

## Is Post Operative Catheter Traction is Necessary Need of Transurethral Resection of Prostate Surgery in Moderan Day Urology

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## Abstract

## Original Research Article

Incomplete homeostasis during monopolar transurethral resection of prostate (TURP) makes post-surgical bleeding one of its major draw-back. Proponents of catheter traction and irrigation claim that these reduce the incidence of bleeding from prostatic fossa and catheter blockage. This study proves that there is no need of post-operative catheter traction and irrigation if meticulous haemostasis is achieved intra-operatively. This way we can reduce the discomfort to the patient and the early and long term complications of monopolar TURP. **Methods and Material:** In this study, data of 645 patients who underwent monopolar TURP over 5 years (January 2015 to December 2019) was collected retrospectively. Patients were enrolled in two groups based on operative techniques and post operative management in terms of their protocols regarding application of catheter traction and irrigation. We compared the results in these groups. **Results:** Post-operatively 388 patients were managed with catheter traction and irrigation (Group A) while 245 patients were managed without catheter traction and irrigation (Group B). Episodes of catheter blockage, catheter change in ward, need of cystoscopic clot evacuation, drop in hemoglobin level, duration of post operative catheterization and duration of hospital stay were statistically significantly low in Group B. While post-op culture positive UTI was less in group B, which was statistically not significant. **Conclusions:** If meticulous hemostasis techniques are followed and post operative urine output is maintained adequately, monopolar TURP without catheter traction and irrigation is preferable, safe and has fewer complications in comparison to TURP with irrigation and traction.

**Keywords:** TURP, Catheter traction, Irrigation, TURP hemostasis, Bladder wash, Post TURP clot retention.**Abbreviations:** TURP-transurethral resection of prostate, PSA- prostate specific antigen, PVRU-post void residual urine, UTI- urinary tract infection, DVT- deep vein thrombosis, CBC- complete blood count.

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## INTRODUCTION

Although several methods of prostatectomy have been introduced TURP remains the gold standard procedure for most urologists. The use of irrigation after TURP is well-established and widely used practice with an aim to reduce post operative clot retention [1, 2]. Post TURP catheter traction is also being used commonly to prevent and control post operative prostatic fossa bleeding.

Incomplete homeostasis during the operation makes post-surgical bleeding one of the major drawback of monopolar TURP. This complication is claimed to be less with the newer methods like laser prostatectomy or bipolar TURP. Inducing pressure on the prostate neck using an indwelling catheter by giving

traction is one of the most commonly used techniques to control post prostatectomy bleeding following monopolar TURP [3]. On the other hand, it restricts patient's mobility following surgery significantly increasing chances of DVT. It reduces lumen diameter of the catheter available for irrigation and it also causes discomfort to the patient.

When there is active bleeding from the prostatic fossa, use of irrigating fluid may reduce the incidence of clot formation and episodes of urine retention following catheter blockage by clot. Proponents of "irrigation" claim that it reduces the incidence of catheter blockage and requirement of change of catheter [4]. They also claim that it decreases the episodes of clot retention in bladder and need for further cystoscopic intervention. Conversely proponents

of "no irrigation" argue that (1) clot retention is uncommon and they feel that normal urine flow with or without diuresis is sufficient to avoid the formation of clots [5]. (2) Furthermore, it has been suggested that continuous irrigation may delay the homeostasis and increase the risk of TUR syndrome [6]. (3) Continuous irrigation also increases discomfort and pain to patient particularly if a blocked catheter is not recognized quickly. (4) They also claim that there is increase in the incidence of UTI in patient who were kept on irrigation. The reason they give is frequent manipulation and disturbance of the close sterile system that was established intra- operatively.

In our institute, we routinely perform monopolar TURP both with and without catheter traction and saline irrigation. We assessed results of our experience over 5 years comparing both the techniques. In this study we evaluated operative techniques, results and early post operative complications in both the groups.

## AIMS AND OBJECTIVES

To compare the results of monopolar TURP- with and without post operative bladder irrigation and catheter traction in terms of (1) catheter blockage (2) need of bladder wash (3) catheter change in ward (4) incidence of clot retention (5) need of cystoscopic intervention for clot evacuation (6) fall in haemoglobin level (7) need of blood transfusions (8) duration of post operative catheterization (9) duration of hospital stay (10) and rate of post operative culture positive UTI.

## MATERIAL AND METHODS

Study data was collected retrospectively of patients who underwent standard monopolar TURP in Ruby Hall Clinic Hospital, Pune from January 2015 to December 2019 over 5 years. Total 645 patients who underwent monopolar TURP were selected for data analysis.

Patients were divided into 2 groups on the basis of their admission in respective unit, as both units followed different operative techniques and post operative management in terms of their protocols regarding application of catheter traction and bladder irrigation. Patients who got admitted in unit A were enrolled in Group A. Patients in this group had both post operative irrigation and catheter traction. Patients who got admitted in unit B were enrolled in group B. Patients in this group did not have post operative bladder irrigation and catheter traction.

Following parameters were compared in both groups. Preoperative haemoglobin, total leukocyte counts, serum creatinine, serum PSA, urine analysis, urine culture and uroflowmetry, ultrasound of abdomen for prostate size and post void residual volume. Post operative parameters like catheter blockage, need of

catheter change, need of bladder wash, clot retention, duration of hospital stay and post operative UTI were also compared. If patients were on higher anti platelet agents like clopidogrel, it was stopped 5days before surgery. Aspirin was continued if felt necessary by physician.

Group A included 388 patients. All patients in this group underwent monopolar TURP with resection up to the capsule. At the end of TURP, all major bleeders were secured. Haemostasis was carefully achieved. Roller ball electrode was not used to secure meticulous haemostasis.

All patients had 22 Fr, three way Foley's catheter with application of catheter traction for approx 16 hours. Catheter traction was given and fixed to patients' thigh. Irrigation was started with isotonic normal saline for 24 to 48 hours. Adequate continuous irrigation was maintained.

Group B included 257 patients. All patients in this group also underwent monopolar TURP with resection up to capsule. All patients were hydrated adequately pre-operatively and intra-operatively. And near the end of the procedure, 10 mg of IV furosemide was administered. Meticulous attention was given to the homeostasis during procedure including major bleeders as well as small venous bleeders. Roller ball electrode was always used to achieve adequate homeostasis. At the end of TURP, irrigation speed was minimized to look for bleeders and to coagulate the bleeding vessels.

All patients had 22 Fr three way Foley's catheter post TURP. At the end of TURP, while patient was still under anaesthesia and on the operating table, catheter traction was given manually. Traction was given to produce pressure on the bladder neck with 35 cc inflated balloon and this traction was maintained till the outflow colour change adequately to clear urine and it further continued for additional 3 minutes. This manoeuvre was performed in all the cases in this group to assure that we achieve clear urine on the operation table. No catheter traction was applied. No bladder irrigation was started. Blood transfusion in post operative period was avoided in both the groups unless the haemoglobin level dropped to less than 10mg/dl.

12 out of 257 patients required continued catheter traction either due to intra-operative inadequate hemostasis and presence of reddish urine even after 3 minutes of manual catheter traction or due to post-operative bleeding. These 12 patients were excluded from group B. Though these patients were excluded, they also were never given continued catheter traction for more than 1 hour in post-operative period. Continuous irrigation was not given in any of these patients.

In both the groups, IV fluids were administered at the rate of 100 ml/hour for the first 12-14 hours. Post operative urine output was monitored every six hourly. If there is sudden drop in urine output, then an impending catheter block is anticipated. If in doubt, a screening ultrasound was done to look for clot retention if required.

On the first post-operative day CBC, serum creatinine and electrolytes were assessed in all patients. Majority of the patient in group B were discharged on either 1<sup>st</sup> or 2<sup>nd</sup> post operative day with an indwelling catheter. At discharge, the catheter balloon was deflated to 15cc. While in group A, all patients were discharged after removal of catheter. Duration of catheter in situ was noted in hours. Post-op antibiotics were given for 7-10 days. In the follow-up period, a urine culture was done at 2 weeks.

### Statistical Analysis

All statistical analyses were performed using SPSS ver.16.5 (Statistical Package for Social Sciences for Windows 16.5 Inc., Chicago, IL, USA). For parameters that did not show normal distribution, the nonparametric Mann-Whitney U-test was used to compare them. Between groups, analysis was performed using the chi squared test.

## RESULTS

During study period, total 645 patients underwent standard monopolar TURP. Average age was 68.56 years (SD  $\pm$  8.4 years) in the first group while 67.24 years (SD  $\pm$  9.1years) in the second group. Among our total study patients, 304 (43.12%) had hypertension, 256 (36.31%) had diabetes, and 92

(13.04%) patients were on anticoagulants preoperatively.

In group A, mean prostate size was 55.23 gm ( $\pm$  30.78 gms). Average resected weight of prostate was 28.12 gm. In the post operative period, 38(9.79%) patients had catheter blockage. Out of these, 12 patients (3.4%) required catheter change in the ward. 15 (3.86%) patients had clot retention and cystoscopic clot evacuation was needed in 10 patients (2.85%). 4 patients (1.14%) required blood transfusion and average fall in hemoglobin was 1.98gm/dl. Average duration of post operative catheter was 86.2 hours and average hospital stay was 5.23 days. On follow up, incidence of post operative culture-positive UTI was observed in 38 patients (9.85%).

In group B patients, mean prostate size was 51.62 ( $\pm$ 28.1 gms). Average resected weight of prostate was 27.25 gms. In the post operative period, 5 (2%) patients had catheter blockage and among these no patient required catheter change in the ward. Only 1 (0.4%) patient had clot retention and cystoscopic clot evacuation was required in him. One (0.4%) patient required blood transfusion and average haemoglobin fall was 1.32gm/dl. Average duration of post operative catheter was 63.4 hours and average hospital stay was 2.1 day. On follow up, incidence of post operative culture-operative culture UTI was observed in 18 patients (7.5%).

Upon analysis of all patients who required blood transfusion, large prostate size was found as a striking feature. The average prostate size in patients who required blood transfusion was 92gm (Table-1).

**Table-1: Comparison between group A and group B**

Result	With catheter traction and bladder irrigation	Without catheter traction and irrigation	P value	Significance
Number of patients	388	245	----	----
Mean prostate size	55.23 ( $\pm$ 30.78)	51.62 ( $\pm$ 28.1)	----	----
Catheter blockage	38 (9.79%)	5 (2%)	0.0003	Significant
Catheter change in ward	12 (3.4%)	Nil	0.003	Significant
Clot retention	15 (3.86%)	1 (0.4%)	0.006	Significant
Cystoscopic clot evacuation	10 (2.85%)	1 (0.4%)	0.028	Significant
Blood Transfusion	4 (1.14%)	1 (0.4%)	0.003	Significant
Average HB fall	1.98gm/dl	1.32 gm/dl	0.001	Significant
Duration of Post op catheter	86.2 hrs	63.4 hrs	0.0001	Significant
Average hospital stay	5.23days	2.1 days	0.0001	Significant
Post op UTI	38 (9.85%)	18 (7.5%)	0.313	Not significant

**Table-2: Comparison of studies with monopolar TURP without irrigation**

	GILLIN E MOBB, D.J. FARRAR	BRITTON JP, FLETCHER MS	PRASANNAKUMAR K, VENKATESH	OUR STUDY (NO IRRIGATION GROUP)
N	121	100	900	245
Resected Prostate weight	23.04 gm	31 gm	21.6 gm	27.25 gm
Catheter blockage	29 (23%)	66 (66%)	45 (5%)	5 (2%)
Bladder wash	23 (19%)	66 (66%)	23 (2.55%)	5 (2%)
Catheter change	6 (4.95%)	NIL	22 (2.45%)	Nil

**Table-3: Comparison of studies with monopolar TURP with irrigation and without irrigation**

	Without post-op irrigation and Catheter traction	With post-op irrigation and Catheter traction			
	present study	Present study	Mayer et al.,	Reich O et al.,	Mebust et al.,
Number of patients	245	388	3470	10654	3885
Average Prostate size (gm)	51.62	55.23	47.6	44.5	45
Resected Weight (gms)	27.25	28.12	25.8	28.4	22
Clot retention (%)	0.4	3.86	7.2	-	3.3
Blood Transfusion (%)	0.4	1.14	4.4	2.9	6.4
Duration catheterization (days)	2.5	3.5	2.5	-	3
Duration of hospital stay (days)	2.1	4.23	3.6	8	5
Post operative culture positive UTI (%)	7.5	9.85	6.8	3.6	2.3

## DISCUSSION

TURP is considered as the gold standard in surgical treatment of symptomatic bladder outlet obstruction secondary due to the Benign Prostatic Hyperplasia (BPH) [1, 2, 7]. Haemorrhage and clot formation are the most common complications associated with TURP procedure. Both of these can be reduced by good intra operative haemostasis and adequate post operative bladder drainage.

### (A) Resection of prostate up to capsule and meticulous haemostasis

Post resection arterial bleeding is easy to identify by either direct spurt or bouncing spurt and can be easily fulgurated. However seeing venous bleeding is more difficult as it often disappears with a full bladder because of the resultant pressure on the prostatic venous channels [8]. Furthermore, rapid influx of irrigation fluid makes identification of venous bleeding more difficult. All these factors make stopping of the venous bleeding more challenging. In group B, good intra operative haemostasis was achieved; (1) firstly by routine use of a ball electrode to coagulate venous bleeders in prostatic fossa and (2) by looking for bleeders in prostatic fossa with partially filled bladder, irrigation outflow continues but without irrigation influx at the end of procedure. This helps in visualisation even smallest venous bleeders. They can be coagulated and thus on the operating table clear irrigation can be achieved. As mentioned earlier, at this stage a catheter is inserted and traction is given only on the operation table till clear irrigation is seen coming from the full

bladder. After that, further 3 minutes traction is maintained to confirm the clear urine on the OT table.

### (B) No traction, early ambulation and reduced risk of deep venous thrombosis

With the above mentioned precautions, we do not put traction on the catheter. We strongly believe that it increases discomfort to the patient. Due to immobility, especially in the post operative period following pelvic surgery, it increases the risk of deep venous thrombosis [9]. Thus by avoiding traction, we allow early ambulation in the post operative period.

### (C) Adequate post operative urine output

The second important aspect of avoiding clot formation is maintaining adequate bladder drainage. Clot retention is uncommon and normal urine flow with or without diuresis is sufficient to avoid the formation of clots [5]. In group A, irrigation of bladder with normal saline was started as described earlier to maintain adequate output. In group B, adequate urine output was maintained for sufficient bladder drainage. In an attempt to do that, patients were hydrated well during pre-operative and intra-operative period. We administered 10 mg of diuretic towards the end of the procedure. In the post operative period, intravenous fluids were administered at the rate of 100ml/hour for the first 8 hours. If we found that intake was inadequate in post operative period, intravenous fluids were continued to maintain output.

**(D) Less bleeding and less fall in haemoglobin level**

This study states average fall in hemoglobin was 1.32 gm/dl in group B compared to 1.82 gm/dl in group A. Fall in hemoglobin level was significant in patients with continuous irrigation compared to patient without irrigation. As continuous irrigation prevents physiological clotting formation in prostate fossa, there is continuous loss of blood along with the irrigation fluid.

**(E) Reduced nursing burden and cost saving**

Continuous traction and its associated discomfort and immobility results in increased nursing burden. Continuous irrigation also causes repeated visits by nurses and doctors. As shown in Table-1, no traction and no irrigation policy has resulted in decreased catheter blockage, change of catheter, clot retention and resultant need of clot evacuation. This significantly reduces cost to the patient. Following is the cost analysis in relation to Indian hospital system for stay in the private room. Total saving per case is approx 23,200 rupees (US \$ 370) which are probably 25% of the total case cost.

1. Average 15 bottles/patients- Rs:3200
2. Cost of hospital stay including medical and nursing care –Rs20,000

**(F) Reduced UTI episodes and maintenance of close system**

The study clearly establishes that a close sterile system of the catheter and the urine bag, inserted in the operation theatre, is preferable and should not be disturbed. In group A, due to the irrigation and associated catheter problems, the sterile system repeatedly gets disturbed. This results in increase in the incidence of UTI, in spite of taking all the aseptic precautions during the catheter manoeuvre.

**(G) Hospital stay**

Catheter traction and irrigation also results in delayed ambulation. This delays the whole post-operative management and increases the hospital stay. As seen in group A, average duration of hospital stay was 5.23 days; while in group B, average duration of stay was 2.1 days. Increase stay in hospital results in more morbidity and increased chances of hospital acquired infections. This will also lead to increase in final cost of surgery.

There were three studies available where TURP patients were managed post-operatively without irrigation. Data of these studies was compared in Table-2. In these three studies, we found that the respected prostate weight was comparable. The number of patients in our study requiring bladder washouts (2%) was far lesser as compared to the others studies (23%-65%) (Table-2).

Comparing our data with available other large meta-analysis of patients managed with irrigation after a standard monopolar TURP, we found that pre operative prostate gland and resected weight of the prostate, post operative UTI were comparable. Requirement of blood transfusion was comparatively lesser in our study as compared to other 3 studies. The duration of catheterization is comparable to the rest of the studies (Table-3).

**CONCLUSION**

Monopolar TURP without catheter traction and irrigation is safe and has fewer complications in comparison to TURP with irrigation. Catheter traction and irrigation is not necessary after TURP if meticulous attention is given to the haemostasis techniques in controlling bleeding during the procedure e.g. use of ball electrode, confirming clear returning fluid on the table and 3 min continuous traction after getting clean returning fluid on the table.

The Advantages with no catheter traction and irrigation policy are:

1. Reduced patient discomfort by avoiding catheter traction
2. Early ambulation and reduced risk of deep venous thrombosis
3. Less bleeding and less fall in post operative Hemoglobin level
4. Reduced nursing burden and cost saving
5. Less duration of hospital stay and possible to discharge even on first post operative day
6. Reduced incidence of post operative UTI.

**Conflict of interest:** None

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