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BACTERIOLOGICAL PROFILE OF CATHETER ASSOCIATED UTI IN ICU PT IN A TERTIARY CARE HOSPITAL

Microbiology

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ABSTRACT

Introduction: Catheter associated UTI is common hospital acquired infection due to widespread use of urinary catheter.
Objectives:
1. To know the occurrence of CAUTI in ICU of our hospital.
2. To know the bacteriological profile and antibiotic sensitivity pattern of the isolates.

Materials and Methods: All consecutive urine samples of catheterized patient who are admitted in ICU for more than two days have been collected and processed for culture & antibiotic sensitivity.

Results: In our study 155 samples were processed. Occurrence of CAUTI in our ICU set up was 21 %. Among 155 samples in 33 sample bacteria were isolated . Most common isolates were *Escherichia coli* (30%) *Klebsiella spp*. (20%) & *Enterobacter spp*. (13.3%) followed by *Pseudomonas spp. (13.3%), MRSA (9.09%) & Enterococcus (9.09%)*. Most of the isolates were multidrug resistant.

Conclusion: Urinary tract of catheterized patient is highly susceptible to infection, when duration of catheterization is prolonged. Isolates are usually multidrug resistant. There should be judicious use of urinary catheterization only when indicated as well as for minimum time interval.

KEYWORDS

INTRODUCTION

The incidence of nosocomial infections in intensive care units (ICU) is showing a rising trend mainly because of increasing invasive procedures performed in the ICU. Modern medical care is heavily dependent on a reliable and safe vascular access. However these intravascular devices, which provide a stable access on one hand, are also associated with significant potential for producing iatrogenic disease on the other, resulting in catheter-related bacteremia [1].

Infection frequently occurs after the placement of urinary catheters[2]. Each day of urethral catheterization carries a risk of significant bacteriuria, which has been estimated to be 5 to 10% per day [3]. Urinary catheterization for more than 2 days is by far the most important risk factor for acquisition of a urinary tract infection (UTI) [4] .The incidence of urosepsis, which is defined as an inflammation of the upper urinary tract resulting in sepsis and bacteremia, occurs in approximately 16% of an Intensive Care Unit population [5]. Fungiuria, mostly candiduria, is the other concern, which is reported in 3% – 32% of patients catheterized for short periods of time[6,7] . Management of all these complications, causes increased treatment costs, besides contributing to prolonged use of antimicrobial therapy, increased length of hospital stay, physician visits, and morbidity [8] .

A range of gram-negative and gram-positive organisms, can cause nosocomial CAUTI including *Escherichia coli*, *Proteus mirabilis*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Enterococcus faecalis.* These infections are often polymicrobial and can last from several days to months [9].

These large reservoir of antimicrobial-resistant organisms, arising from the catheter and can be the source of cross-infection. It is reported that 15% of episodes of hospital-acquired bacteriuria occur in clusters, and these often involve highly resistant organisms [10].

AIM &OBJECTIVES:

AIM

To identify the causative microorganism of CAUTI.

OBJECTIVES

The above aim will be achieved by:
- Isolation and identification of causative microorganism.
- To assess the antibiotic sensitivity pattern of the bacterial isolates.
- Assess their respective frequencies in CAUTI.

MATERIALAND METHODS:

An observational study was carried out at Sri Krishna Medical College & Hospital during January 2019 to December 2019

All consecutive sample of catheterised patient, who were catheterized in ICU for more than two days have been collected for bacterial culture & antibiotic sensitivity[10].

Urine was collected by standard aseptic procedure .The sampling port of the catheter was disinfected with 10% povidine-Iodine and 3ml of urine was aspirated with a sterile syringe.

Urine samples were transferred to the laboratory within 1hr of collection. Samples were processed as per standard microbiological techniques. Bacterial isolates were put for Antimicrobial Susceptibility Testing as per CLSI guidelines.[11]

Standard statistical analysis was employed during analysis of results.

RESULT:

In our study 155 samples were processed. 33 samples, Out of 155 samples yielded bacterial isolates. Occurrence of CAUTI in our ICU set up is 21%.

Gender distribution of the patient as a risk factor for development of CAUTI

- Out of the 33 cases of CAUTI, 13 were males and 20 were females. Amongst the 122 who did not develop CAUTI, 44 were males and 78 were females.
- Percentage of males developing CAUTI were = 13/57 X 100 = 24.07%
- Percentage of females developing CAUTI were = 20/98 X 100 = 20.4%
- The difference was not statistically significant with p value of <0.88

Table 1: Gender distribution of the patient as a risk factor for developing CAUTI

Gender of the patient	CAUTI		Total	P value
	Yes	No		
Male	13	44	57	P=0.8821
Female	20	78	98	
Total	33	122	155	

- Chi square value = 0.022, degree of freedom = 1

Distribution of various isolates causing CAUTI

Table 2: Bacteria isolated from the cases of CAUTI

Organism	Number	Percentage
Escherichia coli	10	30%
Klebsiella spp	7	21.21%
Enterobacter spp	5	15.15%
Pseudomonas aeruginosa	5	15.15%
Enterococcus spp	3	9.09%
MRSA	3	9.09%
Total	33	100%

Most common isolates were *Escherichia coli* (30%) followed by *Klebsiella spp.* (21%) ,*Enterobacter spp.*(15%) *Pseudomonas spp.*(15%) , *MRSA* (9%) &*Enterococcus spp.*(9%) . All *Klebsiella & Escherichia coli* isolates were sensitive to Polymixin B &Imipenem but resistant to Ceftazdime, Ciprofloxacin, Chlorampheicol, Netilmicin, Nitrofuratoin. Two isolates were sensitive to Piperacillin+ Tazobbactam and Amikacin.

Staphylococcus &Enterococcus spp. were only sensitive to Vancomycin,Teicoplanin and Linezolid.

CONCLUSION

Health care associated infections affect a vast majority of patients, especially those admitted in the ICU. Majority of these infections are related to the use of devices which have become indispensable in modern care. One of the most commonly used such devices, urine catheters can lead to catheter associated urinary tract infection , which may further complicate patient's illness and contribute to patient morbidity and mortality.

Regular surveillance of these infections especially in the ICU settings to estimate the burden of infection is an essential step in the infection control and quality care assurance to patients. Prevalence of these infections is increasing especially in the developing countries and more studies are required on this subject.

The most important strategy in the prevention of infection is avoiding unnecessary placement of indwelling catheter, ensuring staff hygiene, avoiding repeat catheterizations and using alternates to indwelling urine catheterizations. CAUTI are associated with isolation of microorganisms with increased antimicrobial resistance leading to complications in patient management and prolonged hospital stay of patients. Early detection of these infections therefore and a hospital policy on prevention and management of device related infections may help in the control of these infections.

Fig 1: Growth of *Escherichia coli* on Mcconkey`s agar after overnight incubation.

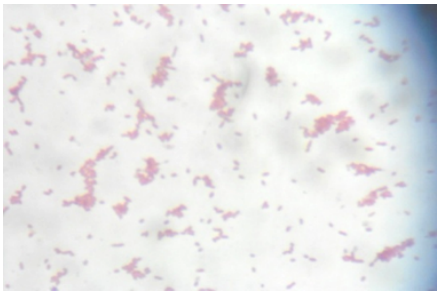

Fig 2: Gram negative bacilli in Gram staining from colony

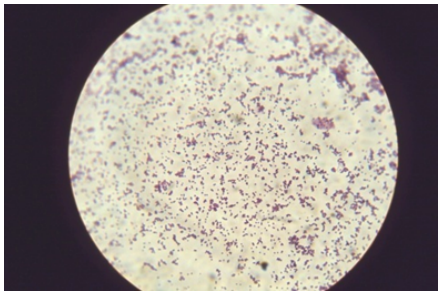

Fig 3: Gram positive cocci in Gram staining from colony.

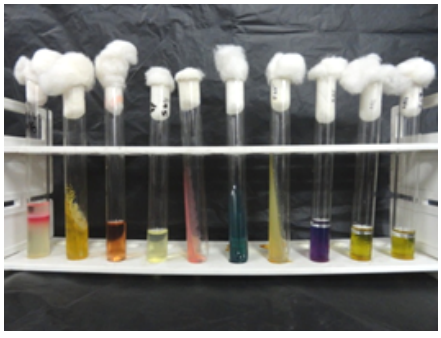

Fig 4: Biochemical reaction of *Escherichia coli.*

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