

Original Research Article

Effectiveness of the Catheter Care Protocol Vs Conventional Catheter Care on Catheter Associated Urinary Tract Infection

Isha Sharma¹, Sembian N², Vinay kumari³

¹Nursing Second Year (Medical Surgical Nursing), M.M. College of Nursing, Mullana.

²Associate Professor (Medical Surgical Nursing), UPRIMS & R, Govt Nursing College, Saifai.

³Associate Professor (Medical Surgical Nursing), M.M. College of Nursing, Mullana.

Corresponding Author: Isha Sharma

Received: 18/07/2016

Revised: 10/09/2016

Accepted: 12/09/2016

ABSTRACT

Background: The use of indwelling urinary catheters (IUCs) is thought to be the most significant risk factor for developing nosocomial urinary tract infections (UTIs), which are the most common type of healthcare-associated infection (HAI) and are most often caused by the placement or presence of a catheter in the urinary tract. The purpose of the study was to assess and compare the effectiveness of catheter care protocol vs. conventional catheter care on the occurrence of CAUTI in female patients with indwelling catheter.

Methodology: 54 female catheterized patients having sterile urine culture within 24 hours of catheterization were enrolled in the study and were equally divided into experimental and comparison group. In the experimental group, patients were given catheter care using catheter care protocol, whereas in comparison group conventional catheter care was followed for consecutively 3 days. Data was analyzed by descriptive statistics and inferential statistics. SPSS-17 software was used and P value less than 0.05 were considered significant.

Result: The result showed that there was no significant difference in experimental and comparison group in terms of occurrence of CAUTI and the p value was found to be > 0.05 i.e. also there is a significant association of co-morbid illnesses and soiled urinary catheter with the occurrence of CAUTI.

Conclusion: It is concluded on the basis of the findings of this study that both the techniques i.e. catheter care protocol and conventional catheter care are equally effective in the prevention of CAUTI. Normal saline is equally effective as Betadine in the prevention of CAUTI amongst female catheterized patients.

Key words: catheter care protocol, conventional catheter care, catheter associated urinary tract infection, and catheter associated asymptomatic bacteriuria (CAUTI).

INTRODUCTION

Urinary tract infections are the most common type of Health care associated infections (HCAIs), and account for almost 40% of them. ^[1,2] Eighty percent of UTIs that develop during a period of hospitalization are precipitated by the use of an indwelling urinary catheter, and these are referred to as catheter-associated urinary

tract infections (CAUTIs).

Catheter-associated urinary tract infection (CAUTI) is an Urinary tract infection if the Patient have at least one of the following signs or symptoms i.e. Fever, Supra pubic tenderness, Costovertebral angle pain or tenderness and has a urine culture with no more than two species of organisms identified, at least one of which is

a bacterium of $\geq 10^5$ CFU/ml among the patients with indwelling catheter and Catheter associated asymptomatic bacteriuria refers to urine culture with no more than two species of organisms identified, at least one of which is a bacterium of $\geq 10^5$ CFU/ml and the absence of the symptoms of the CAUTI. [3]

Between 15% and 25% of hospitalized patients may receive short-term indwelling urinary catheters. [4,5] Microbial pathogens can enter the urinary tract either by the extraluminal route, via migration along the outside of the catheter in the periurethral mucous sheath, or by the intraluminal route, via movement along the internal lumen of the catheter from a contaminated collection bag or catheter-drainage tube junction. [6]

A study conducted in US identified gender as an important risk factor for the development of certain HCAs and there is strong evidence of an increased risk of CAUTI in females, attributable to anatomic differences that result in a greater propensity for bacterial contamination of the catheter. [7,8]

Diabetes, COPD and ICU stay for ≥ 8 days have been identified as the risk factors being significantly associated with device associated infections. [9] The mortality from UTI is 5 times higher in patients with diabetes aged 65 and older, as compared to elderly control patients. [10] Factors that were found to enhance the risk for UTI in diabetics include age, metabolic control, and long term complications, primarily diabetic nephropathy and cystopathy. [11]

The risk of an associated infection can be decreased by catheterizing only when necessary, using aseptic technique for insertion, and maintaining unobstructed closed drainage of the catheter. [12] Even with meticulous care, bacteriuria will not be prevented. After bacteriuria develops, the ability to limit its complications is minimal. Keeping this in view, two catheter care techniques are compared i.e. catheter care protocol (perineal and periurethral cleansing

with normal saline) versus conventional catheter care i.e. using betadine as ingredient for periurethral and perineal cleaning as the preventive measure for the prevention of the CAUTI among the female catheterized patients.

MATERIALS AND METHODS

A "Quantitative research approach" was used. The research design selected for the study was Non equivalent control group, post test only design. Ethical permission was taken from institutional ethical committee and formal administrative approval was obtained to conduct the final study

Data was collected from female catheterized patients admitted in selected units of MMIMSR & Hospital, Ambala. Female patients within 24 hrs of catheterization were taken. The Exclusion criteria were Female patients with age less than 18 years, existing UTI, bladder irrigation, Caesarean section surgery, menstruation period, the history of removal of catheter accidentally or therapeutically before the completion of intervention, indwelling catheter in situ referred from other hospital.

Data was collected using Sample characteristics performa, CAUTI assessment checklist, which consisted of checklist for signs and symptoms of CAUTI and Performa for microbiological count as per CDC guidelines.

Sample characteristics performa comprised of 8 items i.e. Age, diagnosis, surgical intervention, presence of co-morbid illness, name of co-morbid illness, BMI, presence of soiled urinary catheter, catheter inserted by. CAUTI assessment checklist consists of the assessment of the physical signs and symptoms i.e. fever ($>38^\circ\text{C}$), suprapubic tenderness, costovertebral angle pain or tenderness, urinary urgency, urinary frequency, dysuria related to the presence of signs and symptoms in the female catheterized patients and the presence of at least one of these signs or symptoms for the occurrence of symptomatic CAUTI is

required as per CDC guidelines and Performa for microbiological count, which consists of the assessment of the patient for the presence of the positive urine culture with microbiological count of 10^5 or more as recommended in CDC guidelines.

Female catheterized patients were selected by purposive sampling and equal numbers of patients were allotted to experimental (27 subjects) and comparison group (27 subjects). On 1st, 2nd & 3rd day, comparison group received the conventional catheter care using betadine and the experimental group received the catheter care protocol using normal saline. On 4th day, the patients were assessed for the signs and symptoms of CAUTI using CAUTI assessment checklist and urine sample taken for culture was transported to the microbiology lab by maintaining the strict aseptic techniques for determining the occurrence of the CAUTI among the female catheterized patients. On 5th day, urine sample was analyzed for the presences of significant bacterial count i.e. 10^5 CFU/ml.

For the CAUTI assessment checklist, the inter-observer rater reliability was assessed using simple Cohen's Kappa (K) formula and the reliability was found to be 0.9

Analysis Data was analyzed and interpreted by employing descriptive and inferential statistics. SPSS version 17.0 was used to analyze the data. Level of significance for the present study was taken as p value < 0.05.

RESULTS

The majority of the subjects in the experimental group (81.4%) and comparison group (81.4%) were above 40 years. Most of subjects in experimental group (63%) and in the comparison group (66.7%) had medical diagnosis. Majority (77.8%) of subjects in the experimental group and comparison group were not having surgery. Majority of patients in experimental group (59.3%) and comparison group (66.7%) were having co-morbid illness. Majority of patients in experimental group (18.5%) were having both hypertension and diabetes and majority of patients in comparison group (29.6%) were having only hypertension.

Nearly half of the patients in the experimental group (48.1%) and comparison group (51.9%) were overweight. Majority of patients in the experimental group (59.3%) and comparison group (66.7%) were having maintained fluid balance. Majority of patients (85.2%) in experimental group and in comparison group (92.6%) were not having soiled urinary catheter and majority the catheters (66.7%) were inserted by nurses in the experimental and comparison group. The computed chi-square value for selected variables of Age, Diagnosis, surgery, co-morbid illness, BMI, Fluid balance, soiled urinary catheter, catheter inserted by was found to be statistically non-significant at 0.05 level of significance.

Table- 1: Frequency and percentage of patients according to the signs and symptoms of CAUTI

Signs and symptoms	Experimental group(n=1) f (%)	Comparison group (n=2) f (%)
Fever	1 (100)	1(50.0)
Suprapubic tenderness	1(100)	0.0
Costovertebral angle pain or tenderness	0.0	0.0
Urinary urgency	1(100)	1(50.0)
Urinary frequency	0.0	0.0
Dysuria	0.0	2(100)

Table-2: Chi-square value showing the comparison of occurrence of CAUTI in the Experimental and Comparison group.

Group	CAUTI f (%)	CA-ASB f (%)	Non- CAUTI f (%)	χ^2	df	p value
Experimental group (n=27)	1(3.7)	5(18.5)	21(77.8)	0.44	2	0.801 ^{NS}
Comparison group (n=27)	2(7.4)	4(14.8)	21(77.8)			

$\chi^2(2) = 5.99$.^{NS} Not significant (p>0.05)

The majority of patients (77.8%) in the experimental and comparison group

were not having CAUTI and about 18.5 % of patients in the experimental group and

about 14.8% of patients in comparison group were having catheter associated asymptomatic bacteriuria, whereas only 3.7% of patients in the experimental group and 7.4% of patients in the comparison group were having catheter associated urinary tract infection as shown in the table-2, which is found to be statistically insignificant.

Hence, it is concluded from the findings that there is no significant difference in the rate of CAUTI in experimental and comparison group after the administration of catheter care protocol and conventional catheter care. Normal saline is equally effective as Betadine in preventing CAUTI.

Association of occurrence of CAUTI with selected variables in Experimental group (Catheter care protocol) revealed that the co-morbid illness and soiled urinary catheter were significantly associated with occurrence of CAUTI among the female catheterized patients. Association of occurrence of CAUTI with selected variables in Comparison group (Conventional catheter care) revealed that the soiled urinary catheter is very important factor for the occurrence of CAUTI among the female catheterized patients in comparison group.

DISCUSSION

Catheter associated bacteriuria has an important implications for patient health. Thus, prevention of Catheter associated bacteriuria and/or CA-UTI should receive high priority in infection prevention programs.

In the present study, the findings suggest that the rate of occurrence of CAUTI was similar in both the groups that reveal that the Normal saline is equally effective as Betadine for the prevention of CAUTI. Similar findings were reported in a an experimental study by Burk John P et al. to evaluate the efficacy of daily cleansing of the urethral meatus and catheter junction with povidone-iodine solution in one group and non antiseptic solution of green soap

and water bacteriuria in another group in preventing bacteriuria during closed urinary drainage. There was no evidence in either trial of a beneficial effect of meatal care. Moreover, each of four different statistical methods indicated that the rates of bacteriuria were higher in the treated groups than in the untreated groups. [13] In another study by K Nasiriani et al. there were no significant differences in the rate of bacteriuria or urinary tract infections in the water and povidone-iodine groups. [14]

In present study, there was significant association with co-morbid illness i.e. for Diabetes mellitus ($P < 0.05$) with the occurrence of CAUTI and the results are consistent with a study conducted in an Indian hospital by Datta P et al. which identified diabetes, COPD and ICU stay for ≥ 8 days as the risk factors being significantly associated with device associated infections. [9] In present study, the soiled urinary catheter is taken as an important selected variable and a significant association is found with soiled catheter with the occurrence of CAUTI and in a similar study conducted in Japan by T Tsuchida et al. identified fecal incontinence as the major risk factor for CAUTIs in the study population. [15]

CONCLUSION

It is concluded from the study that catheter care protocol is equally effective as conventional catheter care.

REFERENCES

1. Saint S, Kowalski C, Kaufman S, et al. Preventing hospital-acquired urinary tract infection in the United States: A national study. *Clin Infect Dis* 2008; 46:243-50.
2. Tambyah P, Knasinski V, Maki D. The direct costs of nosocomial catheter-associated infection in the era of managed care. *Infect Control Hosp Epidemiol* 2002; 23:27-31.
3. CDC/NHSN Centres for disease control and prevention/ National health care safety network. Available at www.cdc.gov/nhsn/pdfs/psc

- Manual/7pscCAUTH current. pdf. Retrieved on 27.09.2011.
4. Warren JW. Catheter-associated urinary tract infections. *Int J Antimicrob Agents*. 2001; 17(4):299-303.
 5. Weinstein JW, Mazon D, Pantelick E, Reagan-Cirincione P, Dembry LM, Hierholzer WJ, Jr. A decade of prevalence surveys in a tertiary-care center: Trends in nosocomial infection rates, device utilization, and patient acuity. *Infect Control Hosp Epidemiol*. 1999; 20(8):543-548.
 6. Kunin CM, McCormack RC. Prevention of catheter-induced urinary-tract infections by sterile closed drainage. *N Engl J Med*. 1966; 274(21):1155-1161.
 7. Eckenrode Sheila, Bakullari Anila, ML Metersky, Y Wang, MM Pandolfi et al. The Association between Age, Sex, and Hospital-Acquired Infection Rates: Results from the 2009-2011 National Medicare Patient Safety Monitoring System. *Infection control and Hospital Epidemiology*. 2014; 35(3):3-9
 8. Warren J. Catheter-associated urinary tract infections. *International Journal of Antimicrobial Agents*. 2001; 17(4):299-303.
 9. Datta Priya, Rani Hena et al. Health-care-associated infections: Risk factors and epidemiology from an intensive care unit in Northern India. *Indian J Anaesth*. 2014 Jan-Feb; 58(1): 30-35.
 10. Kofteridis DP, Papadimitraki E, Mantadakis E, et al. Effect of diabetes mellitus on the clinical and microbiological features of hospitalized elderly patients with acute pyelonephritis. *J Am Geriatr Soc*. 2009; 57(11):2125-2128.
 11. Brown JS, Wessells H, Chancellor MB, et al. Urologic complications of diabetes. *Diabetes Care*. 2005; 28(1): 177-185.
 12. Saint S. Clinical and economic consequences of nosocomial catheter-related bacteriuria. *Am J Infect Control* 2000; 28:68-75.
 13. Burke John P, Garibaldi Richard A, Britt R Michael, Jacobson Jay A, Conti Marlyn et al. Prevention of catheter-associated urinary tract infections. *The American Journal of Medicine*. 1981; 70(3):655-658
 14. K Nasiriani, Z Kalani, F Farnia, M Motavasslian, F Nasiriani, SEngberg et al. Comparison of the effect of water vs. povidone-iodine solution for periurethral cleaning in women requiring an indwelling catheter prior to gynecologic surgery. *Urol Nurs*. 2009; 29(2):118-21,131.
 15. T Tsuchida, K Makimoto, S Ohsako et al. Relationship between catheter care and catheter-associated urinary tract infection at Japanese general hospitals: a prospective observational study. *Int Journal Nursing Studies*. 2008 Mar; 45(3):352-61.

How to cite this article: Sharma I, Sembian N, Kumara V. Effectiveness of the catheter care protocol vs conventional catheter care on catheter associated urinary tract infection. *Int J Health Sci Res*. 2016; 6(10):134-138.
