



ANTIBIOGRAM OF UROPATHOGENS IN AND AROUND MIRAJ

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ABSTRACT

Introduction: Urinary tract infection is one of the most common infection seen in the community. The microorganisms responsible for urinary tract infections's differ from place to place. Their antibiotic susceptibility pattern also differ accordingly. Considering this background present study was conducted to know the prevalence and antibiotic susceptibility pattern of Uropathogens. **Material and Methods:** A Total 3625 urine samples from clinically suspected patients of UTI were examined in Dept. of Microbiology, GMC, Miraj, over a period of 1year. The samples were processed according to standard procedures. **Results and Discussion:** The overall prevalence of urinary tract infections was 50.9%. The uropathogens isolated were *E.coli*, *Klebsiella pneumonia*, *Enterobacter spp*, *Citrobacter spp*, *Pseudomonas aeruginosa*, *Acinetobacter spp*, *Proteus spp*, *Staphylococcus spp*, *Enterococcus*. Most effective antimicrobial agents in our study were, imipenem, nitrofurantoin, linezolid, whereas high resistance found in drugs like cephalosporins, fluoroquinolones, which are mostly given empirically. **Conclusion:** Time to time surveillance of uropathogens should be done to help clinicians to determine the specific treatment for better therapeutic outcome of urinary tract infections.

KEYWORDS: Uropathogens, Antibiotic resistance, Urinary Tract infections(UTI).

INTRODUCTION

Urinary tract infection is defined as a disease caused by microbial invasion of the urinary tract that extends from renal cortex of the kidney to the urethral meatus.^[1]

Urinary tract infections may be broadly classified into, 2 types as, lower urinary tract infections and upper urinary tract infections depending upon the anatomical sites.^[1]

Higher prevalence of urinary tract infections among females is noted due to anatomical variation. Short urethra and proximity to anus helps in spread of infection in females.^[2]

Urinary tract infections is most common in IPD as well as OPD patients. Complicated urinary tract infections's have higher rate of morbidity. Chronic urinary tract infections poses financial burden over individuals.^[3]

Almost 95% of all urinary tract infections are caused by bacteria. *Escheria coli* is the most frequent accounting for more than 65% cases followed by *Klebsiella pneumoniae*, *Staphylococcus*, *Enterococcus*, *Proteus*, *Pseudomonas* and *Candida*.^[4]

Over a period of time a gradual increase in antimicrobial resistance to frequently used antibiotics has been reported.^[5] The reason behind is that, most urinary tract infections are treated empirically without waiting for culture report.^[6] The pattern of resistance varies from place to place. So, for effective management of urinary tract infections initial empirical antimicrobial treatment should be based on the knowledge of most likely pathogen and its local antibiotic susceptibility data.^[7]

AIMS AND OBJECTIVES

Present study is aimed to determine pattern of isolates from urinary tract infections and their antibiotic susceptibility in and around Miraj.

MATERIALS AND METHODS

A cross sectional study was conducted after ethical permission. over a period of 1yr from Jan 2019 to Dec 2019. Present study was done at Dept. of Microbiology GMC, Miraj on urine samples received from clinically suspected patients of urinary tract infections.

Mid stream urine samples received in clean sterile container. Samples were plated on MacConkey agar and Blood agar using calibrated wire loop (0.001ml). Plates were incubated aerobically at 37°C for 24 hrs. Positive

culture was considered significant if urine cultures having colony count $> 10^5$ cfu/ml. Isolates were identified according to standard operating procedures for identification. Culture with colony count less than 10^5 cfu/ml were considered as insignificant bacteriuria and those were not processed further.^[8]

Antibiotic susceptibility testing was done by Kirby-Bauer disc diffusion method as per CLSI guidelines.

Data was collected and assessed with the help of SPSS info software using appropriate statistical tests.

RESULTS

A total 3544 cases of symptomatic urinary tract infections were studied in one year. 1844 cases had positive growth on culture while 196 had insignificant bacteriuria.

TOTAL RECEIVED	3625
TOTAL POSITIVE	1844
TOTAL NO GROWTH	1585
TOTAL INSIGNIFICANT BACTERIURIA	196

Females (52%) were more than males (48%)

DISTRIBUTION OF ORGANISMS CAUSING URINARY TRACT INFECTIONS-

GRAM NEGATIVE BACILLI=84% (1549)

GRAM POSITIVE COCCI=16% (295)

From total uropathogens *E.coli* was the commonest isolate. The 2nd most common isolate was *Klebsiella pneumonia* followed by *Staphylococcus aureus*, *Acinetobacter spp*, *Pseudomonas aeruginosa*, *Proteus spp*, *Citrobacter spp*, *CONS*, *Enterobacter spp*, *Enterococcus spp*.

DISTRIBUTION OF GRAM NEGATIVE BACILLI (N=1844)

ORGANISM	PERCENTAGE %	TOTAL NO.OF ISOLATES
<i>E.coli</i>	42	774
<i>Klebsiella pneumonia</i>	19	350
<i>Enterobacter spp.</i>	2	37
<i>Citrobacter spp.</i>	4	74
<i>Pseudomonas aeruginosa</i>	6	111
<i>Proteus spp.</i>	5	92
<i>Acinetobacter spp.</i>	6	111

DISTRIBUTION OF GRAM POSITIVE COCCI (N=1844)

ORGANISM	PERCENTAGE %	TOTAL NO OF ISOLATES
<i>Staphylococcus aureus</i>	11	203
<i>CONS</i>	4	74
<i>Enterococcus</i>	1	18

ANTIBIOGRAM OF GRAM NEGATIVE BACILLI

DRUG	SENSITIVITY %	RESISTANT %
Nitrofurantoin	75.7	24.3
Ampicillin	0.3	99.7
Piperacillin Tazobactam	37.8	62.2
Cefazolin	16.2	83.8
Cefuroxime	12.9	87.1
Cefotaxime	33.5	66.5
Cefepime	18.6	81.4
Aztreonam	80	20
Imipenem	93.2	6.8
Amikacin	59.2	40.8
Gentamicin	30.1	69.9
Ciprofloxacin	24.3	75.7
Norfloxacin	28.9	71.7
Cotrimoxazole	33.9	66.1

Above table is representing overall antibiotic sensitivity pattern of gram negative bacilli. Imipenem, Aztreonam, Nitrofurantoin found to be agents of higher sensitivity. There is maximum resistance to Ampicillin, Cephalosporins, Ciprofloxacin, Norfloxacin making these drugs not effective for empirical treatment.

ANTIBIOGRAM OF GRAM POSITIVE COCCI

DRUG	SENSITIVITY %	RESISTANT %
Penicillin	14.5	85.5
Ampicillin	6.9	93.1
Cefoxitin	46.3	53.7
Amikacin	100	0
Gentamicin	24.1	75.9
Ciprofloxacin	19.4	80.6
Cotrimoxazole	62.2	37.8
Clindamycin	35	65
Erythromycin	30.8	69.2
Linezolid	91.9	8.1

All gram positive cocci isolates showed high level resistance to Ampicillin, Gentamicin, Erythromycin. Most useful drugs for gram positive cocci isolates found to be Amikacin and Linezolid.

DISCUSSION

Urinary tract infections is a major health problem worldwide.^[3] Misuse or irrational use of antibiotics has made the treatment of urinary tract infections more difficult.^[14] Present study provide current information regarding the etiologic agents and their antimicrobial susceptibility pattern.

The prevalence of urinary tract infections was found to be 51% in this study. This is correlating with the study done by Harshkumar Patel et al (46%).^[9] Sanjaykumar More et al had higher prevalence than present study.^[10] While Anu Sharma et al and Harsha V et al had lower prevalence than present study.^[11,4] This variety of prevalence may be because studies done different geographical locations. In INDIA the prevalence ranges from 16.3 to 62.5.^[10,4]

In present study, majority of urinary tract infections were due to gram negative bacilli (84%) while only 16% were due to gram positive cocci. This finding is consistent with similar studies done by Pritam Pardeshi, Harsha V et al, Anu Sharma et al.^[12,4,11] The reason could be that, gram negative bacilli have more virulence factors in comparison to gram positive cocci.

E.coli was the predominant uropathogen causing urinary tract infections, followed by *Klebsiella pneumonia*, *Staphylococcus spp.*, *Citrobacter spp.*, *Enterobacter spp.*, *Proteus spp.*, *Acinetobacter spp.* and *Pseudomonas aeruginosa* were isolated in small no.s. This finding is in agreement with other studies done by Chongtham et al, Pritam Pardeshi, Anu Sharma et al.^[13,11,12] The prevalence of MRSA was 54% in present study which is lower than Harsha V et al.^[4]

In present study Enterobacteriaceae were responsible for 72% of UTI. Similar finding was reported by Harsha Vijayvergiya et al. As enterobacteriaceae colonize urogenital mucosa and produces chronic infections.^[4]

The result of present study showed overall sensitivity to antimicrobial agents is low. Most effective antibiotics for gram negative bacilli in this study were Imipenem, Nitrofurantoin, Aztreonam, Amikacin. These results are similar with the study done by Patel H et al, Harsha V et al.^[9,4] For gram positive organisms Nitrofurantoin, Linezolid Amikacin and Cotrimoxazole. Similar reports have been given in studies done by Harsha V et al, Sanjaykumar More et al, Chongtham et al.^[4,10,13]

Ampicillin, Cephalosporins, Gentamicin, Norfloxacin, Erythromycin showed high level resistance in both gram negative bacilli and gram positive cocci. This could be because of wide use of these drugs for variety of other indications, self treatment by individuals, over the counter sell of antibiotics without prescriptions.^[4]

CONCLUSION

Present study give important data about the trend in uropathogens and their susceptibility pattern. This will help to formulate the antibiotic guideline for empirical and definitive treatment of urinary tract infections.

LIMITATIONS

Vancomycin sensitivity pattern not mentioned in present study as E strips of Vancomycin were not available.

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