Original Article

Prophylactic ureteric catheterization before pelvic surgery in Rajavithi Hospital

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Abstract

Objective: To evaluate the incidence and the correlation between the risk factors of ureteric injury and complications in patients who underwent prophylactic ureteric catheterization before pelvic surgeries.

Material and Method: From October 2015 to December 2018, the medical records of 130 patients in Rajavithi Hospital who underwent pelvic surgeries and prophylactic ureteric catheterization were retrospectively reviewed. Information included age, history of previous pelvic surgeries, pelvic radiation, presence of hydronephrosis, pathology, stage of cancer, injury of ureters, and complications.

Results: Incidence of ureteric injury was 4.6% (n=6). The significant risk of injury was location of the tumor at the ovary (p=0.034); borderline significant risk was malignant pathology (p=0.057). After the procedure, 16.2% (n=21) of the patients had gross hematuria and 14.6% (n=19) of the patients had a urinary tract infection. Average time of catheterization was 20.95 minutes. Significant risk of gross hematuria was older age (p<0.001) and malignant pathology (p=0.006).

Conclusion: From this study, ureteric injury may be significantly higher in cases of malignancy at the ovary and may not prevent injury in high-risk patients. Ureteric catheterization should be carefully considered in elderly patients because of the higher rate of complications.

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Introduction

Surgical injury to the ureter is an uncommon but potentially serious complication of pelvic surgeries. Unrecognized ureteral injuries may cause prolonged postoperative morbidity, such as fistula formation, sepsis, or renal loss. Gynecologic and colorectal procedures account for most of these injuries[1,2]. The incidence of ureteral injury during gynecologic surgery ranges from 0.1-2.5%[3-6] and 0.2-4.5%[7] for colorectal surgery.

The uses of prophylactic ureteric stents or catheter placement are controversial for preventing ureteric injury. Occasionally, prophylactic ureteric catheters are associated with significant complications, such as hematuria, reflux anuria, urinary tract infection. The procedure also consumes more time, instruments, and costs more.

The aim of this study was to find the incidence of ureteric injury in patients who underwent prophylactic ureteric catheterization before pelvic surgeries. Secondary outcomes were the correlations between the risk factors of ureteric injury and complications.

Material and Method

Data were collected by reviewing the medical records of patients who underwent prophylactic ureteric catherization before pelvic surgery by a gynecologist and colorectal surgeon from October 2015 to December 2018 in Rajavithi Hospital.

On all patients a cystoscopy was used with 19 Fr outer sheath and 30 degree angulation telescope. After filling the bladder with normal saline, 5 Fr open end ureteric catheter was inserted into bilateral ureteric orifices gently at a 25 cm depth from the orifices or less if it could not advance more (Figure 1). For difficult cases, hydrophilic guide wire was used to help with the advancement of the ureteric catheter. After ureteric catheter insertion was complete, the patients were transferred to the operative room within 1 hour before starting the operation.

A total of 140 medical records were collected; 10 were excluded due to being incomplete. Thus, 130 medical records were retrospectively reviewed for demographic data, which included age, history of previous pelvic surgery, pelvic radiation, presence of hydronephrosis, pathology, stage of the cancer, incidence of ureteric injuries, treatments, and complications of ureteric catheterization.

Statistical analysis was performed using SPSS version 17. Comparison of categorical data was performed by Chi-square test with $p<0.05$ considered as significant.

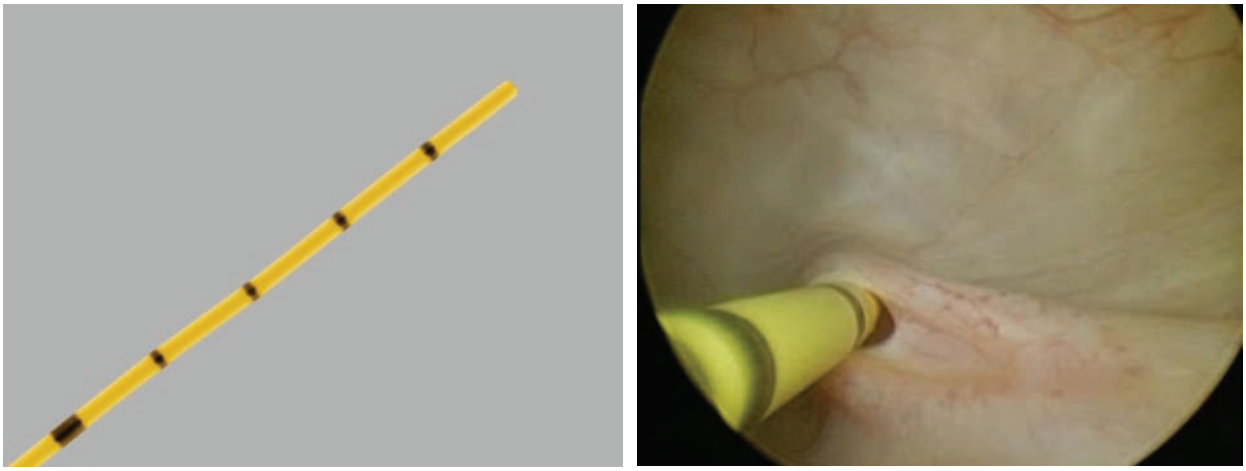

Figure 1. Insertion of 5 Fr open end ureteric catheter into both ureteric orifices at 25 cm depth.

Results

A total of 130 medical records were reviewed. Patient characteristics are shown in Table 1. The mean age of patients was 48.25 years. Most patients were females (94.6%) from the gynecologic department. Most of the patients had hydronephrosis before the surgery (61.5%); 6.2% of patients had a history of pelvic radiation and 30% had prior pelvic surgery. Pathology was benign in 56.2% and malignant in 43.8%. Mean time of ureteric catheterization was 20.95 minutes. There were 6 (4.6%) patients who had ureteric injury. All of the injuries were detected intraoperatively. Two patients had reimplantation with psoas hitch, and 2 patients had reimplantation; 1 patient had a simple repair and 1 patient had a uretero-ureterostomy.

Two patients with ureteric injury had ovarian disease (Figure 3), with a significant correlation between injury (p=0.034). Correlation between the pathology and injury were shown nearly significant risk in the malignancy group (p=0.057) (Figure 2).

Correlation between patient characteristics and complications are shown in Table 3 and 4. Significant risk of UTI was advanced age (p<0.001) and malignant disease (p=0.006).

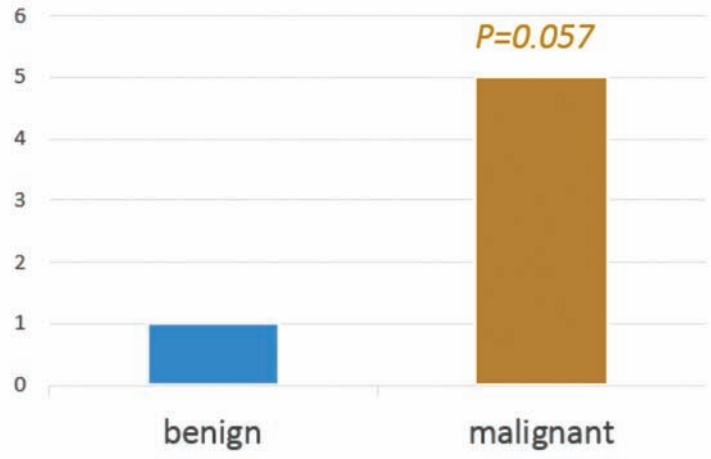

Figure 2.
Correlation between pathology and injury.

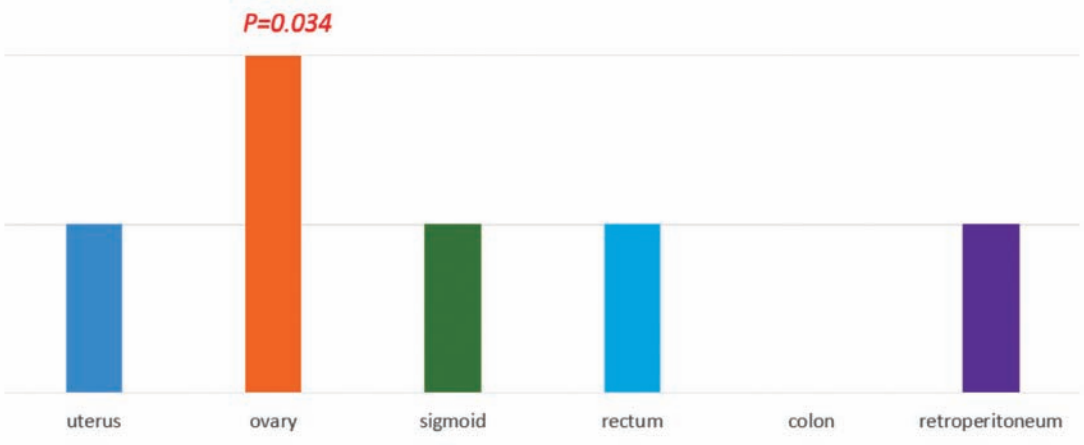

Figure 3. Correlation between disease location and injury.

Table 1. Patient characteristics.

Characteristics	Number of patients/Percent (%)
Age (mean ± SD)	48.25 ± 12.9
Sex	
Male	7 (5.4%)
Female	123 (94.6%)
Pelvic radiation	8 (6.2%)
Previous pelvic surgery	39 (30%)
Hydronephrosis	80 (61.5%)
Pathology	
Benign	73 (56.2%)
Malignant	57 (43.8%)
Time (minutes)	20.95 ± 5.56
Number of stent	
Bilateral	101 (77.7%)
Unilateral	28 (21.5%)
Fail bilateral	1 (0.8%)
Ureter injury	6 (4.6%)
Complication	
Hematuria	21 (16.2%)
Urinary tract infection	19 (14.6%)
Anuria	0
Hematuria and urinary tract infection	5 (3.8%)

Table 2. Correlation between patient characteristics and injury.

Characteristics	No injury	Injury	P-value
Mean age (years)	48.02	53.00	0.358
Pelvic radiation	7 (5.6%)	1 (16.7%)	0.322
Previous pelvic surgery	35 (28.2%)	4 (66.7%)	0.066
Hydronephrosis	75 (60.5%)	5 (83.3%)	0.252

Table 3. Correlation between patient characteristics and hematuria.

Characteristics		No hematuria	Hematuria	P-value
Mean age (years)		47.40	52.67	0.087
Radiation		7 (6.4%)	1 (4.8%)	0.619
Pelvic surgery		34 (31.2%)	5 (23.8%)	0.609
Hydronephrosis		66 (60.6%)	14 (66.7%)	0.635
Pathology	Benign	60 (55.0%)	13 (61.9%)	
	Malignant	49 (45.0%)	8 (38.1%)	0.636
Time (minutes)		20.63	22.57	1.816
Number of Catheter	1	25 (22.9%)	3 (14.3%)	
	2	83 (76.1%)	18 (85.7%)	0.634
	0	1 (0.9%)	0	

Table 4. Correlation between patient characteristics and urinary tract infection.

Characteristics		No urinary tract infection	Urinary tract infection	P-value
Mean age (years)		46.63	57.74	<0.001
Radiation		6 (5.4%)	2 (10.5%)	0.331
Pelvic surgery		36 (32.4%)	3 (15.8%)	0.128
Hydronephrosis		67 (60.4%)	13 (68.4%)	0.614
Pathology	Benign	68 (61.3%)	5 (26.3%)	
	Malignant	43 (38.7%)	14 (73.7%)	0.006
Time (minutes)		20.74	22.16	0.306
Number of Catheter	1	24 (21.6%)	4 (21.1%)	
	2	86 (77.5%)	15 (78.9%)	1.000
	0	1 (0.9%)	0	

Discussion

The incidence of ureteric injury during gynecologic and colorectal surgeries ranges from 0.1-4.5%[1-7]. The uses of prophylactic ureteric stents or catheter placement are controversial for preventing ureteric injury. Preoperative ureteric stenting can be used to ease the identification of the ureter in high-risk cases. However, published data in gynecologic and colectomy populations show that it may increase intraoperative recognition of ureteric injuries, but may not actually decrease ureteric injuries[8-10]. One study showed that stents might even increase rather than reduce the chance for intraoperative injury[1].

In a study by Jeong Hyun Park[11] on ureteral injury in gynecologic surgery, it was reported that a laparoscopic case was 1.1% similar to laparotomy (1.2%).

Increasing the rate of injury in high-risk conditions (2.7%) included endometriosis, retroperitoneal fibrosis, pelvic inflammatory disease with direct tumor invasion, previous pelvic surgery, broad ligament fibroids, history of pelvic radiation, and congenital abnormalities. In high-risk patients, the stenting group had a lower rate of ureteric injury than the non-stenting group. Peter Andersen[12] reported that the risk of ureteric injury in colorectal cancer surgery was higher in laparoscopic surgery. Age, gender, preoperative chemo-radiation, previous pelvic surgery, and tumor stage did not increase the rate of injury.

Ureteric catheterization sometimes might not be successful. A stent cannot be placed on one side in 13% of cases and failure bilaterally can occur in 2%[9]. Ureteric stent placement also reported complications. Fadi Chahin[13] reported the complication rate of ureteric stent placement in patients who underwent colorectal surgery: Hematuria 98.4%, Anuria 6.1%, UTI 6.1%. Unilateral stenting had a lower complication rate than bilateral.

In this study, the incidence of ureteric injury was 4.6%. There was a significant risk of injury when the location of the tumor was at the ovary. Nearly significant risk was malignant pathology and previous pelvic surgery. There was a significant risk of urinary tract infection when the patient was older and had a malignant pathology; advanced age may increase the risk of hematuria. For nearly significant parameters may significant if more sample size.

Limitations of this study are its retrospective nature, and its nonrandomized and small sample size. Any further studies should be randomized with an increased sample size in order to reduce any confounding factors.

Conclusion

From this study, ureteric injury was higher in cases located at the ovary, and may have been higher in cases of malignancy and previous pelvic surgery. Preoperative ureteric catheterization may not prevent injury in high-risk patients, and should be carefully considered in elderly patients because of its higher rate of complications.

Conflict of interest

The authors declare no conflict of interest.

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