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CAUTI: Bacteriological Profile and Clinical Manifestations in Surgical Patients; A Short-Term Study at Tertiary Care Centre

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ABSTRACT

Background: The most common HAI (hospital acquired infection) in surgical patients admitted in wards and intensive care units (ICU) is urinary tract infection (UTI) secondary to urinary catheterization, the term commonly known as Catheter Associated Urinary Tract Infections (CAUTI). This study aims for choosing appropriate and judicial antibiotic therapy based on bacteriological profile in reducing morbidity and mortality related to CAUTI. **Methods:** 150 patients were included in this cross-sectional study that was carried out over two months. All the patients were catheterized by latex Foley's catheter for varying duration & for various indications. They were followed up with relation to symptoms of CAUTI, bacteriological profile and antibiotic susceptibility. **Results:** 21% patients developed CAUTI and 33.33% patients were having asymptomatic bacteriuria. E. coli was the most common isolated organism followed by Klebsiella and Pseudomonas. All gram negative and positive organisms showed maximum sensitivity towards Nitrofurantoin drug. **Conclusion:** Judicial use of catherization, type of indwelling catheter and post catherization catheter care can help in reducing the incidence of CAUTI. A routine screening of the patients by doing simple urine microscopy, culture & sensitivity can detect early bacteriuria and microbial sensitivity that helps in reducing catheter associated morbidity and mortality.

Keywords: Urinary catheter; urinary tract infection; bacteriology.

INTRODUCTION

The incidence of Catheter Associated Urinary Tract Infections (CAUTI) in an Intensive Care Unit is around 45% to 79% and 17%–23% patients in the wards.[1] Among nosocomial septicemia, CAUTI still contributes as one of the most important cause.[2] Therefore, choosing appropriate treatment based on local antimicrobial patterns should always be a priority, in order to initiate treatment before the availability of urine culture results. The present data regarding the local antimicrobial trends in surgical wards and ICU in relation to CAUTI is insufficient. The present study aims to assess the bacterial profile for CAUTI and antimicrobial sensitivity or resistance to routinely used antibiotics so as to frame institutional guidelines for judicial use of antibiotics in catheterized patients.

MATERIALS AND METHODS

A cross-sectional study was conducted involving 150 patients who were catheterized after admission to surgical wards and surgical intensive care unit at a tertiary care hospital, over a period of two months. It was a Cross-sectional study conducted on patients with special emphasis on the indications denoting surgical intervention. Patients less than 18 years of age and patients already receiving antibiotics priorly were excluded from the study.

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Methodology:

After obtaining proper consent, urine samples were collected just after catheterization and as and when required depending on occurrence of symptoms of CAUTI. Collection of urine sample was done from Foley's catheter after clamping the catheter near the urethral meatus and disinfecting the outer surface of catheter with sterile cotton soaked in povidone iodine followed by 70% ethyl alcohol. A 2-c.c. syringe was used to aspirate the urine from prepared site. The aspirated samples were immediately sent to Microbiology Department maintaining all aseptic precautions for routine microscopy, culture and sensitivity. Reports obtained were compared in relation with the type of bacteria, resistance and sensitivity profile.

Statistical analysis:

All the collected data was statistically analyzed using EPI INFO software version 7 for deducing results of data analysis.

RESULTS

A total of 150 patients were followed up in relation to, symptoms of CAUTI, bacteriological profile and antibiotic susceptibility.32 cases (21%) developed CAUTI during their course of stay and 50 patients

(33.33%) were having asymptomatic bacteriuria. The number of CAUTI cases in males were 17(16%) out of 104 and that of females were 15(33%) out of 46. The higher incidence of CAUTI in females was statistically significant (p value > 0.001) due to shorter and straight urethra combined with anatomical proximity of genitourinary system to the rectum. The incidence of CAUTI in our study was maximum in patients who were more than 70 years of age. Fever was the most common presenting symptom of CAUTI in 20 patients (13.3%) followed by urine turbidity in 8 patients (5.3%), lower back pain and hematuria each in 2 patients (1.33%). Maximum incidence of CAUTI was noted on 7th day of catheterization (56.25%) that suggests the incidence of CAUTI is directly proportional to duration of catheterization [Table 1].

Table 1: Table showing relationship of development of CAUTI with duration of catheterization

Duration of Catheterization	Development of CAUTI	Percentage
Within 3 days	04	12.50%
Within 5 days	10	31.25%
Within 7 days	18	56.25%

A variable bacteriological profile was observed amongst the patients who developed CAUTI. E. coli was the commonest pathogen isolated in 12 patients (34.37%), followed by Klebsiella, pseudomonas and Candida sp. [Table 2].

Table 2: Table showing micro-organisms casing CAUTI

Organism isolated	Number of isolates	Percentage
E.coli	12	37.50%
Klebsiella	9	28.12%
Pseudomonas	4	12.50%
Enterococcus	3	9.37%
MRSA	2	6.25%
Proteus	1	3.12%
Candida	1	3.12%

50 patients (33.33%) patients were having asymptomatic bacteriuria, with E. coli again being the commonest isolated microorganism (72.4%). Microbial sensitivity for drugs was maximum for Nitrofurantoin followed by Imipenem and Ciprofloxacin. All gram-positive isolates in the study were sensitive to Vancomycin followed by Nitrofurantoin while they were least sensitive to cotrimoxazole.

DISCUSSION

CAUTI is one of the most common cause of nosocomial infection.[3] The presence of indwelling catheter as an integral tool for clinically monitoring of the patients further contributes in development of urinary tract infections. CAUTI is defined as UTI where an indwelling urinary catheter was in place for more than two calendar days.[4] The incidence of CAUTI or asymptomatic bacteriuria increases with increasing number of days of indwelling catheter, the incidence reaching near 100% in four weeks duration.[5] CAUTI increases both psychological and financial burden to the patient as well as increased hospital stay and cost. More recently, prevention of CAUTI has become a major focus of many hospital infection control programme. Colonization around catheter usually present with asymptomatic bacteriuria that resolves as soon as the catheter is removed. But, persistent colonization of microbes leads to ascending infections around genito-urinary tract causing cystitis, epididymo-orchitis, prostatitis, pyelonephritis and septicemia.[6]

In present study incidence of CAUTI in patients admitted under surgical unit was 21%, which when compared to studies done in India, like that of Vinoth M et al,[7] and Md. Yousuf khan et al,[8] mentioned the incidence of CAUTI to be 20% and 59% respectively. In our study, maximum incidence of CAUTI was noted on 7th day of catheterization (56.25%) that suggests the incidence of CAUTI is directly proportional to duration of catheterization. In a study conducted by Vargas-Cruz et al,[9] where a double balloon Foley catheter was used for irrigating the extraluminal catheter surfaces within the periurethral space between the urethral-bladder junction and meatus using antimicrobial solution in an ex vivo porcine model to prevent colonization were compared with catheters that were not irrigated. Significant (p < 0.001) inhibition of colonization was seen in irrigated catheters whereas an antimicrobial resistant biofilm was formed in non-irrigated catheters adding to the importance of catheter care in preventing CAUTI. In the present study, most common isolate is E.coli (34.37%) followed by Klebsiella (21.87%) having maximum sensitivity to Nitrofurantoin(90%). These gram-negative microbes also showed multidrug resistant, similar to earlier studies.[10,11] Higher resistant was found for fluoroquinolones which is the commonly used drug for urinary tract infection.[12] Whenever possible, a condom catheter is comfortable and a good alternative in reducing the risk of infection.[13] A few recommended tips for prevention of CAUTI in form of regular hand hygiene by health care workers involved in catheter care, aseptic method of catheterization and change of urinary bags, usage of single use closed drainage system for indwelling catheters, minimum handling of catheters for sampling, use of silicon urinary catheters when long duration catheterization is anticipated and appropriate use of antibiotics can definitely reduce the incidence of CAUTI.[14,15]

CONCLUSION

Judicial use of catherization, type of indwelling catheter and post catherization catheter care can help in reducing the incidence of CAUTI. Protocols for

educating the paramedical staff, strict infection control practices and an appropriate institutional antibiotic policy is the need of the hour. A routine screening of the patients by doing simple urine microscopy, culture & sensitivity can detect early bacteriuria and microbial sensitivity that helps in reducing catheter associated morbidity and mortality.

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