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A STUDY ON THE BACTERIOLOGICAL PROFILE OF URINARY TRACT INFECTION INADULTS AND THEIR ANTIMICROBIAL SENSITIVITY PATTERN IN DMCH, LAHERIASARAI, BIHAR

Microbiology

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ABSTRACT

Background: Urinary tract infection is one of the most common bacterial infections in humans and a major cause of morbidity. The etiology of UTI and the antimicrobial sensitivity pattern varies with the widespread availability of antimicrobial agents; UTI has become difficult to treat because of appearance of pathogens with increasing resistance to antimicrobial agents.

Methods: A descriptive study done during January 2020 to June 2020. All positive urine culture and sensitivity reports of males and females aged 20-70years were included. A total of 373 positive urine culture cases were taken from the culture and sensitivity register from Microbiology department and details were entered using a questionnaire.

Results: Out of 373 adults, males were 137 (36.7%) and females were 236 (63.3%). *E. coli* (74.3 %) was the most common organism, followed by *Klebsiella* (15.8%), *Enterococcus, Pseudomonas* and *Staphylococcus*. The incidence of UTI was more in patients in the age group of 60-70years. *E. coli* and *Klebsiella* were sensitive to Amikacin (97.1%), Nitrofurantoin (90.7%), Gentamycin and Imipenem. Both organisms were resistant to Ampicillin (>90%).

Conclusions: In this study, females were mostly affected and the most common organisms were E.Coli and Klebsiella. These organisms were most sensitive to Amikacin, Nitrofurantoin and resistant predominantly to Ampicillin. The sensitivity and resistance pattern of uropathogens to common antimicrobial agents must be taken into account when selecting treatment plans for UTI.

KEYWORDS

Antibiotic sensitivity, Urinary tract infection, Uropathogenes

INTRODUCTION

Urinary tract infections (UTIs) are the most common bacterial infection encountered in tertiary care settings. Etiological agents of UTI are variable and usually depend on time, geographical location and age of patients. However, *Escherichia coli, Proteus mirabilis*, *Enterobacteragglomerans*, *Citrobacterfrreundii* and*Klebsiella pneumonia* account for over 70% of cases.

UTIs are defined by the presence of a growth of more than 105 colony forming units (CFU) of bacteria per ml of urine for asymptomatic individual and much lower for symptomatic individual (~103CFU/ml). In urine sample obtained by supra pubic aspiration or in-and-out catheterization and in samples from a patient with an indwelling catheter, colony count of 102-104 /ml generally indicates infection.

The introduction of antimicrobial therapy has contributed significantly to the management of UTIs. The antimicrobial agents used in treatment of UTI include cell wall inhibitors like penicillin, third generation Cephalosporins (Cefotaxime, Cephradine, Ceftazidimeand Cefaclor), DNA gyrase inhibiters like Floroquinolones (Ciprofloxacin, Ofloxacin, Sparfloxacin and Enoxacin) and Aminoglycosides (Amikacin, Gentamycin and Kanamycin) that are protein synthesis inhibitors. Inappropriate and extensive use of antibiotics has leads to the development of multidrug resistance among the pathogens. In patients with suspected UTI, antibiotic treatment is usually started empirically, before urine culture results are available. To ensure appropriate treatment, knowledge of the organisms that cause UTI and their antibiotic susceptibility is mandatory. So in the above context we have done this study to determine the common uropathogenes and their antibiotic susceptibility pattern.

AIM OF THE STUDY

Aim of the study was to study the bacteriological profile of UTI and their antibiotic sensitivity pattern in adults aged 20-70. And various objectives were to determine the bacteriological profile of pathogens responsible for UTI in adults aged 20-70 and to assess the antibiotic sensitivity pattern of the causative uropathogens in adults aged 20-70.

MATERIALAND METHODS

The study was conducted in Department of Microbiology, Darbhanga Medical College, Laheriasarai, Bihar. All positive urine culture and sensitivity reports of males and females aged 20-70years during January 2020 to June2020, were included in the study. Urine culture and sensitivity reports with more than one causative organism were excluded from the study Sample size: A total of 373 positive urine 'culture and sensitivity' (C&S) reports obtained from the Microbiology Department. Study procedure: using a pre tested semi structured questionnaire, relevant data of cases (age, sex, type of uropathogen, isolated by C and S, and their antibiotic susceptibility) was collected from the urine C&S register in the Microbiology Department. In this study, a positive case of UTI was defined as significant bacterial growth (≥105 CFU/ ml of urine).

STATISTICALANALYSIS:

Data entry was done using Microsoft Excel and the data was analysed using SPSS 16.

RESULTS

A total of 373 positive urine culture cases were taken from the culture andsensitivity register aged 20-70years and out of 373 adults, males were 137 (36.7%) and females were 236 (63.3%) (Table 1).

Table 1 : Sex-wise distribution of UTI

Sex	Frequency	Percentage
Males	137	36.7
Females	236	63.3

E. coli (74.3 %) was the most common organism, followed by *Klebsiella* (15.8%) *Enterococcus,Pseudomonas* and *Staphylococcus*. Gender-wise, females (63.3%) were more affected than males (36.7 %). Sex-wise distribution of UTI by organism, Out of 137 males *E. coli* was isolated from 64.9% and Klebsiella 22.6 and out of 236 females *E. coli* was isolated from79.7% and *Klebsiella* 11.9%.The incidence of UTI was more in patients with age group of 60-70years (Table 2).

There was significant growth of *E. coli*, *Klebsiella*, *Enterococci, Staphylococcus* and *Pseudomonas*. *E. coli* and *Klebsiella* infections

were most common organisms. *E. coli* was sensitive to antibiotic gentamycin,nitrofurantoin. The sensitive antibiotic to *Klebsiella* isolates are gentamicin piperacillintazobactum*E. coli* and *Klebsiella* pneumoniae were resistance to ampicillin. *Enterococcus* was sensitive to vancomycin& linezolid. *Staphylococcus* was sensitive to vancomycin.

Table 2 : Sex-wise distribution of UTI by organism

Organism	Male (%)	Female (%)	Total
Escherichia coli	89(64.9%)	188(79.7%)	277
KlebsiellaPneumoniae	31(22.6%)	28(11.9%)	59
Pseudomonas Aeruginosa	10(7.3%)	3(1.13%)	13
Enterococci	4(2.9%)	10(4.2%)	14
AcinetobacterBaumannii	2(1.6%)	4(1.7%)	6
Staphylococci	1(0.73%)	3(1.3%)	4
Total	137	236	373

Table 3 :Age-wise distribution of UTI according to type of uropathogen

Organism	20-30 yrs.	30-40 yrs.	40-50 yrs.	50-60 yrs.	60-70 yrs.	Total
E. coli	29(80.6%)	28(80%)	52(77.6%)	75(72.1%)	93(70.9%)	277
Klebsiella	4(11.1%)	4(11.4%)	11(16.4%)	16(15.4%)	24(18.4%)	59
Pseudomonas	0	0	0	6(5.8%)	7(5.3%)	13
Enterococci	0	3(8.6%)	1(1.5%)	4(3.8%)	6(4.6%)	14
Acinetobacter	2(0.06%)	0	2(2.9%)	2(1.9%)	0	6
Staphylococci	1(0.03%)	0	1(1.5%)	1(0.96%)	1(0.8%)	4

and Pseudomonas. Ecoli&Klebsiella infections were most common organisms similar to another studies.

E. coli was sensitive to antibiotic gentamycin and nitrofurantoin similar to another studies. The sensitive antibiotic to *Klebsiella* isolates are gentamicin, *Piperacillintazobactum* similar to another study. *E. coli* and *Klebsiellapneumoniae* were resistance to ampicillin similar to another study. *Enterococcus* was sensitive to vancomycin& linezolid. *Staphylococcus* was sensitive to Vancomycin. Rama Biswas et al found that 86.36% of all isolates were sensitive to Amikacin and 73.63% were sensitive to Nitrofurantoin.

CONCLUSION

In this study, females were mostly affected and the most commonly found organisms were *E. coli* and *Klebsiella*. These organisms were most sensitive to Amikacin,Nitrofurantoin, Piperacillin+ Tazobactam and Cefoperazone + Sulbactam. They were resistant predominantly to Ampicillin.

DISCUSSION

Urinary tract infection is huge burden on health care due to high prevalence of infection in both community and nosocomial settings. It is caused by variety of pathogens including *E. coli*, *K. pneumonia* and *P. aureginosa*. Continuous surveillance of antibiotic susceptibility patterns of uropathogens at local level is crucial in dealing with emerging problems of antibiotic resistance and provides assistance in managing effective initial therapy. A total of 373 positive urine culture and sensitivity report during a 6 month period (January-June 2020) were analysed in this study. Gender-wise, more females were affected than males, this finding is consistent with other studies done by Prakasam A. K.C et al and Azra S. Akram T et al, in their study analyzed age and gender-wise data of the prevalence of uropathogens in community-acquired urinary infections. They found that all the organisms were more common in females than males. There was significant growth of E.Coli, Klebsiella, Enterococci, Staphylococcus

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