. IPSS was found to improve with time in this study. At follow-up, the majority of men evaluated their urine symptoms as light, with an average decrease in IPSS of 14 points, suggesting a 67% reduction in 15 symptoms. (IPSS score 7–9). This is in contrast to preoperative assessments, in which the majority of patients described their symptoms as severe (IPSS 20–35). This improvement in IPSS is similar to **Ahyai *et al.*** [(10)] and **Shingleton *et al.*** [(11)] studies**,** which gave a score between 6 and 7.7. Not surprisingly, the recovery in LUTS is reflected in QOL and overall impression of improvement scores. Most men initially reported they were "mostly dissatisfied" (QOL score of 4) with their symptoms but this improved, and, at follow-up, they regarded themselves as "pleased" to "mostly satisfied" (QOL score of 1-2). This study discovered improvements in flow rate, voided volume, and postvoid residue. The average postoperative flow rate was 14 mL/s, with a 12 mL/s rise in flow rate, according to paired data. This is one of the biggest documented increases in flow rate, with an average predicted improvement of roughly 10 mL/s [(12)].

Both post-void residual and void volumes were improved by 69 and 80% respectively. The re-intervention rate for recurrent BPH (residual adenoma) identified in this study was eight patients (20%), 6 of

these patients (15%) after M-TURP, one patient (2.5%) after B-TURP, and 1 (2.5%) of these eight patients had recurrent BPH after open prostatectomy. **Roos *et al.*** [13] reported that the rates for repeat surgery after initial TURP is 2.3–4.3 % of patients at one year, while re-intervention rate after initial open simple prostatectomy was 0.6–1.2 % at one year, the rate in the present study was high. **Roos *et al.*** [13] reported that the most common causes of reoperation included inadequate resection of adenoma due to low surgeon's experience or no available equipment. In this study, it was discovered that ten patients (25%) required intervention for various reasons, while four patients (10%) required intervention owing to urethral strictures. In agreement with our results, **Rassweiler *et al.*** [14] showed that the rate of re-intervention rate for urethral stricture is between 2-10 %. This study found that the rate for stricture urethra post-open prostatectomy was two patients (5 %), one patient (2.5%) post-M-TURP, and one patient (2.5 %) post-B-TURP. **Autorino *et al.*** [15] compared four years' results of TURP vs. mTURP and found that urethral stricture rates were 3% vs. 6%, respectively. **Serretta *et al.*** [16] indicated that the most frequent late complications for open prostatectomy for BPH were urethral stricture (4.8%). **Varkarakis *et al.*** [17] reported long-term complications of open prostatectomy in 232 patients with prostates >75 grams. In a mean follow-up of 41.8 months, the rate of urethral strictures was about 0.6%. Our study rate is high. The development of urethral stricture is most likely secondary to instrumentation, technique, surgeon experience, or postoperative catheterization. In this study, all TURP operations were conducted using a 26F continuous resectoscope. The advantages of using a larger, continuous flow resection sheath are improved irrigation and vision with lower irrigation pressures. This contributes to better hemostasis hence the absence of blood transfusion and the absence of TUR syndrome observed in this study. The use of this large sheath is likely to have helped contribute to the higher resection volume identified in this study. Other factors have also been suggested in the literature as contributing to an increased incidence of urethral strictures. These include a high cutting current and the use of lubrication [14].

The present study also found that the symptoms of lower urinary tract dysfunction still have three common causes; detrusor overactivity (DO), sphincter damage, and poor detrusor contractility. The rate of DO in this study was five patients (12.5 %), and rate of sphincter damage was six patients (15 %), and poor detrusor contractility was six patients. **Abrams** [9] indicated that the causes of persistent symptoms after TURP included detrusor overactivity (up to 54%). A study on 129 men with post-TURP voiding symptoms, reported 8 % of those patients had intrinsic sphincter deficiency and detrusor hypercontractility in (4%) of patients [9]. In our study, it was found that urinary tract infection was one of the most common complications of surgery for BPH and the major cause for persistent LUTS in five patients (12.5%). This is similar to the results of **Liu *et al.*** [18] who found that the rate of recurrent UTI accounts for 15.5%. **Chughtai and his team** [19] indicated that there is 1–20% incidence of urinary tract infections. Management of LUTS following BOO surgery should be directed based on a combination of subjective bother from LUTS and UDS findings, taken in the context of other clinical data. UDS should help determine the underlying cause of LUTS, and determination of whether or not obstruction is present takes precedent. Detrusor contractility, urethral sphincter function, the presence of DO, and incontinence will undoubtedly affect the nature of the subsequent treatment. In some instances, optimal management may entail a multifactorial approach. As with managing the initial presentation of LUTS, it is not unreasonable to trial. Conservative methods such as behavioral/lifestyle modifications, changes in fluid intake, or re-evaluation of other potentially confounding medications, especially if the UDS tracing is normal. Pharmacotherapy or surgical intervention may be necessitated. Patients should also be counseled on the possibility of persistent LUTS despite secondary intervention.

McVary *et al.* [20] reported that if an obstruction is highly suspected as the underlying etiology of LUTS, then it would be prudent to determine whether urethral/meatal stricture or bladder neck contracture have been developed, as these entities may require endoscopic resection/incision, dilation, or more complex reconstruction. If incomplete prostatic resection or regrowth is evident, however, medical management with an alpha-adrenergic antagonist and/or 5-alpha-reductase inhibitor is a reasonable first step to assess for symptomatic improvement. In refractory cases with persistent obstruction suspected, there remains a role for secondary prostatic intervention, preferably TURP as the gold standard or simple prostatectomy for larger glands, though this latter approach may be more challenging in a pre-operative setting. The effectiveness of other endoscopic technologies in secondary prostatic operations remains poorly understood.

Kuntz *et al.* [21] reported that if non-obstructive, non-retentive DO with or without incontinence is suspected, and differential considerations (infection, malignancy, neurologic processes) have been excluded or addressed, then pharmacologic management with anticholinergic medications or mirabegron is reasonable. If symptomatology in refractory cases remains consistent with OAB after an appropriate duration of therapy, then consideration can be given to minimally invasive interventions such as intra detrusor on a botulinum toxin A injections or neuromodulation (sacral or percutaneous tibial) following patient counseling and selection patients with bladders at end-stage may

contemplate more drastic procedures like urine diversion or augmentation cystoplasty in rare situations [(22)].

We advise future researchers to conduct a thorough examination of each case in order to get a precise diagnosis of the cause of LUTS prior to surgery. With a prostate size of less than 80 mL, B-TURP may be recommended technique. For men with a prostate volume greater than 80 mL, OSP is recommended. To reduce histological alterations in the bladder, try to reduce the blockage time before surgery. Antibiotics should be taken before, during, and after surgery. To reduce the risk of infection, try to shorten the time spent indwelling catheterization before and after surgery. Surgical procedure selection is influenced by the surgeon's experience and the availability of equipment.

CONCLUSION

We found that B-TURP is the more effective therapy, has the least rate of postoperative complications, can minimize morbidity, and increase the quality of life.

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