RESEARCH ARTICLE

BACTERIOLOGICAL PROFILE AND ANTIBIOTIC SENSITIVITY PATTERN OF URINARY TRACT INFECTION (UTI) IN TERTIARY CARE HOSPITAL

BAJARANGI LAL CHAUDHARY*, BRIJ NANDAN SINGH, TANUJ GUPTA, DIVYA SINGH
Department of Microbiology, Mayo Institute of Medical Sciences and Hospital, Lucknow
*Correspondence: bajarangi678@gmail.com

BAJARANGI LAL CHAUDHARY

ABSTRACT

Urinary tract infection is one of the most common bacterial infections in humans and a major cause of morbidity. To detect the prevalence and antibiotic sensitivity among pathogen isolate from patients having UTI. The organism was isolated using standard microbiological procedures and tested for their antimicrobial susceptibility, results were interpreted according to CLSI guidelines. The prevalence rates of UTI were 45%. *E. coli* was 10.56% *Klebsiella* spp (71.46%), and *Staphylococcus aureus* (8%). The highest sensitivity of GNB with imipenem (97.31%), nitrofurantoin (71.36%), gentamicin (75.20%) and GPC was highly sensitive to gentamicin (73.96%), tetracycline (72.45%) and linezolid (71.77%). *E. coli* is the most frequent gram negative bacteria causing UTI and susceptibility pattern reports need before antibiotics therapy.

Key words: UTI, Uropathogens, Antibiotics Resistant Pattern

INTRODUCTION

The urinary tract is the body's filtering system for removing waste liquid; it comprises the kidneys, ureters, bladder and urethra [1]. UTI is mainly caused by bacteria and fungi and viruses may rarely be cause. Women are more likely than men to get UTI because of their urinary tract's structure. Men have a larger urethra, so the chances for bacteria to enter the urinary tract are more difficult. Nearly half of the women will have a UTI at some point in their lives [2-5]. UTIs are a common burden in patients with diabetes mellitus and cystitis [6]. UTI has become the most common hospital acquired infection, accounting for as many as 35% of nosocomial infections [7]. UTI is the second most common infectious may present in community practice. It accounts for approximately one million hospitalizations annually worldwide [8]. Most of UTI are may caused by gram-negative bacteria like *E.coli, P.mirabilis*, *P.vulgaris, Klebsiella* sp, *Pseudomonas aeruginosa*, *Acinetobacter*, *Serratia, and Morganella morganii* and caused by Gram positive bacteria include *Enterococcus spp.*, *Staphylococcus aureus* especially coagulase-negative Staphylococci, and *Streptococcus agalactiae* [9]. At least 80% of the uncomplicated cystitis and pyelonephritis are due to *E.coli*. Whereas *Proteus mirabilis* and *Klebsiella pneumoniae* infection accounts 10% and 6% respectively [10]. The aetiology of UTI and the antibiotic resistance of uropathogens have been changing over the past years, both in community and hospital infection [11]. Therefore, the present study was aimed at gaining knowledge about the type of pathogens responsible for UTI and their susceptibility patterns which may help clinicians to choose the right empirical treatment.

Materials and Methods

This study of urine tract infection was carried out in the Department of Microbiology, Mayo Institute of Medical Sciences and Hospital. Barabanki, UP. Over a period of one year from (May 2014 to April 2015). A

total of 1620 urine samples were collected by standard "mid-stream clean catch" method from all the patients, in a sterile, wide mouthed container that can be covered tightly with lid. Microscopic examination of urine, a wet film of uncentrifuged urine was carried out to detect the presence of pus cells, erythrocytes, microorganisms, casts etc. The samples were processed using standard microbiological procedures. The specimens were cultured on MacConkey's agar, Sheep Blood agar and Cystine Lactose Electrolyte Deficient (CLED) agar, by standard method and incubated at 37°C overnight. Culture results were interpreted as significant and insignificant bactiurea, according to the standard guidelines and procedures. The organism was identified by routine methods from the samples showing significant bacteriuria [12,13]. The isolated organisms from culture plates were identified by standard laboratory techniques [14]. The antimicrobial susceptibility test results were interpreted according to the guidelines of Clinical and Laboratory Standards Institute [15]. *E .coli* ATCC 25922 and *S. aureus* ATCC 25923 was used as a quality control strain.

Result and Discussion:-

Table 1: Gender wise distribution - Prevalence of Urinary Tract Infection.

Sex	Total no of samples	No of positives (N=729)	Percentage
Males	585	77	10.56
Females	1035	652	89.43

Table 2 : Age wise distribution- Prevalence of UTI.

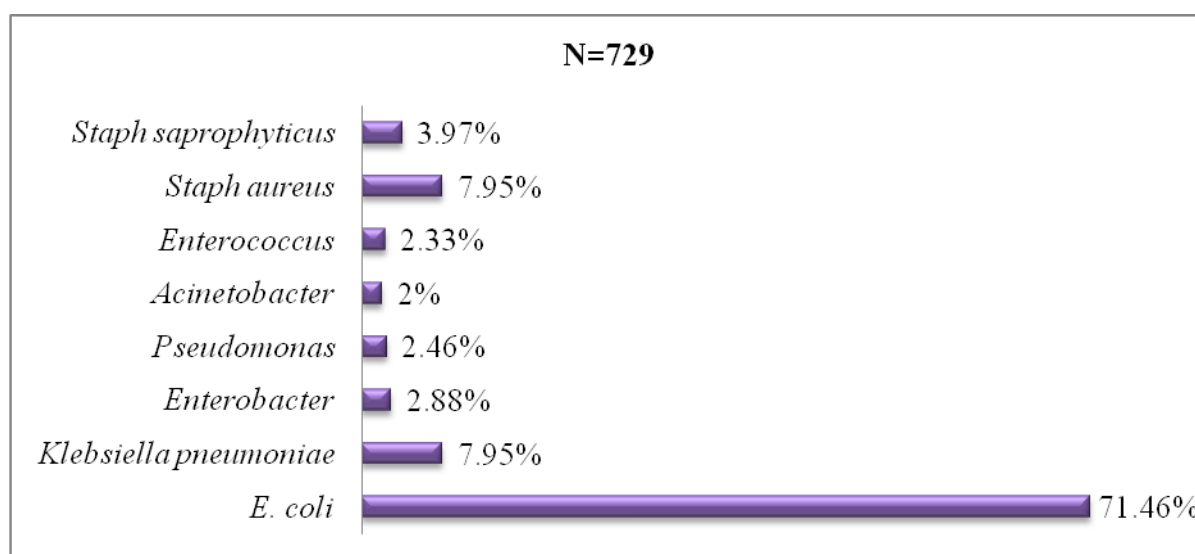| Age(years)	Total sample	Male Positive (%)	Female Positive (%)	Total (%)
<20	281(17.34)	13 (16.88)	137 (21.01)	150 (20.57)
21-40	785(48.45)	37 (48.05)	351 (53.83)	388 (53.22)
41-60	355(21.91)	18 (23.37)	127 (19.47)	145 (19.89)
61-80	190(11.72)	7 (9.09)	36 (5.52)	43 (5.89)
>80	9(0.55)	2 (2.59)	1 (0.15)	3 (0.41)
Total	1620(100)	77 (100)	652(100)	729(100)

Figure 1: Incidence of Isolates.

Table 3 : Antimicrobial susceptibility of GNB.

Antibiotics	*E.coli* (N=521)	*Klebsiella pneumoniae* (N=58)	*Enterobacter* spp (N=21)	*Pseudomonas aeruginosa* (N=18)	*Acinetobacter* spp (N=15)
A/S	52.2	65.70	60.35	61.12	65.09
AK	47.3	45.76	55.12	53.67	62.78
CIP	71.45	72.65	68.31	70.12	75.32
CX	60.24	52.45	57.78	63.02	62
CTX	58.23	55.56	57.76	65.89	67.32
CAZ	63.61	62.87	55.11	63.12	65.55
PIT	72.34	57.94	65.43	65.45	63.87
GEN	72.13	75.54	85.34	70.36	72.66
NX	55.46	65.76	70.54	62.78	50.55
NIT	70.35	72.54	80.54	70.33	65.23
IPM	95.34	97.01	100	94.23	100

Note: Results are presented in percentage.

Table 4 : Antimicrobial susceptibility of GPC.

Antibiotics	*Enterococcus* spp (N=17)	*Staphylococcus aureus* (N=58)	*Staphylococcus Saprophyticus* (N=21)
AK	40.33	55.23	57.11
A/S	63.73	60.35	71.54
CIP	55.89	60.34	62.65
CX	60.12	62.67	55.32
E	55.42	65.87	60.23
CD	60.89	68.45	62.54
LZ	75.32	67.76	72.23
CHO	65.67	65.54	60.14
RIF	72.54	71.25	70.55
GEN	72.23	73.89	75.78
TE	70.54	75.47	71.34

Note: Results are presented in percentage

AMC-amoxyclav, CIP-ciprofloxacin, COT-cotrimoxazole, NX-norfloxacin, NFT nitrofurantoin, CTX-cefotaxime, CAZ-ceftazidime, GEN-gentamicin, IPM-imipenem VA-vancomycin, LZ-linezolid, CHO-chloramphenicol, RIF-ripampicin, E-erythromycin

A total of 1620 samples were collected during the study period of which 1035 (63.88%) were from females and rest 585(36.11%) samples were from males. Pathogenic bacteria were isolated in 729 samples with prevalence rate of 45%. The prevalence in female was 89.43% and in male was 10.56% shown in (table 1) which correlates with the other studies [16,17,18]. Women are more prone to UTIs than men because of short urethra and it is closer to the anus [19]. UTI was most commonly seen in the age group of 21-40 years 53.83%. The age wise distribution of the samples and their positivity is shown in (table 2). *E.coli* was the most

commonly isolated urinary pathogen 71.46%, followed by *Klebsiella* spp and *Staphylococcus aureus* 8% (table 3). This study was supported by other studies [20,21]. The antibiotic sensitivity test of the GNB were with imipenem 97.31% followed by nitrofurantoin 71.36%, gentamicin 75.20% (table 4) and among GPC were highly sensitive to gentamicin (73.96%) followed by tetracycline (72.45%) and linezolid (71.77%). Similar results were also obtained by Azra S. et al. [22] and Kolawole. et al.[23].

CONCLUSION

Prevalence of UTI was 45% and more prevalent in females between the age group of 21 to 40 years. It is also concluded that *E. coli* is the most frequent bacteria causing UTI. The susceptibility pattern shown by this study need for *in-vitro* sensitivity reports before antibiotics therapy initiation, however, it should be born in mind that *in-vitro* antimicrobial sensitivity is only a guide.

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