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Original Article

Antibiotic Sensitivity Pattern of the Isolated of Urinary Pathogens at Dhaka National Medical College & Hospital

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Abstract

Urinary tract infection is the most common infection causing illness in children and adults. This study was aimed to identify the uropathogens and their antibiotic sensitivity pattern. This study was done in Microbiology Department at Dhaka National Medical College & Hospital, Dhaka, during January, 2010 to December, 2010. A total of 1874 samples of urine were collected from suspected cases of urinary tract infections, from Dhaka National Medical College & Hospital. Among them, 290 (15.48%) showed significant bacterial growth. The most common uropathogens isolated were *E.coli* 229 (78.97%), Staph. saphrophyticus 15 (5.18%), Coliform 12 (4.13%), Klebsiella spp. 10 (3.44%), Enteococous 10 (3.44%), Staph. aureus 05 (1.72%), Streptococcus spp. 05 (1.72%) and Pseudomonas spp. 04 (1.38%). E.coli is the most common urupathogen and showed sensitivity pattern to Imipenem 84.28%, Amikacin 83.41%, Nitrofurantoin 73.80%, Gentamycin 66.88%, Ciprofloxacin 41.48%, Doxycycline 36.30%, Ceftazidime 34.50%, Ceftriaxone 33.62%, Cefexime 31.0%, Cotrimoxazole 32.31%, Nalidixic acid 24.01%, Cephradine 17.47% and Ampicillin 11.35%.

Keywords: Urinary tract infection, E.coli, antibiotic sensitivity.

Introduction:

Infection of urinary tract characterized by bacteuria, dysuria and increased frequency of micturation. UTI is the most common bacterial Infection of different age groups and both sexes.[1] E.coli and Klebsiella spp., Staph. saprophyticus are the most common organisms for UTI and UTI is encountered by clinicians in developing countries.[2] It is very necessary to identify uropathogens and their sensitivity pattern as early as possibly to avoid any long term complications, to reduce the risk of morbidity and proper treatment.

Unrecongnized urinary tract infection may progress into renal damage, hypertension and any stage of renal diseases.[3] Misdiagnosis, delay in diagnosis and treatment of UTI appears to cause renal scaring may produce end stage of renal disease.[4]

The presence of microorganisms 10^5 or $>10^5$ CFU/ml of urine with or without symptoms was considered as significant bacteriuria. All the microorganisms were identified by their colony morphology, staining character, pigment production, motility and other biochemical tests.[6] All bacterial isolates were tested for antimicrobial susceptibility by disc diffusion method using Mueller Hinton agar media against different antimicrobial agents.[7]

Materials and Methods:

The prospective study was carried out in the Department of Microbiology, Dhaka National Medical College & Hospital, Dhaka, Bangladesh, from January 2010 to December, 2010. A total of 1874 urine samples were collected from suspected cases of urinary tract infection from in-patient and out-patient department of Dhaka National Medical College & Hospital. Samples were collected from both sexes and different age groups by clean catch mi-stream method.

Data were analyzed by Statistical Package for Social Science (SPSS). All urine samples were inoculated in Blood agar and MacConkey agar media. All plates were incubated at 37^0C aerobically for 24 hours. After incubation plates were checked for presence of suspected pathogens. Colony was counted by calibrated loop method.[5]

Results

A total of 1874 urine samples were collected from patients suspected to have urinary tract infections. From the 1874 samples, 290(15.48%) were isolated (Table-I).

Table-I: Distribution of samples of the study

Sample	Number of tested samples studied	Number of isolated bacteria
Urine	1874	290 (15.48%)

Table-II: Sex distribution of patient whose urine samples yielded growth.

Sample	Number of tested samples studied	Number of isolated bacteria
Male	291	36 (12.38%)
Female	1583	254 (16.5%)

Table-III: Distribution of isolated bacteria in urine samples (n=290)

Isolated bacteria	Number of organisms (%)
E.coli	229 (78.97%)
Staph. saphrophyticus	15 (5.18%)
Coliform	12 (4.13%)
KLebsiella spp.	10 (3.44%)
Enterococous	10 (3.44%)
Staph. aureus	05 (1.72%)
Streptococcus	05 (1.72%)
Pseudomonas spp.	04 (1.38%)

Among the isolates, 229(78.97%) were *E. coli*, 15(5.18%) *were Staph. Saphrophyticus*, 12(4.13%) were *Coliform*, 10(3.44%) were *KLebsiella spp.*, 10(3.44%) were *Enterococous*, 05(1.72%) were *Staph. aureus*, 05(1.72%) were *Streptococcus* and 04(1.38%) were *Pseudomonas spp.* (Table-III).

Table-IV: Sensitivity pattern of *E. coli* and *Staph. saprophyticus* to different antimicrobial drugs

Antimicrobial drugs	*E.coli* (N=229)		*Staph. saprophyticus (n=15)*	
	Sensitive	Resistant	Sensitive	Resistant
Ampicillin	26(11.35%)	203(88.65%)	8(53.33%)	7(46.67%)
Cephradine	40(17.47%)	189(82.55%)	6(40.0%)	9(60.0%)
Ceftriaxone	77(33.62%)	152(66.38%)	11(73.33%)	4(26.67%)
Cotrimoxazole	74(32.31%)	155(67.69%)	5(33.33%)	10(66.67%)
Ciprofloxacin	95(41.48%)	134(58.52%)	9(60.0%)	6(40.0%)
Cefuroxime	71(31%)	158(69.0%)	10(66.67%)	5(33.33%)
Ceftazidime	79(34.50%)	150(65.50%)	6(40.0%)	9(60.0%)
Doxycycline	61(36.30%)	168(63.70%)	5(33.33%)	11(73.33%)
Gentamycin	152(66.88%)	77(33.62%)	14(93.33%)	1(6.67%)
Nalidixic acid	55(24.01%)	174(75.99%)	4(26.67%)	11(73.33%)
Nitrofurantoin	169(73.80%)	60(26.20%)	11(73.33%)	4(26.67%)
Amikacin	191(83.41%)	38(16.59%)	12(80.0%)	3(20.0%)
Imipenem	193(84.28%)	36(15.72%)	14(93.33%)	1(6.67%)

From Table-IV *E.coli* showed high degrees of sensitive to Imipenem (84.28%), Amikacin (83.41%), Nitrofurantoin (73.80%) and Gentamicin (66.88%) respectively and resistance to Ampicillin (88.65%), Cephradine (82.53%) and Nalidixic acid (75.99%) respectively. On the other hand *Staph. saprophyticus* showed high degrees of sensitive to Imipenem (93.33%), Gentamicin (93.33%), Amikacin (80.0%) and Nitrofurantoin (73.33%) respectively and resistance to Nalidixic acid (73.33%), Doxycycline (66.67%), Ceftiaxone (66.67%) and Cephradine (60.0%) respectively.

Table-V: Sensitivity pattern of *Klebseilla spp.* And *Enterococcus spp.* to different antimicrobial drugs

Antimicrobial drugs	*Klebsiella spp.* (N=10)		*Enterococcus spp. (n=10)*	
	Sensitive	Resistant	Sensitive	Resistant
Ampicillin	1(10.0%)	9(90.0%)	4(40.0%)	6(60.0%)
Cephradine	2(20.0%)	8(80.0%)	4(40.0%)	6(60.0%)
Ceftriaxone	4(40.0%)	6(60.0%)	7(70.0%)	3(30.0%)
Cotrimoxazole	4(40.0%)	6(60.0%)	3(30.0%)	7(70.0%)
Ciprofloxacin	5(50.0%)	5(50.0%)	7(70.0%)	3(30.0%)
Cefuroxime	5(50.0%)	5(50.0%)	3(30.0%)	7(70.0%)
Ceftazidime	4(40.0%)	6(60.0%)	5(50.0%)	5(50.0%)
Doxycycline	3(30.0%)	7(70.0%)	4(40.0%)	6(60.0%)
Gentamycin	7(70.0%)	3(30.0%)	6(60.0%)	4(40.0%)
Nalidixic acid	3(30.0%)	7(70.0%)	2(20.0%)	8(80.0%)
Nitrofurantoin	5(50.0%)	5(50.0%)	6(60.0%)	8(40.0%)
Amikacin	9(90.0%)	1(10.0%)	7(70.0%)	3(30.0%)
Imipenem	10(100.0%)	0(00%)	7(70.0%)	3(30.0%)
Erythromycin	-	-	6(60.0%)	4(40.0%)
Linazolid	-	-	6(60.0%)	4(40.0%)
Vancomycin	-	-	7(70.0%)	3(30.0%)

From Table-V *Klebsiella spp.* showed high degrees of sensitive to Imipenem (100.0%), Amikacin (90.0%) and Gentamicin (70.0%) and resistance to Ampicillin (90.0%), Cephradine (80.0%), Doxycycline (70.0%) and Nalidixic acid (70.0%) respectively. On the contrary, *Enterococcus spp.* showed high sensitive to Vancomycin (70.0%), Imipenem (70.0%), Amikacin (70.0%), Ceftriaxone (70.0%) and Ciprofloxacin (70.0%) and high resistance to Nalidixic acid (80.0%), Cotrimoxazole (70.0%) and Cefuroxime (70.0) respectively.

Discussion:

The presence of infection in the urinary tract indicates urinary tract infections.[8] Identification of uropathogens and their sensitivity pattern are very important for early treatment of urinary tract infections. In the present study, the most common isolated uropathogens were *E.col* 229(78.97%), *Staph. saphrophyticus* 15(5.18%), *Coliform* 12(4.13%), *KLebsiella spp.* 10(3.44%), *Enterococous* 10(3.44%), *Staph. aureus* 05(1.72%), *Streptococcus* 05(1.72%) and *Pseudomonas spp* 04(1.38%) respectively. *E.coli* is the most common uropathogens in both sexes and different age groups. This finding is similar to studies done in Tunisia.[9] Antibiotic sensitivity pattern varies from one country to another depending on antibiotic use.

In our study among the *E.coli* strains, 193(84.28%) were sensitive to Imipenem, 191(83.41%) to Amikacin, 169(73.80%) to Nitrofurantoin and 152(66.88%) to Gentamycin. Among the *Staph. saprophyticus*, 14(93.33%) were sensitive to Imipenem, 14(93.33%) to Gentamycin, 12(80.0%) to Amikacin, and 11(73.33%) to Nitrofurantoin.

Among the *Klebsiella spp.* 10(100%) were sensitive to Imipenem, 9(90%) to Amikacin and 7(70%) to Gentamycin.

Among the *Enterococcus spp.* 7(70%) were sensitive to Vancomycin, 7(70%) to Imipenem, Amikacin 7(70%) and 7(70%) Ciprofloxacin. On the other hand the results of this study showed that sensitivity rates of the uropathogens were low for Ampicillin, Cephradine and Cotrimoxazole. The

lower rate of sensitive might be due to indiscriminate and widespread use of antibiotics in our country.

A study at Turkey observed that the resistance rate of Ampicillin is high followed by Cephradine and Cotrimoxazole.[10]

Conclusion:

Urinary tract infection is the most common disease occurs in both sexes and different age groups. The common uropathogens are *E.coli* followed by *Staph. saprophyticus* and *Klebsiella spp.* So early identification of uropathogens and knowledge of sensitivity pattern of bacterial strains with help to guide the appropriate and judicious antibiotic use.

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