Original Article

Impact of Early Catheter Removal after Transurethral Resection of Prostate: A Comparative Study of Post-Op Complications in Patients with Early VS Delayed Catheter Removal

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ABSTRACT

Objective: To compare the outcome of TURP in terms of post-operative complications in early versus delayed removal of foley catheter after TURP for benign prostatic hyperplasia.

Study Design: descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Urology, Medical Teaching Institute, Ayub Teaching Hospital, Abbottabad from 1 June 2022 to 31 October 2022.

Materials and Methods: A total of 81 patients were randomized to two groups. Group A patients had their catheter removed early, i.e., in first 24 hours after TURP, and Group B patients had their catheter removed as per protocol of the department

Results: There was no statistically significant difference in both groups in terms of incidence of post-operative complications. In addition, there was no significant association between age, post-operative bleeding & weight of prostate and interval to catheter removal. Similarly, there was no statistically significant association between post-operative complications and age and weight of the prostate in our study participants.

Conclusion: Early removal of catheter after TURP is not associated with an increased incidence of post-operative complications.

Key Words: TURP, BPH, Urinary Retention, Re-catheterization, Urinary Tract Infection, Post-operative Bleeding

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INTRODUCTION

The term benign prostatic hyperplasia (BPH) is often used for the "proliferation of smooth muscle and epithelial cells with in the transition zone of prostate" as determined by histologic findings.[1]

The incidence of benign prostatic hyperplasia increases with age.[2,3] Its incidence increases from around 40% in men in 4th decade of life to as high as 80% in men older than 90 years of age.[4]

The progressive hyperplasia of prostatic smooth muscle becomes associated with a number of symptoms such as, a feeling of an urgent need to urinate (urgency), increased frequency of urination, nocturia, urinary incontinence, urinary hesitancy, straining during urination, weak urine stream, post-void dribbling and feeling of incomplete urination etc., also known as the lower urinary tract symptoms.[5] Both BPH and LUTS are associated with a number of co-morbid conditions such as urinary incontinence, acute urinary retention, urinary tract infections, bladder stones, gross hematuria with / without prostatic infections and renal insufficiency, significantly impacting the patient's quality of life.[6]

The management of BPH depends on the severity of the condition.[7] In mild to moderate cases of BPH, medical management is usually the preferred approach. Agents indicated for medical management of BPH include alpha adrenoceptor blocking agents or 5-α reductase inhibitors.[8,9] In severe cases surgical management is the preferred approach and trans-urethral resection of prostate is the gold-standard for management of severe BPH.[7,10] Trans-urethral resection of prostate is indicated in case of recurrent urinary retention, failure of or resistance to medical management, recurrent hematuria with or without prostatic bleeding and complications associated with outflow tract obstruction such as renal failure, vesical stone and urinary tract infections.[7]

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TURP has been associated with a number of post-operative complications such as clot retention, urinary tract infection, haemorrhage, re-catheterization, epididymo-orchitis, atrial fibrillation and CCF, dilutional hyponatremia, re-admission & re-operation.[6,4] Patients undergoing TURP usually require catheterization following the procedure for continuous irrigation of bladder to decrease chances of clot retention and hemorrhage for a duration of upto 5-7 days. However, no consensus exists regarding the optimal duration of catheterization after TURP, and arguments exists for and against early or delayed removal of catheter.[11] The practice varies from country to country: the catheter is removed on next post op day in UK & Australia[12], while it is usually left in-situ for 4-5 days in Pakistan and Singapore.[13,14] Advocates of early catheter removal present cost-effectiveness, decreased hospital stay, early return to work, and decreased incidence of urinary tract infections as the benefits of early catheter removal.[4,11,15] While proponents of delayed catheter removal cite prevention of clot retention and hemorrhage as the main arguments for delayed removal of urinary catheter in patients who have undergone TURP.[4,16]

Since delayed removal of catheter is associated with a longer hospital stay, increased risk of post-operative infection and increased cost of healthcare, this study was designed to assess the impact of early versus late removal of catheter in patients undergoing TURP in terms of post-operative complications in our setup.

MATERIALS AND METHODS

This descriptive cross-sectional study was done in the Department of Urology, Medical Teaching Institute, Ayub Teaching Hospital, Abbottabad from 01 June 2022 to 31 October 2022. Patients diagnosed with benign prostatic hyperplasia who were candidates for TURP were included in the study. A sample size of 81 was calculated using the WHO software for sample size estimation studies using the following criteria: confidence interval: 95%, anticipated population proportion of clot retention with early removal of catheter after TURP: 5.56%[6], absolute precision required: 0.05%. Consecutive non-probability sampling was used for this study and patients were divided into two groups of 75 patients each using block randomization. Foley Catheter was removed early, on first post-op day, in patients labelled as Group A, the rest of the patients in whom catheter removal was delayed were placed in Group B. Patients older than 40 years and younger than 70 years with benign prostatic hyperplasia and symptoms of LUTS were included in the study.

Patients with urethral strictures, diabetes mellitus, hypertension, large post-void urine volume, those undergoing simultaneous TURP & internal urethrotomy, diseases affecting spinal cord, cerebro-vascular diseases or any other condition that may lead to a neurogenic urinary bladder, chronic kidney disease, prostatic cancer, malignant lesions of bladder, conditions that required fluid restriction, intra-operative complications such as bladder- or capsular perforation, severe intra- or post-operative hemorrhage were excluded from the study.

TURP was performed as per standard procedure using a 1.5% glycine solution for irrigation. After the procedure, a 22/24 Fr 3-way Foley catheter was placed in bladder for irrigation purpose and irrigation was continued with normal saline solution till the color of catheter effluent became light pink. The decision to remove catheter was based on a number of criteria such as normal urine output, absence of clot, adequate catheter effluent, normal vital signs and functioning irrigation channel. The catheter was removed 24 hours after surgery in early removal group and after 4 days in the delayed removal group. All patients were observed for a few hours for effectiveness of intervention after removal of catheter.

All patients were observed for development of post-operative complications and the data was recorded in a pro forma before analysis using SPSS v 25. Numerical variables were defined as mean±SD while categorical variables were described as frequencies and percentages. Data was stratified by the catheter removal time and post-stratification chi-square test was done. A p value ≤ 0.05 was taken as significant. One-way ANOVA was used for comparison of means between the two groups.

RESULTS

The 81 study participants were randomly allocated to either of the groups via block randomization. 41 patients had their catheter removed on first post op day while 40 patients had their catheter removed as per department protocols. The mean±SD age of study participants was 58.25±7.74 years with a range of 45-70 years. The mean±SD prostate size was 54.22±11.13 grams (Table-1).

Table No.1: Descriptive statistics of study participants

	N	Min.	Max.	Mean	Std. Deviation
Age (yrs)	81	45	70	58.25	7.742
Size of prostate (gram)	81	34.80	71.71	54.2175	11.13362
Valid N (listwise)	81				

The post-op complications of TURP observed in this study in group A & B respectively, included clot retention (2.4% vs 12.5%), urinary retention (4.9% vs 15%), urinary tract infection (2.4% vs 5%), need for re-catheterization (9.8% vs 5%), Post-operative hemorrhage (4.9% vs 12.5%) and epididymoorchitis

(4.9% vs 10%) (Table-2). The outcome, i.e., complications of TURP were stratified by the catheter removal time to see effect modification and no statistically significant difference was observed between the groups in terms of the outcome ($p > 0.05$) (table-3). In addition, we didn't find any significant association between age, post-operative bleeding & weight of prostate and interval to catheter removal ($p > 0.05$). Similarly, there was no statistically significant association between post-operative complications and age and weight of the prostate in our study participants ($p > 0.05$).

Table No.2: Frequency of post-operative complications in study participants

Clot Retention			Frequency	Percent
Early Catheter removal		Yes	1	2.4
		No	40	97.6
		Total	41	100.0
Delayed Catheter Removal		Yes	5	12.5
		No	35	87.5
		Total	40	100.0
Urinary Retention			Frequency	Percent
Early Catheter removal		Yes	2	4.9
		No	39	95.1
		Total	41	100.0
Delayed Catheter Removal		Yes	6	15.0
		No	34	85.0
		Total	40	100.0
Post-operative hemorrhage			Frequency	Percent
Early Catheter removal		Yes	2	4.9
		No	39	95.1
		Total	41	100.0
Delayed Catheter Removal		Yes	5	12.5
		No	35	87.5
		Total	40	100.0
Urinary Tract Infection			Frequency	Percent
Early Catheter removal		Yes	1	2.4
		No	40	97.6
		Total	41	100.0
Delayed Catheter Removal		Yes	2	5.0
		No	38	95.0
		Total	40	100.0
Re-catheterization			Frequency	Percent
Early Catheter removal		Yes	4	9.8
		No	37	90.2
		Total	41	100.0
Delayed Catheter Removal		Yes	2	5.0
		No	38	95.0
		Total	40	100.0
Epididymoorchitis			Frequency	Percent
Early Catheter removal		Yes	2	4.9
		No	39	95.1
		Total	41	100.0
Delayed Catheter Removal		Yes	4	10.0
		No	36	90.0
		Total	40	100.0

Table No.3: Stratification of Post-operative complications by interval to catheter removal

		Clot Retention		Total	
		Yes	No		p value
Catheter Removal time	Early Catheter removal	1	40	41	0.084
	Delayed Catheter Removal	5	35	40	
Total		6	75	81	
		Urinary Retention			
		Yes	No	Total	p value
Catheter Removal time	Early Catheter removal	2	39	41	0.127
	Delayed Catheter Removal	6	34	40	
Total		8	73	81	
		Post-operative Hemorrhage			
		Yes	No	Total	p value
Catheter Removal time	Early Catheter removal	2	39	41	0.222
	Delayed Catheter Removal	5	35	40	
Total		7	74	81	
		Urinary Tract Infection			p value
		Yes	No	Total	
Catheter Removal time	Early Catheter removal	1	40	41	0.542
	Delayed Catheter Removal	2	38	40	
Total		3	78	81	
		Re-catheterization			p value
		Yes	No	Total	
Catheter Removal time	Early Catheter removal	4	37	41	0.42
	Delayed Catheter Removal	2	38	40	
Total		6	75	81	
		Epididymoorchitis			p value
		Yes	No	Total	

Catheter Removal time	Early Catheter removal	2	39	41	0.38
	Delayed Catheter Removal	4	36	40	
Total		6	75	81	

DISCUSSION

The standard practice in our hospital is to let the catheter remain in place after a TURP for 3-5 days, allowing for observation of patients and timely management of post operative complications, if any. The timing of Foley catheter removal varies worldwide and arguments can be put forward for or against any approach towards removal of Foley's catheter after TURP.[13] However, safety and cost-effectiveness of early catheter removal has been established in literature.[17–20]

We compared the outcome of TURP in terms of early vs delayed catheter removal and found that there was no significant difference between the two practices in terms of post-operative complications (p >0.05). A number of risk factors such as age, weight of resected prostate, comorbidities and post-operative bleeding have been identified as important predictors of delayed catheter removal[13,19], however, we didn't find any statistically significant association between age, weight of prostate and post-operative bleeding (p > 0.05).

It is interesting to know that apart from a significant reduction in mean hospital stay with early removal of catheter after TURP, no significant difference in incidence of post-operative complications such as reoperation and post-operative urinary retention with early removal of catheter has been observed.[19] Our work validates these observations.

The interval to remove catheter following TURP has decreased over the past couple of decades[21], however the benefits of this practice are mostly economic[22–24], since there is a theoretical reduction of medical complications of an in-dwelling catheter. The decision to remove catheter early doesn't influence the incidence of these complications and early removal of catheter is advocated purely on the basis of its cost-effectiveness.[13,21,22].

CONCLUSION

There is no significant increase in post-operative complications following early removal of catheter after TURP. Apart from cost-effectiveness, there is no statistically significant difference between early removal of foley catheter and delayed removal of foley catheter in patients who have undergone TURP for benign prostatic hyperplasia.

Author's Contribution:

Concept & Design of Study:	Muhammad Shahzad
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