

A Randomized-Controlled Trial Comparing an Abdominally-Anchored Urethral Catheter versus a Thigh-Anchored Urethral Catheter in Controlling Bleeding and Pain After Transurethral Resection of the Prostate

Christian Dale R. Feri, MD and Rufino T. Agudera, MD, FPUA

Department of Urology, Jose R. Reyes Memorial Medical Center

Objective: To compare the effectiveness of abdominal placement of indwelling Foley catheter (IFC) versus thigh traction in the prevention of bleeding and pain after transurethral resection of the prostate (TURP).

Patients and Methods: This randomized, controlled trial involves 91 patients who underwent TURP at JRRMMC. After TURP, 46 patients were inserted with a urethral catheter which was then anchored to the thigh and placed on traction, while the catheter was anchored to the abdomen without application of any traction in the remaining 45. A simple dipstick test was used to check for the presence of blood in urine on the 12th and 24th hour after the surgery. Intensity of pain from the catheter was assessed prior to discharge using a visual analogue score (VAS).

Results: There were no significant differences between the two groups in terms of the amount of blood in the urine at the 12th hour ($p=1.00$) and 24th hour ($p=0.427$) after TURP. The mean VAS score was significantly higher for the thigh traction group (5.17 vs 1.51, $p=0.0001$). Additionally, there were more patients in the IFC thigh traction group who complained of moderate (65% vs 4.4%, $p=0.0001$) and severe (20% vs 4.4%, $p=0.0001$) pain.

Conclusion: Abdominal placement of IFC post TURP is an effective, safe and comfortable way in controlling post-operative bleeding post-TURP. This method can provide better pain control.

Keywords: Transurethral Resection of the Prostate (TURP), abdominal placement, thigh traction, bleeding

Introduction

An Indwelling Foley Catheter (IFC) placed on thigh traction has been the traditional practice of Filipino urologists in controlling perceived or anticipated hemorrhage after TURP. This procedure is done by pulling the catheter to the patient's thigh and fixing it using a tape mesentery for 24 hours. In this method, the catheter balloon is drawn towards the

bladder neck and prevents prostatic bleeding from entering the bladder.

TURP is the gold standard in the operative management of bladder outlet obstruction caused by benign prostatic hyperplasia (BPH).^{1,2} TURP underwent significant technical improvements during the last decade with major impact on the incidence of intra- and postoperative complications.³ Blood loss during and after TURP is a potential cause of morbidity and occasional

mortality. Various methods have been advocated to control bleeding after TURP, including traction to an indwelling catheter.⁴

There are several studies^{4,7} on the control of bleeding after TURP using thigh traction but there has been no published data on abdominally-anchored catheter on Filipino patients. Abdominal placement of IFC without traction is feasible as long as adequate hemostasis is done during prostate tissue resection. It may produce less post-operative pain because there is no pressure from placing traction on the catheter.

This study will evaluate and compare the effectiveness of abdominal anchor versus thigh traction of IFC in the management of perceived or anticipated hemorrhage and pain after transurethral resection of the prostate.

Patients and Methods

All patients with benign prostatic obstruction who underwent transurethral resection of the prostate from January 2017 to August 2018 at JRRMMC were included in this study. Excluded were patients diagnosed with prostate cancer and those with other concomitant problems like urethral stricture disease, cystolithiasis, etc. Preoperatively, a letter of informed consent was given and the procedure was carefully explained to them. The Nesbit technique for TURP was done for all cases in this study.¹ After the surgery, a Fr22 3-way indwelling Foley catheter was inserted into the patient's urethra. A 30ml of water was placed in the Foley catheter balloon port.

Patients were randomly selected by systematic sampling to having thigh traction on the catheter versus abdominal placement without traction. Patients were unaware as to where they would be assigned. Patients assigned to the thigh traction group had their IFC fixed to their inner thigh. Traction was maintained until the first post-operative day. On the other hand, patients assigned to the abdominal placement group had their IFC anchored on their hypogastric area without applying any traction.

All patients had continuous 0.9% Normal Saline Solution (NSS) cystoclysis attached at a rate of 80gtts/min up to the first 24 hours post-operatively.

A simple dipstick test was used to check for the presence or absence of blood in urine on the 12th and 24th hour after the surgery. The level of hematuria was classified following the dipstick criteria. (See figure below)

Intensity of pain from the catheter was assessed using a visual analogue score (VAS) where pain was rated 0 to 10. Scores were categorized into No Pain (0), Mild Pain (1-3), Moderate Pain (4-6), Severe Pain (7-10). VAS was taken prior to discharge of the patient.

Chi-square test was used to analyze categorical variables while the t-test was used to analyze continuous variables. A p value of 0.05 was considered significant. All analyses were performed using SPSS version 20.0.

This study was approved by the Institutional Review Board (IRB) of JRRMMC.

Dipstick reading	Estimated amount of blood in urine (RBC/u/L)	Colorimetric result
Absence of Blood	0	Orange
Small Amount	~ 25	Light green
Moderate Amount	~ 80	Olive green
Large Amount	~ 200	Dark olive green

Results

A total of 91 patients were included in this study. Forty six patients were from IFC thigh traction group while the remaining 45 were from IFC abdominal placement without traction. The two groups were similar in terms of age, prostate size on rectal examination, prostate size on ultrasound, operative time and length of hospital stay (Table 1).

All patients had no observed macroscopic hematuria on the first 24 hours postoperatively. However, there was microscopic hematuria as shown in the dipstick analysis. The two groups were compared in terms of the amount of blood in urine via Dipstick test 12 hours after surgery, where results showed that large amount of blood (~200 RBC/u/L Urine) were found in 100% of the patients. The two groups were again compared in terms of the amount of blood in urine 24 hours after surgery. Among patients

under IFC thigh traction group, there were 54.3% still with large amount of blood (~200 RBC/u/L Urine), while 4.3% had small amount of blood (~25 RBC/u/L Urine). Likewise, majority of patients of IFC abdominal placement group had large amount of blood (~200 RBC/u/L Urine) (55.6%) while there were 11.1% who had small amount of blood (~25 RBC/u/L Urine). There were no significant differences between the two groups in terms of the amount of blood in the urine at the 12th hour ($p=1.00$) and 24th hour ($p=0.427$) after TURP (Table 2).

The intensity of pain is presented in Table 3. The mean VAS score was significantly higher for IFC thigh traction group (5.17 vs 1.51, $p=0.0001$). Additionally, there were more patients in the IFC thigh traction group who complained of moderate (65% vs 4.4%, $p=0.0001$) and severe (20% vs 4.4%, $p=0.0001$) pain. No untoward complication was experienced by patients involved in the present study.

Table 1. Patient demographics.

Profile	Thigh (n=46) mean±sd	Abdominal (n=45) mean±sd	p value
Age (years)	66.9 ± 7.7	69.2 ± 8.2	0.1652 ns
Prostate size on DRE (grams)	43.7 ± 8.0	43.1 ± 7.3	0.7171 ns
Prostate Size on Ultrasound (grams)	47.7 ± 11.4	46.5 ± 8.1	0.5707 ns
PSA (ng/ml)	2.5 ± 3.5	2.5 ± 3.6	0.9605 ns
Operative time (minutes)	40.7 ± 9.8	39.5 ± 7.9	0.5282 ns
Hospital Stay (days)	4.8 ± 1.2	4.4 ± 1.2	0.0876 ns

ns = not significant

Table 2. Dipstick test for blood in urine on the 12th and 24th hour after surgery.

	Thigh (n=46)	Abdominal (n=45)	p value
RBC in dipstick 12th hour (n,%)			
Absence of Blood	0 (0.0)	0 (0.0)	1.000ns
Small Amount	0 (0.0)	0 (0.0)	
Moderate Amount	0 (0.0)	0 (0.0)	
Large Amount	46 (100.0)	45 (100.0)	
RBC in dipstick 24th hour (n,%)			
Absence of Blood	0 (0.0)	0 (0.0)	0.427ns
Small Amount	2 (4.3)	5 (11.1)	
Moderate Amount	19 (41.3)	15 (33.3)	
Large Amount	25 (54.3)	25 (55.6)	

ns = not significant

Table 3. VAS for presence or absence of post-operative pain and discomfort.

VAS Score	Thigh (n=46)	Abdominal (n=45)	p value
Mean	5.17	1.51	0.0001*
SD	1.54	1.87	
Range	2 - 9	0 - 8	
No Pain	0 (0.0)	16 (35.6)	0.0001*
Mild Pain	7 (15.0)	25 (55.6)	
Moderate Pain	30 (65.0)	2 (4.4)	
Severe Pain	9 (20.0)	2 (4.4)	

*significant

Discussion

TURP is still the gold standard for prostatic tissue resection. The most common and significant post-operative complication is bleeding.^{5,6,8} Blood loss post-TURP depends on several factors such as prostate size, surgery duration and operator skill.¹⁵ In the present study, patients had an average prostate size of 47 grams on ultrasound and the resection time averages to 40 minutes.

Postoperative bleeding is a common complication for patients who underwent TURP. Mebust, et al. reported 2-34% of patients who underwent TURP required intraoperative or postoperative blood transfusion. If there is post-TURP bleeding, urologists often perform catheter traction, so that the catheter balloon is drawn toward the bladder neck and prevent prostatic bleeding from entering the bladder.²

Postoperative bleeding directly affects post-TURP catheterization time. In general, traction force is maintained by fixating catheter to the thigh. However, when the influence of anesthesia fades, patients begin to move their leg, which changes the traction force, thus affecting the process of hemostasis. Relative to this, catheter traction towards the abdomen can be considered with benefits such as maintenance of the traction force and movement freely of the limbs.¹⁴

Traction on the catheter has been advocated to control post-operative bleeding.^{4,9,10,13} According to Blandy, et al, a Salvaris swab tied round the catheter under traction at the tip of the

penis has been recommended and has the advantage that it closes both ends of the urethra. However, it should be removed after 20 min to avoid the risk of slough at the tip of the penis.⁹ A pulley and weight system applies traction directly to the catheter and thus avoids this potential problem. The purpose of traction is to compress prostatic veins by keeping the balloon of the catheter in the bladder and not to provide lateral tamponade by the balloon in the prostatic cavity. This is the current practice locally. However, prolonged use of traction could be associated with ischemic necrosis of the prostatic capsule and should therefore be avoided.

Today, most urologists in the Philippines use catheter traction with the fixation of a urethral catheter to the thigh or, less commonly, to the abdomen in order to prevent post-operative bleeding.^{11,14} However, these are some disadvantages of thigh traction of IFC: 1) patients must keep their lower extremities immobile because the efficacy of the traction decreases with any type of leg mobility and knee bending, 2) immobility of the lower extremities, especially in aged patients and those who have previously undergone pelvic surgery, is a risk factor for deep vein thrombosis (DVT), a lethal complication,¹² 3) any knee movement alters the amount of pressure elicited by this method, 4) sweating and leakage around the urethral catheter from the urethral meatus allows the adhesive bands to become wet, and they gradually loosen over time, making the traction less effective, and 5) potential occurrence of urethral stricture.

Abdominal traction post TURP can provide shortened postoperative irrigation and catheterization time, including reduced post TURP hospitalization and pain degree. Devntha, et al. recommended the abdominal traction use of as the reference standard in the catheter placement for post TURP patients.¹⁴

The amount of catheter traction force is not usually controlled due to the patient's movements of his lower extremities. In the study by Ariani et al, the traction force (either towards the thigh or the abdomen) was assessed qualitatively by observing the fluid production coming from the catheter prior to fixation. Thus, the effect of traction force's stability is expected to influence the process of post-TURP hemostasis.¹⁴

The results of this study showed no significant difference between the two groups in terms of controlling post-TURP hemorrhage. Thigh traction on IFC had been the traditional practice done by Filipino urologists to prevent perceived or anticipated bleeding. The data obtained from this study concurred with the results of the study done by Ariani, et al. wherein the effect of direction of catheter traction on hemostasis and pain degree and their results showed no statistical difference in terms of hemoglobin decline.¹⁴ In the similar study of Oesterling, et al. an abdominal catheter holder similar to a corset was utilized. Their study revealed no statistical difference in terms of post-TURP hematuria.⁸

Another finding in this study is that the IFC abdominal placement group had a statistically significant finding with regards to pain. This translates to a more comfortable post-operative course for the patients with abdominally-placed IFC. This result is similar with the study of Ariani, et al. wherein the type of surgery, duration of operation and operator's skill are all associated with the degree of post-operative pain. Using VAS score to measure the degree of pain, the abdominal traction group was more comfortable and had lower degree of pain than the limb traction group. Abdominal placement of IFC provided shortened postoperative irrigation and catheterization time, and less degree of pain.¹⁴

Future researches could include additional parameters such as amount of resected tissue,

catheterization time and occurrence of urinary retention post-TURP.

Conclusion

Abdominal placement of IFC after transurethral resection of the prostate (TURP) is a safe and effective way in the prevention of perceived or potential hemorrhage and post-operative pain. It provides the same level of controlling post-operative hemorrhage as that of the traditional practice of placing thigh traction. This method also provides less post-operative pain and discomfort which in turn leads to a comfortable post-operative course, earlier ambulation and shorter hospital stay.

References

1. Gravas S, Cornu JN, Drake MJ, Gacci M EAU Guidelines on Non Neurogenic Male LUTS including Benign Prostatic Obstruction 2018.
2. Mebust WK, Holtgreve HL, Cockett ATK, Peters PC, Writing Committee. Transurethral prostatectomy: Immediate and postoperative complications. A cooperative study of 13 participating institutions evaluating 3,885 patients. *J Urol* 1989; 141: 243-7.
3. Hoffmann R. Transurethrale Resektion (TURP) und transurethrale Inzision (TUIP) der Prostata. In: Hoffmann R, editor. *Endoskopische Urologie*. Heidelberg: Springer 2005; 1: 50-84.
4. Walker FM. Does catheter traction reduce post-transurethral resection of the prostate blood loss? *Br J Urol* 1995; 75: 614-7.
5. Adshead J, Sinclair A, Williams G. Procedure Specific Consent Forms for Urological Surgery. British Association of Urological Surgeons, London 2003.
6. Neal DE. The National Prostatectomy Audit. *Br J Urol* 1997; 79(Suppl 2):69-75.
7. Rassweiler, J. Complications of transurethral resection of the prostate (TURP)-Incidence, management and prevention. *Eur J Urol* 2006; 969-80.
8. Oesterling JE. Abdominal catheter holder to maintain controlled urethral catheter tension post transurethral resection of the prostate. *Urology* 1992; 40(3): 206-10.
9. Blandy, JP. *Operative Urology* 2nd edn. Oxford: Blackwell Scientific Publications 1978: 158.
10. Badenoch AW. *Manual of Urology*. 2nd edn. London: Heinemann 1974: 631.
11. Tan L, Venkatesh SK, Consigliere D, Heng CT. Treatment of a patient with post-TURP hemorrhage using bilateral SAPE. *Natur Rev Urol* 2009; 6(12):680-5.

12. Montesi L, Quaresima L, Tiroli M, Lacetera V, Cantoro U, Sbrollini G, et al. Improvement of lower urinary tract symptoms and sexual activity after open simple prostatectomy: prospective analysis of 50 cases. *Arch Ital Urol Androl* 2014;86(4):353-5. doi: 10.4081/aiua.2014.4.353. [PubMed: 25641470].
13. Akhavizadegan, H. A Novel Technique for Post-Prostatectomy Catheter Traction. *Nephrourol Mon. InPress(InPress)*:e37394.
14. Ariani DT, Umbas R, Rasyid N. The effect of catheter traction direction on hemostasis and pain post TURP. *Indonesian J Urol* 2012; 19: 2.
15. Chen SS, Hong JG, Hsiao YJ, Chang LS. The correlation between clinical outcome and residual prostatic weight ratio after transurethral resection of the prostate for benign prostatic hyperplasia. *BJU Int* 2000; 85: 79-82.