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Original Article

Continuous bladder drainage following anterior colporraphy-2 versus 4 days- A Randomized Controlled Study

C H Rambabu[1*], N Bhaskar Rao[2]

[1]Department of Obstetrics and Gynecology, GEMS Hospital, Srikakulam, AP, India
[2]Department of Obstetrics and Gynecology, GEMS Hospital, Srikakulam, AP, India

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ABSTRACT

Catheter drainage of urine is done to reduce the risk of retention of urine postoperatively. Overfilling of the bladder might have a negative impact on the surgical outcome. The aim of the present study was to determine in a randomized controlled trial the incidence of bladder retention after postoperative indwelling catheterization for 2 days versus indwelling catheterization for 4 days. Twenty percent (3) of patients in the 2-day protocol needed temporary catheter replacement compared to none in the 4-day protocol ($p < 0.01$). Of all patients 80% had uneventful postoperative period, defined as having no post-voiding residual volume more than 200 mL. Based on the results of this study, we advise removing an indwelling catheter after an anterior repair on the fourth day postoperatively to avoid excessive residual urine and retention of urine.

Key Words: Bladder Drainage, Colporraphy and Controlled Study

INTRODUCTION

The mean duration of catheterization following anterior colporraphy is 3 days (1–4 days). Catheter drainage of urine is done to reduce the risk of retention of urine postoperatively. Overfilling of the bladder might have a negative impact on the surgical outcome [1]. A review of the studies published on the effects of the duration of postoperative indwelling catheterization following an anterior colporrhaphy was made. The first study in 106 women did not find a significant difference in incidence of urinary retention between catheter removal on the first (24%) and third day (31%) postoperatively [2].

In contrast, a randomized controlled trial in The Netherlands in 100 patients showed 40% of patients having a post-voiding residual of more than 200 mL after removal of the catheter on the first postoperative day versus 9% of patients having retention after removal of the catheter on the fifth postoperative day [2]. However a multicentre randomized controlled study [3] comparing 2 days versus 5 days post-operative catheterization by Mirjam Weemhoff et al concluded in favor of 2 day catheterization protocol.

However the conditions prompting us to do this study are different.

Firstly all our patients receive preoperative and postoperative prophylactic antibiotic. Secondly our patients are uneducated and not capable of doing self-catheterization at home. Lastly hospital stay does not cost much to our patients as treatment given was free. In view of these conditions our prime objective is to avoid urinary retention and the concern about urinary infection is secondary. Based on the above differences, we hypothesized that 4 days of indwelling catheterization postoperatively after an anterior colporrhaphy is more appropriate.

High-grade cystocele, higher intra-operative blood loss, Kelly plication, and levator plication were identified as independent risk factors for short-term urinary retention after vaginal prolapse surgery [4].

The aim of the present study was to determine in a randomized controlled trial the incidence of bladder retention after postoperative indwelling catheterization for 2 days versus indwelling catheterization for 4 days.

***Corresponding Author Address:** Dr. C H Rambabu, Department of Obstetrics and Gynecology, GEMS Hospital, Srikakulam, AP, India*

METHODS

Between January to December 2015, a randomized controlled trial was performed in patients undergoing vaginal hysterectomy and anterior colporrhaphy comparing postoperative temporary indwelling catheterization for 2 days versus indwelling catheterization for 4 days. The primary outcome measure was the number of temporary catheter replacements after the first removal of the catheter postoperatively. An indwelling catheter was temporarily retained in case the residual volume after micturition was more than 200 mL. Secondary outcome measures were urinary infection and the length of the hospital stay. We excluded independent risk factors like BMI, history of obstructive micturition or recurrent urinary tract infections, concomitant surgery and urinary tract infections.

All patients were aged above 45 yrs old post-menopausal with stage III or IV prolapse uterus with moderate or large cystocele. BMI of all patients was <29Kg / mt^2. In all cases uterus was normal in size and there were no other masses in the adenexae. None of the patients had stress urinary incontinence. All patients underwent anterior colporraphy along with vaginal Hysterectomy and perineorrhaphy. All surgeons followed similar surgical technique and the blood loss was comparable. All most all the patients received pre or post-operative blood transfusion as their preoperative hemoglobin levels were low. After informed consent, patients were included. The protocol was approved by the medical ethical committee of the Hospital.

Patients were randomized to postoperative temporary indwelling catheterization for either 2 or 4 days. At the start of the operation, urine was collected for analysis. After the operation was finished, the indwelling catheter was inserted and at that moment, the patient was randomized to temporary indwelling catheterization for either 2 or 4 days.

The catheter was removed in the morning of the second or fourth day postoperatively. The residual volume was measured by post void bladder catheterization 6 h later. A residual volume of more than 200 mL was considered abnormal and the indwelling catheter was retained. The next morning, the catheter was removed, and again the post-voiding residual volume was assessed 6 h later. If the volume was still more than 200 mL, the catheter was retained, this time for 3 days. In case the residual volume was still more than 200 mL after these three extra days, intermittent catheterization done until the residual volume after spontaneous micturition was less than 200 mL.

All patients received prophylactic antibiotics at the beginning of the operation. Postoperative prophylactic antibiotics were given routinely. After removal of the catheter, urine samples were taken for sedimentation and culture. Urinary tract infection was defined as having more than 25 white blood cells per high power field or more than 20 bacteria per high power field. Urinary tract infection was confirmed by a positive culture. For the outcome measure urinary tract infection, only the infections proven by a positive culture at the time of the first removal of the catheter were included. None of the patients were discharged with an indwelling catheter.

The primary outcome measure in the study was the number of patients with temporary catheter replacements after removal of the first indwelling catheter postoperatively. Three patients needed repeated catheterization after removal of the catheter on the second day and none after removal of catheter on fourth postoperative day. None of the patients in either group showed urinary infection.
All data were collected and analyzed in SPSS 15.0 for Windows. The *t* test, Pearson chi-square test, Fisher's exact test, and univariable and multivariable logistic regression were used in the statistical analysis of all data. All patients were analyzed according to the intention to treat principle.

RESULTS

Between January and December 2015, 34 patients underwent an anterior colporrhaphy along with vaginal Hysterectomy for genital prolapse with cystocele. Four patients withdrew from the study for various reasons. Follow-up after 4 weeks was achieved in 30 patients.

Table.1 shows patient characteristics in both groups. There were no significant differences between both groups with respect to age, BMI, Classification of cystocele and rectocele, history of symptoms, history of surgery, pre-operative urine tract infections, concomitant surgery, mean amount of blood loss and placation of the bladder. Table 2 shows the outcome measures of the two groups. Twenty percent (3) of patients in the 2-day protocol needed temporary catheter replacement compared to none in the 4-day protocol ($p < 0.01$). Of all patients 80% had uneventful postoperative period, defined as having no post-voiding residual volume more than 200 mL and having no urinary tract infection at time of the first catheter removal in 2 days and 100% in 4 days.

Table 1: **Baseline characteristics of the study population**

	Protocol 2 days catheterization ($n = 15$)	Protocol 4 days catheterization ($n = 15$)	p value
Mean age in years	57.2 ± 8.2	58.1 ± 5.4	0.57
Mean BMI in kg/m²	26.6 ± 1.4	26.4 ± 1.7	0.61
History of previous Gynecological surgery	6%	10%	0.24
History			
Obstructive micturition Stress urinary incontinence	nil nil	nil nil	
Recurrent urinary tract infections	nil	nil	
Urinary tract infection in pre-operative sedimentation	nil	nil	
Cystocele (Baden–Walker)			
II /III	80% (12/15)	80%(12/15)	0.04
Rectocele (Baden–Walker)			
I	13.3% (2/15)	20% (3/15)	0.05
II	13.3% (2/15)	13.3% (2/15)	0.60
III	6% (1/15)	7% (1/15)	0.4
Technique			
Hysterectomy	all	all	
Posterior colporrhaphy	33% (5/15)	40%(6/15)	
Mean amount of blood loss in ml	175ml	180ml	

Table 2: **Outcome measures comparing the 2 and 4 days protocol**

	Protocol 2 days	Protocol 4 days	OR (95% CI)	p value
Percentage of patients needing temporary catheter replacement (n)	20% (3/15)	0% (0/15)		<0.01
Percentage of patients with a urinary tract infection at the time of first catheter removal (n)	nil	nil		
Percentage of patients with uneventful postoperative period*	80% (12/15)	100% (15/15)		0.06
Hospital stay Median (range)	3.0 (4 -44)	5.0 (1-50)		≤0.01

*Uneventful postoperative period defined as post-voiding residual <200 ml and no urinary tract infection (culture $<10^5$ colony forming unit per milliliter) at time of first catheter removal

DISCUSSION

Postoperative edema or innervation trauma of the bladder after anterior colporraphy can cause voiding difficulties with increasing risk of retention. Overfilling of the bladder might possibly have a negative impact on the surgical outcome [1]. For this reason prolonged drainage of urine by an indwelling catheter is done. The question is about the ideal duration of postoperative catheterization to prevent urinary retention without at the same time increasing the incidence of urinary infection.

In our study, 20% of patients (3/15) in the 2-day protocol needed repeated temporary catheterization compared to none in the 4-day protocol ($p < 0.01$). These results are in line with a previous study, in which 40% of patients had retention after removing the catheter on the first postoperative day versus 9% of patients after removing the catheter on the fifth postoperative day [2]. Three patients in our study should have their catheter left in place for 5 days instead of 2 days thereby extending hospital stay by 3 days. This confirms findings by other investigators [5]. Majority of our patients are

uneducated and cannot leave the hospital with an indwelling catheter in situ to be removed by themselves at home. None of the patients in either group showed confirmed urinary infection.

CONCLUSIONS

Based on the results of this study, we advise removing an indwelling catheter after an anterior repair on the fourth day postoperatively to avoid excessive residual urine and retention of urine. In our population the possibility of urinary retention overrides the concern about urinary infection.

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