FACTORS INFLUENCING RECOVERY TIME AND HOSPITAL STAY AFTER TRANSURETHRAL RESECTION OF PROSTATE (TURP)

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How to cite this article

Khan AY, Izhar M, Ahmad W, Khan MK, Khan TS. Factors Influencing Recovery Time and Hospital Stay After Transurethral Resection of Prostate (TURP). J Gandhara Med Dent Sci. 2026;13(1):67-71.
https://doi.org/10.37762/jgmds.13-1.788

Date of Submission: 14-09-2025
Date Revised: 21-12-2025
Date Acceptance: 21-12-2025

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ABSTRACT

OBJECTIVES

This study aimed to evaluate the factors influencing recovery time and the length of hospital stay (LHS) following TURP surgery.

METHODOLOGY

A descriptive study was conducted over 6 months in the Department of Urology at the Institute of Kidney Diseases, Peshawar, involving 78 patients aged 40-80 years undergoing TURP. Data were collected on demographic and clinical variables, perioperative factors, and postoperative outcomes, including recovery and LOHS. Data were analysed using SPSS version 23. Chi-square and Fisher's exact tests were applied, with $p \leq 0.05$ considered statistically significant.

RESULTS

The mean age was 70.05 ± 8.14 years. Median BMI was 24.55 (23.0-26.93) kg/m². Median prostate size was 82.0 (72.0-89.0) g. Median length of hospital stay was 4.0 (3.0-5.0) days. Median recovery time was 54.5 (32.8-74.0) days. Recovery <30 days occurred in 25.0% of patients aged 40-60 years and 16.9% aged 61-80 years ($p = 0.511$). Prostate size >80 g ($p < 0.001$), intraoperative bleeding >500 ml ($p < 0.001$), operative time >1 hour ($p = 0.014$), and clot retention ($p < 0.001$) were significantly associated with delayed recovery. Comorbidities showed borderline association with recovery ($p = 0.051$) and significantly influenced LOHS. Age and BMI were not significant predictors.

CONCLUSION

This study demonstrated that prostate size, intraoperative bleeding, operative time, and clot retention were significantly associated with prolonged hospital stay and delayed recovery following TURP. However, on multivariable logistic regression analysis, postoperative clot retention was the only independent predictor of both prolonged hospitalization and delayed recovery.

KEYWORDS: *Transurethral Resection of the Prostate, Benign Prostatic Hyperplasia, Recovery Time, Length of Hospital Stay, Perioperative Factors.*

INTRODUCTION

Transurethral Resection of the Prostate (TURP) is the most commonly performed surgical procedure for treating Benign Prostatic Hyperplasia (BPH), a prevalent condition in aging men characterized by lower urinary tract symptoms (LUTS) and bladder outlet obstruction.[1] While TURP is highly effective in alleviating symptoms, recovery time and hospital stay length post-surgery vary considerably among patients, influenced by several factors. Understanding these factors is essential for improving patient outcomes and optimizing healthcare resource utilization.[2] Key determinants of recovery time and hospital stay include patient demographics (age and body mass index [BMI]), preoperative comorbidities (diabetes and hypertension), and intraoperative factors (anaesthesia type and operative time). Postoperative complications, including urinary tract infections, bleeding, and catheter-related issues, also play a significant role in prolonging recovery and hospitalization.[3,4] Evidence suggests that patients with advanced age or multiple comorbidities are more likely to experience delayed recovery and extended hospital stays due to their reduced physiological resilience and higher susceptibility to complications.[5] Additionally, variations in surgical techniques and postoperative care protocols contribute to differences in recovery patterns. The advent of minimally invasive techniques and enhanced recovery protocols has reduced recovery times, yet

individualized factors remain critical determinants of outcomes.[6] The study on factors accountable for prolonged hospital stay in patients undergoing transurethral resection of the prostate (TURP) was conducted by Kirollos MM et al. A total of 227 patients were included. 63 (27.7%) patients had an increased length of hospital stay due to various factors. Of 63 patients, 7 (11 .1%) had an increased length of hospital stay due to previous comorbidities (Cardiovascular and respiratory conditions) (7 Increasing the length of hospital stay increases the cost and burden on patients and the health care system.[8] This study aims to evaluate the factors influencing recovery time and length of hospital stay following TURP surgery. Identifying these factors can guide clinicians in risk stratification, enabling tailored perioperative care to improve recovery and reduce the burden on healthcare systems. Also, identifying these factors preoperatively will help reassure patients throughout the recovery process.

METHODOLOGY

This descriptive study was conducted in the Department of Urology, Institute of Kidney Diseases (IKD), Peshawar, over a period of six months following approval from the institutional ethical review board and research committee. Patients aged 40-80 years scheduled for transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH) were included. Patients with previous prostate surgery other than TURP, suspected or confirmed prostate cancer, acute urinary retention from other causes, history of bladder or urethral surgery, urinary tract infections or abnormalities, and bleeding disorders or anticoagulant use were excluded. A total of 78 patients were recruited using non-probability consecutive sampling. Sample size was calculated using the WHO Sample Size Calculator, considering a prevalence of comorbidities associated with prolonged length of hospital stay (LHS) of 11.1%, a 95% confidence interval, and a 7% margin of error. Age was recorded in years, body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2), and comorbidities were defined as the presence of diabetes, hypertension, or other chronic illnesses based on medical history and documented diagnosis. Prostate size was measured in grams using ultrasound, with enlargement defined as >30 g. Operative time was recorded from incision to closure and categorized as <1 hour and >1 hour. Significant intraoperative bleeding was defined as blood loss >500 ml, estimated via surgical suction and gauze. Postoperative clot retention was defined as the presence of obstructive blood clots in the bladder requiring manual or catheter-based intervention. All these factors were measured by trained residents or consultants through direct clinical assessment, ultrasound evaluation, and medical record review, and documented in a standardized study questionnaire. Length of hospital stay was recorded as the total number of days from hospital admission for TURP until discharge, and recovery time was defined as the number of days from surgery until the patient resumed normal daily activities, including independent walking, eating, and personal care. Demographic and clinical data, including age, BMI, comorbidities, prostate size, operative time, intraoperative bleeding, and postoperative clot retention, were collected prospectively. Operative and postoperative events were recorded during hospital stay, and recovery milestones were documented using structured follow-up interviews and hospital records. All data were compiled into a structured proforma for analysis. Data were analyzed using IBM SPSS version 23. Continuous and categorical variables stratified LHS and recovery time, and associations were assessed using the Chi-square or Fisher's exact test, with p-values ≤ 0.05 considered statistically significant, and 95% confidence intervals.

RESULTS

Table 1: Clinicodemographic Variables Statistics (n=78)

Variable	Mean ± SD / Median (IQR)	Yes, n(%)	No, n(%)
Age (years)	70.05 ± 8.14	-	-
BMI (kg/m²)	24.55 (23.0 - 26.93)	-	-
Prostate size (grams)	82.0 (72.0 - 89.0)	-	-
Length of hospital stay (days)	4.0 (3.0 - 5.0)	-	-
Recovery time (days)	54.5 (32.8 - 74.0)	-	-
Comorbidities	-	46(59.0%)	32 (41.0%)
Intraoperative bleeding (>500 ml)	-	51 (66.2%)	26 (33.8%)
Operative time >1 hr	-	59 (75.6%)	19(24.4%)*
Clot retention	-	44 (56.4%)	34 (43.6%)

**For operative time, "No" corresponds to <1 hour.*

Table 2: Association of Clinical Variables with Length of Hospital Stay (LOHS)

Variable	Categories	LOHS <3days	LOHS >3days	P-Value
Age (years)	40-60	06	06	0.411
	61-80	22	37	
BMI	Normal	16	23	0.472
	Overweight	09	20	
	Obese	05	04	
Prostate size	30-80 g	22	14	<0.001
	>80 g	08	34	
Comorbidities	Yes	13	33	0.026
	No	17	15	
Intraoperative bleeding (>500 ml)	Yes	11	40	<0.001
	No	18	08	
Operative time	<1 hr	14	05	<0.001
	>1 hr	16	43	
Clot retention	Yes	02	42	<0.001
	No	28	06	

Chi-square or Fisher's exact test was used, with a p-value of <0.05 considered significant

Table 3: Association of clinical variables with Recovery Time

Variable	Categories	Recovery < 30 days	Recovery > 30 days	P-Value
Age (years)	40-60	03	09	0.511
	61-80	10	49	
BMI	Normal	07	32	0.952
	Overweight	05	24	
	Obese	02	07	
Prostate size	30-80 g	13	23	<0.001
	>80 g	01	41	
Comorbidities	Yes	05	41	0.051
	No	09	23	
Intraoperative bleeding (>500ml)	Yes	03	48	<0.001
	No	11	15	
Operative time	<1 hr	07	12	0.014
	>1 hr	07	52	
Clot retention	Yes	01	43	<0.001
	No	13	21	

Chi-square or Fisher's exact test was used, with a p-value of <0.05 considered significant

Table 4: Multivariable Logistic Regression Analysis for Prolonged Length of Hospital Stay (>3 days)

Variable	AOR (Exp B)	95% CI	P-Value
Prostate size >80 g	0.86	0.13-5.67	0.873
Intraoperative bleeding >500ml	0.85	0.10-7.47	0.884
Operative time >1 hour	1.10	0.15-7.88	0.925
Clot retention	100.07	12.60-794.65	<0.001

Model fit: *Hosmer–Lemeshow test p > 0.05*
Abbreviations: *AOR, adjusted odds ratio; CI, confidence interval.*

Table 5: Multivariable Logistic Regression Analysis (Outcome Variable)

Variable	AOR (Exp B)	95% CI	P-Value
Prostate size >80 g	0.13	0.01-1.26	0.078
Intraoperative bleeding >500 ml	3.00	0.44-20.64	0.264
Clot retention	11.79	1.15-120.48	0.037
Operative time >1 hour	1.81	0.29-11.13	0.522

Abbreviations: *AOR, adjusted odds ratio; CI, confidence interval.*

DISCUSSION

The present study evaluated perioperative and clinical factors influencing length of hospital stay (LHS) and postoperative recovery following surgery for benign prostatic enlargement (BPE). Age did not demonstrate a statistically significant association with either LHS or recovery time in the present cohort. This finding is consistent with Suryalathifani et al., who reported that chronological age alone is not a decisive determinant of postoperative outcomes when comorbidities are adequately controlled.[9] However, this contrasts with the observations of GH GE et al. and Shamout S et al., who reported worse recovery profiles and more extended hospitalizations among older patients, suggesting that population characteristics and baseline health status may influence these associations.[10,11] Similarly, body mass index showed no significant relationship with LHS or recovery, aligning with the findings of Chen PH et al., who concluded that BMI is not a reliable predictor of perioperative outcomes in endoscopic prostate surgery.[12] In contrast, Yang TK et al. reported more favorable outcomes among patients with higher BMI, indicating heterogeneity in the existing literature.[13] On univariate analysis, prostate size >80 g was significantly associated with prolonged LOHS and delayed recovery. These findings are supported by Chen SS et al., who reported that larger prostate volume increases operative complexity and delays convalescence.[14] However, this association did not persist on multivariable analysis, suggesting that prostate size alone does not independently predict adverse postoperative outcomes. This observation is consistent with the findings of Rao JM et al., who reported no significant impact of prostate size on outcomes following TURP.[15] Comorbidities were significantly associated with prolonged LHS on univariate analysis, although their association with recovery was marginal. These results differ from those of Suryalathifani et al., who reported a greater influence of comorbid conditions on hospitalization duration.[9] Differences in comorbidity burden, perioperative optimization, and institutional protocols may explain this discrepancy. Intraoperative bleeding exceeding 500 ml and prolonged operative duration were significantly associated with prolonged LHS and delayed recovery on univariate analysis. These findings align with reports by Lynch M et al., who identified excessive intraoperative bleeding as a predictor of postoperative morbidity and extended recovery.[16] Similarly, Lekei EE et al. demonstrated that longer operative time reflects procedural complexity and is associated with delayed postoperative recovery.[17] However, neither bleeding volume nor operative duration retained statistical significance in multivariable analysis, suggesting that their effects may be mediated by postoperative complications rather than acting as independent determinants. Notably, clot retention emerged as the sole independent predictor of both prolonged LOHS and delayed recovery on multivariable regression analysis. This finding underscores the central role of postoperative complications in determining patient outcomes and is consistent with the work of Antoniou V et al., who reported that clot-related complications substantially delay recovery following prostate surgery.[18]

LIMITATIONS

The results of this study may not be as broadly

applicable as they could be because it was conducted at a single location with a small sample size. Establishing a causal relationship between the indicated causes and outcomes is impossible due to the observational methodology. Due to resource limitations, some potential confounding variables were not evaluated, including anesthesia type and surgeon experience. Furthermore, patients recorded their own healing times, which could have led to recall bias.

CONCLUSIONS

This study demonstrated that prostate size, intraoperative bleeding, operative time, and clot retention were significantly associated with prolonged hospital stay and delayed recovery following TURP. However, on multivariable logistic regression analysis, postoperative clot retention was the only independent predictor of both prolonged hospitalization and delayed recovery.

CONFLICT OF INTEREST: None

FUNDING SOURCES: None

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Muhammad Kamran Khan *- Concept & Design; Data Acquisition; Drafting Manuscript; Supervision; Final Approval*

Tariq Saleem Khan *- Concept & Design; Data Acquisition; Drafting Manuscript; Critical Revision; Final Approval*

The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.