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Original Article

Comparison of Catheterization Rates Following Catheter Removal on the First Versus Fifth Postoperative Day After Transurethral Resection of the Prostate

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ABSTRACT

Objective: To compare the re-catheterization rate after catheter removal on 1st versus 5th postoperative day after transurethral resection of prostate (TURP) for management of benign prostate enlargement.

Study Design: Quasi-experimental study.

Place and Duration of Study: Armed Forces Institute of Urology, Rawalpindi, Pakistan, from Jun 22 May 23.

Methodology: After ethical approval of study, two groups were constituted of a sample collected through non-probability consecutive sampling. Consultant urologists and senior registrars performed all transurethral resections of prostate surgeries under spinal anesthesia. After surgeries, irrigation was done with Normal Saline. The catheter was removed on 1st Post op day in one group, while on 5th post-operative day in another group, and the data were recorded in SPSS.

Results: The primary outcome was frequency of re-catheterization. The re-catheterization was required in 3(5%) patients after early catheter removal, that is, on day one after TURP, who were kept in Group-1, while 5(8.3%) patients who required re-catheterization were in Group-2 with a *p*-value of 0.008.

Conclusion: It was concluded that early catheter removal had a better outcome and a lesser need for re-catheterization as compared to late catheter removal after transurethral resection of prostate (TURP) done for management of benign prostatic hypertrophy.

Keywords: Benign Prostatic Enlargement, Catheter, Re-catheterization, and Transurethral Resection of Prostate (TURP).

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INTRODUCTION

Benign prostatic enlargement due to hyperplasia is a very prevalent urological condition, especially in elderly age group. More than 50 % of people experience some sort of benign prostatic enlargement symptoms by the age of fifty years.[1] Worldwide statistics show that over two million males are affected, which makes six percent of the world's male population.[2] Prostate gland increases in volume and size with increasing age in majority of men. Forty-five percent of patients with no symptoms are liable to develop some symptoms of prostatic enlargement in the next fourth decade of their life.[3] Different management options of enlarged prostate have emerged in clinical practice of urology in last 10 years. Many procedures that initially claimed to be the best practices failed to prove effective and were unable to demonstrate their reliability over time.[4] Trans Urethral Resection of Prostate (TURP) is the only procedure that is time-tested, and it has been a part of urological practice for many years and is recognized as the gold standard for benign prostatic hypertrophy.[5]

Various new innovative techniques have been tried, including bipolar resection, Holmium laser enucleation of prostate to prevent TURP syndrome, but none of them has been able to be as effective as TURP, and so far TURP has maintained its reliability and effectiveness in the realms of urology as the gold standard for BPH.[6] The reason behind its popularity is that it usually results in instant success. The success is linked to the fact that it clears majority of the prostatic tissue causing obstruction and gives relief of symptoms for a longer time.[7]

After TURP, an indwelling Foley catheter is placed to prevent hemorrhage, monitor urine output, and facilitate urination. The timeframe for bladder irrigation and catheter removal varies from hospital to hospital, but in general, it ranges from 4 to 7 days. However, there are no national and international recommendations regarding catheter duration after surgery. Irrespective of the recommendation, re-catheterization is a common and cumbersome complication of TURP. Some Centers favor a catheter for only one day, while others recommend a minimum of 7 days.[8] Choudhury et al demonstrated that the

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need for re-catheterization was more than 10 percent in short-term catheterization versus 3 percent after long-term urinary catheterization.[9] Şahin and Kalkan concluded their trial with almost similar results that re-catheterization was much higher once the catheter was removed early, vs catheter removal after a long time.[10]

The rationale of this study is to compare the rate of re-catheterization associated with early versus delayed postoperative catheter removal, specifically on the first versus the fifth postoperative day, following transurethral resection of the prostate (TURP) for benign prostatic hyperplasia (BPH). In our department, it is customary to maintain urinary catheters for a longer duration; however, this practice often contributes to patient discomfort and an increased risk of urinary tract infections. Existing national and international literature presents variable recommendations regarding the optimal duration of catheterization. Therefore, this study aims to determine whether short-term catheterization offers superior outcomes compared to prolonged catheterization in terms of the requirement for re-catheterization.

METHODOLOGY

This quasi-experimental study was done at Armed Forces Institute of Urology (AFIU), Rawalpindi, Pakistan, after obtaining approval of the Ethical Committee vide certificate no Uro-Adm-Trg-1/IRB/2022/005 dated 22 May 2022, from Jun 22 to May 23. The WHO sample size calculator was utilized for sample size calculation. A total of 120 patients were enrolled through non-probability consecutive sampling. 60 patients were allotted to each group. 80% of the test power and 5% level of significance were used for computing the sample size, and the anticipated percentage of re-catheterization was taken as 0% after long-duration catheterization and 22.7% after short-duration catheterization.

Inclusion Criteria: Patients aged 50–80 years, diagnosed with benign prostatic hyperplasia (BPH) with a history of Lower urinary tract symptoms (LUTS), planned to undergo transurethral resection of prostate (TURP) were included in the study.

Exclusion Criteria: Patients with a history of coagulopathy (PT>16 sec, APTT>36 sec), Ischemic Heart Disease, and Hypertensive patients with BP >180 mmHg and Ejection fraction <55%, >100 Grams prostate, Capsular or bladder perforations during TURP, or Hepatitis B&C positive patients.

A total of 120 who fulfilled the criteria of selection were included in our study through consecutive sampling. Written Informed consent was taken. Demography was recorded. We randomized all patients into two groups by using the sealed envelope method. Standard TURP surgeries were performed with tungsten's standard wire loop using settings of cutting at 110 watts and a coagulation of 70 watts. All procedures were performed by consultant urologists and senior registrars under spinal anesthesia. Once surgery was finished, bladder irrigation was done with 3-way Foley catheters. During surgeries, 5% Dextrose Water was used for irrigation, while Normal Saline irrigation was done after surgeries. In Group-1, removal of Foley catheter was done at day 1 post-operatively, and in Group-2 catheter removal was done on day 5 post-operatively. The requirement for catheterization was recorded when patient was not able to void after Foley catheter removal and had a painful, palpable, and percussible bladder with a void volume of almost 150 ml. (Figure)

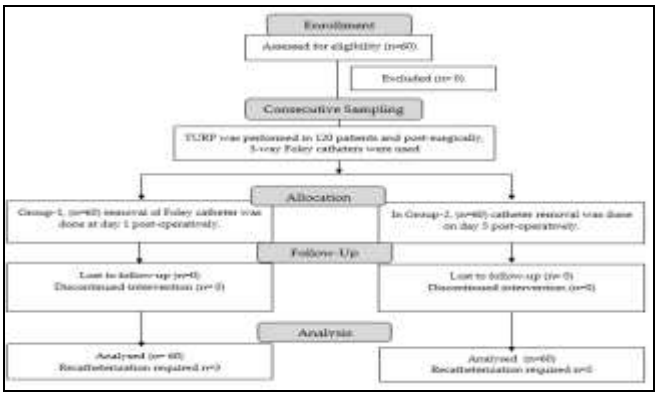

Figure: Patient Flow Diagram Comparing the Requirement of Re-catheterization Postoperatively

Quantitative variables like age were calculated as Mean±SD, whereas Qualitative variables like outcome in terms of re-catheterization were measured as frequency and percentages. Comparison between two groups of patients was done by using the Chi-square test. *p*-value ≤ 0.05 was considered significant.

RESULTS

One hundred and twenty patients completed the study protocols, and none of the patients were dropped from the study. the demographic features were fairly consistent in both study groups. Group-1 patients had a mean age of 69.00±7.75 years, while mean age was 67.00±8.25 years in Group-2. The 1st group had mean prostate size 46.00±5.02 grams while

mean prostate size of the second group had a mean prostate size of 56.00±4.25 grams. In Group-1, the mean duration of voiding LUTS was 7.32±2.26 months, while in Group-2, mean duration of obstruction was 6.66±2.39months (Table-I).

Table-I: Patient Characteristics (n=120)

Variables	Group-1 n=60	Group-2 n=60
Age (years)	69.00± 7.75	67.00± 8.25
Size of prostate (grams)	46.00± 5.02	56.00±4.25
Duration of Obstruction (months)	7.32±2.26	6.66±2.39

The primary outcome was frequency of re-catheterization. The re-catheterization was required in 3(5%) patients after early catheter removal, that is, on day one after TURP, while 57(95%) Group-1 patients did not require re-catheterization. In Group-2, there were 5(8.3%) patients who required re-catheterization, while 55(91.6%) patients did not require re-catheterization. The results implied that there was statistically no significant difference between the frequency of re-catheterization between the two study groups, with *p*-value <0.008 as shown in Table-II.

Table-II: Comparison of Re-catheterization Rate in Study Groups (n=120)

Re-catheterization	Group-1 n=60 Frequency (%)	Group-2 n=60 Frequency (%)	*p*-value
YES	3(5.0)	5(8.3)	0.008
NO	57(95.0)	55 (91.6)	

DISCUSSION

The study revealed that re-catheterization was required in 8 patients, of which 3 were in early catheter removal group and 5 in the late catheter removal group. The catheter removal on 1st post op day had better results as compared to 5th post op day. These findings suggest that early catheter removal is associated with a lower rate of re-catheterization compared to delayed removal. The results also indicate that prolonged catheterization did not confer additional benefit in terms of reducing the risk of urinary retention; rather, it may be linked with unnecessary patient discomfort and potential complications, such as increased susceptibility to urinary tract infections. Overall, early catheter removal demonstrated comparatively favorable outcomes, supporting the consideration of shorter catheterization duration in postoperative management after TURP. Nakagawa *et al*., also analyzed the impact of early catheter removal following transurethral prostatectomy in 431 patients, and the results were in concordance with this study's result. They conducted a study and found different results and concluded that 43.8% patients with 5-day catheterization needed re-catheterization, and this was significantly higher than one-day catheterization (almost 2.2%, $p<0.001$).

Additionally, Lower urinary tract symptoms from benign prostate hyperplasia (LUTS/BPH) are a common condition that affects men, with increasing prevalence as men age. The purpose of the study by Heiman *et al*., clarified the optimal catheterization approach to the surgical patient with LUTS/ BPH.[12] Aslan et al concluded that in 79.6% patients, catheters were removed on 1st postoperative day, and the mean duration of stay in the hospital was 1.4 days.[13] Durrani et al., reported that removal of the catheter on the first postoperative day following TURP does not increase the risk of complications and is associated with a shorter hospital stay. Although the rate of re-catheterization was higher in the short-duration catheterization group (10%) compared to the long-duration group (3%) ($p=0.04$), the incidence of urinary tract infection was significantly lower in patients with short-term catheterization.[14]

Park *et al*., trial concluded that the recatheterization rate was much higher in short-duration catheterization i.e., 22.7% in comparison to long-duration catheterization i.e., 0% ($p<0.05$).[15] Another study by Vartak *et al*., concluded that the recatheterization rate was 4 % in whom catheter removal was done on 1st post op day, whereas 24 % in whom catheter removal was done on 4th post op day.[16]

So the results of our study showed better outcome after early removal of catheter which was in accordance with some other national and international studies but conflicting with some other studies.[17,18]

CONCLUSION

We concluded that early catheter removal patients had lesser need of re-catheterization as compared to late catheter removal after transurethral resection of prostate (TURP) done for management of benign prostatic hypertrophy.

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Authors' Contribution

Following authors have made substantial contributions to the manuscript as under:

WAR & MRZ: Study design, drafting the manuscript, data interpretation, critical review, approval of the final version to be published.

SK & MAK: Data acquisition, data analysis, approval of the final version to be published.

MF & MT: Critical review, concept, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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