

MICROBIOLOGICAL PROFILE OF URINARY TRACT INFECTION AND AST PATTERN OF MICROORGANISM RESPONSIBLE FOR UTI AT TERTIARY CARE HOSPITAL, LUCKNOW”

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Abstract

Infections which occur in any part of the urinary tract is known as Urinary Tract Infection. Many of the microorganisms are responsible for causing urinary tract infection. Urinary tract infection is the most common infection in nosocomial infection. The aim of this study was to find out the microbiological profile for urinary tract infection and AST pattern of the organism causing UTI. This study was conducted in the department of microbiology in Era's Lucknow Medical College, Lucknow. A total of 400 samples were collected from a tertiary care hospital, Lucknow. Out of which 153 samples were tested positive for urinary tract infection. Out of which 98 were females and 55 were males. The most prevalent bacteria found to be responsible for causing UTI in the patients was E.coli with prevalence of 58.82%. Other bacteria found to be responsible for causing UTI were Klebsiella, Enterococcus, Pseudomonas, Micrococcus, CoNS, BYLC. Different drugs were used for testing the antibiotic susceptibility of these microorganism.

Keywords- Urinary tract infection¹,

Introduction- A urinary tract infection (UTI) is a collective term for infections that involve any part of the urinary tract. It is one of the most common infections in local primary care. The incidence of UTIs in adult males aged under 50 years is low, with adult women being 30 times more likely than men to develop a UTI. Urinary tract infections (UTIs) remain the second most common infection worldwide which can occur in any time in the life of an individual. Urinary tract infections (UTIs) are some of the most common bacterial infections, affecting 150 million people each year worldwide. The E.coli serotypes commonly responsible for community-acquired UTI are those normally found in the gut of the person. Those acquired in the hospital, following instrumentation, are more often caused by bacteria such as Pseudomonas and Proteus. Antibiotic resistance can appear spontaneous because of random mutation or more commonly following gradual build up over time. The increasing rate of antibiotic resistance in uropathogens leads to difficulties in selecting adequate empirical therapy and achieving treatment success. However, this antibiotic sensitivity pattern may vary in different geographical locations.

Materials and methods- This study was done in the department of Microbiology, Era's Lucknow Medical College, Lucknow from October 2020 to March 2021. This study is a cross sectional study. The sample was collected from Era Hospital, Lucknow, both IPD and OPD patients were included. The sample size was 400. After the collection of sample, sample were examined by direct microscopy for pus cells and bacteria. After that samples were inoculated on culture media and after overnight incubation the samples which were showing significant number of colonies i.e., 10^5 /ml were considered as positive for urinary tract infection. After that, different bacteria were identified by colony characteristics, gram staining and by different biochemical tests. After the identification of the bacteria antibiotic susceptibility test were performed by Kirby and Bauer's disc diffusion method.

RESULT- A total of 400 samples were collected from a tertiary care hospital, Lucknow. Out of which 153 samples were tested positive for urinary tract infection.

Out of which 98 were females and 55 were males.

The bacteria found to be responsible for causing UTI in the patients and their prevalence are as follows-

BACTERIA	NUMBER OF +VE CASES	PREVALENCE
E.coli	90	58.82%
Klebsiella	12	7.84%
Enterococcus	15	9.80%
Pseudomonas	03	1.96%
Micrococcus	09	5.88%
CoNS	15	9.80%
BYLC	09	5.88%
TOTAL	153	38.25%

AGE WISE DISTRIBUTION OF URINARY TRACT INFECTION

AGE	MALE	FEMALE	TOTAL
0-18 years	08	10	18
19-37 years	15	33	53
38-56 years	12	25	37
57-75 years	20	30	45
TOTAL	55	98	153

ANTIBIOTIC SUSCEPTIBILITY TEST

Antibiotic susceptibility test was performed for gram negative bacterial isolates and Enterococcus.

Drugs used for different isolates and their sensitivity percentage are as follows.

(1) E.COLI

Total number of E.coli isolates = 90

<u>Antibiotics</u>	<u>Number of isolates are sensitive</u>	<u>Sensitivity %</u>
Amikacin	48	53.33%
Amoxicillin	43	47.77%
Piperacillin	30	33.33%
Ampicillin	32	35.56%
Ceftazidime	59	65.56%
Tetracycline	80	88.89%
Tigecycline	87	96.67%
Imipenem	87	96.67%
Meropenem	90	100%

Ciprofloxacin	70	77.78%
Levofloxacin	66	73.34%
Norfloxacin	60	66.67%
Ofloxacin	62	68.89%
Gentamycin	53	58.89%
Tobramycin	55	61.12%
Polymyxin-B	90	100%
Colistin	89	98.89%

(2) KLEBSIELLA

Total number of Klebsiella pneumoniae isolates = 12

<u>Antibiotics</u>	<u>Number of isolates are sensitive</u>	<u>Sensitivity %</u>
Amikacin	9	75%
Amoxicillin	10	83.33%
Piperacillin	9	75%
Ampicillin	5	41.67%
Ceftazidime	9	75%
Tetracycline	9	75%
Tigecycline	11	91.67%
Imipenem	12	100%
Meropenem	12	100%
Ciprofloxacin	6	50%
Levofloxacin	4	33.34%
Norfloxacin	4	33.34%
Ofloxacin	7	58.34%
Gentamycin	7	58.34%
Tobramycin	7	58.34%
Polymyxin-B	12	100%
Colistin	12	100%

(3) PSEUDOMONAS

Total number of Pseudomonas isolates = 03

<u>Antibiotics</u>	<u>Number of isolates are sensitive</u>	<u>Sensitive %</u>
Amikacin	01	33.34%

Amoxicillin	0	0%
Piperacillin	0	0%
Ampicillin	0	0%
Ceftazidime	01	33.34%
Tetracycline	0	0%
Tigecycline	0	0%
Imipenem	03	100%
Meropenem	03	100%
Ciprofloxacin	01	33.34%
Levofloxacin	01	33.34%
Norfloxacin	01	33.34%
Ofloxacin	01	33.34%
Gentamycin	00	0%
Tobramycin	02	66.68%
Polymyxin-B	03	100%
Colistin	03	100%

(4) **ENTEROCOCCUS**

Total number of Enterococcus isolates = 15

<u>Antibiotics</u>	<u>Number of isolates are sensitive</u>	<u>Sensitive %</u>
Co-trimoxazole (cot)	02	13.34%
Norfloxacin (NX)	06	40%
Fosfomycin (F)	0	0%
Erythromycin (E)	0	0%
Chloramphenicol (C)	0	0%
Gentamycin (GEN)	0	0%
Nitrofurantoin (NIT)	08	53.34%
Vancomycin (VA)	13	86.68%

DISCUSSION- From this study, it is observed that females are more prone to urinary tract infection with a prevalence of 64.05% as compared to males having prevalence 35.94% only. Similarly, in the study of Adamu Almustapha Aliero et al, urinary tract infection was highest in females with 66/176 (37.5%) as compared to 20/91 (22.0%) in men.

In this study it is also observed that urinary tract infection was found to be more commonly in the reproductive age and old age of females whereas in males urinary tract infections were mostly seen in older age group.

In the study of Adamu Almustapha Aliero et al, *Escherichia coli* was the most prevalent bacterial uropathogen with 36/86 (41.9%). In this study also, E.coli were found to be most prevalent bacteria and pseudomonas were found to be least prevalent bacteria causing urinary tract infection

Previous study in Mulago by Mwaka et al. found a much higher prevalence of significant bacteriuria of 29/40 (72.5%) in asymptomatic patients. The higher proportion in the study carried out at Mulago, may be because of the study included only adult females who are always at high risk of developing asymptomatic bacteriuria. The prevalence of UTI in the current study was found to be 38.25%.

Worldwide, the rising rate of resistance has been detected and has evolved into a major global health crisis (Carlet et al., 2014, Michael et al., 2014, Speck, 2013)

In this study, antibiotic susceptibility test was performed for gram negative bacterial isolates (E.coli, Klebsiella and Pseudomonas) and Enterococcus.

In the study of Erick Sierra-Díaz et al., The sensitivity and resistance of isolated microorganisms were reviewed for 34 antibiotics, highlighting daptomycin and linezolid, both with 100% sensitivity. Carbapenems were tested in >1300 cases, reporting sensitivities of >90% whereas in this study for gram negative bacterial isolates 17 antibiotics were used and they were Amikacin, Amoxicillin, Piperacillin, Ampicillin, Ceftazidime, Tetracycline, Tigecycline, Imipenem, Meropenem, Ciprofloxacin, Levofloxacin, Norfloxacin, Ofloxacin, Gentamycin, Tobramycin, Polymyxin-B, Colistin and for Enterococcus 08 antibiotics were used and they were Co-trimoxazole (cot), Norfloxacin (NX), Fosfomycin (F), Erythromycin (E), Chloramphenicol (C), Gentamycin (GEN), Nitrofurantoin (NIT), Vancomycin (VA).

According to a study of Molina Lopez et al, the uropathogenic strains expressed resistance as high as 83% for ampicillin and lowest resistance rate was for meropenem with 0.85%.

Almost similar result are shown in this study, all the bacterial isolates are sensitive to meropenem whereas only few are sensitive to ampicillin.

E.coli are found to be more resistant to piperacillin and ampicillin similar to another study reported in 2015 by Paniagua-Contreras et al. in Mexico, nearly 48% of *E. coli* strains were resistant to cephalothin, 97.4% to ampicillin.

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