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## BACTERIAL UROPATHOGENS IN URINARY TRACT INFECTION AND ANTIBIOTIC SUSCEPTIBILITY PATTERN OF PATIENTS ATTENDING JNIMS HOSPITAL, IMPHAL.

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**ABSTRACT:** The present study was conductedto determine the antibiotic susceptibility patterns of the organism isolated from patients with urinary tract infections (UTIs). This study was carried out in the Department of Microbiology, Jawaharlal Nehru Institute of Medical Sciences (JNIMS), Imphal, Manipur for a period of one year. A total of 946 mid-stream urine samples were collected, out of which 285 (30.13%) showed growth of bacteria with significant count. Escherichia coli 123(43.16%) was the commonest bacterial pathogen followed by Klebsiellapneumoniae 51(77.89%), Staphylococcus aureus 43(15.09%), Enterococcus species 26 (9.12%), Proteus species 18 (6.3%) Pseudomonas aeruginosa 14 (4.9%) and Coagulase negative Staphylococcus 10 (3.5%). Most of the strains of Escherichia coli, Klebsiellapneumoniae, Staphylococcusaureus showed resistant to ciprofloxacin and norfloxacin. Sensitivity was highest with gentamicin and netilmicin. Enterococcus, Proteus, Pseudomonas and Coagulase negative Staphylococcus showed resistant to cotrimaxazole and is sensitive to nitrofurantoin, gentamicin and netilmicin.

**KEYWORDS:**UTIs, antibiotic susceptibility, bacterial pathogens, Escherichia coli, Imphal.

**INTRODUCTION:** Urinary tract infection (UTI) is one of the most common infectious diseases seen in the community. Empirical antibiotic therapy is usually applied here and for this, knowledge of the common uropathogens and their susceptibility to commonly used antibiotics is needed[1]. Incidence of infection is higher in women, and 20 -50% of whom will suffer a clinical episode during their lifetime[2]. Approximately 5.0 -6.0% of girls have at least one episode of bacteriuria between first grade and their graduation from high school, and as many as 80.0% of these children experience recurrent infections[3]. Urinary tract infection can be either symptomatic or asymptomatic. Patients with significant bacteriuria who have symptoms referable to the urinary tract are said to have symptomatic bacteriuria. Asymptomatic bacteriuria is a condition characterized by presence of bacteria in two consecutive clear voided urine specimens both yielding positive cultures (> $10^5$cfu /ml) of the same pathogen, in a patient without classical symptoms.[4]

Current management of UTI's are usually empirical, without the use of a urine culture or susceptibility testing to guide therapy. However, as with many community acquired infections, antimicrobial resistance among the pathogens that cause UTI's is increasing and is a major health problem in the treatment of UTI[5, 6]. Much of the data is available for community acquired infections. This may be different from that of the hospital acquired infections. Since patterns of antibiotic resistance in a wide variety of pathogenic organisms may vary even over short periods and depend on site of isolation and on different environments, periodic evaluation of antibacterial is needed to update this information[7, 8].

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For appropriate management of UTIs, it is essential to isolate and determine the sensitivity or the resistance to antimicrobial agents used. Hence, the present study was conducted to determine the antibiotic susceptibility patterns of the organism isolated from patients with UTI's in Imphal, Manipur.

**MATERIALS AND METHOD:** This study was carried out in the Department of Microbiology, Jawaharlal Nehru Institute of medical sciences (JNIMS), Imphal east, Manipur. A total of 946 mid-stream urine samples were collected in a sterile wide mouth container during the period of July 2011 to June 2012. Urine samples were collected before the start of antibiotic therapy. The samples were processed within one hour of collection for aerobic bacterial cultures.

The standard loop technique was used to place 0.01 ml of urine on Blood and MacConkey agar media, incubated overnight at 37°C. The number of viable bacterial colonies was counted by semi-quantitative method[9]. Organisms were identified by doing standard biochemical tests[10]. Antibiotic susceptibility testing were done on Mueller Hinton agar according to Kirby-Bauer, s disc diffusion method for all the isolates[9].

The antibiotics used were Nitrofurantoin (100mcg), Norfloxacin (10mcg), Ciprofloxacin (5mcg), Gentamicin (10 mcg), Tetracycline (30 mcg) and Cotrimoxazole (25 mcg).

**OBSERVATIONS AND RESULTS:**

| ORGANISMS ISOLATED | NUMBER OF ORGANISMS | % |
|---|---|---|
| Escherichia coli | 123 | 43.16% |
| Klebsiellapneumoniae | 51 | 17.89% |
| Staphylococcus aureus | 43 | 15.09% |
| Enterococcus species | 26 | 9.12% |
| Pseudomonas aeruginosa | 14 | 4.9% |
| Proteus species | 18 | 6.3% |
| Coagulase negative staphylococcus | 10 | 3.5% |
| Total number | 285 | |
| TABLE 1: ORGANISMS ISOLATED FROM URINE SAMPLES | | |

Total number of urine sample tested in the study period were 946, out of which 285 (30.13%) showed growth of bacteria with significant count. Escherichia coli (43.16%) was the commonest organism isolated followed byKlebsiellapneumoniae (17.89%), Staphylococcus aureus (15.09%) and others (table-1).

| Organisms | NOR | | NIT | | CIP | | G | | NT | | COT | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | S | R | S | R | S | R | S | R | S | R | S | R |
| E.coli | 52 (42.28%) | 71 (57.72%) | 73 (59.35%) | 50 (40.65%) | 50 (49.65%) | 73 (59.35%) | 97 (78.86%) | 26 (21.14%) | 93 (75.61%) | 30 (24.39%) | 70 (56.91%) | 53 (43.01%) |
| Klebsiellapneumoni-ae. | 21 (41.18%) | 30 (58.82%) | 20 (39.22%) | 31 (60.78%) | 23 (45.10%) | 28 (54.90%) | 27 (52.94%) | 24 (47.06%) | 27 (52.94%) | 24 (47.06%) | 20 (39.22%) | 31 (60.78%) |
| Staph aureus. | 6 (13.95%) | 37 (86.05%) | 33 (76.74) | 10 (23.26%) | 13 (30.23%) | 30 (69.77%) | 42 (97.67%) | 1 (2.35%) | 39 (90.7%) | 4 (9.3%) | 8 (18.60%) | 35 (81.40%) |
| Enterococcus sp. | 15 (57.69%) | 11 (42.31%) | 18 (69.23%) | 8 (30.77%) | 15 (57.69%) | 11 (42.31%) | 18 (69.23%) | 8 (30.77%) | 11 (42.31%) | 15 (57.69%) | 0 (0%) | 26 (100%) |
| Proteus sp. | 8 (44.4%) | 10 (55.56%) | 16 (88.89%) | 2 (11.11%) | 10 (55.56%) | 8 (44.4%) | 14 (77.78%) | 4 (22.22%) | 5 (27.78%) | 13 (72.22%) | 4 (22.22%) | 14 (77.78%) |
| Pseudomonasaeruginosa | 3 (21.43%) | 11 (78.57%) | 7 (50%) | 7 (50%) | 5 (35.71%) | 9 (64.29%) | 12 (85.71%) | 2 (14.29%) | 4 (28.57%) | 10 (71.43%) | 1 (7.14%) | 13 (93.86%) |
| Coagulase –ve staphylococcus | 3 (30%) | 7 (70%) | 4 (40%) | 6 (60%) | 7 (70%) | 3 (30%) | 8 (80%) | 2 (20%) | 4 (40%) | 6 (60%) | 0 (0%) | 10 (100%) |

**TABLE 2: ANTIBIOTIC SUSCEPTIBILITY PATTERN OF ISOLATED ORGANISMS**

**NOTE:** S= SENSITIVE, R= RESISTANT, NOR= NORFLOXACIN, NIT= NITROFURANTOIN, CIP= CIPRO-FLOXACIN, G= GENTAMICIN, NT= NETILMICIN, COT= COTRIMOXAZOLE.

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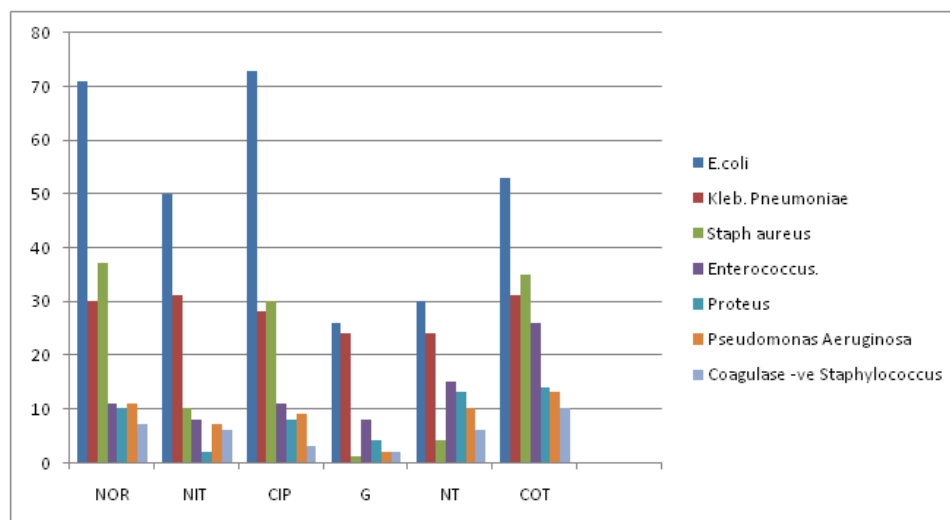


**Bar Chart Showing Resistant of Different Organisms to Norfloxacin, Nitrofurantoin,Cipro-floxacin, Gentamicin, Netilmicin, Cotrimoxazole.**

Most of the strains of E. coli, Klebsiellapneumoniae, Staphaureus showed resistant to Ciprofloxacin and Norfloxacin. Sensitivity is highest with Gentamicin and Netilmicin. Enterococcus sp, Proteus sp, Pseudomonas and coagulase negative Staphylococcus showed resistant to Cotrimoxazole; and sensitive to Nitrofurantoin, GentamicinandNetilmicin.

**DISCUSSION:** The total growth rate positivewith bacterial isolate in this study was 30.13%. This finding is much higher compared to similar study conducted by Getenet et al (9.2%)[11] from Ethiopia, and Akram et al (10.8)[8] from India, this may be due to different geographical location and not categorizing the samples with ages, sexes. This study is similar with another study conducted by ChitraYengkokpam et al (40.4%) [12] in India, Manipur and Rai et al (37.4%) [13] in Kathmandu, Nepal.

In this study, E. coli (43.16%) was the predominant bacterial pathogen followed by Klebsiellapneumoniae (17.89%) and Staphylococcus aureus (15.09%). This finding was in agreement with other studies done by Farajnia S et al in Iran[14]and M. Eshwarappaet al in South India[1].

Most of the strains of E. coli, Klebsiellapneumoniae, Staphylococcusaureus showed resistant to Ciprofloxacin and Norfloxacin which is one of the commonly used antibiotics. This study is similar to findings by M. Eshwarappa et al, [1]Kumariet al[15]. The most sensitive antibiotic for E. coli, Klebsiellapneumoniae and Staphylococcus aureus in this study is aminoglycosides. Same findings were seen in study conducted by Mutate AJ et al[16]. There was a generalized decrease in bacterial susceptibility to quinolones which was considered as one of the drugs of choice for the treatment of UTI.This finding is consistent with a study done by Eswarappa M [1]et al who have recorded a high rate of resistance against quinolones.The resistance of the bacterial pathogens to nitrofurantoin was relatively low in our study. The reason could be due to the less frequent use of nitrofurantoin in the study area.This increasing resistance necessitates a change in the empirical treatment in UTI.Indiscriminate use of antibiotic has lead to the development of resistance strains

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**CONCLUSION:** The antimicrobial resistance patterns of the causes of the urinary tract infection are highly variable and a continuous surveillance of the trends in resistance patterns is highly essential to ensure appropriate recommendation for the treatment of the infections.

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