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Original Research Article

Comparison of Early Versus Late Removal of Foley's Catheter in Patients After Transurethral Resection of Prostate

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Abstract: *The primary surgical intervention addressing urinary blockage caused by an enlarged non-cancerous prostate involves a procedure performed via the urethra. Despite its widespread use, protocols for the timing of catheter withdrawal after surgery differ significantly. This research aimed to evaluate outcomes between patients undergoing immediate versus postponed catheter extraction, analyzing factors such as hospitalization duration, volume of tissue excised during the procedure, operative time, need for blood transfusions during or after surgery, and adverse events following the intervention.* ***Methods:*** *This prospective clinical investigation was conducted at the Department of Urology, Victoria Hospital, Bahawalpur, from 25th December 2024 to 25th March 2025. Patients were chosen through a random selection methodology following consent authorization and categorized into two groups: Group A-standard catheter removal group, and Group B-early catheter removal group. Exclusion criteria comprised individuals with elevated residual urinary retention, concurrent urethral procedures alongside prostate tissue excision, underlying medical conditions, and surgical challenges during the operation. Patients were cleared for discharge post-catheter extraction contingent on demonstrating proper urination. In Group A, drainage tubes were retained beyond 24 hours per established guidelines. The data were analyzed using SPSS-17.* ***Results:*** *The study was conducted with 320 patients, 163 in Group A and 157 in Group B. The average mass of excised tissue in Group A was 46.67±9.133 grams; it was 45.22±7.532 grams in Group B. The Mean catheter removal day was 4.13±1.65days in Group A and 1.23±0.933 days in Group B. Hospitalization periods differed markedly, with Group A averaging 3.57 days±1.028 and 1.29 days±1.030 in Group B (p-value<0.05). A direct relationship was observed between hospitalization duration and the timing of catheter extraction. Both groups demonstrated comparable rates of post-surgical adverse events, with no notable discrepancy in clinical outcomes.* ***Conclusion****: Removal of the catheter on the first postoperative day after transurethral prostatectomy does not heighten the likelihood of post-surgical adverse effects and is correlated with reduced hospitalization duration.*

Keywords: Catheter extraction, prostate tissue excision, post-surgical adverse events

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Introduction

Urinary difficulties caused by non-cancerous prostate growth frequently affect older individuals. Management strategies for this condition include monitoring without intervention, pharmacological therapies, procedures with minimal tissue disruption, and surgical techniques involving urethral access for tissue removal or traditional gland excision (1). Each approach presents distinct benefits and limitations. Transurethral Resection of Prostate (TURP) is a reference standard treatment for patients with bladder outflow obstruction due to benign prostatic enlargement (2). However, unlike less invasive alternatives, a notable disadvantage of this procedure is its typical requirement for inpatient care (3). Time of urethral catheter removal after TURP varies and ranges from the night of operation to 5 days [2, 5]Some research indicates that prompt device removal
Accelerating recovery periods, lowering healthcare costs, and allowing earlier resumption of normal activities (3–6). Conversely, other investigations highlight potential drawbacks, including elevated rates of subsequent catheter reinsertion and blood clot formation following early extractions (2, 7.8).
This research aimed to assess differences between groups undergoing immediate versus delayed catheter removal in terms of parameters such as age, duration of inpatient care, excised gland mass, operative time, transfusion requirements during or after surgery, challenges in urinary flow resumption following device withdrawal, and adverse clinical outcomes during recovery.

Methodology

It was a randomized controlled trial (RCT) carried out in the Department of Urology, Quaid-e-Azam Medical College, Victoria Hospital, Bahawalpur, from 25th December 2024 to 25th March 2025. The study included 320 patients with urinary blockage caused by non-cancerous prostate growth requiring prostate tissue removal via urethral access. All the patients obtained written consent before they were enrolled in the study. Exclusion criteria involved excessive residual urine after voiding, narrowed urethral passages, individuals receiving concurrent urethral procedures during surgery, systemic health conditions such as unstable metabolic disorders, neurological impairments affecting bladder function, or surgical incidents like organ wall breaches or significant intraoperative bleeding. Patients were divided into the two groups by randomly selecting from a pile of sealed opaque envelopes containing assignments A or B as the patients came and were included in the study. Sealed opaque envelopes were kept in a box in equal proportion, and patients were asked to select one sealed envelope. The trial employed a stratified allocation system using 50 concealed packets (25 per group) stored in a secure container under principal researcher oversight. When 10 packets remained, an additional 50 were replenished following the initial distribution ratio. There were 163 patients in the conventional or delayed catheter removal group (Group A) and 157 in the early catheter removal group (Group B). All the patients for TURP were hospitalized one day before the surgery. A detailed history included International Prostate Symptom Severity Score (IPSS) scoring and thorough physical examinations. Investigations included: Full Blood Count, serum

Creatinine, serum Electrolytes, Hepatitis B and C screen, serum PSA, Urinalysis, ECG, Chest X-ray, and Echocardiography in selected cases. Abdominopelvic ultrasound and uroflowmetry were done on an outpatient basis before admission. The prostatic volume was calculated by trans-abdominal ultrasonography.

The trial protocol mandated the stoppage of antiplatelet drugs 7 days before surgery. Standard TURP was carried out under spinal anesthesia by two senior urologists. Perioperative infection prophylaxis involved intravenous administration of a broad-spectrum antibiotic (1g) during anesthetic induction. TURP was performed using a continuous irrigation resectoscope (Karl Storz®, 26 Fr), a tungsten cutting loop, and a roller ball (Karl Storz®). Glycine solution was used during resection. A three-way 22 Fr hematuria catheter was inserted at the end of the procedure, and continuous bladder irrigation was started with normal saline. Traction was not applied in any case. Bladder irrigation was continued until the effluent was light pink. The operative time was noted from the time of insertion of the resectoscope to the insertion of the catheter.

Catheters were removed on the first postoperative day in Group B (early catheter removal group), and patients were discharged the same day if they could void urine normally. Extraction occurred only when clinical stability, clear urinary output, and absence of obstructions were confirmed. In Group A, the catheters were kept for more than one day, according to the protocol of our ward. Patients were discharged after removal of the catheter if they could void successfully. If prolonged catheterization was required, the patients were discharged with a catheter and instructed to come for catheter removal after a few days.

Important variables of the study were catheter removal day, length of hospital stay, weight of resected prostatic tissue, duration of resection, perioperative blood transfusion, acute urine retention after catheter removal, need for re-catheterization, re-admission in emergency, need for second operation, and post-operative complications within 6 weeks of surgery.

Patients attended follow-up evaluations at 2,4, and 6 weeks following their procedure. Assessments included reviewing clinical background, administering standardized urinary symptom questionnaires, conducting physical exams, analyzing kidney function markers, urine testing, microbial culture analyses (when indicated), and measuring urinary flow rates. This doctor did not know the actual grouping of patients and collected all the data. The data was entered in a pro forma format and analyzed using SPSS-17. Means and standard deviations were used to describe quantitative data, as well as frequencies and proportions for categorical or dichotomous data. Tests of significance included an independent sample t-test for quantitative outcome data and a Chi-square test for categorical outcome data. A 95% confidence interval was used. A *P-value* of less than 0.05 was considered significant.

Results

The study included 320 patients. One hundred sixty-three patients were in Group A (standard/conventional catheter removal group), and 157 were in Group B (early catheter removal group). The average age was 71.32±5.94 years.

Group A exhibited a mean excised gland mass of 46.67±9.133 grams compared to 45.22±7.532 grams in Group B. The Mean duration of resection was 53.05±10.057 minutes. Blood transfusion was required in 20 (6.2%) cases in the perioperative period. Out of these 13 (4.06%) cases that required transfusion in the preoperative period, they had preoperative hemoglobin of less than 10 gm/dl. Seven (2.1%) patients had bleeding in the immediate postoperative period requiring transfusion.

The mean catheter removal day was 4.13±1.65 days in the standard catheter removal group (A) and 1.23±0.933 days in the early catheter removal group. Group-B catheter was not removed on the first postoperative day in 6 (3.8%) cases because they did not meet the early catheter removal criteria. The mean length of hospital stay in group A was 3.57±1.028 days; in group B, it was 1.29±1.03 days. In Group B, 12 (7.6%) cases were not discharged on the first postoperative day. In group A, 15 (9.2%) cases were discharged with a catheter and asked to come for catheter removal after a few days. There was no significant difference between the two groups regarding postoperative complications. (Table-1) Trial without catheter failed in 15 (9.2%) cases in Group A and 10 (6.4%) cases in Group B. These patients required catheterization.

The trial documented low sodium levels due to fluid imbalance in five patients (three in Group A and two in Group B), resolving with medical intervention by extending their hospitalization. Emergency readmission was seen in 5 cases in Group A and 2 cases in Group B. Secondary bleeding with clot retention and urinary tract infection were the leading causes of readmission. These patients required catheterization, continuous bladder irrigation, and intravenous antibiotics. Surgical reintervention for clot removal and electrosurgical cauterization was performed in four cases (3 (0.9%) cases in Group-A and one 0.3% in Group-B). No fatalities occurred during the trial.

Table 1: Postoperative Complications

Postoperative Complications	**Group A**		**Group B**		***p***
	N	%	n	%	
Failed TWOC	15	4.7	10	3.1	>0.05
Re-catheterization	15	4.7	10	3.1	>0.05
Clot retention	14	4.4	8	2.5	>0.05
Urinary tract infection	6	1.9	3	0.9	>0.05
Dilutional hyponatremia	3	0.9	2	0.6	>0.05
Epididymoorchitis	2	0.6	1	0.3	>0.05
Haemorrhage	9	2.8	7	2.2	>0.05
Atrial fibrillation and CCF	0	0	1	0.3	>0.05
Re-admission	5	1.6	2	0.6	>0.05
Re-operation	3	0.9	1	0.3	>0.05

Discussion

The time of removal of the catheter after TURP varies significantly. Removing the catheter on the fourth or fifth postoperative day is a standard practice in our ward. Most of our patients belong to remote areas where proper health care facilities are unavailable; the nearest hospitals are 12–24 hrs distance, so the patients usually do not want to be discharged early. However, many studies report that early catheter removal is safe and cost-effective (3–5, 9). Some authors even carry out TURP as day case surgery (10). A study by Mueller *et al* reported that the mean cost saving of early catheter removal after TURP was $829 and $1406 for patients aged <70 and >70 years, respectively (9).

Aslan *et al* reported that in 79.6% of patients, the catheter was removed on the first postoperative day, and the mean hospital stay was 1.4 days (11). Nakagawa *et al* reported that in 96.3% of patients, the catheter was removed on the first postoperative day, and 80% were discharged on the same day. The author suggested that the difference in the percentage of catheter-free patients on the first postoperative day between their study and other studies might be due to improved anesthesia technique and more meticulous hemostasis (3).

In our study, the catheter was removed in 96% of the early catheter removal group cases. A strong correlation was seen between the catheter removal time and hospital discharge. The length of hospital stay was significantly reduced in the early catheter removal group. Several risk factors have been identified as predictors of delayed catheter removal and delayed discharge from the hospital. A study by Nakagawa *et al* suggested that age, postoperative bleeding, and comorbidities predicted delayed catheter removal (3). Weight of resected prostate tissue and duration of resection have also been reported by many studies as important risk factors for delayed catheter removal (6, 12). In a study by Kirollos MM, the mean weight of resected prostatic tissue was 31.6±22.9grams, strongly correlated with length of hospital stay. In our study, the mean weight of resected tissue was higher than in most Western studies. This difference in weight may be due to the late presentation of our patients. Most of the patients delay the hospital visit and surgery because of poor socioeconomic conditions or lack of awareness. The mean weight of resected tissue is similar to that of Romania, Eastern Europe, and other local studies (2, 13–17). Retention after catheter removal was not significantly different between the two groups. Under contractility of the aged detrusor, caused by axonal and muscular degeneration or persistent urethral obstruction after TURP, is believed to be responsible for postoperative retention. (2, 18). In short, early catheter removal shortens the length of hospital stay, which reduces the burden on the health care system. This is especially beneficial in our setup, as there is a shortage of beds in the hospitals. Short hospital stays are also advantageous for patients, as most patients belong to villages, are underprivileged, and cannot afford extended leave from work. Short follow-up and small sample sizes were the significant limitations of our study.

Conclusion

Removal of the catheter on the first postoperative day after transurethral prostatectomy in selected patients does not increase the postoperative complications and results in shorter hospital stay.

Declarations

Data Availability statement
All data generated or analysed during the study are included in the manuscript.
Ethics approval and consent to participate
Approved by the department concerned. (IRBEC-IRBEC-24)
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Conflict of interest

The authors declared the absence of a conflict of interest.

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All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.

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