

## IS IRRIGATION NECESSARY AFTER MONOPOLAR TURP? OUR 11 YEARS EXPERIENCE

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### Abstract

#### Objective:

This study was conducted to evaluate efficacy and safety of monopolar transurethral resection of the prostate without post operative irrigation.

#### Methods:

During the period between Jan 2004 and Dec 2014. A total of 993 patients underwent monopolar transurethral resection of the prostate (TURP) in our hospital. All patients were evaluated pre-operatively for prostate size and co morbidities. We performed standard monopolar TURP in all the patients. Meticulous attention was given for hemostasis during the procedure and irrigation was not started. Post-operatively patients were closely monitored for 3rd hourly urine output, hospital stay, catheterization time, need for blood transfusion and complications were recorded. Outcomes were compared with results reported in literature on TURP with irrigation

#### Results:

A total of 993 patients underwent monopolar TURP. The average age was 66.1 years. 505 (54%) had hypertension, 354 (37.7%) had diabetes and 140 (14.9%) had ischemic heart disease. Mean preoperative prostate weight was 47.1 gm. The mean weight of resected prostate tissue was 21.6gm. 900 (96.25%) were managed without irrigation and 35 (3.74%) required irrigation postoperatively. Post-operatively blood transfusion was required in 19 patients (2.04%), bladder wash in 23 (2.4%), clot retention occurred in 2.3%, mean duration of catheterization was 48 hours and hospital stay was 3.2 days.

#### Conclusion:

Monopolar TURP without irrigation is safe, and has comparable complications in comparison TURP with irrigation. Irrigation is not always necessary after TURP if meticulous attention is given to the technique in controlling bleeding during the procedure.

**KEY WORDS:** TURP, Irrigation, Bladder wash, Clot retention.

## **ABBREVIATIONS:**

TURP- Transurethral resection of the prostate

UTI- Urinary tract infection

TUR syndrome - Transurethral resection syndrome

IHD- Ischemic heart disease

## **INTRODUCTION:**

The use of irrigation after transurethral prostatectomy is a well-established and widely used practice to reduce post-operative clot retention<sup>1,2</sup>. Although, the use of irrigating fluid may reduce the incidence of clot retention<sup>3</sup>, it has been suggested, that it may delay the hemostasis and increase the risk of TUR syndrome, particularly if a blocked catheter is not recognized quickly<sup>4</sup> and also it restricts patient mobility.

Proponents of irrigation argue that, if a patient requires catheter manipulation or clot evacuation, it increases the chance of UTI. Conversely proponents of “no irrigation” argue that, clot retention is uncommon and feels that normal urine flow with or without diuresis is sufficient to avoid the formation of clots<sup>5</sup>.

In our institution, we routinely perform monopolar TURP without irrigation. We evaluated the early postoperative complications, like need for bladder irrigation, bladder wash, catheter change, clot retention and fall in hemoglobin, duration of hospital stay, improvement in uroflow and post-operative UTI.

These are the results of our experience over the past 11 years.

## **AIMS AND OBJECTIVES :**

To assess the safety and efficacy of TURP - without post operative bladder irrigation, in terms bladder wash, catheter change, clot retention, duration of hospital stay, and post-operative UTI.

## **MATERIALS AND METHODS:**

The study was conducted retrospectively in NU Trust Hospitals, Bengaluru from January 2004 to December 2014 over 11 years, during which 935 patients underwent TURP without irrigation. All the patients selected for our study were evaluated preoperatively with hemoglobin, total leucocyte count, urinalysis, urine culture and uroflowmetry. Ultrasound abdomen was done to evaluate the prostate size, post-void residual volume. If patients were on Clopidogrel, it was stopped 5 days before surgery and Aspirin was continued.

We performed standard monopolar TURP in all the patients. Majority of TURP's were performed by a single surgeon (90%) and rest by assistant surgeons under the supervision who followed same technique and protocol. Meticulous attention was given to the hemostasis during procedure. At the end of TURP, irrigation speed was reduced to look for bleeders. Every attempt was done to coagulate even the venous bleeders. Once the hemostasis was adequate, 10 mg of IV Furosemide was administered and a 18 Fr, 2-way Foley catheter was inserted after inflating the balloon to 10 ml without applying any traction. IV fluids were administered at the rate of 100 ml/hour for the first 24 hours.

Postoperative urine output was monitored every 3<sup>rd</sup> hourly. If 3<sup>rd</sup> hourly urine output was lesser than 200 ml, then anticipating an impending catheter block, a screening ultrasound was done to look for clot retention. On the first post-operative day, we obtained hemoglobin to assess the blood loss. Foley catheter was removed after 48 hours. Following catheter removal, an uroflowmetry and ultrasound pre-post void was done to assess the improvement in urine flow and residual urine. Majority of the patients were discharged on 3<sup>rd</sup> post operative day. In the follow up period, a urine culture was done at 2 weeks. The outcomes obtained in our study were compared with the available literature on TURP with irrigation.

### **Statistical analysis used**

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 were performed using the chi squared test.

## RESULTS

During study period, total 935 patients underwent standard monopolar TURP. The average age was 66.1 years (SD 9.4). The mean prostate size was 47.65 gm (+28.8). Among which 505 (54%) had hypertension, 354 (37.7%) had diabetes, 155 (15.9 %) had IHD and 77 patients were on anticoagulants preoperatively. pre-operative urine culture was positive in 131 (14%) patients.

The mean resected prostate weight was 20.96 gm. In the post operative period 35(3.74%) patients required irrigation. 22 (2.3%) patients had clot retention and 19(2.03%) required blood transfusion. Bladder wash was needed in 23 patients (2.40%) and 22 patients (2.3%) required catheter change. Average hospital stay was 3.2 days and incidence of post operative culture-positive UTI was observed in 64 patients (6.8%). The average hemoglobin fall was 1.52gm/dl. The mean increase in Qmax was 11.95ml/sec (10.88→22.83) and the mean increase in average flow was 7.52ml/sec (5.44→12.96).

Upon analysis of 19 patients who required blood transfusion, the striking feature was the large prostate size. The average prostate size in these patients was 95 gms with the average resected weight of 49.7 gms. Among which 11 patients had more than 100 gms prostate. On compared to the remaining patients (average prostate size 47.1gms) who did not require bladder wash, the patients who required bladder wash had larger prostate, more resected weight and also more time taken for the resection.

Of the 23 patients who required bladder wash post-operatively, 19 patients had clot retention and rest of the 4 patient's catheter was blocked due to other reasons. Catheter change was required in 22 of these patients (2.35%).

Total number TURP	935	
Without irrigation	900	96.26%
With Irrigation	35	3.74%
Blood transfusion	19	2.03%
New Post op UTI (culture positive)	64	6.8%
Bladder wash	23	2.4%
Catheter change	22	2.35%
Clot retention	19	2.03%
Average Hospital stay	3.2 days	
Increase in Q max	11.95ml/sec	
Increase in average flow	7.52ml/sec	

## **DISCUSSION**

Since the introduction of TURP by Nesbit in 1943<sup>7</sup>, TURP has been considered as the gold standard in surgical therapy, of symptomatic bladder outlet obstruction secondary to the BPH<sup>1,2,9</sup>. TURP procedure has always been associated with risk of hemorrhage and clot formation. Hemorrhage and clot formation can be reduced by meticulous hemostasis and adequate post operative urine output.

While post resection the arterial bleeding is evident even with irrigation and its precise fulguration is easy, venous bleeding can be more vexing and will often disappear with a full bladder because of the resultant pressure on the prostatic fossa. Identifying venous sinuses may be difficult owing to the lack of bleeding with rapid irrigation influx, and controlling of the bleeding with fulguration may be even more challenging<sup>8</sup>.

In view of this difficulty in identifying venous bleeders we have developed a protocol in our hospital. Firstly towards the end of the TURP we reduce/stop the irrigation and empty the bladder to reduce the pressure in prostatic fossa and look for venous bleeders. We then meticulously coagulate the venous bleeders. It is a difficult task to completely coagulate all the venous bleeders, as aggressive coagulation might aggravate hemorrhage by opening up even more venous sinuses and can cause breach in the prostatic capsule. We routinely use a ball electrode to coagulate venous bleeders.

The second important aspect of avoiding clot formation is maintaining adequate urine output. We developed a protocol to maintain adequate output postoperatively by three ways

- 1) Intra-operatively we hydrate the patient with an average of 2 liters of fluids.
- 2) Once we felt hemostasis was adequate, a single dose of diuretic is administered.
- 3) In post-operative period, IV fluids were administered at the rate of 100 ml/hour for the first 24 hours and urine output was strictly monitored every 3<sup>rd</sup> hourly. If the urine output was lesser than 200 ml, we examined for signs and symptoms of obstruction and we also did a screening ultrasound to look for clot retention. If there was no evidence of obstruction, we then specifically look at the patient's fluid intake as it is generally overlooked most of the times. If intake was inadequate, appropriate fluid boluses were given to maintain output.

With our modified technique and protocol, we could manage majority of the patients (96.26%) without irrigation. On analysis of 35(3.74%) patients who required irrigation, in 28 patients irrigation was started

immediate post op in anticipation of clot retention. The factors which necessitated us to start irrigation in these group of patients are, persistent bleeding from the prostatic fossa despite the best effort of hemostasis (16), chronic kidney disease with a poor urine output(7), intraoperative hypotension(2) and continued anticoagulants(2). Remaining 8 patients required bladder irrigation in the ward.

In patients who required irrigation, the mean prostate size was 68.3 gm compared to 46.5 gm ( $p < 0.001$ ) in non irrigation patients. The average weight of the prostate resected in irrigation patients was 31.6 gm compared to 21.6 gm in non irrigation patients.

This article is the audit of our above practice. We have compared our results with data available in the literature where patients have been managed with and without bladder irrigation.

### **Comparison with monopolar TURP without irrigation**

There were two studies available, where TURP patients were managed postoperatively without irrigation. In those two studies, we found that the resected prostate weight was comparable. The number of patients in our study requiring bladder washouts were far lesser (2.4%) compared to the other studies (23%-75%).

TURP without post operative bladder irrigation			
VARIABLES	OUR STUDY	J FARRAR 1993 <sup>4</sup>	HARRISON 1992 <sup>5</sup>
Number of patients	935	121	200
Without irrigation	900 (96.26%)	113 (93.4%)	100 (50%)
With irrigation	35 (3.74%)	8 (6.61%)	99 (50%)
Resected weight(gm)	21.6	23.04	31
Bladder washouts	23 (2.4%)	29 (23.9%)	74 (75%)

### **Comparison of monopolar TURP with irrigation and without irrigation**

On comparing our data with available large meta-analysis of patients managed with irrigation after a standard monopolar TURP, we found that age of patients, pre operative prostate gland and resected weight of the prostate, post operative culture positive UTI were comparable. Requirement of blood transfusion (2.03%) was comparatively lesser in our study compared to the other 3 studies (4.4, 2.9, 6.4) respectively and clot evacuation rate was 2.3% in our study compared to 7.2% and 3.3%. While the duration of catheterization is comparable to the rest of the studies. One more meta analysis study done by

Ahyai et al in 2010<sup>9</sup> also had reported similar rates of blood transfusion (2%) and lesser post op UTI(4.9%) and higher incidence of clot retention(4.8%) compared to our study.

Post operative improvement in Q max in our study was 11.95ml/sec compared to other studies by Hirik et al. 2015<sup>11</sup>, was 20.2ml/sec, Mamoulakis et al 2012<sup>10</sup> was 20ml/sec.

	Without post operative bladder irrigation	Meta analysis TURP studies with post operative bladder irrigation		
Study	Our study	Mayer 2012 <sup>9</sup>	Reich 2008 <sup>8</sup>	Mebust 1989 <sup>3</sup>
Number of patients	935	3470	10654	3885
Age (years)	66.1	67	71	69
Preoperative gland size(gm)	47.1	47.6	44.5	45
Resected weight(gm)	21.6	25.8	28.4	22
Duration of catheterization(days)	2	2.5		3
Duration of hospital stay(days)	3.2	3.6	8	5
Blood transfusion(%)	2.03	4.4	2.9	6.4
Clot retention(%)	2.03	7.2		3.3
Post op UTI	6.8	6.8	3.6	2.3

What is it that we do differently that makes our post operative complications less even though we don't use irrigation? We feel that, we coagulate even the venous bleeders and use low coagulation settings (30watt) compared to standard practice of 60-90 watt. We use diuretics at the end of the procedure and maintain adequate output and close monitoring of patients.

### **ADVANTAGES OF WITHOUT IRRIGATION**

Urine output monitoring was easy as it was once in three hours. There was lesser nursing burden as there the number of nursing action were reduced, and time could be given to monitor vitals rather than keeping a watch on the bag and inflow. If we take cost into consideration an internal audit in our hospital revealed that we could save around 1700 rupee in each patient if irrigation was not started. In our study we managed 900 patients without irrigation. So it accounts for about 15 lakh direct savings.

## **LIMITATIONS OF STUDY**

Although collection of data was being done prospectively since 2004, analysis of the data was retrospective.

All the TURP procedures are not done by a single surgeon.

We have not looked in to long term complications like stricture, incontinence.

## **CONCLUSION**

Monopolar TURP without irrigation is safe, and has comparable complications in comparison TURP with irrigation. Irrigation is not always necessary after TURP if meticulous attention is given to the technique in controlling bleeding during the procedure

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