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Evaluation of Early Removal of Urinary Catheter after Rectal Cancer Surgery

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Abstract

Background: It is a common practice to catheterize the bladder during major surgical procedure and leave the catheter *in situ* to avoid post-operative urinary complications such as retention or incontinence. Catheter removal on post-operative day 5 is a routine, and it causes some urinary problems and longer hospital stay. The objective of this study was to evaluate the effect of early removal of urinary catheter on the 1st day after rectal cancer surgery, on the rate of urinary complications.

Methods: This quasi-experimental study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Iran. 80 patients with rectal cancer underwent surgery at Imam Hossein Hospital from 2015 to 2016, were recruited with planned early removal of urinary catheter after surgery. Personal and disease information was recorded in all patients after obtaining the informed consent. Urinary complications were checked by the surgical resident after the operation.

Results: Mean age of participants was 56.64 ± 14.90 (range: 22-84 years). From these patients 46 (57.5%) were male, and 34 (42.5%) were female. Two cases (2.5%) were manifested urinary problems in men. One of them reported urinary retention and the other one had hematuria. Both patients were in Stage III of rectal cancer and had laparoscopic surgery. Urinary incontinence was not reported in any patients.

Conclusions: In patients who undergoing rectal cancer surgery, urinary catheter can be removed on the 1st post-operative day without any significant increase in urinary complications.

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Keywords: Urinary catheter; Rectal cancer; Urinary retention; Urinary incontinence

Introduction

The routine post-operative indwelling urethral catheter is used during and after major surgery to monitor urinary output and prevent urinary retention. One of the most hospital-acquired infection is urinary tract infection (UTI), and the major risk factor for UTI is an indwelling urinary catheter (1,2). Catheter-associated urinary infection (CAUTI) has been reported with increased length of hospital stay and additional cost per admission (3,4). In addition to infection, catheter use is associated with negative outcomes including nonbacterial urethral inflammation, urethral strictures, mechanical trauma, urinary retention, and morbidity impairment (5,6).

Reducing unnecessary catheter placement and minimizing the duration catheter remains *in situ* is a primary strategy for prevention of CAUTI and one of the compartments of Fast-track protocol after surgery to accelerate the recovery process of patients (7).

In some cases of urinary disorders such as pelvic anatomical changes and nerve damage, the urinary catheter should remain for 5-7 days after surgery (8).

An integrative review study in 2013, recommended reducing unnecessary urinary catheter use and they did not report any harm from early catheter removal strategy (9). In surgical patients receiving thoracic epidural anesthesia, the rate of urinary retention was not significantly different between the 1-day and the 4-day catheterization group and the prevalence of UTI significantly reduced with the early removal of transurethral catheter (10). On the other hand, there are some evidence which show the early removal of the catheter was associated with urinary retention in adults undergoing rectal resection operation, uncomplicated total abdominal hysterectomy, and rectal cancer surgery (11-13). Therefore, the ideal timing for urinary catheter removal is still unknown, and there are different opinions between surgeons on this issue. The level of evidence is low and further studies are needed.

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The objective of the present study was to determine the urinary retention and incontinence rate with early removal (1st day) of urinary catheter after surgery in patients with rectal cancer. Meanwhile, we evaluated the effects of background disease, type of procedure of surgery and other risk factors that may be related to complications.

Materials and Methods

This quasi-experimental study (IRCT#2017072635290N1) was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Iran, (No # IR.SBMU.MSP.REC.1395.599), and informed consent was obtained from all participants. Data of the present study were collected from Imam Hossein University Hospital from 2015 to 2016. All patients who had rectal cancer were evaluated before and after surgery by a surgical resident. Control group was not allocated in this study. Individual and disease information was recorded including age, sex, tumor location, history of previous pelvic surgery, previous history of urinary problems, and benign prostatic hypertrophy (BPH). Meanwhile, the tumor metastasis to other pelvic organs was recorded considering imaging tests. The type of surgery was selected for each patient due to tumor location and other factors as one of the three methods: Abdominoperineal resection (APR), low anterior resection (LAR), and very low anterior resection. The surgical procedure was open or laparoscopic. The cancer staging system of the tumor was recorded based on 7th American Joint Committee on Cancer, and tumor-node-metastasis system staging (14). Duration of anesthesia and intraoperative findings such as invasion to adjacent organs and gross hematuria was recorded. The urinary catheter of all patients was removed on the 1st post-operative day. All patients were checked for urinary complications such as retention and incontinence during hospital stay (4-5 days).

We estimated the proportion of urinary complications in patients who receive standard protocol (4-5 days) is about 20% and with early removal will be about 10%. Therefore, we calculated that 80 patients would be required with a power of 80% and $\alpha = 0.05$ in one-side test.

Data analyses were performed with SPSS software (version 20, IL, Chicago, USA). Quantitative data were presented as a mean ± standard deviation, and qualitative data were presented as number with percentages.

Results

At final analyses, 80 patients were recruited. Mean age of participants was 56.64 ± 14.90 (range: 22-84 years). From these patients 46 (57.5%) were male and 34 (42.5%) were female patients. Individual and disease information of patients is shown in table 1. 17 (37%) male patients had BPH. From all these patients, 2 cases (2.5%) were manifested urinary problems in men. One of them had urinary retention and the other one had hematuria. Both patients were in Stage III of rectal cancer and APR surgery with the laparoscopic procedure was performed for them. They had no history of pelvic surgery and BPH, and both of them had previous history of diabetes mellitus. Urinary incontinence was not reported in any patients.

Table 1. Individual and disease characteristics of participants (N = 80)

Variables	Total (n =80)	Female (n = 34)	Male (n =46)
Age (years)	56.64 ± 14.90	53.65 ± 10.88	58.85 ± 17.07
Interval between radiotherapy and surgery (h)	8.81 ± 3.58	8.68 ± 3.30	8.91 ± 3.81
Tumor anal verge distance (cm)	5.71 ± 4.04	6.75 ± 4.27	4.93 ± 3.73
Anesthesia duration (hour)	2.40 ± 0.69	2.27 ± 0.72	2.49 ± 0.65
Diabetes	18 (22.5)	9 (26.5)	9 (19.6)
Hypertension	25 (31.3)	7 (20.6)	18 (39.1)
History of ischemic disease	17 (21.3)	5 (14.7)	12 (26.1)
History of pelvic surgery	10 (12.5)	9 (26.5)	1 (2.2)
Pelvic radiotherapy	70 (87.5)	31(91.2)	39 (84.8)
Stage of disease			
I	8 (10.0)	3 (8.8)	5 (10.9)
II	28 (35.0)	16 (47.1)	12 (26.1)
III	32 (40.0)	10 (29.4)	22 (47.8)
IV	12 (15.0)	5 (14.7)	7 (15.2)
Type of surgery			
LAR	25 (31.3)	14 (41.2)	11 (23.9)
VLAR	14 (17.5)	7 (20.6)	7 (15.2)
APR	41 (51.2)	13 (38.2)	28 (60.9)
Procedure of surgery			
Open	51 (63.8)	22 (64.7)	29 (63.0)
Laparoscopic	29 (36.2)	12 (35.3)	17 (37.0)

Data are expressed as mean ± standard deviation or number with the percentage in parenthesis. LAR: Low anterior resection; VLAR: Very low anterior resection; APR: Abdominoperineal resection

Discussion

The result of the present study shows that in 80 patients who underwent rectal cancer surgery, only one (1.3%) of the male patients (55 years old) had urinary retention after early removal of the urinary catheter.

The result of this study revealed the early removal of the urinary catheter was not associated with higher incidence of retention and it is similar to another study that reported no significant differences in early with late removal of the urinary catheter in other surgery. They reported UTI in 2% of early removal catheter in compared with 14% in standard group (3-5 days) and the incidence of recatheterization was not different between the two groups. They concluded leaving the bladder catheter longer results in a higher incidence of UTI and prolonged hospital stay (10).

However, our result is contradicted with another one who reported the higher rate of urinary retention after rectal surgery (11,13). These differences may be due to differences in patient's age or other characteristics such as the stages of disease, the procedure of operation and large sample size as an important factor.

The results of Lee et al. study in 2015 revealed that male sex [odds ratio (OR) = 2.24, P = 0.039], laparoscopic operation (OR = 2.42, P = 0.024), and urinary catheter removal on post-operative day 1 or 2 days (OR = 3. 65, P = 0.02) are independent risk factors for acute urinary retention after rectal cancer surgery (13). The results of the present study showed that male sex and laparoscopic surgery are two risk factors for urinary retention. However, we did not confirm that early removal of the urinary catheter is associated with higher incidence of urinary problems.

A prospective randomized controlled trial showed that after rectal resection, 1 day of urinary drainage can be recommended for most patients and 5-day drainage should be reserved for patients with low rectal carcinoma. They found that after selection of patients without low rectum carcinoma, the rate of urinary retention was statistically similar in both groups. However, UTI was significantly higher in the 5-day group (15).

In our study, the mean age of women was 53.65 ± 10.88, and none of the women reported urinary complications. One study that measured sexual and urinary outcomes in women after rectal cancer excision revealed female aged 65 or older are associated with significant impairments in the urinary and sexual outcome (16). However, women who participated in our study were belonging to the younger population, and they did not reveal any urinary problems. Hence, it is better to conduct this kind of study in the different category of age.

These findings may help to identify patients who are at increased risk of acute urinary complication. The urinary catheter should remain longer only in patients with higher risk factors.

Therefore, it seems in all studies researchers agree that delay urinary catheter removal was associated with a higher incidence of UTI, delay ambulation time and longer hospital stay. However, there is still disagreement on the rate of urinary retention in the early removal or standard remaining catheter. It means that we are depriving patients of early urinary catheter removal advantages based on an illogical fear of some rare complication.

In conclusion, the risk of urinary retention or incontinence in our patients was very low and the early removal (1st day after surgery) of the urinary catheter in rectal cancer patients is recommended. Although more study in different sex and age category with large sample size in the future are needed.

Conflict of Interests

Authors have no conflict of interests.

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