

## A Study on Utilization Pattern of Antibiotics for the Complicated Urinary Tract Infections in a Tertiary Care Centre

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**Abstract:** A drug utilization pattern of antibiotics for complicated urinary tract infections in 100 cases above 18 years of age was done at Sri Ramachandra Medical College and Research Institute. The antibiotic sensitivity profile of the microorganism causing urinary tract infections was studied in age group between 18-60 yrs of either sex as in patients ward and diagnosed as urinary tract infection. The patients with significant bacteriuria ( $> 10^5$  CFU/ ml) were treated with antibiotics Cephalosporin's, Amikacin, Fluroquinolones, Amoxicillin + Clavulanic acid and Linezolid. The antibiotic sensitivity profile of the microorganism causing urinary tract infections were studied. The incidence of urinary tract infections was more or less equal in either sex. More than 2/3 of these cases were found in the age group of 18 to 60 years. The most common organisms isolated from the urine culture and sensitivity test was *E.coli* and the most commonly prescribed antibiotic was amikacin.

**Key words:** *E.coli* • Antimicrobials • UTI • Drug utilization • Amikacin

### INTRODUCTION

Drug utilization has been defined as the “marketing, distribution, prescription and use of drugs in a society with special emphasis on the resulting medical and social consequences”. Antibiotics being the most commonly prescribed group of drugs, the problem of its over use is a global phenomenon. In India the prevalence of use of antimicrobial agents varies from 24 to 67% [1]. As per Kunin's criteria it was observed that 64% of total antibiotics prescribed were either not indicated or inappropriate in terms of drug or dosage and was estimated that in India, they account for over 50% of the value of drugs sold [2]. In several situations, the rational use of antibiotics has been reported to have reduced the emergence of resistant strains. The prescribing behavior of physician depends upon the input from various sources like patients, commercial publicity, professional colleagues, academic literature and government regulations [3]. Ineffective use of these inputs can result in a wide variety of prescribing errors. In the recent study reported that gram -ve organisms were the most

common uropathogens causing cUTI in the pediatric age group [4]. *E.coli* was the most common organism causing cUTI in the United States. The present study was undertaken to find out the antibiotic sensitivity profile of micro organisms responsible for cUTI, the drug utilizing pattern of antibiotics and to generate data on the extent of rational/irrational prescribing in our centre.

**Study Design:** Observation drug utilization study was conducted at Sri Ramachandra Medical College and Research Institute. (SRU), located in Porur, Chennai. The proposal of the study was approved by medical ethics committee (MEC/06/51/40 dt 04.07.2006). The duration of this study was 6 months in 100 patients, age group between 18-60 yrs of either sex. All in patients diagnosed as urinary tract infection and treated with antibiotics with significant bacteriuria ( $> 10^5$  CFU/ ml).

**Mode of Data Analysis:** The mode of data analysis were age distribution, sex ratio, frequency of etiological agents, antibiotics sensitivity pattern, antibiotics utilization pattern, prescription analysis using WHO drug indicators.

Table 1: Age Distribution

| Age (Yrs) | Incidence (%) |
|-----------|---------------|
| 18-40     | 46            |
| 41-60     | 38            |
| Above 60  | 16            |

Table 2: Gender Distribution

| Sex    | Percentage |
|--------|------------|
| Male   | 44         |
| Female | 56         |

Table 3: Antibiotic Sensitivity to *E.Coli* (60 Cases)

| Antibiotic                | Number of Patients (%) |
|---------------------------|------------------------|
| Amikacin                  | 60 (100)               |
| Cephalosporins            | 42 (70)                |
| Cefoperazone + sulbactam  | 20 (33.3)              |
| Cefotaxime                | 9 (15)                 |
| Cefuroxime                | 9 (15)                 |
| Cefepime                  | 3 (5)                  |
| Imipenem                  | 25 (41.6)              |
| Norfloxacin               | 9 (15)                 |
| Piperacillin / tazobactam | 5 (8.33)               |
| Cotrimoxazole             | 5 (8.33)               |

**Statistical Analysis:** Out of the 100 patients analyzed, the incidence of UTI was more *i.e.* 46% in the younger (18-40 yrs) and 38% middle age (41-60 yrs) groups (Table1). The occurrence was rare after 60 yrs. With respect to sex ratio, 56% were females and 44% were males (Table2). (Table 3) shows the antibiotic sensitivity pattern to *E.coli*. Out of the cases, all were sensitive to amikacin, 70% were sensitive to cephalosporin's (3<sup>rd</sup> generation) and 41.6% to Imipenem.

## DISCUSSION

In the antibiotic sensitivity pattern of causative agents Overall utilization of antimicrobials UTI (Table 4) majority of organisms were sensitive to amino glycosides, especially amikacin [5]. Next to amikacin third generation cephalosporins like Cefotaxime, Cefoperazone and Cetriaxone were sensitive for most of the agents [6]. Gram positive *stap.aureus* was found to be sensitive to gentamicin. Cefoperazone (extended spectrum against pseudomonas) along with Beta lactamase inhibitor sublaclum was sensitive to all pseudomonas and most *E.coli* this shows that the organisms have developed resistance to pencillins, cotrimoxazole and gentamicin which were used earlier to treat these infections [7].

Table 4: Overall utilization of antimicrobials UTI

| Antimicrobials                   | Number of patients (%) |
|----------------------------------|------------------------|
| 1. Amikacin                      | 33                     |
| 2. Cephalosporins                | 34                     |
| a) Cefotaxime                    | 12                     |
| b) Ceftriaxone                   | 8                      |
| c) Cefoperazone + sulbactam      | 8                      |
| d) Cefixime                      | 6                      |
| 3. Fluoroquinolones              | 30                     |
| a) Levofloxacin                  | 14                     |
| b) Ciprofloxacin                 | 8                      |
| c) Norfloxacin                   | 8                      |
| 4. Amoxicillin + Clavulanic acid | 6                      |
| 5. Linezolid                     | 6                      |

89% of patients were treated with antimicrobial agents, out of which 72% were appropriate. This is one area of concern which should be looked into to prevent the emergence of antibiotic resistance. The 11% of patients who didn't receive antimicrobials were treated symptomatically *i.e.* urine alkalinizing agents with plenty of water. The patient got better of the symptoms and repeated urine culture also showed significant decrease in colony forming unit (CFU) count. Amikacin was the most commonly prescribed antimicrobial (33%).

In conclusion, a drug utilization pattern of antibiotics for complicated urinary tract infections in 100 cases above 18 years of age was done. The antibiotic sensitivity profile of the microorganism causing urinary tract infections was studied. The incidence of urinary tract infections was more or less equal in either sex. More than 2/3 of these cases were found in the age group of 18 to 60 years. The most common organisms isolated from the urine culture and sensitivity test was *E.coli* and the most commonly prescribed antibiotic was amikacin. The outcome of this study shows that the most common agent causing Urinary tract infection was *E.coli* with the most frequently used antibiotic being amikacin.

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