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Complications of Urinary Catheterization

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A B S T R A C T

Urinary catheters are used to manage urinary incontinence and retention, reducing postoperative bladder dysfunction related to anesthesia, surgery and immobility. Objective of our study was to study the complications of urinary catheterization in surgical patients and to assess the incidence of complications in relation to the period of urinary catheterization. To study the complications of urinary catheterization in surgical patients and to assess the incidence of complications in relation to the period of urinary catheterization. The study was conducted in the Department of Surgery, MMIMSR, Mullana, Ambala. A total of 150 patients admitted in surgical ward were catheterized under aseptic conditions. The overall incidence of catheter associated urinary tract infection was found to be 20.7%. Complications were noticed majority in females in age group above 50 years. Catheter associated UTI was present predominantly in patients catheterized for duration of 6-10 days. The urinary tract of catheterized patients is highly susceptible to severe infection and is associated with varied microbiological etiology. Emphasis should be made on reducing the duration of catheterization to reduce the incidence of catheter-related UTI. The most common practices shall include hand hygiene, close drainage, aseptic insertion and catheter care along with daily cleanliness.

Introduction

These catheters are used to manage urinary incontinence and retention, reducing postoperative bladder dysfunction related to anesthesia, surgery, and immobility (Kramer *et al*., 2008). Indwelling urinary catheters are frequently used to measure accurate urinary output in critically ill patients. In addition IUCs are used with patients with spinal cord injuries as well as patients who receive large-volume infusions or diuretics during surgery and improvement comforts for end of life care (Wald *et al*., 2008). Currently there are three main types of urinary catheters which are commonly used in clinical settings: condom catheters, indwelling catheters and intermittent catheters.

The NHSN (National healthcare safety network) definition of symptomatic Catheter

associated urinary tract infection has the additional indications that the patient has a fever of >100.4F; urgency, frequency, dysuria, or suprapubic tenderness and a positive urine culture with >100,000 microorganism per cc of urine with no more than two species of microorganism. Patient's risk of acquiring a CAUTI increases with extended usage and inappropriate insertion and maintenance (Harrison *et al*., 2011). In CAUTIs Escherichia coli remains the most common infecting organism. However, a wide variety of other gram negative microorganisms isolated like *Klebsiella* spp, *Enterobacter* spp, and *Serratia* spp. Gram positive cocci including coagulase-negative Staphylococci and *Enterococcus*, The EPIC Project Guidelines recommend four interventions related to reducing urinary catheter-associated infection. It recommends assessing the need for catheterization, selecting the catheter type, aseptic catheter insertion and regular catheter maintenance (Pratt *et al*., 2001).

Materials and Methods

The present study was conducted in the "Department of Surgery" MMIMSR, Mullana, Ambala. A total of 150 patients admitted to the surgical ward who underwent urinary catheterization were studied. All the patients of adult age and both gender were included in the study. Patients under the age group of <18 years, cases of mechanical obstruction in urethra (stricture urethra, meatal stenosis, benign prostatic hypertrophy) and diabetic patients were excluded from this study.

The glans penis was cleaned after retraction of the prepuce with betadine solution before and after urinary catheterization. Urethra was anaesthetised with 2% lignocaine jelly. Appropriate size foley's catheter was placed in situ and balloon was inflated with distilled water according to size of catheter. In females catheterization was done using all aseptic precautions. Urine Sample was taken before catheterization or just after the catheterization in cases with retention of urine. Urinary catheter was put in taking into account all aseptic precautions where ever it was indicated. Second Sample of urine was taken 48 hours after catheterization. Third Sample of urine was taken after a period of seven days wherever urinary catheter was in-situ for such period. The written and informed consent were taken from all the patients included in the study.

Results and Discussion

Out of 150 catheterized patients, maximum patients i.e. 42 (28%) were in the age group of 41- 50 years followed by 38 (25.3%) in the age group of 20-30 years and more than 50 years followed by 30 (21.3%) were in the age group of 31-40 years. We found that males and females were equal in number i.e. 75 (50%) each. 35 male patients had catheterization for a duration of 1 to 5 days followed by 36 male patients for 6 to 10 days and 4 male patients with a duration of ≥11 days of catheterization. Whereas 34 female patients had catheterization for a duration of 1 to 5 days followed by 32 female patients for 6 to 10 days of and 9 female patients with a duration of ≥11 days of catheterization

Candida albicans was present in 1(1.4 %) patients who were in the duration group of 1-5 days followed by 2 (2.9%) patients were in the duration group of 6-10 days. Only 2(15.4%) patients were in the duration group of >11 days. Similarly Diptheroids 3 (4.4%) patients who were in the duration group of 6-10 days. Only 1 (7.7%) patients were in the duration group of >11 days. Similarly E.coli was present in 1 (2.9%) patients who were in the duration group of 1-5 days followed by majority i.e. 8 (11.8%) patients

were in the duration group of 6-10 days. Only 1 (7.7%) patients were in the duration group of >11 days. *Enterococcus* was present in only 1 (1.4%) patients were in duration grade of 1-5 days followed by 1 (1.5%) patients who were in the duration group of 6-10 days. Only 1 (7.7%) patient were found in age duration grade of >11 days.

Table.1 Distribution of Catheterized patients, Urine C/S 2nd day Vs Duration Grade

S.No	Urine Culture Sensitivity 2nd Day	Duration Grade			
		1 to 5 days	6 to 10 days	>11 Days	Total
1.	*E.coli*	1	8	1	10
		1.4%	11.8%	7.7%	6.7%
2.	*Proteus mirabilis*	2	0	0	2
		2.9%	0%	0%	1.3%
3.	*Diphtheroids*	0	3	1	4
		2.9%	14.7%	7.7%	8.7%
4.	*Klebsiella*	0	3	1	4
		0%	4.4%	7.7%	2.7%
5.	*Pseudomonas*	0	2	0	2
		0%	2.9%	0%	1.3%
6.	*Candida albicans*	1	2	2	5
		1.4%	2.9%	15.4%	3.3%
7.	*Enterococcus*	1	1	1	3
		1.4%	1.5%	7.7%	2.0%
8.	*S.aureus*	0	1	0	1
		0%	1.5%	0%	0.7%
9.	Strl	64	48	7	119
		92.8%	70.6%	53.8%	79.3%
10.	Total	69	68	13	150
		100.0%	100.0%	100.0%	100.0%

Table.2 Distribution of Catheterized patients, Urine C/S 7th day Vs Duration Grade

S. No.	Urine C/S day 7	Duration Grade			Total
		1 to 5 days	6 to 10 days	>11 Days	
1.	Non-sterile	2	2	0	4
		2.9%	2.9%	0%	2.7%
2.	Sterile	67	66	13	146
		97.1%	97.1%	100.0%	97.3%
	Total	69	68	13	150
		100.0%	100.0%	100.0%	100.0%

Table.3 Distribution of Catheterized patients, CAUTI Vs Duration Grade

S. No.	Catheter associated urinary tract infection (CAUTI)	Duration Grade			Total
		1 to 5 days	6 to 10 days	>11 Days	
1.	Present	5	20	6	31
		7.2%	29.4%	46.2%	20.7%
2.	Absent	64	48	7	119
		92.8%	70.6%	53.8%	79.3%
	Total	69	68	13	150
		100.0%	100.0%	100.0%	100.0%

Similarly, *Klebsiella* was not present in duration grade of 1-5 days while 3 (4.4%) patients were in the duration group of 6-10 days and only 1 (7.7%) patient were found in duration grade of >11 days. *Proteus* M was present in only 2(2.9%) patients were in duration grade of 1-5 days and not seen in 6-10 days and >11. Pseudomonas was not found in patients in duration grade of 1-5 days followed by 2(2.9%) in the duration group of 6-10 days and no patient were found in duration grade of >11 days respectively. Staph Aureus was not found in duration grade of 1-5 days followed by 1(1.5%) in the duration group of 6-10days and no infection was found in >11 days respectively (Table 1). In our study among catheterized patients, majority i.e. 67 (97.1%) patients who were having sterile culture and sensitivity in the duration group of 1-5 days followed by 66 (97.1%) patients who were in the duration group of 6-10 days. Only 13 (100.0%) patients were in the duration group of >11 days.

Similarly, 2 (2.9%) patients who were having Non sterile culture and sensitivity in the duration group of 1-5 days followed by 2 (2.9%) patients who were in the duration group of 6-10 days and no patients were in the duration group of >11 days (Table-2). In our study among catheterized patients in the duration group of 1-5 days, 5 (7.2%) patients had catheter associated Urinary tract infection. In the duration group of 6-10 days, 20 (29.4%) patients had Catheter associated Urinary tract. In the duration group of more than 11 days, 6 (46.2%) patients had Catheter associated Urinary tract infection (Table-3).

In our study, fever was present maximum in females 7 (46.66%) in the age group of > 50 years. Burning micturition was present maximum in females 5 (38.46%) in the age group of > 50 years. which signifies that the maximum complications noted amongst the females according to findings of history. A study done by Prajapati *et al.,* (2005) has shown higher incidence in female (14/99) 14.14% compared to male 11 (105) 10.48%.The present study included 150 patients with total 985 catheter days, and CAUTI incidence was 20.7/ 1000 catheter days. This study showed 20.7% CAUTI/1000 catheter days is nearly parallel with a study by Duo-Shuang-Xie *et al*., (2011) in which 425 patients and 2632 catheter days resulted CAUTI incidence of 15.8/1000 catheter days. Similar results were seen with a study by Barbadoro *et al*., (2015) who also found the incidence of 15.1/ 1000 catheter days. A study by Bhatia N *et al*., (2010) revealed higher incidence rate, 22.6/ 1000 catheter days in Indian population.

The present study has a slightly higher incidence of CAUTI probably because of poverty in Indian continent, lack of facilities, illiteracy (lack of education), poor catheter hygiene, prolong hospital stay, overcrowding and inadequate knowledge about diseases.

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