Short Communication

Urinary tract infections: Prevalence and antimicrobial susceptibility pattern

Gurjeet Singh[*]**, Raksha and A.D. Urhekar,**

Department of Microbiology, MGM Medical College, Kamothe, Sector-18,
Navi Mumbai-410209, Maharashtra, India
***Corresponding author e-mail:** gurjeetsingh360@gmail.com*

A B S T R A C T

Keywords

Urinary tract infections; *Escherichia coli*; microscopic examination; pyuria.

This study was to find out the bacteria involved in urinary tract infections in patients. Urinary tract infection (UTI) is the most common acute infection which more occurs in females than males. The common bacteria were isolated i.e. Escherichia coli followed by coagulase negative staphylococci, Enterococci and *Staphylococcus aureus*. Amikacin, Ampicillin/Sulbactam, Sparfloxacin and Gatifloxacin showed high degree of sensitivity to common pathogens. This short communication will be useful to proper diagnosis of the causative agents involved in infections and for proper treatment and management of the infection.

Introduction

Urinary tract infections (UTI) represent serious threats to human health all around the world affecting millions of people each year. These are the most common nosocomial as well as community acquired infections, resulting in high morbidity and increased economic loss in terms of treatment. UTIs are widespread in both males and females; nevertheless, females are more susceptible than males. In early childhood, persistent urinary tract infections may usually emerge and 1 to 8% of children may experience UTI at least once between the age of 1 and 11 years. Gram negative bacilli are the most prevalent uropathogens including *Escherichia coli, Klebsiella pneumoniae, Pseudomonas aeruginosa* and *Proteus*

mirabilis that result in bacteremia and hospital acquired infections (Sarwar *et al.,* 2013).

Etiologic agents of UTI are variable and usually depend on time, geographical locationand age of patients. However, Enterobacteriacea species including *Escherichia coli, Proteus mirabilis, Enterobacter agglomerans, Citrobacter freundii* and *Klebsiella pneumoniae* account for over 70% cases (Rasoul *et al.,* 2009).

Urinary tract infection (UTI) is the most common acute infection which occurs in females. Females are more frequently affected by UTI (particularly cystitis) due

to (1) colonization of urethra by colonic Gram-negative bacilli (2) close proximity of urethra to anus. (3) short length of urethra (about 4cm) and (4) sexual intercourse (Introduction of bacteria into the bladder). Three quarter of Urinary tract infections occur in pregnant women and one quarter in non-pregnant women (Singh *et al.,* 2012).

Materials and Methods

This prospective study was conducted at Department of Microbiology, MGM Medical College and hospital, Navi Mumbai over a period of six months from December 2012 to May 2013. Total 200 samples were taken from males and females including all age groups with suspected cases of urinary tract infections.

Samples examined macroscopically and microscopically. In the presence of pus cells (indicates significant pyuria) urine samples were mixed properly and using standard calibrated loop which delivered 0.001 ml of urine was used to inoculate on Blood agar. The samples were also inoculated on MacConkey's agar. The plates were incubated at 37°C for 48 hours. Samples which showed >100 colonies were taken as significant and bacterial identification was done by standard microbiological methods. Antibiotic sensitivity testing was performed according to CLSI guidelines (CLSI document (M100-S21), 2011).

Results and Discussion

65 (32.5%) out of 200 samples showed significant growth on culture. Out of 65 culture positive samples were taken 24 (37%) were males and 41 (63%) were females. The median age group of males and females was 39 (18-60) years. Single

and multiple pathogens were isolated from 58 (89.23%) and 7 (10.77%) respectively. The major single pathogens was Escherichia coli isolated from 22 samples (33.85) followed by Coagulase negative staphylococci from 11 samples (16.92%), Enterococci from 10 samples (15.38%), *Staphylococcus aureus* from 7 samples (10.77%), *Klebsiella pneumoniae* from 5 samples (7.69%) and *Klebsiella oxytoca*, Acinetobacter baumanii and *Citrobacter diversus* from 1 sample (1.54%) each (Table 1). The more than one pathogens was Escherichia coli + Enterococci and Coagulase negative staphylococci + Proteus mirabilis were isolated from 2 samples (3.08%) each and *Acinetobacter baumanii + Klebsiella pneumoniae, Escherichia coli + Staphylococcus aureus* and *Escherichia coli + Klebsiella oxytoca* from 1 sample (1.54%) each (Table 1).

A study reported that *Escherichia coli* was the most common bacteria causing urinary tract infection followed by *Pseudomonas aeruginosa, Klebsiella pneumoniae* and *Proteus mirabilis.* Amikacin sensitive to all the pathogens was isolated (Sarwar *et al.,* 2013).

Another study reported that the common isolates were *Escherichia coli* followed by *Klebsiella pneumoniae, Staphylococcus aureus* and *Acinetobacter baumanii.* However this study showed high resistance against Ampicillin, Co-trimoxazole, Nalidixic acid, Tobramycin and Nitrofurantoin (Rasoul *et al.,* 2009). Conclusively, this study showed the prevalence of Gram negative bacteria was more than Gram negative bacteria in most of urinary tract infections in both male and females. Major isolated bacteria were more sensitive to Amikacin, Ampicillin/Sulbactam, Sparfloxacin and Gatifloxacin.

Table. 1 Single and multiple pathogens isolated from urine samples by standard methods.

Pathogens isolated	No. of cases (%) (n=98)
Single pathogen	
Escherichia coli	22 (33.85)
Coagulase Negative Staphylococci	11 (16.92)
Enterococcus species	10 (15.38)
Staphylococcus aureus	7 (10.77)
Klebsiella pneumoniae	5 (7.69)
Klebsiella oxytoca	1 (1.54)
Acinetobacter baumanii	1 (1.54)
Citrobacter diversus	1 (1.54)
Multiple pathogens isolated	
Escherichia coli + Enterococci	2 (3.08)
Coagulase negative staphylococci + *Proteus mirabilis*	2 (3.08)
Acinetobacter baumanii + *Klebsiella pneumoniae*	1 (1.54)
Escherichia coli + *Staphylococcus aureus*	1 (1.54)
Escherichia coli + *Klebsiella oxytoca*	1 (1.54)
Total	65 (100)

Table.2 Antimicrobial sensitivity pattern of isolated bacteria.

Isolated pathogens	Antimicrobial sensitivity (%)									
	AK	AS	DC	GF	FD	NX	RC	GM	RO	CH
Escherichia coli	100	75	100	100	80	30	50	50	75	60
Klebsiella pneumoniae	100	80	75	80	67	50	80	60	100	90
Acinetobacter baumanii	100	100	50	50	0	0	0	0	0	0
Klebsiella oxytoca	100	100	100	100	100	100	100	100	0	100
Citrobacter diversus	100	100	100	100	100	100	100	100	100	100
Staphylococcus aureus	100	100	100	88	-	-	75	33	50	-
CoNS	100	100	-	-	-	-	100	50	75	-

References

CLSI document M100-S21' Wayne, PA: Clinical and Laboratory Standards Institute; 2011. Performance Standards for Antimicrobial Susceptibility Testing; 'Twenty-First Informational Supplement.

Rasoul, Y. M., B. Hooshang and Javad Y. 2009. Urinary Tract Infections: Bacteriology and Antibiotic Resistance Patterns. Ind. Pediatri. 46: 617-620.

Sarwar, A., S. Aslam and Habeeb, M.A. 2013. Prevalence and Antimicrobial Susceptibility of Gram Negative Bacteria Isolated From Urinary Tract Infections. J. Inf. Mol. Biol. 1 (1): 18-20.

Singh, G., Raksha, A.V. Hodiwala and Sharma, S.D. 2012. A study on bacterial uropathogens causing urinary tract infection in females in Allahabad district. IJMPR. 2(1): 22-25.