ORIGINAL RESEARCH

A Randomized Evaluation of Urinary Catheters Removal after Complete Abdominal Hysterectomy

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ABSTRACT

Background: The purpose of this study is to determine whether immediate, intermediate, or delayed removal of an indwelling urinary catheter after an uncomplicated abdominal hysterectomy has an effect on the rate of recatheterization due to urinary retention, the rate of urinary tract infection, the amount of time patients spend walking around in the hospital, and the total length of their hospital stay.

Martial and Methods: A Randomized controlled study was carried out at Narayana Medical College, Nellore, A. P, and India. A total abdominal hysterectomy was performed on two hundred twenty one women who were diagnosed with benign gynecological disorders. The patients were then divided into three groups at random. Urinary catheters were removed from the urinary systems of the women in group and as soon as possible after surgery. In group B, the catheter was withdrawn six hours after the surgery, while in group C, it was removed twenty-four hours after the surgery. The frequency of urine retention, the number of urinary tract infections, the amount of time spent ambulating, and the total length of hospital stay were the primary end measures.

Results: The rapid removal group saw a statistically significant increase in the number of urinary retention episodes requiring catheterization when compared to the groups that underwent intermediate or delayed removal. The delayed urinary catheter removal was associated with a greater prevalence of urinary tract infections, a longer delay in ambulation time, and an extended hospital stay as compared to the early and intermediate removal groups.

Conclusion: Removal of the urinary catheter 6 h postoperatively appears to be more advantageous than early or late removal in cases of uncomplicated total abdominal hysterectomy.

Keywords: Randomized, evaluation, urinary catheter. Abdominal hysterectomy.

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INTRODUCTION

When performing an abdominal hysterectomy, one of the preparatory steps typically involves the insertion of an indwelling urinary catheter. This is done so that the patient's urinary bladder can be kept empty throughout the procedure, which enhances the visibility of the surgical field, simplifies the various operative steps, and prevents iatrogenic injury to the urinary bladder.[1-3] The operating team is able to evaluate the patient's urinary output and be

certain that the patient's urine is clear because the patient has an indwelling catheter.[4] After surgery, the catheter is typically left in place in order to prevent postoperative urine retention, which can lead to bladder atony and may raise the risk of long-term urinary morbidities such as difficulty voiding, detrusor instability, and an increased risk of urinary tract infection (UTI).[5-7] On the other hand, prolonged insertion of an indwelling urethral catheter may lead to increased urine bacterial colonisation and, as a result, an infection of the urinary tract. This results in increased patient morbidity and a longer hospital stay, which leads to an increase in the overall cost of healthcare. Infectious Diseases Society of America's expert panel developed evidence-based international clinical practice guidelines for procedures and strategies to reduce the risk of catheter-associated asymptomatic bacteriuria and urinary tract infections.[8-10] These guidelines were developed for procedures and strategies to reduce the risk of catheter-associated asymptomatic bacteriuria and urinary tract infections. They were in agreement that there is substantial evidence to suggest that indwelling catheters should be withdrawn as soon as they are no longer necessary in order to lower the risk of bacteriuria and UTI.[11-13] It is still debatable whether an indwelling urethral catheter should be removed after a simple complete abdominal hysterectomy, and the decision of when to remove the catheter postoperatively is typically made primarily on tradition rather than on evidence-based information.[14-16] Figure 1 shows an illustration of the complications that can arise while using a urinary catheter.
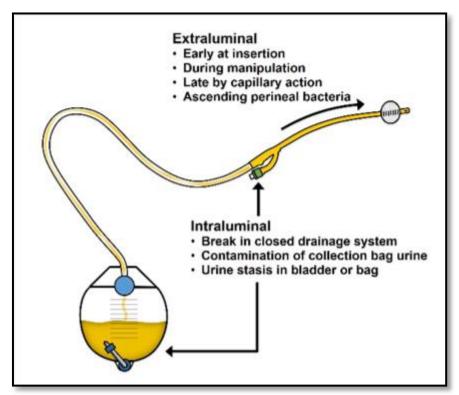

Figure 1: Complication in applications of urine catheter

Dobbs et al. discovered that in–out catheterization was associated with higher rates of postoperative urinary retention when compared to delayed removal of an indwelling catheter.[17] However, Dunn et al. demonstrated that immediate removal of catheters was not associated with adverse outcomes, in particular urinary retention, when compared to delayed removal. As a result, the purpose of the current study was to determine whether the immediate, intermediate, or delayed removal of an indwelling catheter after an uncomplicated

abdominal hysterectomy can have an effect on the rate of re-catheterization due to urinary retention, the rate of symptomatic urinary tract infections, the amount of time spent ambulating, and the amount of time spent in the hospital.[18-20]

MATERIALS & METHODS

The research was carried out in compliance with the ethical principles for medical research involving human subjects that are included in the Helsinki declaration. Additionally, a randomized controlled studies were carried out at Narayana Medical College, Nellore, A. P, and India. All of the women who were eligible for the study and met the requirements were encouraged to take part in the research, and their informed written consent was collected from each of them.

Inclusion criteria:

+ We included women undergoing total abdominal hysterectomy with or without bilateral salpingo-oophorectomy for various benign gynecological diseases after counseling about available alternative treatments.

Exclusion criteria:

+ Known history of neurological disorders women who had urinary tract infections preoperatively confirmed by urine analysis culture and sensitivity,
+ Women for whom a complicated procedure was encountered during the hysterectomy so that an indwelling catheter had to be kept postoperatively on the surgeon's decision,
+ Women who had spinal anesthesia by choice or when general anesthesia was contraindicated, women who had urge incontinence, and women who refused to participate in the study.

Total of 203 different people underwent the procedure. Twelve individuals were ultimately disqualified from the trial; five of them had difficulties during surgery (iatrogenic bladder injury), necessitating the maintenance of an indwelling catheter at the surgeon's request. The other seven patients did not complete the postoperative follow-up. The remaining 200 women underwent a simple randomization process in which computer-generated random numbers were used to assign each participant to one of three groups. Patients in group A had their urinary catheters removed as soon as they were able to following surgery. While the catheter was removed from group B six hours following surgery, it was left in group C for twenty-four hours. Utilizing the study's power, which was calculated to be 80%, and the a-error, which was calculated to be 0.05, the necessary sample size was established. There is a 5% possibility that the patient will experience symptoms of a urinary tract infection after a hysterectomy. Therefore, 62 patients would be the least sample size required for each of the study arms. On the morning before operation, each patient got one intramuscular injection of the prophylactic antibiotic ceftriaxone, 1 g. This was carried out to stop any infections from happening. A 12-millimeter latex Foley's catheter was inserted using an aseptic technique after general anaesthesia was administered. All patients underwent total abdominal hysterectomy, with or without concurrent bilateral salpingo-oophorectomy, according to usual practise, with continuous drainage of the bladders. The catheter was then either removed in the operating room immediately following the procedure, at 6 or 24 hours later, or kept in place for the whole 24 hours, depending on the research project. All of the patients were then instructed to voluntarily empty their bladders once the urine catheter was removed. A single urine catheterization with a disposable female catheter was carried out in the event that they were unable to do so six hours after the catheter was removed and it was discovered through clinical assessment or an ultrasound scan that the bladder was full. If the patient could not empty the bladder 12 hours after the catheter was removed and/or there was clinical

or ultrasound indications of urine retention, an indwelling catheter was implanted. On the second postoperative day, a midstream urine sample was collected from each patient for analysis, culture, and comparison with the preoperative urine sample. A third urine sample was also collected one week after the operation.

RESULTS
The three groups in this study did not significantly differ in terms of demographic or clinical parameters including mean age, body mass index (BMI), parity, length of surgery, or reasons for undergoing a hysterectomy. It is crucial to emphasize that fibroid tumour were discovered to be the most typical cause of hysterectomy. In actuality, fibroid tumours were cited as the cause in more than half of all cases. When it came to things like the occurrence of hypertension, diabetes mellitus, liver or renal problems, and other things, the medical histories of the groups did not significantly differ from one another. There was also no statistically significant difference between the women studied in terms of the number of prior caesarean sections or other pelvic surgeries, pre-operative laboratory tests, or other pelvic procedures. The key outcome measurements that were derived from the study are presented in [Table 1].

Table 1: Study groups' primary outcome indicators

Sr. No.	Parameters	Group A	Group B	Group C
1.	Urine retention and re-catherization	15	2	1
2.	Symptomatic UTI	1	3	11
3.	Postoperative urine culture	73	77	58
4.	First ambulation (mean)	5.1	5.8	10.4
5.	Hospital stay (mean)	3.5	4.5	5.5

When compared to patients in groups B and C, patients in group A exhibited a statistically significant higher incidence of urine retention and the requirement for re-catheterization. Regardless of the care they received, this was the situation. Patients in group C were found to have experienced considerably longer hospital stays than those in the other two groups, with a mean stay of 5.6 days compared to those in the other two groups. Additionally, it was demonstrated that patients in group C had a much longer time until their first ambulation, which was a statistically significant difference. One week after the catheter was removed; it was shown that 22-26% of patients in group C had symptomatic lower UTI, whereas 2.9% of the same group exhibited symptoms indicative of nephritis. Only two patients in groups A and B, on the other hand, displayed symptoms consistent with a lower urinary tract infection. Regarding the results of the cultures, around 21% of the patients in group C had positive cultures, while there was not a single patient in group A or group B who had a positive culture.

DISCUSSION
Our research demonstrates that removing the urine catheter six hours following a total abdominal hysterectomy leads to quicker patient mobility and fewer chances of urinary retention and UTIs. Although most, if not all, gynaecological surgeries involve the use of indwelling urinary catheters to monitor urine flow and avoid postoperative urinary retention, their usage must be weighed against the potential risk of increased urinary tract infection and patient discomfort.[21] It's still debatable how long postoperative catheter use should last. After a simple abdominal hysterectomy, an indwelling catheter is often left in place for 24 hours. However, it has been demonstrated that the presence of an indwelling catheter affects

both the frequency of urinary tract infections and the length of hospital stays. Our research revealed that the group with early catheter removal experienced a significant rate of re-catheterization due to transient urine retention, a finding not seen in the group with delayed removal. Although the detrusor muscle works independently of intra-abdominal pressure, as time goes on following surgery, the ability to increase intra-abdominal pressure will be less affected by the uncomfortable surgical wound and can thus aid in voiding, which may account for the delayed removal group's lack of urinary retention.[22-24] According to our findings, Alessandri et al. discovered greater rates of re-catheterization in situations when the catheter was removed immediately, whereas none of the intermediate or delayed cases required re-catheterization. Despite the limited sample size in that investigation, this conclusion was not significantly different in a recent study by Chai and Pun. De-afferentiation of the bladder wall or bladder neck may be linked to urinary retention following hysterectomy for benign illness. This may cause the bladder to lose its ability to feel full, resulting in an increase in bladder capacity and secondary urine retention.[25] It may also cause partial or complete sensory denervation of the bladder. After total hysterectomy as opposed to partial hysterectomy, lower voiding frequency and larger bladder capacity are more typically recorded. Denervation and retention as a result of hysterectomy do occur frequently, however these symptoms are typically transient. In our investigation, bacteriuria and symptomatic UTI were frequently observed. Comparing cases with rapid or intermediate catheter removal to those with delayed removal, a tendency toward a decreased incidence of urinary tract infections was seen. Numerous studies have shown that prolonged postoperative catheterization is the primary initiating factor for UTI, which is consistent with our findings.[26] It has been established that urinary catheterization is a common cause of UTI since it raises the risk of infection by 5–10% every day of use. One week later, the delayed removal group had 21% more urine cultures that were positive and considerably higher incidence of symptomatic UTI. In a moist environment, a urinary catheter in the bladder is a foreign body. Biofilm microorganism colonisation is encouraged by this. Microorganisms in biofilms can tolerate drying, UV radiation, antimicrobial treatments, and other environmental stresses. This means that a pathogenic biofilm cannot typically be removed from an indwelling urinary catheter without removing the catheter. Biofilm-associated organisms can contaminate the urine while the colonized catheter is still in place. Intriguingly, it was discovered that the timing of urinary catheter removal was connected with ambulation time and hospital stay, with the delayed catheter removal group having a longer ambulation time and hospital stay than the other groups.[27] The prolonged hospital stay was ascribed to the occurrence of urinary tract infections (UTIs) with symptoms and/or positive urine cultures, which required protracted in-patient antibiotic therapy. As a result of urethral site discomfort and/or pain, as well as patient anxiety and concern from the placed catheter, indwelling urinary catheters may prevent early ambulation. Early ambulation is therefore a suggested and encouraged practice because it significantly reduces bladder and bowel inertia, lowers the risk of venous thrombosis, and improves pulmonary function.

CONCLUSION

In summary, early catheter removal was linked to a higher risk of transitory urine retention and re-catheterization. However, this approach was linked to quicker ambulation, shorter hospital stays, and a lower incidence of urinary tract infections. On the other hand, urine retention was not a result of delayed urinary catheter removal, but rather a higher incidence of urinary tract infection, delayed ambulation, and a longer hospital stay. It is interesting that in all of our research findings, withdrawing the urinary catheter at a middle time point just six hours after surgery seems to be more advantageous than doing so either early or late. We

recommend that the indwelling urine catheter be withdrawn six hours following a simple abdominal hysterectomy because this is linked to quicker patient mobility and lower risks of urinary tract infection.

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