Contents lists available at www.innovativejournal.in

INNOVATIVE JOURNAL OF MEDICAL AND HEALTH SCIENCE

Journal homepage: http://www.innovativejournal.in/index.php/ijmhs

ISSN No. 2277-4939

IDENTIFICATION OF URINARY PATHOGENS AND DRUG RESISTANCE PATTERN

Anupama Moirangthem*, Sanasam Sanjeev

Dept. of Microbiology, Nepalgunj Medical College ,Chisapani,Banke, Nepal

ARTICLE INFO

Corresponding Author:
Anupama Moirangthem
Dept. of Microbiology
Nepalgunj Medical College,
Chisapani, Banke, Nepal

Keywords: *Escherichia coli, Staphylococcus aureus*, *Klebsiella pneumoniae, Proteus mirabilis,* Antibiotic susceptibility test.

ABSTRACT

Urinary Tract Infection (UTI) is a common syndrome in community especially in females.The objective of this study is to determine the prevalence of most common bacteria causing UTI and antibiogram pattern. A total of 180 urine culture sensitivity reports were analyzed. The predominant growth of single bacteria was seen in 47 samples (26.11%). The most common organisms isolated were *Escherichia coli*, *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Proteus mirabilis.* More than 80% of the isolates were sensitive to Gentamicin. More than 70% of the *Staphylococcus aureus* and *E.coli* were sensitive to nitrofurantoin. Very high rate of resistance was shown by strain of *Staph. aureus* against oxacillin. *E.coli* isolated was highly sensitive to amikacin (88.46%) and gentamicin (92.31%).

INTRODUCTION

Urinary tract infection (UTI) remains very common. As many as 50% of the woman report of having had UTI at least once in their lifetime. They are second most common type of infection in the body accounting for about 8.3 million visits to the hospital each year [1]. Urinary tract infection is the most common cause of infection in nursing home residents and the most common source of bacteraemia in the elderly population [2].

UTI are caused by presence of bacteria in urine, although fungi and viruses could be involved. Majority of woman have recurrent infection within one year [3]. *E.coli* causes 75-90% uncomplicated urinary tract infections [4]. *Staphylococcus saprophyticus* causes an estimated 5-15% of UTI frequently in younger woman [5]. *Enterococcus* and other gram negative rods other than *E.coli* have also been implicated in some cases [6].

So, the present study had been aimed to find out the urinary pathogens as well as their susceptibility pattern in patients attending CRH, Sikkim.

MATERIALS AND METHODS

The study was conducted in the Department of Microbiology, Sikkim Manipal Institute of Medical Sciences, Gangtok. A total of 180 urine samples were collected from both symptomatic and asymptomatic cases. Clean voided, mid-stream urine specimen was collected. The specimens were processed with the help of wet mount, culture and antibiotic susceptibility test. Wet mount was done to examine the pus cells and RBCs.The specimens were inoculated on Blood agar, MacConkey agar and CLED. The plates were examined for the growth of bacteria and the pathogenic organisms were identified by conventional methods. Antibiotic susceptibility test was performed by Kirby Bauer disc diffusion method. Commercially procured antibiotic disc (Hi Media) used were: Amikacin (30 µg), Ampicillin (10 µg), Cefazolin (30 µg), Ciprofloxacin (5 µg), Gentamicin (10 µg), Imipenem (10 µg), Nitrofurantoin(300 µg), Oxacillin(1 µg), Vancomycin (30 µg).

RESULT

A total of 180 samples of urine had been collected from both symptomatic and asymptomatic patients attending CRH. 23 samples were from children and 157 were from adults. Out of 180 samples, culture was positive in 47(26.11%) samples. In females, the urine culture was positive in 39 (83%) cases whereas it was positive in 8 (17%) cases in males. Out of the 47 positive cases 3 were from the children where 2(4.26%) were males and 1(2.13%) was female. Table 1 shows bacterias isolated from urine.

26 strains of *E.coli* (55.31%), 15 strains of *Staph. aureus* (31.91%), 5 isolates of *K.pneumoniae* (10.63%) and 1 strain of *Pr. mirabilis* (2.12%) were isolated. 24 (92%) isolates of *E.coli*, 13 (87%) isolates of *Staph. aureus* , 5 isolates of *K. pneumoniae* (100%) were highly sensitive to gentamicin. The only 1 *Proteus* strain was also sensitive to gentamicin. 19 (73%) isolates of *E.coli* and 10 (67%) isolates of *Staph. aureus* were sensitive to nitrofurantoin. 2(13%) isolates of *Staph. aureus* were sensitive to methicillin. Methicillin resistance were seen in 13 (87%) strains of *Staph.aureus.* 5 (100%) strains of *K.pneumoniae* were sensitive to gentamicin, ciprofloxacin and nitrofurantoin.

Table 2, Table 3, Table 4 and Table 5 shows the antibiotic susceptibility pattern of *E.coli*, *Staph. aureus* , *K. pneumoniae* and *Pr. mirabilis* respectively.

Table 1: shows bacteria isolated from the urine culture.

Specimen	Name of organisms	Number of isolates	
		Male(%)	Female(%)
Urine	*Ecoli*	06(13)	20(43)
	Staph. aureus	00(0)	15(32)
	K. pneumoniae	01(2)	04(9)
	Pr. mirabilis	01(2)	00(0)

Table 2 : Antibiotic susceptibility pattern for *E.coli*

Sl.No.	Antibiotics	Susceptibility pattern		
		Sensitive (%)	Moderately sensitive (%)	Resistant (%)
1.	Ampicillin	10(38)	0(0)	16(62)
2.	Amikacin	23(88)	0(0)	3(12)
3.	Cefazolin	16(62)	0(0)	10(38)
4.	Ciprofloxacin	08(31)	0(0)	18(69)
5.	Gentamycin	24(92)	0(0)	2(08)
6.	Nitrofurantoin	19(73)	0(0)	7(87)

Table 3: Antibiotic susceptibility pattern for *Staph. aureus*

Sl.No.	Antibiotics	Susceptibility pattern		
		Sensitive (%)	Moderately sensitive (%)	Resistant (%)
1.	Cefazolin	10(67)	0(0)	05(33)
2.	Ciprofloxacin	04(27)	0(0)	11(73)
3.	Gentamycin	13(87)	0(0)	02(13)
4.	Nitrofurantoin	10(67)	0(0)	05(33)
5.	Oxacillin	02(13)	0(0)	13(87)
6.	Vancomycin	06(40)	0(0)	9(60)

Table 4: Antibiotic susceptibility pattern for *K.pneumoniae*

Sl.No.	Antibiotics	Susceptibility pattern		
		Sensitive (%)	Moderately sensitive (%)	Resistant (%)
1.	Amikacin	03(60)	0(0)	02(40)
2.	Amoxycillin/Clav	00(00)	0(0)	05(100)
3.	Ampicillin	00(00)	0(0)	05(100)
4.	Ciprofloxacin	05(100)	0(0)	00 (00)
5.	Gentamycin	05(100)	0(0)	00 (00)
6.	Nitrofurantoin	05(100)	0(0)	00 (00)

Table 5: Antibiotic susceptibility pattern for *Pr. mirabilis*

Sl.No.	Antibiotics	Susceptibility pattern		
		Sensitive (%)	Moderately sensitive (%)	Resistant (%)
1.	Amikacin	01(100)	0(0)	00(00)
2.	Amoxycillin/Clav	01(100)	0(0)	00(00)
3.	Ampicillin	01(100)	0(0)	00(00)
4.	Ciprofloxacin	00(00)	0(0)	01(100)
5.	Gentamycin	01(100)	0(0)	00 (00)
6.	Nitrofurantoin	00(00)	0(0)	01 (100)

DISCUSSION

180 urine samples were collected from both symptomatic and asymptomatic patients attending CRH among which 23 (12.78%) samples were from children and 157(87.22%) were from adults. Out of 180 samples, culture was positive in 47(26.11%) samples. The male female ratio was 1:0.40. Out of 180 samples, culture was positive in 47(26.11%) samples having not less than 10^5 cfu of bacteria per 1 ml of voided urine.

26 strains of *E.coli* (55.31%), 15 strains of *Staph. aureus* (31.91%), 5 isolates of *K.pneumoniae* (10.63%) and 1 strain of *Pr. Mirabilis* (2.12%) were isolated. However, 8 other specimen has insignificant bacterial count having less than 10^5 cfu of bacteria per 1 ml of urine. In children urine culture was positive in 3 cases (6.38%) whereas in adults it was positive in 44 cases (93.62%). Culture positive was seen in 8 males (17%) and 39 females (83%) patients.

Mbanga J et al had shown that *E.coli* was of highest prevalence (40.3%) in urine culture followed by *Staph. aureus* (8%) [7] . Goswami et al also reported of *E.coli* being the highest prevalence (64.3%) followed by *Staph. aureus* (21.45) and *K. Pneumonia* (14.3%) [8]. Similarly, in our study also the highest prevalence was of *E.Coli* but the isolation rate is quiet high (92%) compared to both the findings above which is followed by *Staph. aureus* (31.91%).

In a study done by El. Mahmood both gram negative and gram positive bacteria were isolated with prevalence of 74.70% and 25.30% respectively [9] whereas in our study only gram negative bacteria were isolated with a prevalence of 26.11%. El. Mahmood Muhammad reported that the samples obtained from female patients (54.3%) yielded more bacteria than those obtained from males (45.7%) [9]. Similarly, we observed the higher culture positivity in females (83%) compared to males (17%).

Falahatkar et al reported of the high resistance of *E.coli* to ampicillin (96.8%) but our study had shown relatively lesser resistance (62%) [10]. Zakich Rostamzadeh et al had shown lesser drug resistance of *E.coli* to nitrofurantoin in comparison to ampicillin and cotrimoxazole [11]. Similarly our study had shown the same pattern.

A study conducted by Adebola onanuga et al reported of higher resistance of *Staph. aureus* to gentamicin (73.9%), 39.1% to nitrofurantoin and 69% to vancomycin [12]. Whereas in our study, the resistance to gentamicin is low (13%) but the resistance to nitrofurantoin and vancomycin is quiet similar. Getanet Beyene et al reported 100% of *K.pneumoniae* isolates resistant to amoxicillin and ampicillin[13] which is similar to our study.

CONCLUSION

The higher resistance rate of bacterial uropathogens for commonly used antimicrobials leaves the clinicians with few options to choose drug for treatment of UTI. The selection of antibiotics should be wise so that it aids to the control of antimicrobial resistance.

ACKNOWLEDGEMENT

I wish to express my thanks and gratitude to my respected Professor and Head of Dept. of Microbiology, Dr.T. Shantikumar Singh , S.M.I.M.S,Gangtok, Sikkim, for his guidance.

REFERENCES

1) UDHHS (2004). Vital and Health Statistics 13(1): 157
2) Barnett, Ben J. Urinary Tract Infection: An Overview. American Journal of the Medical Sciences;October 1997,Vol 314(4): 245-249.
3) Sairii K, Kai T et al. Persistance of E.coli clones and phenotypic and genotypic antibiotic resistance in recurrent urinary tract infection in childhood. J.Clin.Micro.47:99-105.
4) Karan et al.Pulse field gel electrophoresis typing of Escherichia coli strains from samples collected before and after pivmeecillinam or placebo treatment of uncomplicated community acquired urinary tract infection in woman. J.Clin.Micro 44:1776-1781.
5) Micheal W, Johan et al (2007). Molecular epidemiology of Staphylococcus saprophyticus isolated from women with uncomplicated community- acquired urinary tract infection. J.Clin. Microbiol. 45: 1561-1564.
6) Benjamin WD, Brian KP, Gary VD. Lactobacillus deldrueckii as the cause of urinary tract infection. J. Clin. Microbiol, 2009; 47: 275-277.
7) Mbanga J et al. Prevalence and drug resistance in bacteria of urinary tract infection in Blawayo province, Zimbabwe.East Afr. J.Public health, 2010 Sept;7(3):229-32.
8) Goswami et al. Prevalence of UTI and renal scars in patients with diabetis mellitus. Diabetic Res.Clin.Prac, 2001;53(3):181-186.
9) El Mahmood Muhammad Abubakar. Antimicrobial susceptibility pattern of pathogenic bacteria causing urinary tract infection at the specialist hosp,Yole Adamawa State,Nigeria. J.of Clin Med.and Res.2009 Oct;1(1),01-08.

10) Falahatkhar S Sobha et al. Urinary tract infection in spinal cord transacted war.Arch Iran Med J ,2000;13(3):133-135.

11) Zakich Rostamzadeh Khamenah et al. Antimicrobial susceptibility pattern of urinary tract pathogens. Saudi J. of kidney diseases and transplantation,2009;20(2):251-253.

12) Adebola Onanuga et al. Antimicrobial resistance of Staph.aureus strains from patients with urinary tract infections in Yenagua,Nigeria. J. of Phar and Bioallied Sci,2012,Jul-Sept; 4(3): 226-230.

13) Getenet Beyene et al.Bacterial uropathogens in urinary tract infections and antibiotic susceptibility pattern in Jimma Univ Spec Hosp,Southwest Ethiopia. Ethiopian J. of Health Sci, 2011;21(2): 141-146.