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RESEARCH ARTICLE

PREVALENCE OF CATHETER ASSOCIATED URINARY TRACT INFECTION AND ITS MICROBIOLOGICAL PROFILE AND ANTIBIOGRAM PATTERN IN OUR TERTIARY CARE HOSPITAL, KANCHIPURAM

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Abstract

Introduction:-

Catheter-associated urinary tract infections (CAUTI) are the commonest among hospital acquired infection (HAI) and 15-20% of the hospitalised patients undergo urinary catheterisation during their stay in hospital.[1, 2] According to the Centers of Disease Control and Prevention(CDC), Catheter-associated urinary tract infection (CAUTI)is defined as UTI where an indwelling urinary catheter was in place for more than two calendar days on the date of event (day 1 being the day of device placement).[3]

The various risk factors related to CAUTI are old age, diabetes mellitus, reduced immunity, hand hygiene, the quality in following aseptic procedure, duration of catheter and care. Gram negative bacteria are the predominant causative agents. Beyond urinary tract infections (UTI), it might lead to complications like bacteremia, osteomyelitis, septic arthritis, meningitis and endocarditis. They are significantly associated with prolonged hospital stay and increase in cost, morbidity and mortality and development of antibiotic resistance will add burden to this.[4]

This study was taken to estimate the prevalence of CAUTI, the bacterial causative agents, and its susceptibility pattern in our tertiary care hospital.

Materials and Method:-

The study was conducted in Microbiology Department Meenakshi Medical College Hospital & Research Institute, Kanchipuram, for the period of one year. The Patients admitted in intensive care unit (ICU), who were on urinary catheter insertion for >48 hours from were included in this study. Demographic detailsand informed consent were obtained from the patients. The patients were screened for inclusion and exclusion criteria. Patients with UTI, history of sexually transmitted diseases, Immunocompromised patients & with no consent were excluded from this study. Our Institutional Ethical Committee (IEC) clearance was obtained before starting this study.A total of 500 urine samples were collected from clinically suspected cases of CAUTI in a sterile wide mouthed universal container with all aseptic precautions with a sterile disposable syringe after cleaning and clamping the catheter tube and transported immediately to the microbiology laboratory for further bacteriological processing. The urine samples were inoculated into nutrient agar, MacConkey agar and blood agar and incubated at 37^{o}c, overnight. All

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the isolates were identified using standard biochemical tests. Drug susceptibility test was done by Kirby Bauer disc diffusion method using 3rd generation cephalosporin, gentamycin, amikacin, norfloxacin, ciprofloxacin, nitrofurantoin, and nalidixic acid. The results were interpreted according to CLSI guidelines. [5,6,7]

Results:-

Total no of culture positive in CAUTI

Total no of samples	No of culture positive	Percentage
500	280	56%

Distribution of culture positive.

Total no of samples (n=500)	Number	Percentage
Male	221	78.9
Female	59	21.1

Bacterial profile among CAUTI .

Organism	Number	Percentage
Escherichia coli	158	58.4
Klebsiella species	67	23.9
CONS	37	11.07
Pseudomonas species	13	4.6
Proteus species	7	4.6
Staphylococcus aureus	3	1.07

Antibiotic resistance among bacterial isolates.

Antibiotics	Escherichia coli	Klebsiella species	Pseudomonas species	Proteus species	Staphylococcus aureus	CONS
Gentamicin	28.48%	8.1%	0	28.57%		
Amikacin	5.68	2.7	0	0		
Ciprofloxacin	23.25	36.13	28.25	22.17		
CAZ	12.2	16.2	0	14.28	43.28	34.32
Amoxyclav	74.68	75.67	38.46	28.57	98.5	36.3
CXM	12.23	18.15	10.25	8.62		
Cotrimoxazole	36.27	43.15	35.23	38.13	52	43.28
Nitrofurantoin	13.16	38	30.76	42.85	-	-
Imipenem	0	0	0	0	-	--
Vancomycin	-	-	-	-	0	0

Discussion:-

Patients who are admitted in intensive care units (ICU) will develop UTIs due to their more frequent necessity of urinary catheterization and longer duration of catheter use and it is the most prevalent cause of nosocomial infections and gram-negative bacteremia. CAUTIs pose a significant burden on patients, both in terms of morbidity

and mortality. Catheter-associated urinary tract infections (CAUTI) continue to be among the most common hospital acquired infections. Apart from increased morbidity and mortality there is a significant increase in length of stay in hospital and higher hospital costs for patients and health systems.[1,2,8,9]

In our study, the prevalence of catheter associated urinary tract infection (CAUTI) in our hospital is 56%. Similar rates were reported in the studies of Danchaivijitr S et al., Alavaren et al.,[10,11] A study conducted by Tambyah PA and Maki DG shows 90% of patients positive for culture were asymptomatic. The presence of indwelling catheter predisposes to a symptomatic infection because it provides a surface for the attachment of microbial adhesion. Symptomatic infection can lead to ascending infection of bladder, ureters, and kidney, with subsequent need for antimicrobial agents. [12]

Male preponderance was noted in our study. It is concordant with the studies of Verma et al. Though many studies documented male preponderance Kakariaet al reported female preponderance in his study.[13,14]

E.coli was thepredominant bacterial causative agent in our study which is followed by Klebsiella species. The same observation has been noted in the studies of Tambyahet al, Bagchi et al., This observation seems to agree with several other studies where the most common isolate was E.coli and its isolation rate ranged from 22% to 40.47%.Similar profile of bacterial isolates were also seen in the studies of Vishwajith et al&Vinothet al.,[9,15,16]

The similarity and differences in spectrum of infecting organisms varies with patient population and different environmental places, host factors, history of prior antimicrobial exposure, lab facility available for isolation and the organisms unique to each location.

Among the antibiotic resistance pattern in our study, all organisms were predominantly showed resistance to Amoxiclav, Cotrimoxazole, Gentamicin &Ciprofloxacin. None of the organisms were resistant to Imipenem.

In a study conducted by Sandhu et al, most of the GNB isolates were sensitive to amikacin (77.78%) followed by cefazolin and ceftazidime (66.67%) but decreased sensitivity was observed to nitrofurantoin, cefuroxime, and cefotaxime (55.56%). Whereas in the study of Vinoth M et al. the sensitive pattern of E-Coli to nitrofurantoin is about 81.82% and high-level resistance noticed with drugs such as cefuroxime and norfloxacin.[2,15]

In a hospital environment, the antibiotic susceptibility pattern is changing over years and varies according to hospital practice and infection control & antibiotic policy.

Conclusion:-

Lower 1/3rd of urinary tract is loaded with perianal flora. Catheterisation provides ideal niche for bacterial adherence inducing complications in patients' care and the physicians should carefully evaluate the indications for usage of urinary catheter and avoid unnecessary catheterization to their patients. So strict aseptic precaution has to be taken during insertion of catheter and daily care will reduce CAUTI. The antimicrobials should be started according to culture and sensitivity pattern and treatment should be based on the susceptibility of organisms that are isolated from urine. Reduction in the incidence of CAUTI can be achievedby avoiding unnecessary urinary catheters, strict aseptic precautions at the time of insertion and removal of the catheters, appropriate catheter maintenance practices, early catheter removal unless it is otherwise indicated, well defined hospital antibiotic policy and properly trained infection control programs can reduce not only CAUTI also the development of multidrug-resistant pathogen.

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