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Original Article

Erectile Dysfunction after Transuretheral Resection of the Prostate in Patients with Benign Prostatic Hyperplasia

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ABSTRACT

Background: Benign prostatic hyperplasia (BPH) is commonly associated with lower urinary tract symptoms (LUTS) in aging men, which can significantly impact their quality of life. Transurethral resection of the prostate (TURP) is a standard treatment for BPH, yet its effects on erectile function remain controversial.

Objective: To assess the impact of TURP on erectile function in patients with BPH and to evaluate the potential relationship between the relief of obstructive urinary symptoms and changes in erectile function postoperatively.

Methods: This single-center, non-randomized study enrolled 177 male patients aged 50 to 80 years with a clinical diagnosis of BPH and an International Prostate Symptom Score (IPSS) greater than 8. Participants underwent monopolar TURP and were evaluated using the International Index of Erectile Function (IIEF-5) questionnaire one month post-surgery. Data were analyzed using SPSS version 21 with Chi-square tests applied to examine the influence of age and IPSS scores on erectile function, considering a p-value ≤0.05 as significant.

Results: The mean age of participants was 57.53 ± 6.96 years, and the mean resected prostate tissue weight was 122.82 ± 12.05 grams. Post-TURP, 44.6% of patients were found to have some degree of erectile dysfunction. However, no significant changes in erectile function were observed one month following TURP (p=0.602 for age, p=0.878 for IPSS score).

Conclusion: TURP did not significantly affect erectile function one month postoperatively in BPH patients with severe urinary symptoms. While some improvement in erectile function was noted, the results suggest that the benefits of TURP on erectile function may not be immediate. Further longitudinal studies with larger sample sizes are required to provide more definitive conclusions.

Keywords: Benign Prostatic Hyperplasia, Erectile Dysfunction, Transurethral Resection of the Prostate, Urinary Symptoms, Erectile Function, Prostate Surgery.

INTRODUCTION

Benign Prostatic Hyperplasia (BPH) has been recognized as a significant medical concern, particularly in elderly men starting around the age of 40. Historically defined as stromal glandular hyperplasia within the prostate gland, BPH has shown a substantial impact on the quality of life, primarily due to its association with lower urinary tract symptoms (LUTS) like frequent urination, urgency, nocturia, and incomplete bladder emptying (1, 2). The standard treatment for BPH over the past three decades has been Transurethral Resection of the Prostate (TURP), which, despite being the gold standard for LUTS management, has been known to carry potential morbidity and complications (1, 4, 5). The technique of TURP, including the use of hypo-osmolar irrigation fluids, has also been critically examined due to risks such as TUR syndrome (6). This period saw the emergence of Bipolar TURP (B-TURP) as an alternative to Monopolar TURP (M-TURP), each with its own set of associated risks (7).

A significant focus of research and clinical concern has been the prevalence and controversy surrounding erectile dysfunction (ED) following TURP. While some patients reported improved erectile function postoperatively, studies revealed a varied impact of TURP on erectile function, linking BPH-induced LUTS to erectile function and uncovering various risk factors associated with postoperative

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ED (8, 9). The statistical findings further highlighted the estimated mean probability of post-TURP impotence, ranging from 3.4% to 32.4%, with reports indicating a significant incidence of erection difficulties, ejaculatory disturbance, and pain during sex post-TURP (10, 11, 12). These findings underscored the need to evaluate the magnitude of erectile function before and after TURP in patients with BPH, particularly within the local population, and contributed to the development of surgical management protocols aimed at reducing the incidence of ED post-TURP.

Parallel to these developments, studies indicated that BPH affected approximately 50% of men by age 50 and up to 90% by age 80, with the greatest prevalence occurring among men aged 70 to 79 years (13-15). The condition, characterized by the proliferation of prostatic cells leading to an enlarged prostate and urethral obstruction, was observed to vary in histologic prevalence with age, but not all men with histologic BPH developed significant LUTS (15, 16, 17). This period also witnessed an increased understanding of the role of lifestyle factors in BPH progression. Diets rich in vegetables were found to potentially lessen BPH severity, whereas diets high in starches and meat, as well as excessive alcohol intake and possibly smoking, were linked to an increased risk of developing BPH (15, 30). Physical activity emerged as both a preventive measure and a cost-effective alternative to pharmacological or surgical interventions (29).

In terms of clinical management, BPH symptoms were categorized into storage and voiding issues, with diagnostic approaches evolving to include tools like the American Urological Association Symptom Index and the International Prostate Symptom Score (13, 17, 28). The use of Digital Rectal Examination and PSA levels, though variable, assisted in diagnosing BPH in the presence of other positive outcomes (14, 16). Additionally, the importance of patient education became more pronounced, focusing on symptom awareness, lifestyle modifications, and the significance of regular follow-ups (15, 34, 13).

The merits of TURP in treating BPH were reaffirmed during this period, with the procedure recognized for its efficacy, cost-effectiveness, and durability (38, 39, 40). However, complications associated with TURP, such as failure to void and surgical revision, called for further innovations in the surgical management of BPH (42, 45). This led to the introduction and increasing adoption of Bipolar TURP, which offered an improved safety profile over Monopolar TURP, with fewer risks of TUR syndrome and clot retention, and shorter durations of irrigation and catheterization (49, 45). These advancements in the understanding and treatment of BPH marked a significant phase in urological care, reflecting a deepening comprehension of the disease and its impact on patients' lives.

MATERIAL AND METHODS

The study, conducted at the Department of Urology, Liaquat National Hospital, Karachi, spanned six months from 26th July 2017 to 25th January 2018. It was a cross-sectional study designed to assess the incidence of erectile dysfunction following monopolar Transurethral Resection of the Prostate (TURP) in patients with Benign Prostatic Hyperplasia (BPH). BPH was operationally defined as a noncancerous increase in the size of the prostate, diagnosed through Ultrasound prostate with a prostate weight of over 100 grams. The International Prostate Symptom Score (IPSS), an 8-question tool (7 symptom questions + 1 quality of life question), was employed for diagnosing lower urinary tract symptoms (LUTS). Erectile function was assessed using the International Index of Erectile Function (IIEF-5) Questionnaire. The study classified erectile dysfunction based on IIEF-5 scores, where a score below 22 indicated erectile dysfunction.

The sample size was calculated using WHO software, based on an anticipated 20.9% incidence of erectile difficulties, a 95% confidence level, and a 6% margin of error, resulting in a required sample size of 177. A non-probability consecutive sampling technique was used. Inclusion criteria encompassed male patients aged between 50 to 80 years, diagnosed with BPH as per the operational definition, having an IPSS score of more than 8, and who had undergone monopolar TURP. Exclusion criteria included patients who did not provide informed consent, those diagnosed with prostate carcinoma post-surgery, patients with urethral stricture post-TURP and subsequent urethrotomy, patients with pre-diagnosed erectile dysfunction, and those who refused to complete the erectile function questionnaire.

For data collection, approval was obtained from CPSP. Patients meeting the inclusion criteria at the Department of Urology, Liaquat National Hospital, Karachi, were enrolled in the study after informed consent was obtained. All procedures were performed by the same experienced consultant urologist. The monopolar TURP procedure involved the removal of as much prostate adenomatous tissue as possible, followed by the insertion of an 18 French Foley catheter. The catheter was removed when hematuria sufficiently diminished, typically 2-5 days post-operation, followed by a voiding trial. Erectile dysfunction was assessed one month post-surgery using the IIEF score.

Data were compiled and analyzed using SPSS version 17. Frequencies and percentages were calculated for qualitative variables like IPSS grades and IIEF-5 categories. Quantitative variables such as age, IPSS score, and IIEF-5 score were presented as mean±SD. Stratification was utilized to control for effect modifiers like age, IPSS grade, and IIEF-5 grade scores. The chi-square test was applied

for statistical analysis, with a p-value ≤0.05 considered significant. Bias and confounders were minimized by strictly adhering to the inclusion and exclusion criteria.

RESULTS

In this study, we evaluated 177 male patients aged between 50 to 80 years to determine the frequency of erectile dysfunction after transurethral resection of the prostate (TURP) in patients with benign prostatic hyperplasia (BPH). Data analysis was conducted using SPSS version 21, and the study employed stratification followed by a post-stratification Chi-square test to examine the impact of modifiers on the outcome. The significance level was set at a p-value ≤0.05.

The mean age of the participants was 57.53±6.96 years. Participants were categorized into two age groups: ≤55 years, comprising 89 patients, and >55 years, comprising 88 patients. The average weight of resected prostate tissue was found to be 122.82±12.05 grams. Regarding the International Prostate Symptom Score (IPSS), the mean score among participants was 20.88±7.08. For the assessment of erectile function, the International Index of Erectile Function (IIEF-5) was utilized, and the mean score was 18.74±6.22. The prevalence of erectile dysfunction in the study population was 44.6%. Among those with erectile dysfunction, the distribution was as follows: 16.5% with severe, 22.8% with moderate, 38% with mild to moderate, and 22.8% with mild erectile dysfunction. A stratified analysis was conducted to observe the influence of age and IPSS score on erectile dysfunction. However, the association between erectile dysfunction and both age (p=0.602) and IPSS score (p=0.878) was found to be statistically insignificant.

Table 1 summarizing the key findings:

Demographic Variable	Mean ± SD or %
Age (years)	57.53 ± 6.96
Resected Tissue Weight (grams)	122.82 ± 12.05
IPSS Score	20.88 ± 7.08
IIEF-5 Score	18.74 ± 6.22
Prevalence of Erectile Dysfunction	44.6%
- Severe ED	16.5%
- Moderate ED	22.8%
- Mild to Moderate ED	38%
- Mild ED	22.8%

The results from this study offer a comprehensive overview of the occurrence of erectile dysfunction post-TURP in a BPH patient population, considering various factors such as age and prostate symptoms.

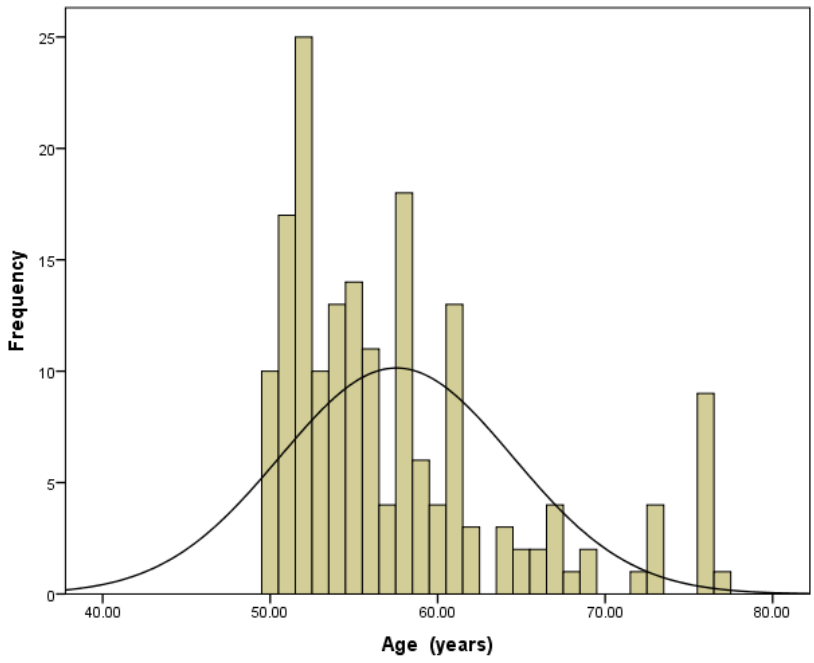

Figure 1 Distribution of Age

The image is a histogram with an overlaid bell-shaped curve, showing the distribution of ages among study participants. The x-axis lists age intervals, and the y-axis indicates the number of participants in each interval. The distribution peaks in the middle age ranges, suggesting most participants are centered around the median age, with fewer in the youngest and oldest age groups. The exact values are not visible, but the distribution pattern is clear.

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The table 2 presents descriptive statistics for the amount of resected prostate tissue measured in grams from 177 participants. The average weight of the tissue removed was 122.82 grams, with a standard deviation of 12.05 grams, indicating some variability around the mean. The median value, very close to the mean, was 123 grams, suggesting a relatively symmetrical distribution of tissue weights. The smallest amount of tissue resected was 101 grams, and the largest was 142 grams, giving a range of 41 grams. These statistics provide a concise overview of the resected tissue amounts in the study cohort.

Table 2 Resected Tissue of Prostate (gram) (n=177)

Mean	122.82
Standard Deviation	12.05
Median	123.00
Minimum	101
Maximum	142
Range	41

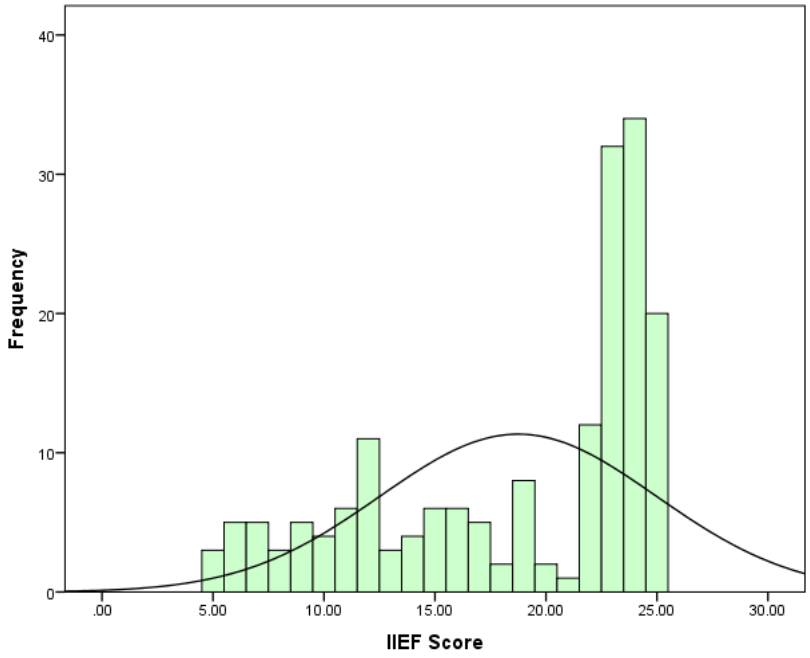

Figure 2 Distribution Of IIEF-5 Score

The graph is a histogram with a superimposed curve displaying the frequency distribution of International Index of Erectile Function (IIEF) scores among study participants. The x-axis represents the IIEF score range, and the y-axis denotes the number of individuals corresponding to each score interval. The bars illustrate the frequency of participants with varying IIEF scores. The tallest bars, indicating the highest frequency, are located towards the higher end of the score range, suggesting that a substantial number of participants had higher IIEF scores. The distribution curve indicates the overall trend and central tendency of the data.

TABLE 3 Erectile Dysfunction (n=177)

	Frequency (%)
Yes	79 (44.6%)
No	98 (55.4%)
TOTAL	177

The table 3 presents the frequency distribution of erectile dysfunction among 177 participants in a study. Out of the total, 79 participants, equating to 44.6%, were found to have erectile dysfunction. The remaining 98 participants, which constitute 55.4% of the sample, did not exhibit signs of erectile dysfunction. In sum, the table breaks down the presence or absence of erectile dysfunction in the study population, totaling 177 individuals.

TABLE 4 Erectile Dysfunction Severity (n=79)

	Frequency (%)
Severe erectile dysfunction (5-7)	13 (16.5%)

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Moderate erectile dysfunction (8-11)	18 (22.8%)
Mild to moderate erectile dysfunction (12-16)	30 (38%)
Mild erectile dysfunction (17-21)	18 (22.8%)
TOTAL	220

The table 4 details the severity of erectile dysfunction among 79 participants who reported the condition. Severe erectile dysfunction, with scores between 5-7, was present in 13 participants (16.5%). Moderate erectile dysfunction, with scores from 8-11, was noted in 18 participants (22.8%). The largest group, those with mild to moderate erectile dysfunction (scores between 12-16), comprised 30 participants (38%). Lastly, mild erectile dysfunction, with scores ranging from 17-21, was reported by 18 participants (22.8%). The total count of observations in the table sums up to 220; however, this appears to be a discrepancy since the number of participants with erectile dysfunction was initially stated as 79.

DISCUSSION

During the exploration of the relationship between benign prostatic hyperplasia (BPH) and erectile function in elderly men, researchers have delved into whether a causal link exists, given the high prevalence of both conditions in this population. Previous studies have offered conflicting evidence on the impact of transurethral resection of the prostate (TURP) on erectile function, with reports of incidence rates of post-TURP erectile dysfunction (ED) ranging from 4% to 35% (50,51,56-58). It was suggested that the erectile function could be influenced by multiple factors, including the psychological impact of the invasive procedure, neurological damage, vascular injuries, and environmental elements (52,53).

TURP's potential to disrupt erectile function could stem from various mechanisms such as psychogenic effects, nerve damage due to electrocoagulation, cavernosal artery thrombosis, venous leakage, and urethral injuries. Despite the documented instances of impaired erectile function post-TURP, some patients reported improvements, attributed to the alleviation of urinary symptoms and reduced mental stress, which, in turn, normalized libido and perceived improvements in erectile abilities (54,55,50).

The debate extended to the role of capsular perforation during TURP as a potential risk factor for developing ED, although studies have produced inconsistent findings regarding its significance. Capsular perforation's impact on erectile function was considered to depend on various procedural factors (60,61,50). Suspected mechanisms for ED following TURP included thermal or chemical injuries to the nerves, with risk factors such as capsular perforation during surgery, adenoma size, and patient-related conditions like diabetes (48,50-53,56-58).

Psychological effects and the interruption of sexual activity post-surgery were also suspected contributors to ED. To isolate the specific impact of thermic or chemical injuries on erectile nerves, a controlled study with age-matched patients who underwent transurethral resection of bladder tumor (TURBT) was conducted. This procedure is similar to TURP but does not involve the same risk to the prostatic capsule. The erectile function was assessed using the International Index of Erectile Function (IIEF-15), with findings indicating improvements in erectile and urinary symptoms post-TURP, even in patients with capsular perforation (53).

The observed enhancement of erectile function was often concurrent with the amelioration of urinary symptoms, supporting a strong correlation between the two. This association was further corroborated by the Multinational Survey of the Aging Male, which identified lower urinary tract symptoms as an independent risk factor for ED after adjusting for age and comorbid conditions. The presumption was that the improvement in erectile function was primarily due to the relief of obstructive urinary symptoms, a hypothesis previously supported by the positive outcomes following alpha-blocker treatment for LUTS (25,68-70).

CONCLUSION

In the current investigation, the impact of transurethral resection of the prostate (TURP) on erectile function was assessed in patients suffering from benign prostatic hyperplasia (BPH) with severe urinary symptoms. The findings suggested that TURP could potentially enhance erectile function, implicating the relief of obstructive urinary symptoms as a contributing factor to this improvement. However, the study's results also indicated that after one month following the procedure, there was no significant alteration in erectile function among the BPH patients. This underscores the need for additional research to thoroughly explore and understand the relationship between TURP and sexual function.

The scope of the study's conclusions is constrained by its limited sample size, which may impact the generalizability of the findings. The research was conducted within a single-center, employing a nonrandomized design, and the patient population was drawn from an urban setting. These factors collectively restrict the extent to which the outcomes can be extrapolated to a broader context.

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Future investigations with a larger and more diverse cohort are necessary to substantiate the initial observations and to offer a more comprehensive evaluation of the postoperative sexual health of patients undergoing TURP for BPH.

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