

Urinary Tract Infection and Associated Risk Factors among Catheterised Patients in the Surgery Department of a Tertiary Care Hospital in South India: A Prospective Cohort Study

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Abstract

Background: Catheter-Associated Urinary Tract Infection (CAUTI) accounts for 36% of the total Health-care associated infections, and are avoidable. Hence, it is important to assess the factors responsible for a catheterized patient developing UTI.

Methods: A prospective cohort study was conducted in a tertiary care hospital among 196 patients from September 2014 to January 2016 to assess the risk factors and estimate the proportion of catheterized patients developing UTI.

Results: 31 (15.3%) patients had CAUTI, out of which 6 (20%) had UTI due to Multi-drug resistant UTI. A majority, 119 (60.75%) were catheterized by the post-graduates. 123 (62.8%) patients were catheterized in the OT. Mean no. of days the catheter was in-situ was 4.79 ± 3.65 days. 22(11.2%) had symptomatic UTI and 8(4.1%) had asymptomatic UTI. Most common organism causing UTI was *Escherichia coli*, 14 (7.1%). Age more than 48 years influenced an individual to develop UTI ($p < 0.05$).

Conclusions: Cauti is an important device associated health acquired infection and infection control programs must be implemented and supervised.

Key words: Catheter Associated Urinary Tract Infection • Multi-drug resistance (MDR) • Symptomatic UTI

Introduction

Nosocomial Infections (NI) or Healthcare Associated Infections(HCAI) are a serious & avoidable consequence of many medical procedures. They often cause a significant aggravation of the patients underlying disease, increase morbidity, mortality, length of stay and cost of treatment. Prevention of HCAI is of utmost importance for the individual and healthcare delivery in general especially in the light of increased antibiotic resistant infections. [1] Following Surgical Site Infections(SSIs), Catheter Associated Urinary Tract Infections (CAUTI) represent the second most common fraction of NI. In a study that provided a national estimate of healthcare-associated infections, urinary tract infections comprised 36% of the total HAI estimate. The process of catheterization provides a mechanism to inoculate organisms into the bladder and promote

colonization and infection. Catheter associated urinary tract infection (CAUTI) can lead to complications like cystitis, pyelonephritis, gram-negative bacteremia, prostatitis, epididymitis, and orchitis in males. Each year, more than 13,000 deaths are associated with UTIs. [2]

Methodology

After approval by the Institutional ethical board, 196 patients were recruited into the study during September 2014 to January 2016, after written informed consent. Patients aged 18 years and above who were admitted and catheterized in the Surgery Department were included. Patients who were catheterized elsewhere (outside our hospital), on intermittent catheterization, history of previous catheterization (within 40 days), on antibiotics, or have gone home with the catheter or date of removal of catheter not known were

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excluded. Age, gender, comorbidities, person catheterizing, place of catheterization and duration of in-situ catheter was collected. After removal of catheter, the patients were followed for 14 days, either through phone or OPD. The symptoms of UTI were asked for and culture & sensitivity reports were collected. Symptomatic UTI diagnosis was done according to the CDC guidelines which are had an indwelling urinary catheter in place for >2 calendar days and at least 1 of the following signs or symptoms: fever (>38°C); suprapubic tenderness; costovertebral angle pain or tenderness and a positive urine culture of ≥ 105 colony-forming units (CFU)/ml and with no more than 2 species of microorganisms [3]. Descriptive and inferential statistics were analyzed based on the objectives in terms of frequencies, percentage, mean, and Chi-square and t-test. Regression analysis was performed to look at influence of various predictors on CAUTI. All statistical analyses were performed using SPSS V 20.

Results

A total of 196 patients were enrolled into the study. Patients age ranged from 18 to 64 years, with the mean age being 47.38 ± 15.51 years. 141(71.9%) were males and 55(28.1%) were females. Among patients with comorbidities, 52(26.5%) had diabetes mellitus, 43(21.9%) had hypertension, 26(13.2%) had both hypertension and diabetes. 35(17.85%) patients had UTI on follow up for 30 days. In our study, we found the frequency of UTI as 31 per 1000 catheter days [4].

A chi square test was performed to ascertain if there was any significant relationship between UTI and age, gender, duration of in-situ catheterization, person catheterizing and place of catheterization. We found that there was a significant difference of developing UTI among patients aged <48yrs and ≥48 years (p<0.05) (Table. 1). There was no significant association between gender, duration of in-situ catheter, person catheterization and place of catheterization.(Tables. 2, 3, 4, 5). All predictors of UTI, such as female gender, older age, diabetes, longer duration of catheterization, catheterized in emergency and catheterization by interns was considered for univariate analysis. Variables with a p value of <0.2 were included for Multivariate Analysis. On doing a univariate analysis for predictors of UTI, only age >48 years had a p value <0.2, which was a significant predictor of a patient developing UTI (Adjusted Odds Ratio= 0.310, p =0.009). (Table. 6)Microbial organism spectrum of the 35 patients who had UTI, showed that E. coli accounted for the maximum number of infections, 19 (9.6%) (Fig.1). The other organisms isolated were Klebsiella, Candida, Pseudomonas, Enterococcus. 2 (1%) had mixed infection [5]. Out of the 35 patients, 6 (20%) had infections with multi-drug resistant organisms.

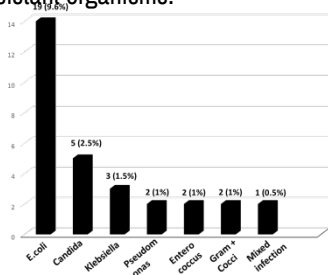


Figure1: Culture and sensitivity.

Factors	UTI		P value
	yes	no	
< 48 years	9 (25.7 %)	93 (57.8 %)	0.001
> 48 years	26 (74.3 %)	68 (42.2 %)	

Table 1: Comparison between age and UTI.

Discussion

The CAUTI observed in our study was 31 per 1000 catheter days. This is high compared to other studies.[6-8] The lower rates described by these researchers is based on studies in the ICU and burns wards respectively, where compliance to uniformity of infection control protocols are slightly better than in the wards. In 2007 a study of a consortium of seven intensive care units in India reported a CAUTI rate of 1.4 per 1000 catheter days with 12.4 days increased length of stay due to UTI as compared to 4.4 days to patients who did not develop CAUTI.

In a 2000 review of literature by Saint on urinary tract infections related to the use of urinary catheters, it was reported that 26% of patients who have indwelling catheters for two to 10 days will develop bacteriuria, after which 24% of those with bacteriuria will develop a CAUTI. Of these patients, approximately 3% will develop bacteremia. Duration of catheterization was a not a significant risk factor in our study as described by Kamat et al. Our data demonstrates that whether the patient has a catheter insitu for more than 4 or less than 4 days the patients did develop UTI. Age more than 48years was determined to be a significant risk factor to acquire CAUTI, similar to many other studies. In our study there was no significant difference between gender developing CAUTI, similar to data published. The 1997 APIC/SHEA position paper on urinary tract infections in long-term care (LTC) identifies CAUTI as the most common infection in LTC residents, with a bacteriuria prevalence without indwelling catheters of 25% to 50% for women, and 15% to 40% for men. The common risk factors cited could be grouped as device associated factors and patient associated factors. Among the patient associated factors age, gender, underlying comorbidities and length of stay pre and post catheterization have been associated with higher risk of acquiring infections. Among the device associated factors the risk factors studied have been the category of personnel inserting the device, location in the hospital where in it was inserted, history of previous catheter use and duration of use have been cited to be associated with increased risk. The data also demonstrated that there is no particular risk depending on the category of the healthcare workers inserting the catheter. Indicating that more attention needs to be paid to the indications and infection control precautions during insertions as demonstrated by the BMJ quality improvement initiative. Enterobacteriaceae and pseudomonas are the common organisms causing CAUTI.

Conclusion

CAUTI is an important device-associated health care acquired infection. Indwelling catheters are associated with a high risk of symptomatic UTI. Patients aged >48 years are at a higher risk and gender, duration of in-situ catheter, person catheterization and place

of catheterization did not determine the risk of developing CAUTI. A monitoring method must also be devised to ensure compliance in the form of care bundles to help reduce these infections, especially multidrug resistant infections.

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