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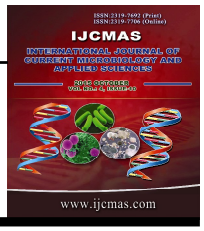

Original Research Article

Bacterial Uropathogens in Urinary Tract Infection and Their Antibiotic Susceptibility Pattern in a Tertiary Care Hospital

Prakriti Vohra[1]*, Shalu Mengi[2], Ruhi Bunger[3], Shavi Garg[4], Deepak Pathania[4] and Varsha A. Singh[3,5]

[1]Department of Microbiology, SHKM, GMC, Nalhar, Mewat, India
[2]Department of Microbiology, MMU, Solan, India
[3]Department of Microbiology, MMIMSR, Mullana, Ambala, India
[4]deparment of Anatomy, SGT, Budhera, India
[5]Department of Community Medicine, MMIMSR, Mullana, Ambala, India
**Corresponding author*

Keywords

Antibiotic susceptibility pattern, *Escherichia coli*, Fluoro-quinolones, UTIs, Uropathogens

A B S T R A C T

The present study was conducted to determine the antibiotic susceptibility patterns of the organism isolated from patients with urinary tract infections (UTIs). This study was carried out in a tertiary care hospital for a period of one year. A total of 500 mid-stream urine samples were collected, out of which 115 (23%) showed growth of bacteria with significant count. *Escherichia coli* 55 (48%) was the commonest bacterial pathogen followed by *Klebsiella pneumoniae* 24 (20.8%), *Staphylococcus aureus* 13 (11.30%), Coagulase negative Staphylococcus (CONS) 9 (7.83%), Enterococcus species 8 (6.96%) , *Pseudomonas aeruginosa* 6 (5.2 %). Most of the strains of *Escherichia coli, Klebsiella pneumoniae, Staphylococcus aureus* showed resistant to ciprofloxacin and norfloxacin. Sensitivity was highest with gentamicin. *Enterococcus, Pseudomonas* and *Coagulase negative Staphylococcus* showed resistant to norfloxacin and is sensitive vancomycin & gentamicin.

Introduction

Urinary Tract Infection (UTI) is defined as microbial invasion of the genitourinary tract. UTI is one of the most common infectious diseases seen in the community. Incidence of infection is higher in women (10 -20%) as compared to males (Mims S, 2006; Gupta P, 2012).

Current management of UTI's are usually empirical, without the use of a urine culture or susceptibility testing to guide therapy (Congetham et al, 2013). Upto date knowledge of the prevalent uropathogens with their antibiotic susceptibility is mandatory for the clinicians to provide appropriate treatment to the patients having UTI.(Grubenberg et al,1984).

This retrospective study was done to compare the frequency and drug resistance

pattern in uropathogens isolated from patients with UTIs in MMIMSR, Mullana, Ambala.

Materials and Methods

This retrospective one year study i.e. from August 2010 to August 2011 was carried out in a tertiary care hospital. A total of 500 mid-stream urine samples were collected from patients attending various OPDs and IPDs of the hospital. Taking all sterile precautions, these samples were inoculated on MacConkey's agar & Cystine lactose electrolyte deficient agar (CLED) using semi-quantitative method of inoculation. The culture plates were incubated at 37°C for 24 hours to 48 hours. Semi-quantitative method was used to count number of viable bacterial colonies. Organisms were identified by doing standard biochemical tests (Colle J.G.,1989). Antibiotic susceptibility testing were done according to Kirby-Bauer disc diffusion method for all the isolates on Mueller Hinton agar (Koneman,1997). The antibiotics used were Ciprofloxacin (5µg), Cotrimoxazole (25 µg), Gentamicin (10 µg), Nitrofurantoin (100µg), Norfloxacin (10µg) for gram negative bacilli and Gentamicin (10 µg) , Nitrofurantoin (100µg), Norfloxacin (10µg) Erythromycin (15 µg), Vancomycin (30 µg) Himedia, Clindamycin (2 µg) for gram positive cocci. All the analysis was performed using simple percentage method.

Results and Discussion

Total number of urine sample tested in the study period were 500, out of which 115 (23%) showed growth of bacteria with significant count. *Escherichia coli* (48%) was the commonest organism isolated followed by *Klebsiella pneumoniae* (20.8%), *Staphylococcus aureus* (11.3%) and others (Table-I).

Escherichia coli isolates showed higher sensitivity towards Gentamicin (96.3%), Cotrimoxazole (65.4%) followed by Nitrofurantoin (61.8%). *Klebsiella* isolates showed good response towards Cotrimoxazole (33.3%), Gentamicin (29.2%), Nitrofurantoin (25%) while *Psuedomonas spp*. shows better response to Gentamicin (83.3%), Nitrofurantoin (50%) followed by cotrimoxazole (33.3%) as shown in Table II. *Enterococcus spp* , *Staphylococcus aureus*, CONS showed good response towards Vancomycin (100%) as shown in Table III.

The total growth rate positive with bacterial isolate in this study was 23%. This study is similar with another study conducted by Chongtham U *et al*, 2013 (30%) , Murugan *et al*,2012 (22.78%). In this study, *E. coli* (48%) was the predominant bacterial pathogen followed by *Klebsiella pneumoniae* (20.8%) and *Staphylococcus aureus* (11.3%). This finding was in agreement with other studies done by (Manjunath *et al*, 2011), (Eshwarappa M. *et al*, 2011), (Chongtham U *et al*,2013). Most of the strains of *E. coli*, *Klebsiella pneumoniae*, *Staphylococcus aureus* showed much resistance to Ciprofloxacin and Norfloxacin which are one of the commonly used antibiotics. This study is similar to findings by Eshwarappa M. *et al*, 2011. The most sensitive antibiotic for *E. coli*, *Klebsiella pneumoniae* and *Staphylococcus aureus* in this study is aminoglycosides. Same findings were seen in study conducted by Manjunath et al,2011. There was a decrease in bacterial susceptibility to quinolones. This finding is similar to (Mandal J *et al*, 2012) ; (Sood *et al*,2012) who have recorded a high rate of resistance against quinolones. This increasing resistance necessitates a change in the policy of use of empirical treatment in UTI.

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Table.1 Organisms isolated from urine samples

Sno.	Uropathogen	No. of isolates	Percentage (%)
1.	*E.coli*	55	48
2.	*Klebsiella pneumoniae*	24	20.8
3.	*Staph. aureus*	13	11.3
4.	*Coagulase negative Staphylococcus spp.*	9	7.83
5.	*Enterococcus spp.*	8	6.96
6.	*Psuedomonas spp.*	6	5.2
Total		115	100

Table.2 Antibiotic Susceptibility pattern(% sensitivity): Gram negative bacilli

S.no.	Organism	NOR	NIT	CIP	G	COT
1.	*E.coli*	23 (41.8 %)	34 (61.8%)	28 (50.9%)	53 (96.3%)	36 65.4%)
2.	*Klebsiella pneumoniae*	5 (20.8%)	6 (25%)	4 (16.6%)	7 (29.2%)	8 (33.3%)
3.	*Psuedomonas*	1 (16.7%)	3 (50%)	2(33.3%)	5(83.3%)	2(33.3%)

NOR- Norfloxacin, NIT- Nitrofurantoin, CIP- ciprofloxacin, G- gentamicin, COT- Cotrimoxazole

Table.3 Antibiotic Susceptibility pattern (% sensitivity): Gram positive cocci

Sno.	Organism	NOR	NIT	CLIND	G	V	E
1.	*Staph.aureus*	2 (15.4%)	4 (30.7%)	9 (69.2%)	12 (92.3%)	13 (100%)	7 (53.8%)
2.	*Coagulase negative Staph. aureus*	2 (22.2%)	4 (44.4%)	6 (66.7%)	7 (77.8%)	9 (100%)	5 (55.5%)
3.	*Enterococcus*	4 (50%)	3 (37.5%)	ND	5 (62.5%)	8 (100%)	3 (37.5%)

ND- not done

NOR- Norfloxacin, NIT- Nitrofurantoin, G- Gentamicin, CLIND- Clindamycin, V- Vancomycin, E- Erythromycin

Inappropriate and indiscriminate use of antibiotics has lead to the development of resistance strains.

In conclusion, the alarming rate of resistance to Ciprofloxacin and/or norfloxacin for major urinary isolates precludes the use of these commonly used antibiotics for empiric treatment of UTI in India. A continuous surveillance of the trends in antimicrobial resistance patterns is highly essential to ensure appropriate

recommendation for the treatment of the infections.

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