

# Comparison between the Outcomes of Short Term Versus Long Term Catheterisation after Anterior Colporrhaphy with or without Other Vaginal Procedures: A Hospital based Prospective, Comparative, Randomised Study

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## ABSTRACT

**Introduction:** Defects in the pelvic supporting structures result in a variety of clinically evident pelvic relaxation abnormalities. The present study was aimed to assess whether removal of an in-dwelling catheter 24 hours after surgery affect the rate of re-catheterization, symptomatic or asymptomatic urinary tract infections and hospital stay in comparison to 72 hours of catheterization.

**Material and methods:** Interventional, Prospective, hospital-based study was done in Department of Obstetrics and Gynaecology of R.G. Kar Medical College and Hospital during July 2016- June 2017. All women under gone anterior colporrhaphy with or without other vaginal procedure were included and divided into two groups randomly. Group A included 195 patients with Foley catheter kept in situ for 24 hours following surgery and Group B included 195 patients with Foley catheter placed in situ for 72 hours following completion of surgery.

**Results:** Mean duration of catheter removal to voiding duration in group A (2.3077±1.2301 hours) and in group B (2.2308±1.1090 hours) was statistically insignificant (p=0.5170). Difference between post-void residual urine in each group was insignificant (p=0.1021). Need and attempts of re-catheterisation in either group was statistically insignificant (p=0.1184). Presence of UTI and Asymptomatic Bacteriuria were statistically significant (p=0.0002 for UTI and p=0.0115 for asymptomatic bacteriuria) in two groups and found less in group A compared to group B. Mean hospital stay in group A (2.533±0.8572 days) was less than Group B (3.7487±1.0762 days) and was statistically significant (p<0.0001).

**Conclusion:** Early removal of catheter is associated with less hospital-stay, less complication like UTI or asymptomatic bacteriuria but has no effect on post void residual volume, voiding duration, attempts and need of re-catheterisation.

**Keywords:** Catheterisation, UTI, Asymptomatic Bacteriuria, Anterior Colporrhaphy

effectiveness can be improved by reducing the duration of catheterization. Short-term use of an indwelling urethral catheter is a safe and effective strategy in maintenance of bladder and renal health and judicious use contributes to improved outcome. However, insertion of indwelling catheter is not without the risk of complications. Catheter associated bacteriuria is common and increased by 5-8% each day during the period of catheterisation.<sup>3</sup> And despite the use of aseptic techniques and closed sterile drainage bacteriuria has been reported in 10-27% of these catheterized patients, which has been linked to length of the duration of indwelling urinary catheterization.<sup>4</sup> Other complications include structural damage to urinary tract, bleeding, patient discomfort. Retention of urine is frequently reported following removal of indwelling urethral catheter especially with short term catheterization. This is associated with risk of over distension and permanent damage of detrusor muscle.<sup>5</sup> Moreover bladder overfilling predicted to have a negative influence on surgical outcome after prolapse surgery. It is presumed that early removal of catheter may lead to retention of urine due to reflex pain in the operation site and also from the idea that overfilling of the bladder after prolapse surgery might have a negative effect on surgical outcome.<sup>6</sup> There is extensive literature regarding type, maintenance and technique of insertion of urinary catheter, limited attention has been given to the policies and procedure of their removal. Most of the studies have been primarily confined to either transurethral or suprapubic

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## INTRODUCTION

Genital prolapse is a common condition met in day to day gynaecological practice.<sup>1</sup> Most of the surgical treatments for prolapse aim to lift the prolapsed organ back into place<sup>2</sup> and restore the normal anatomy as far as practicable. Bladder drainage by transurethral Foley catheter is a common practice following anterior colporrhaphy with or without other associated vaginal procedures for preventing post-operative urinary retention (PUR). Patient comfort and cost

catheter for surgeries other than pelvic floor repair with vaginal hysterectomy.<sup>7</sup> Bladder drainage adversely affects the post-operative recovery in any gynaecological surgery because of the likelihood of UTI observed more frequently in vaginal than abdominal hysterectomy. In a study of 2362 population, where suprapubic catheter was found to cause less urinary tract infection than the indwelling transurethral catheter.<sup>8</sup> Duration of use of Foley catheter is generally based on custom rather than evidence-based knowledge and therefore varies considerably. Findings from a study including equal number of women, 50 in each group where the catheter was removed in the morning after or on the 5th postoperative day following anterior colporrhaphy, showed lesser percentage of residual volumes exceeding 200 ml and the need for re-catheterization 9% in prolonged catheterization as compared to the early catheterization group 40% (OR 0.15, 95% CI 0.045-0.47); but more with positive urine cultures 40% versus 4% (OR 15, 95% CI 3.2-68.6).<sup>9</sup> However, there is no consensus on how best to minimize complications of prolonged catheterisation and practice varies. Although several trials addressed the issue of the duration of catheterisation after surgery, there was not enough evidence to show that any policy was better than other.<sup>10</sup>

In light of the previously done studies, need for development of an optimal strategy is felt regarding catheter removal duration following anterior colporrhaphy and associated other vaginal surgeries in our institution to reduce patient morbidity and to ensure early ambulation. Therefore, the present study was aimed to assess whether removal of an in-dwelling catheter 24 hours after surgery, namely anterior colporrhaphy with or without other associated vaginal procedures, affect the rate of re-catheterization, symptomatic or asymptomatic urinary tract infections and hospital stay in comparison to 72 hours of catheterization.

## MATERIAL AND METHODS

Present interventional, prospective, cohort, comparative, hospital-based study was done in the Department of Obstetrics and Gynaecology of R.G. Kar Medical College and Hospital in July 2016- June 2017.

**Sample size:** In our institute no specific time interval is followed regarding duration of catheter in-situ following anterior colporrhaphy and associated surgeries, though it is assumed that those with short term catheterisation (24 hrs) have higher rate of re-catheterization than those with long term catheterised (72 hrs) patients. Study done by Choudhury FR, Rashid M, Uddin ABMZ, Ava NN shows that the rate of re catheterization in short term catheterization group is 10% and rate of re catheterization in long term catheterization group is 3%. Keeping the alpha error to be 0.05, beta error 0.20, minimum sample size required would be 384. Considering dropout of few cases, we have taken a sample size of 390 with 195 samples in each arm.

**Study population:** All women admitted in the department of Gynaecology and Obstetrics department of R.G. Kar

Medical College and Hospital, due to pelvic organ prolapse and under gone anterior colporrhaphy with or without other associated vaginal procedures for the same.

### Inclusion criteria

All patients undergoing anterior colporrhaphy with or without any other concomitant vaginal surgery for pelvic organ prolapse and/or stress urinary incontinence.

### Exclusion criteria

1. Those with history of previous retention of urine
2. Pre-operative urinary infections. Routine urine examination with culture was done in all patients before admission to exclude both urinary tract infection and also asymptomatic bacteriuria. Those with abnormal reports were excluded. The presence of UTI is defined as positive urine culture of  $>10^5$ CFU / ml, plus one of the following
  - a. Dysuria.
  - b. Fever  $> 38.5^\circ\text{C}$  with chill and rigor
3. Bladder injury during operation.
4. With other associated complication during operation which necessitates prolonged catheterization e.g. haematoma, excessive haemorrhage, anaesthetic complications etc.

### Study Tools

- Clinical
  1. Foley catheter
  2. Urobag
  3. Measuring beaker
  4. 10 c.c syringe.
  5. Pre-designed proforma for data collection.
  6. Various statistical charts and analytical software.
- **Laboratory**
  1. Ultrasonography machine
  2. Microscope
  3. Gram stain
- **Study Parameters**
  1. Catheter removal to voiding duration (in hours)
  2. Post-void residual urine
  3. Re-catheterisation
  4. Total attempts of re-catheterisation
  5. Post-operative UTI and Asymptomatic Bacteriuria
  6. Duration of Hospital-stay

**Study Technique:** This study is a prospective comparative hospital-based study. The purpose of the study and the procedure were explained to the patients whether they agreed or did not to participate in the study. Protocol was approved by Ethical Committee of hospital and informed consent was obtained from each woman. All women who underwent vaginal hysterectomy, tape procedure, colpoperineorrhaphy, anterior colporrhaphy and Manchester operations as required without any given exclusion criteria (history of previous urinary retention, pre-operative urinary infection, bladder injury and other associated complication during operation) were included in this study. After taking detailed history and after proper examinations, patients were included in the

study .The patients were divided into two groups randomly i.e. Group-A and Group-B by using serially numbered opaque sealed envelope technique.

**Group A:** This included 195 patients in whom Foley catheter were kept in situ for 24 hours following surgery.

**Group B:** This included 195 patients in whom Foley catheter was placed in situ for 72 hours following completion of surgery.

Before allocating the patents to certain groups, mid- stream morning urinary specimen of all patients were sent for urine R/E, M/E, C/S. Patients, who were positive for UTI according to the aforementioned criterions, were excluded from study.

All patient received two doses of antibiotic injection (ceftriaxone) 1<sup>st</sup> dose just before the operation and another dose 12 hour after the first dose. Surgery performed by experienced gynaecologists. For removal of the confounding effect of anaesthesia the surgeries were done under spinal anaesthesia. Before surgery, in all patient, thorough vaginal cleaning with same antiseptic solution done. Immediately after the operation Foley catheter of latex material of adequate size inserted in all patients aseptically in Operation theatre. In the study group catheter removed 24 hours after surgery (group A) and this group compared with the other group in whom catheter removed 72 hours after surgery (group B). After the operation patient allowed to get out of her bed when the patients felt themselves comfortable and this was done even with the catheter in situ.

Before removing catheter, urine from Foley catheter is collected and sent for microscopy and culture sensitivity. Patents were then encouraged to drink water and

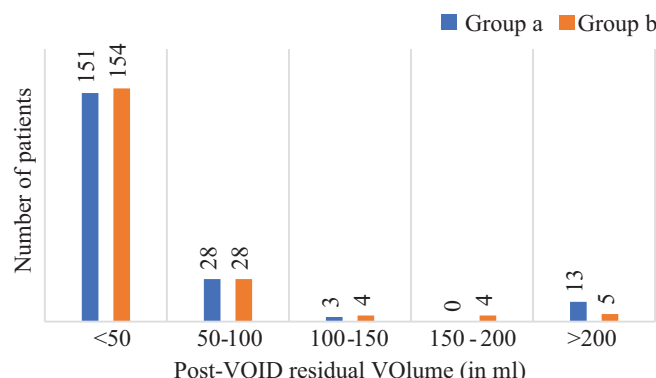
spontaneously void urine after urinary urge. After the first void, residual urine in urinary bladder was measured by ultrasonography. If post-void residue was found to be >200 ml, re catheterisation was done. If they could not pass urine or there was no urge for urination after 8 hours of catheter removal, ultrasonography of bladder was done to detect the urinary volume in bladder, and if that exceeds 200 ml, re catheterisation was done. Attempt to remove the catheter was taken on the next day.

**STATISTICAL ANALYSIS**

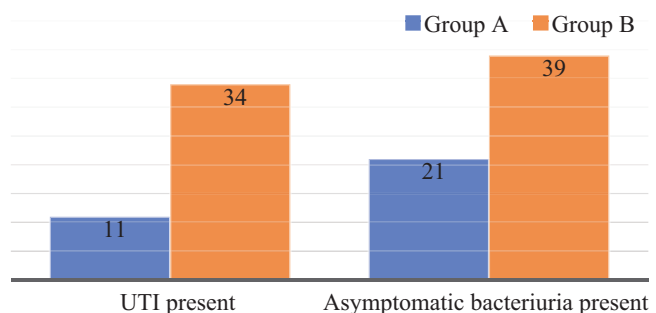
For statistical analysis data were entered into a Microsoft excel spreadsheet and then analysed by SPSS 24.0. and Graph Pad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Chi-square test was done to calculate statistical significance (p<0.0005 is considered statistically significant).

**RESULTS**

**Comparison of catheter removal to voiding duration (in hours):** The mean duration of catheter removal to voiding duration in group A was 2.3077±1.2301 hours and in group B was 2.2308±1.1090 hours. Difference of mean catheter removal to voiding duration was not statistically significant (p=0.5170) (table-1).



**Figure-1:** Distribution of post void residual urine in two groups



**Figure-2:** Bar Diagram showing comparison between two groups in terms of presence of UTI and Asymptomatic Bacteriuria

Duration (in hours)	Group A	Group B
1	63	57
2	49	62
3	58	63
4	15	3
5	7	9
6	2	0
8	1	1

Chi-square=12.2791 p-value=0.0560

**Table-1:** Distribution of catheter removal to voiding duration (in hours) in two groups

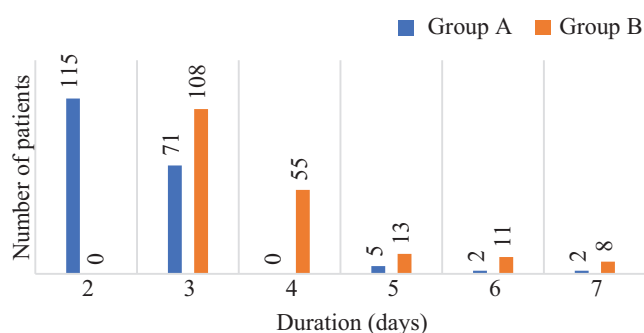
Total attempts of re-catheterisation	Group A	Group B	Total
1	8	5	13
2	4	0	4
3	1	0	1

Chi-square test= 5.8644 and p= 0.1184

**Table-2:** Distribution of total attempts of re-catheterisation

Complication	Present		Absent	
	Group A	Group B	Group A	Group B
UTI	11	34	184	161
Asymptomatic Bacteriuria	21	39	174	156

**Table-3:** Distribution of patients in two groups according to post-operative UTI and Asymptomatic Bacteriuria



**Figure-3:** Bar diagram showing duration of hospital stay in two groups

**Comparison of post-void residual volume:** The difference between post-void residual urine in each group was not significant ( $p=0.1021$ ) (figure-1).

**Comparison of re-catheterisation and total attempts of re-catheterisation:**

Total 18 subject required re-catheterisation of which 13 belonged to group A and 5 belonged to group B. However, this was not statistically significant. Distribution of these 18 patients according to total attempts of re-catheterisation is shown below and this was also not statistically significant (table-2).

**Comparison of UTI and Asymptomatic Bacteriuria:**

Presence of UTI and Asymptomatic Bacteriuria were statistically significant ( $p=0.0002$  for UTI and  $p=0.0115$  for asymptomatic bacteriuria) in two groups and it was seen that both of them were less in group A compared to group B (table-3, figure-2).

UTI is defined as

1. positive urine culture of  $>10^5$  CFU/ml and
2. pus cell count  $>5$ /HPF and
3. one of the following clinical symptoms
  - dysuria
  - fever  $>38.4^\circ\text{C}$  with chill and rigor.

(CFU/ml is Colony Forming Unit /ml and HPF is High Power Field in microscope)

Asymptomatic Bacteriuria is defined as

1. positive urine culture of  $>10^5$  CFU/ml and
2. pus cell count  $>5$ /HPF and
3. No clinical symptoms.

**Comparison of Hospital Stay**

Mean hospital stay in group A was  $2.533\pm 0.8572$  and in Group B was  $3.7487\pm 1.0762$ . Mean duration of hospital stay was thus more for group B. The comparison between two groups showed the duration of hospital stay was statistically significant ( $p<0.0001$ ) (figure-3).

**DISCUSSION**

The difference between catheter removal to voiding duration (table-1) was not statistically significant ( $p$  value= $0.0560$ ). The mean duration between catheter removal to voiding in group A was  $2.3077\pm 1.2301$  hours and in group B was  $2.2308\pm 1.1090$  hours ( $p$  value= $0.5170$ ) which was also insignificant.

Post voidal residual urine amount (Figure-1) was comparable in both groups. Most of the patients were having a residual urine amount  $<50$  ml in both groups (151 patients in group A vs 154 patients in group B) and difference in post voidal residue between these two groups were statistically not significant ( $p$ -value:  $0.1021$ ).

The primary outcome of the study was re-catheterization (Table-2). In our study, re-catheterization was needed more in patients of short-term catheter group than the patients in long term catheter group. We found, 13 Patients in group A (6.7%) needed re-catheterization compared to 5 patients of group B (2.6%) who needed re-catheterization. However, it is not statistically significant ( $p$ -value:  $0.0535$ ). All the aforementioned findings match with Dunn et al<sup>11</sup>, who also had similar result, the early removal of in-dwelling catheters after operation was not associated with need for re-catheterization. Similarly, in the study of Summit et al<sup>12</sup>, in prospective comparison study of indwelling bladder catheter drainage versus no catheter after vaginal hysterectomy two patients in the catheterized group required re-catheterization after the catheters were removed. None of the subjects in the no-catheter group required a catheter. Thapa et al<sup>13</sup>, had similar study, but she had somewhat different result, short time catheterization following vaginal surgery had less incidences of urinary retention than long term catheterization (0% versus 2%).

Pant PR et al<sup>14</sup> showed that in spite of different age, different degree of prolapse, different degree of cystocele and different duration of prolapse out of 257 patients catheterized for 12 to 24 hours, only 5 patients had retention of urine (3.3%). He concluded long duration post-operative catheterization is not necessary in vaginal hysterectomy and pelvic floor repair.

In our study, major portion of the post-operative complications were constituted by urinary tract infection (table-3, figure-2). 11(5.6%) patients had urinary tract infection in group A and 34(17.4%) patients had urinary tract infection in group B. Relation between urinary tract infection in two groups were statistically significant ( $p=0.0002$ ). Similar to this study, Liang et al<sup>15</sup>, found urinary infection (18% versus 4%) in the long-term catheter use group versus short term catheter use. Similarly, Choudhury et al, found positive urine culture (16% versus 6%).<sup>16</sup> Thapa et al (11.1% versus 6.2%)<sup>13</sup>, Hjalmar et al (80% versus 40%)<sup>17</sup> and Hakvoort et al<sup>18</sup>, (40% versus 4%) (OR 15, 95% CI 3.2-68.6) in long term versus short term catheterization group. Pant PR showed that catheterized for 12 to 24 hours, only 8 patients had urinary symptoms out of which 3 patients had frequency and burning micturition. Glavind et al<sup>19</sup>, found higher post-operative bacterial count in patients in long term catheterization group than short term. Thakur et al<sup>20</sup>, in her study has shown that short term catheterization is more beneficial in terms of lower incidence of urinary tract infection and related febrile morbidity as compared to long term catheterization (2 versus 11 in each 50 patients' group). The presence of urinary tract infection was associated with higher number of temporary catheter replacement in both groups. Asymptomatic urinary tract infection in our study

was more common in long term catheterization group than short term (table-3, figure-2) as in most of the past researches. This confirms long term catheterization could be one of the causes of urinary infection after vaginal hysterectomy and pelvic floor repair. It was found that, 21(10.8%) patients had Asymptomatic bacteriuria in group A and 39(20%) patients had Asymptomatic bacteriuria in group B.

Association between asymptomatic bacteriuria in two groups was statistically significant ( $p=0.0115$ ). Findings are similar to the study done by Shrestha *et al*<sup>21</sup> (18% in short term catheter group vs 30% in long term catheter group,  $p$  value 0.001). Early ambulation following early removal of catheter post operatively reduces hospital stay. In our study (figure-3), the mean hospital-stay (mean $\pm$ s.d.) was significantly higher in group B (3.7487 $\pm$ 1.0762) than group A (2.5333 $\pm$ 1.0762). Difference of mean hospital Stay in two groups were statistically significant ( $p<0.0001$ ). This is also similar to study of Choudhury *et al*<sup>16</sup>, (4.68 versus 6.98 days), Hakvoort *et al*<sup>18</sup>, (5.7 versus 7 days), Kamilya *et al*<sup>22</sup>, (1.64 vs 4.09) and Shrestha *et al*<sup>21</sup>(3.42 vs 4.48 days). Alessandri *et al*<sup>24</sup>, in spite of re-catheterization, early removal of in-dwelling catheters immediately after uncomplicated hysterectomy seems to decrease first ambulation time and hospital stay. All these results of above researches conclude that short duration catheterization reduces mean catheterization time and thereby reduce hospital stay. Hospital stay can be reduced to 1 to 2 days more by discharging patients after removal of catheter if they are able to come to the hospital immediately if any complications (e.g. urinary retention, cannot pass stool, bleeding per vagina). This concludes short term catheterization should be practiced for better patient compliance, optimum utilization of hospital resources and to reduced complications.

## CONCLUSION

Optimum duration of post-operative catheterization following anterior colporrhaphy with or without associated other vaginal procedures is sought for in this study.

Two groups of patients with comparable variables were studied. One with 24 hrs of post-operative catheterization (Group A) and the second group with catheterization for 72 hrs (Group B).

- Post-operative urinary retention and need for re-catheterization were statistically insignificant between these two groups.
  - Post-operative complications were evaluated and urinary tract infection and asymptomatic bacteriuria was found to be significantly increased in long term catheter group.
- Hence, this study concludes that short term catheterization is more beneficial in terms of lesser incidence of urinary tract infection and related co-morbidity and reduced hospital stay as compared to long term catheterization following anterior colporrhaphy with or without other vaginal surgeries.

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