Original Research Article

Antibiotic susceptibility pattern in UTI patients with bacterial pathogens

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ABSTRACT

Urinary tract infection (UTI) accounts for a large part of antibacterial drug consumption. Antibiotic resistance, due to irrational use, is increasing every day, especially in the countries with non-restricted policies against wide consumption of antibiotics and no precise plans, like Iran. This investigation is therefore designed to determine the prevalence and antibiotic susceptibility pattern of microbial agents that cause UTI in patients which are suspected to have UTI. The sensitivity of the strains against various antibiotics was determined by using antibiotic sensitivity discs; namely amikacin, gentamicin, ciprofloxacin and piperacillin. The most common pathogen was Escherichia coli (50%) and K. pneumonia (17.3%). Our study showed 100%, 30.76% and 92.30% sensitivity rate of E coli to Imipenem, ciprofloxacin and piperacillin, etc.

Keywords
Antibiotic, susceptibility, UTI, nosocomial, bacteria.

Introduction

Urinary Tract Infection (UTI) remains the most common bacterial infection in human population and is also one of the most frequently occurring nosocomial infections1.

Its annual global incidence is of almost 250 million 2,3. UTI is second only to respiratory tract in acquiring microbial infection especially in female.4 About 20% of women experience a single episode of UTI during their life time and 3% of woman have more than one episode of UTI per year5. They are asymptomatic or symptomatic. UTIs that occur in a normal genitourinary tract with no prior instrumentation are considered as “uncomplicated”, whereas “complicated” infections are diagnosed in genitourinary tracts that have structural or functional abnormalities including instrumentation such as in dwelling urethral catheters, and are frequently asymptomatic6,7. Many
different microorganisms can cause UTIs though the most common pathogens causing the simple ones in the community are *Escherichia coli* and other Enterobacteriaceae, which accounts for approximately 75% of the isolates. Treatment of UTI is often started empirically and therapy is based on information determined from the antimicrobial resistance pattern of the urinary pathogens. Microbial resistance to nearly all classes of antimicrobials continue to rise despite increasing awareness and concern worldwide. Isolated pathogen frequency and antimicrobial resistant rates can vary dramatically even within the same nation. To ensure appropriate therapy current knowledge of the organism that cause UTI and their susceptibility pattern is mandatory. Herein we studied antimicrobial susceptibilities of bacteria isolated from the urine of the patients attending lab of Excel Hospital, Kanpur and Ambikashish Pathology and Microbiology Centre, Kanpur.

Materials and Methods

Patients have been drawn from OPD and indoor wards of LLR and associated hospitals in Kanpur and some private hospitals in Kanpur. These cases have been diagnosed on the basis of clinical symptoms, urine routine microscopy and urine culture at microbiology laboratory.

Collection of samples

Sample collected are midstream clean-catch urine after giving proper instruction to the patient.

a. Clean the genitalia properly (in case of male, retract the prepuce, clean it with sterile normal saline, in case of females wash perineum periurethral with soap and water)
b. Collect a “clean catch” mid stream urine sample in a sterile container. Transportation should be immediate. If a delay of more than 1-2 hours then refrigerated at 4°C.

Isolation of Microbial Flora

The microbial flora was isolated from urine samples of UTIs patient by using different technique.

Identification of Microbial Flora

It is based on Gram stain, biochemical reactions such as oxidase, catalase, indole, MR, VP, citrate utilization, urease, triple sugar iron agar (TSI), germ tube test (GTT), coagulase and motility test and subjected to antibiotic sensitivity testing (AST) by Kirby Baeur Disc Diffusion method. Control strains of E. Coli and P. aeruginosa were used.

Results and Discussion

Out of 175 urine samples collected for the study (30.23%) showed the significant bacteriuria. Isolates are shown in Table 1. The mean age in years was 35.6 (0-93 years). Male were 93 and female 79. The antibioticogram of the isolated pathogens is shown in Table 2. Among the tested antibiotics the highest susceptibility for the Gram negative bacteria was shown by Amikacin, Ceftriaxone and Ciprofloxacin followed by Gentamicin and Nitrofurantoin.
Table 1: Frequencies of isolates

<table>
<thead>
<tr>
<th>Isolates</th>
<th>Frequency (%)</th>
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<tbody>
<tr>
<td>Escherichia coli</td>
<td>26 (50%)</td>
</tr>
<tr>
<td>K. pneumonia</td>
<td>09 (17.30%)</td>
</tr>
<tr>
<td>K. oxytoca</td>
<td>04 (7.69%)</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>05 (9.61%)</td>
</tr>
<tr>
<td>Acinetobacter. sp</td>
<td>03 (5.76%)</td>
</tr>
<tr>
<td>Citrobacter koseri</td>
<td>01 (1.92%)</td>
</tr>
<tr>
<td>P. vulgaris</td>
<td>01 (1.92%)</td>
</tr>
<tr>
<td>Candida non albicans</td>
<td>03 (5.76%)</td>
</tr>
</tbody>
</table>
The main aim of the study was isolation, identification and characterization of microbial flora of UTI patients. It is immense importance to know their exact variations/similarities, if any, between the important organisms at genomic level by using different molecular techniques.

This will also be helpful to know the epidemiology of disease before developing any faster and safer molecular medicine method for their detection and diagnosis for UTIs in India. Accessing whether any similarities/ variations exist at genomic level among various isolates from UTIs patient were attempted for the first time in north Indian patients. This study shows effect of drugs and persistence mutations in UTI isolates and for better understanding the mechanism of unknown mutation during multidrug resistance therapy.

References