

RANDOMIZED CONTROLLED TRIAL COMPARING EARLY AND DELAYED URINARY CATHETER REMOVAL FOLLOWING LAPAROSCOPIC HYSTERECTOMY IN A REMOTE RURAL SETTING

Rakesh A Hasabe¹, Mangesh Hivre², Shrutika Khapre³

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Corresponding Author:
Dr. Rakesh A Hasabe,
Email: rakesh.hasabe@gmail.com

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¹Assistant Professor, Department of Obstetrics and Gynaecology, BKL Walavalkar Rural Medical College, A/P-Kasarwadi, Chiplun, Ratnagiri.

²Assistant Professor, Department of General Surgery, MGIMS Sewagram, Wardha, Maharashtra, India.

³Assistant Professor, Department Obstetrics and Gynaecology, DMIHER Sawangi (Meghe), Wardha, Maharashtra, India.

Abstract

Background: Inserting an indwelling urinary catheter when preparing for hysterectomy ensures that the patient's bladder remains empty and the surgeon is able to complete all the steps of the procedure without iatrogenic complications in a clearly visible surgical field, while monitoring the patient's urine output before, during, and after the procedure (1,2,3,4). An indwelling catheter aims to decrease the risk of postoperative urine retention, atonic bladder, detrusor instability, and urinary tract infection (UTI) (5,6,7). However, prolonged period of indwelling urethral catheter can also increase bacterial colonization and cause consequent UTI, increasing postoperative complications, longer hospital stays, and overall increase in healthcare costs. **Materials and Methods:** Out of all the total laparoscopic hysterectomies that were performed at the study site between December 2020 and March 2022, a total of 140 patients who matched our inclusion and exclusion criteria were recruited for the study. These 140 participants underwent a simple randomization process in order to be assigned to one of the following four groups: Participants in group 1 had their urinary catheters removed immediately after the surgery in the operating room. In group 2, the catheter was removed 12 hours following surgery. It was left in situ in group 3 for 24 hours, and in Group 4, it was removed after 72 hours. **Result:** Incidence of Urine retention and recatheterisation was slightly higher in Group 1 while incidence of symptomatic UTI and post operative positive urine culture was significantly lesser as compared with other groups. **Conclusion:** Our study concluded that, as long as postoperative spontaneous voiding is closely monitored, immediate removal of the urine catheter following an uncomplicated laparoscopic hysterectomy is safe and associated with a manageable risk of urinary retention.

INTRODUCTION

Inserting an indwelling urinary catheter when preparing for hysterectomy ensures that the patient's bladder remains empty and the surgeon is able to complete all the steps of the procedure without iatrogenic complications in a clearly visible surgical field, while monitoring the patient's urine output before, during, and after the procedure.^[1-4] An indwelling catheter aims to decrease the risk of postoperative urine retention, atonic bladder, detrusor instability, and urinary tract infection (UTI).^[5-7] However, prolonged period of indwelling urethral catheter can also increase bacterial

colonization and cause consequent UTI, increasing postoperative complications, longer hospital stays, and overall increase in healthcare costs.

The American Association of Gynecologic Laparoscopists' (AAGLs') or the National Institute for Health and Care Excellence's (NICE's) most recent laparoscopic hysterectomy clinical practise guidelines are ambiguous about when the urinary catheter should be removed after surgery.^[8-10] The Dutch Society of Obstetrics and Gynecology (NVOG) indicates removal "after a particular period," whereas the Royal College of Obstetrics and Gynecology (RCOG) only specifies that the urinary catheter is typically left in place for up to 24 hours.

Even though laparoscopic procedures have significantly increased in recent years, little is known about the timing of catheter removal after abdominal hysterectomies and the incidence of UTI in majority of studies.^[11-14]

Minimizing post-operative complications that can lengthen recovery time is essential to maximising the advantages of minimally invasive laparoscopic surgery.^[11] Early mobilisation and lower UTI risks have been demonstrated to result from shorter catheterization times.^[9] The purpose of our study was to determine whether immediate catheter removal (ICR) following laparoscopic hysterectomy offered comparable patient outcomes to delayed catheter removal (DCR). With regard to the risk for urinary retention, we specifically hypothesised that ICR is not inferior to DCR.

MATERIALS AND METHODS

This research was carried out with IRB approval at BKL Walawalkar Rural Medical College and Hospital, Maharashtra. Informed written consent was obtained from each of the women who met the study's eligibility requirements and were persuaded to participate.

Inclusion Criteria

The inclusion criteria were adult females having bilateral salpingo-oophorectomies or total laparoscopic hysterectomies for various benign gynaecological diseases. Counseling on alternative treatments was given to all eligible women.

Exclusion Criteria

1. Provenance of neurological conditions
2. Provenance of urge incontinence,
3. Women with preoperatively confirmed urinary tract infections by urine analysis, culture, and sensitivity testing
4. Women who chose spinal anaesthesia or for whom general anaesthesia was inadvisable.
5. Post-randomization exclusion criterion: Women in whom an intraoperatively complicated procedure during hysterectomy necessitated an indwelling catheter.

140 patients who met our inclusion and exclusion criteria were recruited from all total laparoscopic hysterectomies performed at the study site between December 2020 and March 2022. These 140

participants were randomly assigned to one of the four groups using a simple randomization procedure. Participants in group 1 had their urinary catheters removed in the operating room immediately following surgery. In group 2, catheter removal occurred 12 hours after surgery. Group 3 left it in place for 24 hours, while Group 4 removed it after 72 hours. Due to the interventional nature of this study, blinding was not possible.

The morning of surgery, 1 mg of ceftriaxone was injected intramuscularly into each patient to prevent infections. After the patient was put to sleep with general anaesthesia, a 12 FR Foley's catheter was introduced with strict adherence to infection control protocols. As is customary, all patients underwent total laparoscopic hysterectomy, with or without simultaneous bilateral salpingo-oophorectomy, and continuous bladder drainage. The catheter was then either removed in the operating room immediately following the procedure, 12, or 24 hours after surgery, or left in place for 72 hours, depending on the group assignment. Each patient was then given explicit instructions to voluntarily empty their bladders after the urinary catheter was removed. Midstream urine was collected from each patient after the catheter was taken out so that it could be analysed, cultured, and compared to the preoperative sample. A third urine sample was taken a week after the procedure. If the patient still had urinary retention 12 hours after the catheter was removed or if there was ultrasound evidence of urine retention, an indwelling catheter was implanted.

RESULTS

Average age, BMI, parity, surgical time, and hysterectomy motivation were all similar across the four groups in this study. Most hysterectomies are performed because of abnormal uterine bleeding caused by uterine fibroids or adenomyosis. Comorbidities such as hypertension, diabetes, and liver or renal issues were not significantly different between the two groups' medical histories. Moreover, there was no distinction between the women in the study with regards to the number of prior Caesarean sections or other pelvic surgeries, pre-operative laboratory tests, or other pelvic procedures.

Table 1: Comparative outcome of our study

SR. NO.	PARAMETERS	GROUP 1 (n=35)	GROUP 2 (n=35)	GROUP 3 (n=35)	GROUP 4 (n=35)
1	Urine retention and re-catheterization	3(8.57%)	1(2.85%)	0	0
2	Symptomatic UTI	1(2.85%)	4(11.42%)	8(22.85)	10(28.57)
3	Post-Operative positive urine culture	0	0	2(5.71%)	7(20%)

The most important outcomes of the study are summarised in [Table 1]. There was no post-

randomization exclusion of participants and no participants were lost to follow-up.

Only slightly more people in group 1 required a re-catheterization due to urine retention compared to groups 2 and 4. Urinary retention required redo catheterization in about 8.57 percent of Group 1 patients and 2.8 percent of Group 2 patients. In groups 3 and 4, no one experienced urinary retention, so re-catheterization was not required.

Patients in Group 4 had a 28.57 percent prevalence of lower UTI symptoms one week after catheter removal, while patients in Group 3 had a 22.85 percent prevalence. The incidence of UTIs was significantly lower in Groups 2 and 1 (11.42% and 2.85%, respectively) compared to Groups 4 and 3. A postoperative urine sample was sent for culture after the catheter was removed, and the rate of positive reports was compared. In Group 4, 20% of cases had a positive urine culture for UTI, while in Group 3, only 5.71 % of cases did. The culture results for the urine samples from Groups 1 and 2 were negative. These findings further support the hypothesis that long-term catheterization is associated with an increased risk of symptomatic UTIs.

DISCUSSION

The purpose of this research was to examine the association between length of hospital stay and incidence of post-operative urine retention and re-catheterization, symptomatic UTI, and post-operative positive urine culture to determine the viability of a new protocol of early post-operative catheter removal following laparoscopic hysterectomy. We have demonstrated the potential for enhanced patient recovery following early catheter removal and shown that this appears to be both feasible and effective.

Our data showed that the rate of urinary retention was 8.57% when the catheter was removed immediately following surgery, but only 2.85% when it was removed 12 hours later. None of the participants experienced urinary retention or required re-catheterization after the catheters were removed at the 24- and 72-hour marks.

The increased risk of symptomatic UTI with prolonged catheterization is supported by the finding that the incidence of symptomatic UTI is significantly lower in cases where the catheter is removed immediately in the operating room after surgery. This was further supported by the higher rate of positive postoperative urine cultures.

When the catheter is abruptly removed, the risk of urinary retention increases to between 8.5% and 34.0%, according to the literature.^[15-19] Urinary retention was reported by 34% of patients who underwent laparoscopic assisted vaginal hysterectomy, according to a study by Liang et al.^[19] (LAVH). Although "postvoid residual bladder volume > 150mL" was the standard definition of urinary retention, these women did not have catheters in place.

We found a significantly lower incidence of urinary retention than previously reported. We may have erred in our reasoning because we chose only

laparoscopic operations. We speculate that this low incidence is because laparoscopic procedures are less traumatic to the bladder than abdominal ones. The fact that women who have laparoscopic hysterectomy recover much more quickly and with less pain than those who have abdominal procedures performed may also contribute to the low incidence. Even though no catheter was used in the Liang et al. study, it is possible that the distention of the bladder during surgery contributed to the increased rate of urinary retention in the postoperative period.

The gynecologist's extensive experience and skill in performing laparoscopic hysterectomies may also have played a role in the patients' low rates of urinary retention. One can expect a surgeon with less experience to have a higher rate of perioperative complications. In general, the rate of complications during laparoscopic hysterectomies decreases as the operative gynecologist's experience with the procedure grows.^[20,21] Results from our study showed that urinary retentions cleared up by the next day following surgery in every case.

Compared to the 1.3% to 4.9% incidence rates reported in previous studies,^[16,18,22] as shown in [Table 1], we found a higher incidence of urinary tract infections.

The higher rate of UTIs in this study is probably due to the difference in definition. Most studies agree that the presence of at least one clinical symptom and a positive culture (>103 bacteria/mL) constitutes a urinary tract infection. However, by analysing a urine sample for leucocytes, erythrocytes, and bacteria, we were able to define the clinical symptoms of UTI in this study. As opposed to open surgery, laparoscopic hysterectomy has a number of well-known advantages, including a shorter hospital stay and a speedier return to normal life. Catheter management may not seem like a surgeon's top priority, but a less-than-ideal routine can undermine the benefits of laparoscopy's minimally invasive technique. Negative effects of a hospital's catheterization policy could have far-reaching consequences for patients' health and recovery after surgery, as well as for the hospital's bottom line.

CONCLUSION

In conclusion, our study showed that, with careful monitoring of postoperative spontaneous urination, it is safe to remove the urinary catheter immediately following an uncomplicated laparoscopic hysterectomy.

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