

ORIGINAL ARTICLE

URINARY TRACT INFECTIONS (UTI) AMONG PATIENTS AT G.G.HOSPITAL & MEDICAL COLLEGE, JAMNAGAR

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ABSTRACT

Background: It has been estimated that symptomatic urinary tract infections (UTI) occurs in as many as 7 million visits to emergency units and 100,000 hospitalizations annually. UTI has become the most common hospital-acquired infection, accounting for as many as 35% of nosocomial infections, and it is the second most common cause of bacteraemia in hospitalized patients.

Objective: (1) To detect the prevalence rate of bacterial infection among urinary isolates from patients having UTI. (2) To detect prevalence rate of drug resistance among pathogen isolate from patients having UTI.

Results: The prevalence of Urinary Tract Infections (UTI) was evaluated in 3046 patients attending G.G. Hospital & Medical College, Jamnagar. Results showed 1416 (46.48%) patients were positive. The most common organisms were *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus*, and *Proteus mirabilis*. In-vitro antibiotic susceptibility tests revealed that the gram negatives bacteria were sensitive to quinolones (Gatifloxacin, levofloxacin) and meropenem, while the gram positive isolates were sensitive to linezolid, erythromycin & quinolones (Gatifloxacin, levofloxacin).

Conclusion: The findings suggested the need for constant monitoring of susceptibility of specific pathogens in different populations to commonly used anti-microbial agents.

Keywords: Urinary tract infections, Antibiotic susceptibility

INTRODUCTION

Gram negative enteric constitutes a serious problem in urinary tract infection in many parts of the world. It has been estimated that symptomatic urinary tract infections (UTI) occurs in as many as 7 million visits to emergency units and 100,000 hospitalizations annually. UTI has become the most common hospital-acquired infection, accounting for as many as 35% of nosocomial infections, and it is the second most common cause of bacteraemia in hospitalized patients.¹ UTI accounts for a significant part of the work load in clinical microbiology laboratories and enteric bacteria particularly *Escherichia coli* remain the most

frequent cause of UTI, although the distribution of pathogens that cause UTI is changing.² There are several factors and abnormalities of UTI that interfere with its natural resistance to infections. These factors include sex and age disease, hospitalization and obstruction in urinary tract. Females are however believed to be more affected than males.³ This is as a result of shorter and wider urethra. The anatomical relationship of the female's urethra and the vagina makes it bacteria been massaged up the urethra into the bladder during pregnancy and child birth.

UTI is challenging, not only because of the large number of infections that occur each year, but also because the diagnosis of UTI is not always

straight forward. UTI has to be distinguished from other diseases that have a similar clinical presentation, some UTIs are asymptomatic or present with atypical signs and symptoms, and the diagnosis of UTI in neutropenic patients (who do not typically have pyuria) may require different diagnostic criteria than those used for the general patient population. Because of these factors, much reliance is placed on laboratory tests to augment clinical impressions; even when clinical diagnoses are unequivocal. It therefore comes as no surprise that the laboratory tests to identify the cause of the infections and/or to provide isolates for anti-microbial susceptibility.

The purpose of this study is to summarize the laboratory diagnoses of routine UTI and the antimicrobial susceptibility pattern of isolates.

MATERIALS AND METHODS

Study population: The study population was drawn from indoor patients at G.G Hospital & Medical College, Jamnagar. 3046 patients not clinically diagnosed as having UTI were involved in the study. Clinically diagnosed patients as UTI and patients on antibiotic therapy were excluded.

Study Duration: May 2005 to February 2006

Collection of Urine Samples: Early morning mid-stream urine samples were collected using sterile, wide mouthed container with screw cap tops. On the urine sample bottles were indicated name, age, sex, and time of collection along with requisition forms. The samples were analyzed bacteriological using the methods.⁴

Sample processing:

Culture

A calibrated sterile nicrom wire loop for the semi-quantitative method was used for the plating and it has a 4.0 mm diameter designed to deliver 0.01 ml. A loopful of the well mixed urine sample was inoculated into duplicate plates of Blood and Mac-Conkey agar. All plates were then incubated at 37°C aerobically for 24 h. The plates were then examined macroscopically and microscopically for bacterial growth. The bacterial colonies were counted and multiplied by 100 to give an estimate of the number of bacteria present per milliliter of urine. A significant bacterial count was taken as any count equal to or in excess of 10,000 cfu/ml.⁵

Microscopy

The urine samples were mixed and aliquots centrifuged at 5000 rpm for 5 min. The deposits were examined using both 10X and 40X objectives. Samples with ≥ 10 white blood cells/mm³ were regarded as pyuric. A volume of the urine samples were applied to a glass microscope slide, allowed to air dry, stained with gram stain, and examined microscopically. Bacterial isolates were identified generally using biochemical reaction.⁶

Antibiotic susceptibility testing

The method used with standardization of the inoculum size was agar diffusion method. The standardized single-disc diffusion method was employed.⁷

Statistical analysis: Data entry and analysis was undertaken by EpiInfo software (version 6.04)

RESULTS

Present study includes 3046 specimens of urine collected from indoor patients. More than one fourth (27.92%) male and near about two third (64.75%) female had positive test result. Overall positivity was 46.48%.

Table 1: Sex wise Distribution of the Cases according to their test results (n=1416)

Sex	Total Cases	Positive Cases (%)
Male	1511	422 (27.92)
Female	1535	994 (64.75)
Total	3046	1416 (46.48)

Table 2: Organisms wise distribution of Positive cases (n=1416)

Type of Organisms	Positive Cases (%)
E.Coli	756 (53.38)
Klebsiella	268 (18.92)
Pseudomonas	152 (10.74)
Proteus Vulgaris	56 (3.96)
Proteus Mirabilis	76 (5.38)
Others (S.saprophyticus S.aureus)	108 (7.62)
Total	1416 (100)

More than half (53.38%) cases reported as E.Coli followed by Klebsiella (18.92%), Pseudomonas (10.74%), Others (7.62%), Proteus (5.38%) and Proteus Vulgaris (3.96%).

Table 3: Incidence of Drug Sensitivity in Isolated Organisms from Urine Culture

Name of Drugs	E.Coli n=756 (%)	Klebsiella n=268 (%)	Pseudomonas n = 152 (%)	Proteus SPP. n = 132 (%)	Others (Gram +ve) n= 108 (%)
Ampicillin	72	61	70	60	77
Ampicillin sulbactam	76	72	74	72	85
Cefuroxime	76	78	70	74	---
Gatifloxacin	98	96	94	98	90
Leofloxacin	96	96	95	98	95
Linolid	68	62	60	72	98
Meropenum	90	100	98	100	----
Nalidixic acid	36	43	43	65	58
Nitrofurantoin	80	57	76	35	7.4
Norfloxacin	52	63	64	70	82
Tobramycin	45	48	88	72	79
Cefazolin	78	59	72	70	---
Erythromycin	---	---	---	---	97

Incidence of drug sensitivity among the positive cases like highest sensitivity of E.Coli with Gatifloxacin (98%), Klebsiella with Meropenum (100%), Pseudomonas with Meropenum (98%), Proteus with Meropenum (100%) and Gram Positive with Linolid (98%).

DISCUSSION

The prevalence of UTI in the population was 46.48%. This figure is higher than prevalence rate of 31.35% significant bacteriuria recorded by Savitha, T et al⁸. It is lower than prevalence rate of 66.78% recorded by Mahesh E et al.⁹ The high prevalence may be due to genuine population susceptibility because factors like sexual intercourse, peer group influence, pregnancy, low socio-economic status.

The most common organism isolated in these patients was E. coli (53.38%), Klebsella (18.92%) P. aeruginosa (10.74%), P. mirabilis (5.38%), and S. aureus (7.2%). This findings pattern were similar with study of Savitha⁸ like E. coli (48.04%), Klebsella (8.82%), P. aeruginosa (0.98%), Proteus.spp (4.9%), and Gram positive organism (37.26%). In study of Mahesh El Complicated Urinary Tract Infection in a Tertiary Care Center in South India, *Al Ame en J Med S c I*, organisms isolated was E. coli (65.7%), Klebsella (15.9%), P. aeruginosa (11.14%).⁹

In this study, the prevalence of UTI in females is more than in males. Of the 1416 isolates obtained, 994(64.75%) were from female patients while 422(27.92%) were from males. This is report that UTI is more frequent in females than

in males. In study of Azra S. et al prevalence rate in female(70.5%) and male (29.5%)¹⁰ and Kolawole et al prevalence rate in female(66.67%) and male (33.33%)¹¹.

The most useful antibiotics in this study were fluoroquinolones (Gatifloxacin, leofloxacin), erythromycin, and linezolid (in gram positives) because they inhibit most commonly isolated UTI pathogens. These drugs are relatively expensive with compared to most antibiotics frequently used. Therefore, making the organisms susceptible to it. Similar to other reports where fluoroquinolones are the most effective (susceptible) by Azra S. et al., Resistance pattern of urinary isolates in tertiary Indian hospital¹⁰ and Kolawole et al¹¹. Nitrofurantoin, ampicillin and nalidixic acid which are commonly used antibiotics were poorly effective against majority of the organisms isolated in this study. This finding is similar to others studies and theirs findings.

CONCLUSION

The results of this study and those of others may not be representative of the general population; urinary tract infections are often treated empirically and susceptibility tests are often carried out only when the patient has failed one or more courses of antibiotics. Even though the susceptibility pattern shown by this study need for *in-vitro* sensitivity reports before antibiotics therapy initiation, however, it should be born in mind that *in-vitro* antimicrobial sensitivity is only a guide.

The findings suggested the need for constant monitoring of susceptibility of specific pathogens in different populations to commonly used anti-microbial agents. These data may be used to determine trends in antimicrobial susceptibilities, to formulate local antibiotic policies, to compare local with national data and overall to assist clinicians in the rational choice of antibiotic therapy to prevent misuse, or overuse, of antibiotics. Also, the results from this study revealed that the important infecting organisms were found to be the commensals of perianal and vaginal regions. This calls for increase in personal hygiene. Finally, since the hospital environment is a sort of collection agency for many pathogenic microorganisms by virtue of the many seriously ill patients who passes through it. Therefore, it is extremely important for the hospital managements to do everything possible to minimize the spread of these organisms to other patients.

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