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Original Article

Antimicrobial Sensitivity Pattern of the isolated Uropathogens at a Teaching Hospital

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Abstract

Background: Urinary tract infection is the most common infection occurs in both male and female. **Objective:** This study was aimed to identify the uropathogens and their antimicrobial sensitivity pattern. **Methodology:** This study was carried out in the Department of Microbiology at Dhaka National Medical College & Hospital, Dhaka from January 2018 to December 2018. **Result:** A total of 1686 samples of urine were collected from suspected cases of urinary tract infections from Dhaka National Medical College & Hospital. Among them, 292 (17.32%) specimens showed significant bacterial growth. The most common uropathogens isolated were *Escherichia coli*. **Conclusion:** In conclusion Gram negative bacteria is the commonest uropathogens isolated. *[Journal of Science Foundation July 2019;17(2):42-45]*

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Introduction

Urinary tract infections are one of the most common bacterial infections different age groups and both sexes (Round and Puttulo 1991). *Escherichia coli*, *Klebsiella* species and *Staphylococcus saprophyticus* are the most common organisms for UTI encountered by clinician's in developing countries (Foxmen et al., 2000). It is very necessary to identify uropathogens and their sensitivity pattern as early as possible to avoid any long term complications, to reduce the risk of morbidity and proper treatment. Unrecognized urinary tract infection may progress to renal damage, hypertension and renal diseases (Adjei and Opoku 2004). Misdiagnosis, delay in diagnosis and treatment of UTI appears to cause renal scring and may produce end stage renal disease (New 1992).

In the community, women are more prone to develop urinary tract infection. It has been observed that about 20.0% of the women experienced a single episode of UTI during their lifetime and 3.0% of women had more than one episode of UTI per year (Gebre-Selassic 1998). Pregnancy also makes the more susceptible to the infections (Pastore et al., 1996). Catheter associate UTI is a treatment problem with about 10% of the

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patients developing bacteriuria (Tambyah Pand Maki 2000). This study was aimed to identify the uropathogens and their antimicrobial sensitivity pattern.

Methodology

This cross sectional study was conducted in the Department of Microbiology, Dhaka National Medical College and Hospital, Dhaka, Bangladesh, from January, 2018 to December 2018. Urine samples were collected from patients who attended both in and out-door patient departments and also who were clinically tract infection. All urine samples were inoculated in blood agar and MacConkey's agar media. All plates were incubated at 37^0 C aerobically for 24 hours. After incubation, plates were checked for presence of suspected pathogens colony was counted by calibrated 100p method (Hoeprich 1960). All the micro-organisms were identified by their colony morphology, staining character, pigment production and motility and other biochemical tests such as oxidase, TSI and MIU (Cheesbrough 2000). All bacterial isolates were tested for antimicrobial susceptibility by disc diffusion method using Mueller Hinton agar media against different antimicrobial agents (Bour et al., 1966).

Results

A total of 1686 urine samples were collected from patients suspected to have urinary tract infection. From the 1686 samples, bacteria was isolated from 292(17.32%) samples (Table 1).

Table 1: Distribution of samples of the study

Samples	Number of tested samples studied	Number of the isolated bacteria
Urine	1686	292 (17.32%)

Table 2: Sex distribution of patient whose urine samples yielded growth

Samples	Number of tested samples studied	Number of the isolated bacteria
Male	656 (38.91%)	98 (33.36%)
Female	1030 (61.09%)	194 (66.44%)

Table 3: Distribution of Isolated Bacteria in Urine Samples (n=292)

Isolated bacteria	Number of organism and (%)
Escherichia coli	226 (77.4%)
Klebsiella spp.	26 (8.9%)
Staph. Saprophyticus	16 (5.48%)
Enterococci spp.	10 (3.42%)
Pseudomonas spp.	08 (2.74%)
Proteus spp.	04 (1.37%)
Citrobacter	02 (0.68%

Table 4: Sensitivity pattern of *E. coli* and *Klebsiella* spp. to different antimicrobial drugs

Antimicrobial drugs	*E. coli* (n=226)		*Klebsiella* spp. (n=26)	
	Sensitive	Resistant	Sensitive	Resistant
Amikacin	185 (81.86%)	41 (18.14%)	21 (80.77%)	5 (19.23%)
Amoxyclave	60 (26. 55%)	166 (73.45%)	6 (23.08%)	20 (76.92%)
Cephradine	36 (15.93%)	190 (84.07%)	5 (19.23%)	21 (80.77%)
Cefixime	105 (46.46%)	121 (53.54%)	16 (61.54%)	10 (38.46%)

Ceftriaxone	112 (49.57%)	114 (50.44%)	12 (46.15%)	112 (46.15%)
Ceftazidime	104 (46.02%)	122 (53.98%)	14 (53.85%)	12 (46.15%)
Cefuroxime	70 (30.97%)	156 (69.03%)	14 (53.85%)	12 (46.15%)
Ciprofloxacin	110 (48.67%)	116 (51.33%)	14 (53.85%)	12 (46.15%)
Cotrimoxazole	112 (49.57%)	114 (50.44%)	16 (61.54%)	10 (38.46%)
Colistin	160 (70.80%)	66 (29.20%)	17 (65.38%)	9 (34.62%)
Doxycycline	160 (70.80%)	66 (29.20%)	14 (53.85%)	12 (46.15%)
Gentamycin	155 (68.58%)	71 (31.42%)	18 (69.23%)	8 (30.77%)
Nitrofurantoin	152 (67.26%)	74 (32.74%)	13 (50.00%)	13 (50.00%)
Nalidixic Acid	70 (30.97%)	156 (69.03%)	14 (53.85%)	12 (46.15%)
Imipenem	188 (83.19%)	38 (16.81%)	24 (92.31%)	2 (7.69%)

E. coli showed high degrees of sensitivity to imipenem (83.19%), Amikacin (81.86%), Colistin (70.80%), Gentamycin (68.58%) respectively and resistance to Cephradine (84.07%), Amonyclave (73.45%) and Nalidixic acid (69.01%) respectively. On the otherhand, Klebsiella spp. showed high degrees of sensitivity to imipenem (92.31%), Amikacin (80.77%) and Gentamycin (69.23%) respectively and resistance to Cephradine (80.77%), Amonyclave (76.92%) and Ceftriaxone (53.85%) respectively (Table 4).

Table 5: Sensitivity pattern of *Staph. saprophyticus* and *Enterococci* species to different antimicrobial drugs

Antimicrobial drugs	*Staph. saprophyticus* (n=226)		*Enterococci* spp. (n=26)	
	Sensitive	Resistant	Sensitive	Resistant
Amikacin	13 (81.25%)	3 (18.75%)	8 (80%)	2 (20%)
Amoxyclave	08 (50%)	8 (50%)	6 (60%)	4 (40%)
Cephradine	10 (62.50%)	6 (37.50%)	6 (60%)	4 (40%)
Cefixime	9 (56.25%)	7 (43.75%)	05 (50%)	5 (50%)
Ceftriaxone	10 (62.50%)	6 (37.50%)	7 (70%)	3 (30%)
Ceftazidime	6 (37.50%)	10 (62.50%)	6 (60%)	4 (40%)
Cefuroxime	9 (56.25%)	7 (43.75%)	4 (4%)	6 (60%)
Ciprofloxacin	10 (62.50%)	6 (37.50%)	7 (70%)	3 (30%)
Cotrimoxazole	8 (50%)	8 (50%)	6 (60%)	4 (40%)
Doxycycline	9 (56.25%)	7 (43.75%)	4 (40%)	6 (60%)
Gentamycine	10 (62.50%)	6 (37.50%)	6 (60%)	4 (40%)
Nitrofurantoin	11 (68.75%)	5 (31.25%)	7 (70%)	3 (30%)
Nalidixic acid	6 (37.50%)	10 (62.50%)	6 (60%)	4 (40%)
Imipenem	15 (93.75%)	1 (6.25%)	8 (80%)	2 (20%)
Erythromycin	9 (56.25%)	7 (43.75%)	6 (60%)	4 (40%)
Linazolid	9 (56.25%)	7 (43.75%)	7 (70%)	3 (30%)
Vancomycin	13 (81.25%)	3 (18.75%)	7 (70%)	3 (30%)

Discussion

Identification of the uro-pathogens and their sensitivity pattern is very important in trenting the cases of urinary tract infections. In symptomatic young women, colony count of $\geq 10^2$/ml plus pyuria of more 10 WBC/mm^3 or $\geq 10^5$/ml of urine without any regards to pyuria is considered significant in or well collected sample. In symptomatic men, colony count as low as $\geq 10^3$/ml of any pathogens micro-organism is consider of significant. The presence of infection in the urinary tract indicates UTI (Jonathan and Evan 2006). In the present study, female samples were more 1030 (61.09%) and also more. The most common isolated uropathogens were E. Coli 226 (77.4%), *Klebsiella* spp. 26 (8.9%), *Staph. saprophyticus* 16 (5.48%), Enterococci spp. 10 (3.42%), *Pseudomonas* spp. 08 (2.74%), *Proteus* spp. 04 (1.37%) and *Citrobacter* 02 (0.68%) respectively. *Escherichia coli* is the most common uropathogens in both sexes and different age groups.

In this study among the *Escherichia coli* strains, 188 (83.19%) were sensitive to imipenem, 185 (81.86%) to Amikacin, 160 (70.80%) to Nitrofurantoin, 160 (70.80%) to Doxycycline. Among the *Klebsiella* spp. 24 (92.31%) were sensitive to imipenem, 21 (80.77%) to Amikacin and 18 (69.23%) to Gentamycin.

Conclusion

Urinary tract infection is a common disease occurring in both sexes and different age groups. The results of the present bacteria showed Gram negative bacteria were the commonest uropathogens isolated. The common uropathogens are E. coli follow. So, early identification of uropathogens and Knowledge of sensitivity pattern of bacterial strains will help to guide the physician in selecting the appropriate and judicious antibiotic and thereby help in the prevention of the development of resistance.

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