DOI: 10.36347/sjams.2017.v05i03.065

Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2017; 5(3E):1061-1064 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com

Original Research Article

A prospective institution based study of Catheter Associated Urinary Tract Infection

Dr. Naimish Patel[1], Dr. Neha Patel[2]
[1]Assistant Professor, Department of Medicine,
[2]Assistant Professor, Department of Microbiology,
G C S Medical College, Hospital & Research Centre, Nr. Chamunda Bridge, Naroda Road, Ahmedabad, India: 380006.

***Corresponding author**
Dr. Naimish Patel
Email: naimishap13@gmail.com

Abstract: The urinary catheterisation is a common procedure in hospital and its association with hospital acquired infection is also common. The catheterization is associated with asymptomatic Bacteriuria (CA-ASB) predominantly rather than Catheter associated urinary tract infection (CA-UTI). The institutional study is designed to assess the prevalence of CAUTI incidence, identify the causative microbial organism and assess the possible cause of CAUTI. The incidence of CA- ASB and CA- UTI is 10.97% and 4.43% respectively. The E. coli is commonest bacteria isolated due to perineal contamination of catheter. The use of autoclaved kit of catheterisation, tutoring of nursing staff for the better aseptic precautions and use of sterilizing solution for hand wash suggested measures to curtail incidence of CA-ASB and CAUTI.
Keywords: Catheter, Microbial, Urinary tract Infection

INTRODUCTION:

Catheter-associated (CA) bacteriuria and urinary tract infection (Ca UTI) is the most common health care–associated infection worldwide and is a result of the widespread use of urinary catheterization[1]. Considerable personnel time and costs are expended by health care institutions to reduce the rate of Ca UTI. The catheterisation is associated with asymptomatic Bacteriuria (CA-ASB) predominantly rather than Catheter associated urinary tract infection CA-UTI [2]. Signs and symptoms compatible with CA-UTI include new onset or worsening of fever, rigors, altered mental status, malaise, or lethargy with no other identified cause; flank pain; costovertebral angle tenderness; acute hematuria; pelvic discomfort; and in those whose catheters have been removed, dysuria, urgent or frequent urination, or suprapubic pain or tenderness. UTI are associated with catheterisation or instrumentation and increase risk by 3-7 % each day. CA-UTI in patients with indwelling urethral, indwelling suprapubic, or intermittent catheterization is defined by the presence of symptoms or signs compatible with UTI with no other identified source of infection along with $\geqslant 10^3$ colony-forming units (cfu)/mL of $\geqslant 1$ bacterial species in a single catheter urine specimen or in a midstream voided urine specimen from a patient whose urethral, suprapubic, or condom catheter has been removed within the previous 48 hours [3]. UTI generally are caused by pathogen that spread up the per urethral space from patient's perineum or gastrointestinal tract or via Intraluminal contamination of urinary catheter due to cross infection by care givers who irrigating catheter or emptying drainage bags. Infection occasionally due to inadequately disinfected or contaminated supply catheter or urological instruments [4]. Hospitals should monitor essential performance measures for preventing nosocomial catheter Ca UTI. Rethinking of indication, minimize duration of catheterisation, application of aseptic precautions for catheterisation. The tropical care and use of antimicrobial agents, drainage bag disinfectants are not routine measures applied in hospital care [5].

MATERIAL AND METHODS:

The study was designed to assess the prevalence of catheter associated bacteriuria and/or catheter associated UTI, isolation of nosocomial

pathogens, its sensitivity to antimicrobial drugs in tertiary care hospital. The study also includes the assessment of the factors responsible form Catheter associated UTI: site of catheterisation in hospital, care giver factors, aseptic precautions applied and post catheterisation care. All patients catheterized were included in study from the first day. The patients admitted with catheterisation are not included in the study. All included patients' registration data noted in performa. All patients catheterized were assess clinically daily for clinical manifestations of urinary tract infection and urine analysis were done on day 1, 3, and day 7 for bacteriuria and pus cells microscopically. The patients suffering from urinary tract infection were advised for culture and sensitivity of urine to isolate the pathogen responsible for the infection. Clinical and bacteriological data were analyzed by standard statistical methods. The catheterized patients, data also includes type and site of catheterisation, care giver's qualification, aseptic precautions, special autoclaved catheterization kit is used or not. The post-catheterization daily care methods peroneal care, bladder wash and change of catheter were not evaluated in the study. The analysis of positive urinary tract infection cases were correlated with the data of type and site of catheterisation, care giver qualification, aseptic precautions, autoclave catheterization kit is used or not.

RESULTS & DISCUSSION:

The Table1 shows female predominance in the study and marginally high percentage of catheter associated UTI in male patients.

The table 2 shows nearly 58% of catheterisation were advised in ICU and surgical ward. The Special rooms, medical ward and orthopaedic ward has above 5% rate of catheter associated UTI.

Table 3 shows nearly equal prevalence of Ca ASB and Ca UTI in both tertiary care Hospitals.

The table 4 shows E. coli is commonest isolated organism in 42.85% cases, while 33.33% cases have no growth or low colony count.

The table 5 shows UTI is nearly 5.68% when care giver is nursing staff while nil when catheterization done by faculty. The incidence of catheter associated bacteriuria and urinary tract infection in the study is 10.97% and 4.43% respectively when patients with primary urological diseases are excluded. The urological diseases include urolithiasis and prostatic enlargement and uro surgical interventions such as cystoscopy or other procedures [6]. The indications for catheterisation include shocks, post-operative and pre-operative retention or routine catheterisation, retention due to acute neurological condition, pre partum or post-partum conditions. The most common site of catheterisation is Intensive Care Unit is due to monitoring of the patient's urine output, alteration in alertness and bed ridden condition of admitted patients.

Table 1: Sex Distribution of Catheterized Patients

Sex	Cases (percentage)	Catheter associated UTI Cases (%)
Male	195 (41.11%)	10 (5.12%)
Female	279 (58.89%)	11 (3.94%)
Total	474	21 (4.43%)

Table 2: The site of catheterization, CA ASB and CA-UTI of patients in hospital

Site of catheterization	Total cases (%)	CA-ASB Cases (%)	UTI case with primary urological diseases	CA-UTI cases without primary urological diseases (%)
ICU	135 (28.48%)	24	12	12 (0.08%)
Recovery/ Operation theatre	33 (6.96%)	00	00	00 (00%)
Surgical ward	141 (29.74%)	09	01	02 (1.41%)
Medical ward	36 (7.59%)	07	02	02 (5.55%)
Orthopaedic ward	18 (3.79%)	02	02	02(11.11%)
OB&G ward	78 (16.455)	09	01	01 (0.08)
Labour room	12 (2.53%)	00	00	00 (00%)
Emergency ward	3 (0.63%)	00	00	00 (00%)
Special Rooms	18 (3.79%)	01	01	01 (5.55%)
Total Catheterization	474	52 (10.97%)	17(2.95%)	21(4.43%)

Table 3: Comparison of study at tertiary care Hospitals

Variables	Present study GCS Hospital	Study at Scotland Hospital [7]
Total cases	747	1045
CA-ASB Cases (%)	52 (10.97%)	84 (8.03%)
CA-UTI cases without primary urological diseases (%)	21 (4.43%)	40 (3.82%)

Table 4: The urine culture reports in UTI patients

Report of urine culture in UTI positive cases	Cases (%)
No growth	04 (19.04%)
Low colony count (< 60000cfu/ml)	03 (14.28%)
Microorganism isolated	14 (66.66%)
E. Coli (ESBL)	06 (42.85%)
Klebsella sp.	04 (20.95%)
Candida Albicans	04 (20.95%)
Total cases	21

Table 5: The Catheterization done by health care giver & UTI positive cases

Health Care giver designation	Cases (%)	UTI positive cases (%)
Faculty	35 (7.38%)	0 (0%)
Resident	105 (14.05%)	02 (1.9%)
Nursing staff	334 (70.46%)	19 (5.68%)
Total	474	

The incidence of bacteriuria and UTI in catheterized patients is higher in the institute as compare to previous studies e.g. the overall incidence was 2.72 cases and 0.68 cases per 100 person-days for CA- bacteriuria and CA-UTI, respectively in [7] The study also shows the highest incidence of catheter associated infection is noted in orthopaedic ward, medical ward and special room patients is 11.11%, 5.55% and 5.55% respectively is due to less no of procedures in said ward, procedure is done without special autoclaved kit and by nursing staff. The ICU, emergency room recovery or operation theatre, labour room and Obstetric and gynaec ward has 0.08%, 0%, 0% and 0% respectively, is due to special kit used for catheterization and well sterile atmosphere with execution of all aseptic precautions. The microbial organism study shows low bacterial colony count or no growth organism in nearly 33.33% cases due to concurrent administration of antibacterial therapy for other indication. The isolation of E coli as commonest bacteria is due to contamination from GI tract and perineum [8]. The isolation of Klebsella sp. in ICU bases patient is nosocomial infection from other patients in ICU [9]. The isolation of Candida albican in patients of ICU and special room is due to patient is on higher antibiotic for other indication followed by fungal infection [10]. The disposable Foley's catheter was used in all patients. The percentage of catheter associated infection was more when catheterization is done by nursing staff, so for reduction of percentage of CA UTI retraining of the staff and aseptic methods tutorial should be planned [11]. In ICU more precautions is advised for prevention of cross infection in patients should be planned [12].

CONCLUSION:

Incidence of Catheter associated bacteriuria and infection is higher in the institute. The commonest organism isolated is E. coli is due to perineal contamination and can be prevented by better perineal care. The Klebsella sp. is nosocomial infection in ICU set up can be controlled by use of sterilizing solution for hand wash. The Candida Albicans infection can be avoided by revising broad spectrum antibiotic indication and duration of therapy. The alternative methods such as ultra sound monitoring for urine output assessment and condom catheter if possible should be advised instead of indwelling catheter to reduce catheter associated UTI.

ACKNOWLEDGEMENT:

Authors would like to acknowledge the outstanding support made by Dr. Bharat Ghodadara Medical Superintendent, Dr. Kirti Patel Dean and team of Internees of GCSMC H &RC and also thankful for their valuable contribution.

REFERENCES:

1. Robert A. Infection Acquired in Health Care Facility in Kasper, Fauci, Hauser, Longo, Jameson, Loscalzo, Harrison's Principal of Internal Medicine19th ed. Mc Graw Hill 2015; 2: 913-15
2. Magill SS, Edwards JR, Bamberg W, Beldavs ZG, Dumyati G, Kainer MA, Lynfield R, Maloney M, McAllister-Hollod L, Nadle J, Ray SM. Multistate point-prevalence survey of health care–associated infections. New England Journal of Medicine. 2014 Mar 27; 370(13):1198-208.
3. Hooton TM, Bradley SF, Cardenas DD, Colgan R, Geerlings SE, Rice JC, Saint S, Schaeffer AJ, Tambayh PA, Tenke P, Nicolle LE. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 International Clinical Practice Guidelines from the Infectious Diseases Society of America. Clinical infectious diseases. 2010 Mar 1; 50(5):625-63.
4. Nicolle LE. Urinary catheter-associated infections. Infectious disease clinics of North America. 2012 Mar 31; 26(1):13-27.
5. Warren JW, Tenney JH, Hoopes JM, Muncie HL, Anthony WC. A prospective microbiologic study of bacteriuria in patients with chronic indwelling urethral catheters. Journal of infectious diseases. 1982 Dec 1; 146(6):719-23.
6. Lo E, Nicolle LE, Coffin SE, Gould C, Maragakis LL, Meddings J, Pegues DA, Pettis AM, Saint S, Yokoe DS. Strategies to prevent catheter-associated urinary tract infections in acute care hospitals: 2014 update. Infection Control & Hospital Epidemiology. 2014 Sep 1; 35(S2):S32-47.
7. Sader HS, Flamm RK, Jones RN. Frequency of occurrence and antimicrobial susceptibility of Gram-negative bacteremia isolates in patients with urinary tract infection: results from United States and European hospitals (2009–2011). Journal of Chemotherapy. 2014 Jun 1; 26(3):133-8.
8. Jacobsen SM, Stickler DJ, Mobley HL, Shirtliff ME. Complicated catheter-associated urinary tract infections due to Escherichia coli and Proteus mirabilis. Clinical microbiology reviews. 2008 Jan 1; 21(1):26-59.
9. Pratt RJ, Pellowe CM, Wilson JA, Loveday HP, Harper PJ, Jones SR, McDougall C, Wilcox MH. epic2: National evidence-based guidelines for preventing healthcare-associated infections in NHS hospitals in England. Journal of Hospital infection. 2007 Feb 1; 65:S1-59.
10. Panknin HT, Althaus P. Guidelines for preventing infections associated with the insertion and maintenance of short-term indwelling urethral catheters in acute care.
11. Marigliano A, Barbadoro P, Pennacchietti L, D'errico MM, Prospero E, Group CW. Active training and surveillance: 2 good friends to reduce urinary catheterization rate. American journal of infection control. 2012 Oct 31; 40(8):692-5.
12. Smith PW, Bennett G, Bradley S, Drinka P, Lautenbach E, Marx J, Mody L, Nicolle L, Stevenson K. SHEA/APIC guideline: infection prevention and control in the long-term care facility. American journal of infection control. 2008 Sep 1; 36(7):504.