Original Article

Efficiency of the newly proposed practice guideline of catheter traction after transurethral resection of prostate (TURP) in patients with benign prostatic hyperplasia (BPH)

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Keywords:
Benign prostatic hyperplasia (BPH), Transurethral resection of prostate (TURP), Catheter traction

Abstract

Objective: To study the efficiency of catheter traction in patients with BPH after TURP, according to the newly proposed practice guideline.

Material and Method: A single-center randomized controlled trial. Randomization was undertaken using computer generated tables in order to allocate treatments. Sixty patients with BPH after TURP were randomized to receive catheter traction, according to the newly proposed or routine practice guidelines. Newly proposed practice guideline of catheter traction in patients with BPH after TURP (See full article). The efficiency of the guideline was evaluated by 1) Postoperative clot retention 2) Re-catheter traction 3) Re-continuous bladder irrigation (CBI) 4) Hematocrit decrease after surgery 5) Length of hospital stay.

Result: Sixty patients (newly proposed guideline n=30; routine traction n=30) were randomized. There was no significant difference in demographic and preoperative data between the two groups. Postoperative clot retention rate, re-catheter traction rate, re-CBI rate and mean hematocrit decrease were not different between the two groups, [(0% vs 3.3%), (0% vs 3.3%), (6.7% vs 10%), p=1.0], [3.52 (2.99) vs 3.43 (2.95), p=0.91] respectively. Length of hospital stay was statistically different in the two groups (3.57 vs 4.37, p=0.04).

Conclusion: The newly proposed practice guideline is safe and efficient. It could be applied in routine practice.

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Introduction

Benign prostatic hyperplasia (BPH) is a common problem. It is estimated that 50% of men over 50 years old have abnormal urinary symptoms from an enlarged prostate and up to 80 percent in men over 80 years[1].

TURP is the gold standard surgery for BPH. Early postoperative hemorrhage is not uncommon and can be treated primarily with catheter traction[2]. However, it can cause pain and bladder neck necrosis. Presently, there is still no conclusive guideline about the criteria for catheter traction.

Currently at Siriraj Hospital, urinary catheterization is indwelled overnight. Since there are no clear criteria for the selection of patients, duration of catheter traction, urine color, monitoring, or the pulling force of the catheter traction, which may cause post-operative pain, we have proposed a guideline that may be useful for urologists, general practitioners, and nurses. Furthermore, it could decrease the length of hospital stay, pain score, and medical expense.

Material and Method

A single-center randomized controlled trial, approved by the Siriraj Institutional Review Board, protocol no. 134/2559 (EC2), was undertaken at Siriraj Hospital, Mahidol University between June 2016 and June 2018. The inclusion criterion was consenting male patients 50-90 years old scheduled for transurethral resection of the prostate (TURP). Exclusion criteria were patients with unresolved bleeding tendencies, complications during surgery, such as the symptoms of electrolyte imbalance, for example, hyponatremia (TURP syndrome), and prostate tissue that was resected less than 15 grams.

Subject allocation

1. Urinary catheter traction after TURP, the newly proposed practice guideline.

2. Urinary catheterization after TURP, traditional guideline of Siriraj Hospital.

Research process for the BPH patients with TURP

1. The patient will undergo a history review, physical examination, and the results will be recorded in medical records.

2. The patients that were indicated for TURP will be informed about the procedure by a physician.

3. Patients will be invited for consultation and the research will be explained to them, including the advantages and disadvantages. After which, they will decide whether to participate or not. The patients will receive standard treatments if they refuse to participate in the research.

4. All patients will receive routine pre-operative laboratory investigations, including complete blood count, kidney function tests, serum electrolytes, urinalysis, urine culture, and serum PSA, chest x-ray and electrocardiogram (EKG).

5. Each patient will be prepared before surgery by Nulla per os (NPO) after midnight, rectal suppository on the day before surgery. Spinal anesthesia and antibiotic prophylaxis will be performed in every case.

6. Patients who agree to participate in the research will be divided randomly into two groups by computer program: new guideline for catheter traction post TURP and traditional guideline for catheter traction post TURP of Siriraj Hospital.

7. Patients undergo TURP (monopolar cautery).

8. The patients who undergo the traditional method of urinary catheterization after prostatectomy will retain the catheter after surgery until 7.00 am next day. The device used to measure the pulling force is a spring scales P101 (Figure 1) with a pulling force of three newtons.

9. The patient group using the new guideline for urinary catheter traction after TURP will use a P101 spring weighed, three newton force with a Hematuria Grading Scale (HGS) (Figure 2) to determine the need for urinary catheterization by a resident or nurse[11]. New clinical practice guidelines for catheter traction (Figure 3).

Figure 1. Spring scales P101

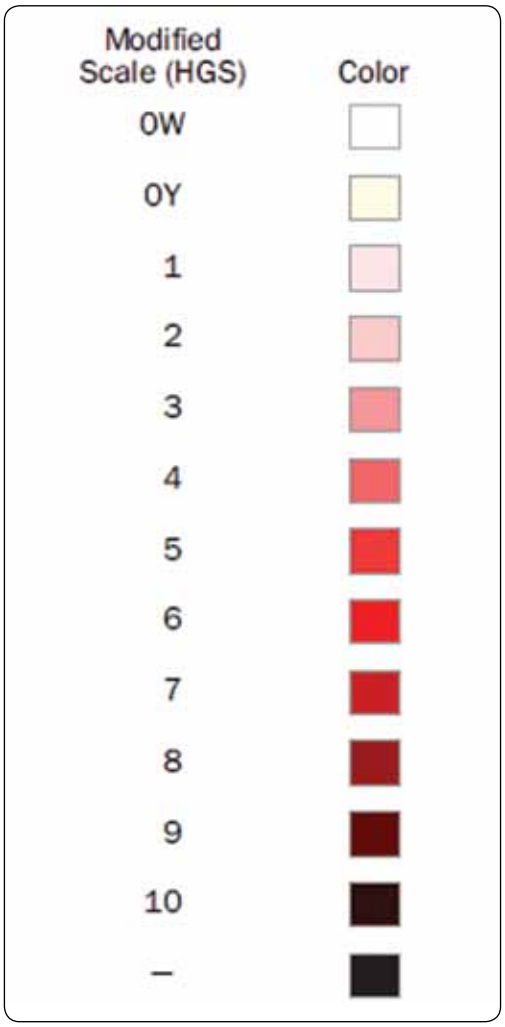

Figure 2. Hematuria Grading Scale (HGS)

10. Surgical care includes recording bleeding, duration of surgery, surgical prostate size, and sterile water used during bladder irrigation (Irrigate until the urine is pale pink. If it is darker, there will be additional endoscopic surgery to stop the bleeding).

11. Continuous bladder irrigation (CBI) for both groups, adjusting the rate of NSS by the traditional guideline of Siriraj Hospital.

12. Postoperative care according to the regular standards. The patient's pain score will be measured by Numeric Pain Rating Scale, urine color, blood concentration test, blood sodium detection, urine test (UA). Blood pressure before catheter traction and normal saline (NSS) will be used for continuous bladder irrigation (CBI).

13. Post-operative complications will be recorded by physicians, including bleeding after surgery that requires re-operation, blood transfusion, and readmission.

14. Patients can be discharged from the hospital when they are able to urinate by themselves, have no fever, and can take care of themselves.

Statistical analysis

1. Descriptive statistics: the number and percentage of the data are presented as the mean and the standard deviation for the continuous data presentation with normal distribution. Or the median, the lowest value, and the maximum value in the continuous data presentation without normal distribution.

2. Inferential statistics: Independent t-test or Mann-Whitney U test was used for comparing blood loss (assessed by preoperative and postoperative hematocrit, blood transfusion volume), duration of hospital stay and pain scores. Chi-square test or Fisher's exact test was used for the comparison of postoperative complications.

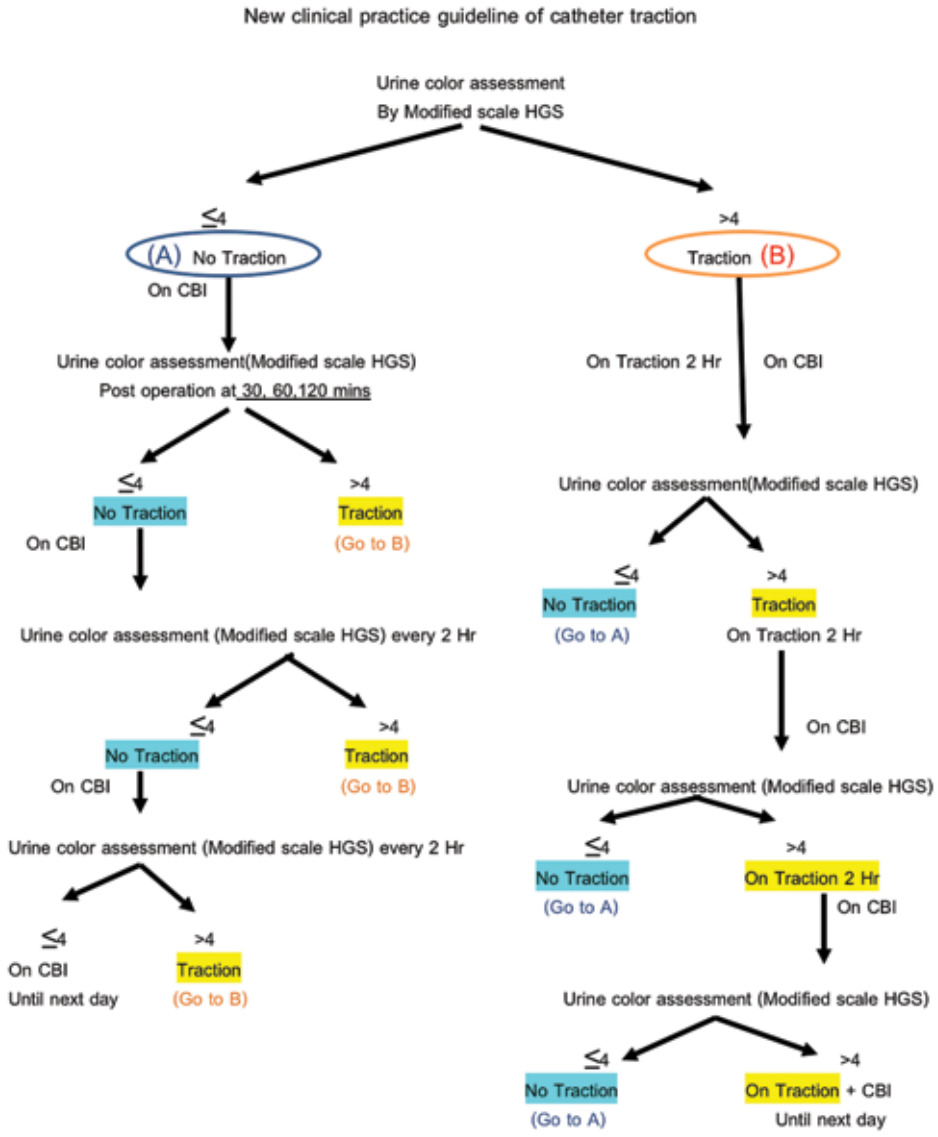

Figure 3. New clinical practice guidelines for catheter traction

Result

Sixty patients were enrolled and randomized. Thirty patients underwent the procedure using newly proposed guideline. Thirty patients underwent routine traction. There was no significant difference in the demographic/preoperative (Table 1) and peri-operative data (Table 2) between the two groups.

Postoperative blood loss, hematocrit decrease, blood transfusion, tranexamic acid and morphine usage were not significantly different between the two groups.

Postoperative normal saline usage, traction time, catheter removal day, pain score, length of stay, and paracetamol usage were statistically different between the two groups (Table 3).

The postoperative clot retention rate, re-catheter traction rate, re-continuous bladder irrigation rate, re-operation rate and readmission rate were not significantly different between the two groups (Table 4).

Table 1. Demographic/preoperative data

	A(n=30)	B(n=30)	P value
Age (Mean±SD)	70.47 ± 6.70	68.40 ± 6.11	**0.217**
Underlying (n)			**1.00**
CAD	1	3	
DM	7	4	
HT	19	17	
DLD	11	12	
CKD	1	1	
CVA	1	2	
5 alfa reductase inh.(n)	6	12	**0.091**
Hct (Mean±SD)	40.51 ± 4.26	41.41 ± 4.05	**0.403**
Platelet 10^3 (Mean±SD)	244.50 ± 69.90	229.40 ± 60.74	**0.374**
PSA (Mean±SD)	10.27 ± 10.24	6.43 ± 4.81	**0.068**
PT (Mean±SD)	12.55 ± 0.61	12.47 ± 0.60	**0.640**
PTT (Mean±SD)	26.44 ± 2.50	26.13 ± 1.69	**0.580**

Table 2. Perioperative data

Perioperative data	A(n=30)	B(n=30)	P value
Surgeon (n)			
- Staff	14	17	0.606
- Staff+Resident	4	2	
- Resident	12	11	
Weight of prostate resected (g) (Mean±SD)	32.53 ± 13.4	26.73 ± 10.34	0.066
Resection time (mins) (Mean±SD)	60.83 ± 22.29	57.67 ± 22.69	0.588
Sterile water (L) (Mean±SD)	28.53 ± 13.85	23.93 ± 11.26	0.163
Blood loss (ml) (Mean±SD)	148.5 ± 116.9	151.8 ± 93.2	0.903

Table 3. Postoperative data

Postoperative data	A(n=30)	B(n=30)	P value
NSS(CBI) (L) (Mean±SD)	19.03±6.65	25.57±7.97	0.001
Traction time (Hour) (Mean±SD)	1.47±1.81	15.87±2.58	0.00
Catheter removed day (POD) (Mean±SD)	2.30±0.92	3.20±0.48	0.00
Hct decrease(%) (Mean±SD)	3.51±3.00	3.43±2.95	0.917
Blood transfusion (n)	0	0	1.0
Transamine use (n)	0	0	1.0
Pain score (0-10)			
Mean±SD	1±1.82	2.97±2.87	0.001
Median	0	3	
Min:Max	0:7	0:7	
Paracetamol (n)	8	17	0.018
Morphine (n)	1	7	0.052
Length of stay (POD) (Mean±SD)	3.57±1.04	4.37±1.00	0.04
Histology			
Benign (n)	28	28	1.00
Malignant (n)	2	2	

Table 4. Postoperative complication data

Complication rate	A(n=30)		B(n=30)		P value
	n	%	n	%	
Re Traction	0	0	1	3.3	>0.05
Re CBI	2	6.7	3	10	>0.05
Clot retention	0	0	1	3.3	>0.05
Re operation	0	0	0	0	>0.05
Re admission	0	0	0	0	>0.05

Discussion

Bleeding is one of the most common post-operative complications that occur during the first period of TURP. Thus it is necessary to be checked carefully due to the rich-vascular supplied prostate gland. Hemorrhage during and after the operation needs to be rapidly assessed, like when post-operative bleeding is observed, urinary catheterization will immediately be performed because the balloon not only causes a tamponade effect, compressing the prostate to stop the bleeding, but also provides bladder irrigation. Despite the surgeon's concern of hemorrhage, if it is unstoppable, transurethral endoscopic and transabdominal surgery may be performed to terminate this complication. Although the principle of management of bleeding was mentioned, there's controversy in its story; in TURP, there is no consensus in hemorrhagic control, especially the criteria for catheter traction in duration, monitoring, and the need for urinary catheter traction after surgery. The study of Saadia Nawaz Durrani and colleagues found that 11 of 320 patients without urinary catheter traction immediately after TURP had post-operative bleeding and needed re-operative management in order to terminate the bleeding[3]. The study of S.K. AGRAWAL and colleagues showed that acute urinary retention occurred in 2 of 83 patients without urinary catheter traction after TURP due to blood clots.[4] In a study by NEIL S. I. GORDON and colleagues: of 58 patients, 7 had urinary catheter traction for 2 hours and one patient had acute urinary retention from blood clots[5]. EM WALKER et al. studied 115 patients: 57 had urinary catheter traction within 30 minutes after TURP and the others without traction immediately after prostate replacement. The results concluded that urinary catheter traction may reduce post-operative bleeding and there were no complications from urinary catheter ablation[6]. A study by GEORGE J. MAMO and colleagues: in 127 patients with post-operative urinary catheter traction for 6 hours, it was found that there were 3 patients who had urinary retention due to blood clots, while 9 patients had post-operative hemorrhage[7]. And in NEIL S. I. GORDON's study of urinary catheter traction after TURP every 2 hours with repeated evaluation and traction for 6-24 hours, it was concluded that traction can decrease posto-perative bleeding, as shown in a previous study's results[8]. Campbell-Walsh Urology 2012 provides the criteria for non-catheter traction when the urine is fainter than light pink, and if the urine is darker, catheter traction needs to be sustained for 7 minutes to control bleeding[9]. The disadvantage of urinary catheter traction is pain. And if urinary catheter traction is sustained for a long time, it can cause pain and ischemia at the posterior fossa, urethra, and glans penis. A study by Kosar, TA Serel, et al. found that ischemia of the glans penis occurred when the urinary catheter was retained for 6 hours[10].

In our study, in the group which used the newly proposed practice guideline of catheter traction, if the weight of the resected prostatic tissue was less than 20 grams, catheter traction was not applied after TURP. If the weight of the resected prostatic tissue was more than 20 grams, catheter traction was applied after TURP. In the other group, 50% traction was applied for 2 hours, and no patient had traction applied for more than 6 hours.

In short, early catheter removal shortens the length of hospital stay, which reduces the burden on the healthcare system. This is especially beneficial in our setup as there is a shortage of beds in the hospitals. A short hospital stay is also advantageous for the patients as most live in villages and cannot afford a long absence from work. The small sample size was the major limitation of our study.

Conclusion

The newly proposed practice guideline is safe, efficient and could be applied in the routine practice. It requires no additional materials and no additional training and experience in its use. There has been no case of clot retention, re-catheter traction and secondary hemorrhage following this procedure.

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