

Antibiotic resistance in *Citrobacter* spp. isolated from urinary tract infection

Sir,

Urinary tract infection (UTI) continues to be the commonest nosocomial infection according for approximately 40% of all hospital acquired infections and it is one of the most important causes of morbidity and mortality.^[1,2] The genus *Citrobacter* is distinct group of aerobic, gram negative bacilli from the Enterobacteriaceae family, widely distributed in water, soil, food and intestinal tract of man and animals. UTIs caused by *Citrobacter* species have been described in 5 to 12% of bacterial urine isolates in adults.^[3-5] We report here the emergence of *Citrobacter* as an increasingly common urinary pathogen in hospitalized patients.

A retrospective analysis was carried out in patients with urine culture positive for *Citrobacter* species from January, 2009 to December, 2010. Patients were identified and studied with respect to age, gender, underlying medical conditions, method of urine collection, and clinical presentations. Identification of isolates was done using standard microbiological techniques.^[6] All isolates were tested for susceptibility to antimicrobial agents on Mueller Hinton agar by the standard disc diffusion method, recommended by the Clinical and Laboratory Standards Institute (CLSI).^[7]

Of the 4,126 urine samples received for culture during the study period, significant bacteriuria was found in 747 (18.1%) samples. Among the 747 culture positive samples, the number of bacterial isolates obtained were 809 (716 had a single pathogen and 31 has two types of bacteria grown on culture). *Citrobacter* isolates were found to be third most common organism causing UTI in hospitalized patients after *Escherichia coli* and *Klebsiella* species accounting to 9.4% of all isolates. *C. koseri* (72.4%) was the predominant organism among the two *Citrobacter* species. Similar to the results of the other researchers, *Citrobacter* accounted for 9.4% of all UTIs in hospitalized patients in the current study.^[3-5]

Most of the patients (55%) in whom *Citrobacter* was isolated had been subjected to in dwelling urethral catheterization or genitourinary instrumentation or had an obstructive uropathy. The highest incidence among various age groups was found in elderly hospitalized patients [Table I] specially males.

The possible reasons for high frequency in elderly male include obstructive uropathy due to prostrate enlargement, loss of bactericidal activity of prostatic secretions, frequent genitourinary instrumentation and catheterization.

The antibiotic susceptibility showed discouraging pattern with multidrug resistance as a common problem. Amoxycillin and ampicillin are often used as oral therapy for gram-negative UTIs, but the high rate of *in vitro* resistance demonstrated in this study and others suggests that they should not be used. Trimethoprim and amoxiclav are also often prescribed; of concern is the increasing rate of resistance to trimethoprim over the last 10 years and the more recent increase in resistance to amoxiclav, presumably as a result of mechanisms other than production of beta-lactamase.^[8] Majority of the urinary tract isolates were found to be resistant to cefotaxime, cephalaxin, norfloxacin, ciprofloxacin, and the aminoglycosides [Figure I]. This has important implications as patients in a tertiary care hospital like ours receive cephalosopriins, aminoglycosides, fluoroquinolone, or a combination of these drugs as empirical therapy or as definitive treatment. Since good *in vitro* activity was shown by nitrofurantoin it may be considered as first line oral therapy for ambulatory patients. The high rates of antibiotic resistance observed in the present study may be due to the fact that ours is a tertiary care hospital with widespread

Table 1: Characteristics of patients

| Parameter | Value | No. of patients | Percentage |
|-----------|--------|-----------------|------------|
| Sex | Male | 53 | 69.7 |
| | Female | 23 | 30.3 |
| Age group | 1-20 | 17 | 22.4 |
| | 21-40 | 13 | 17.1 |
| | 41-60 | 19 | 25 |
| | >61 | 27 | 35.5 |

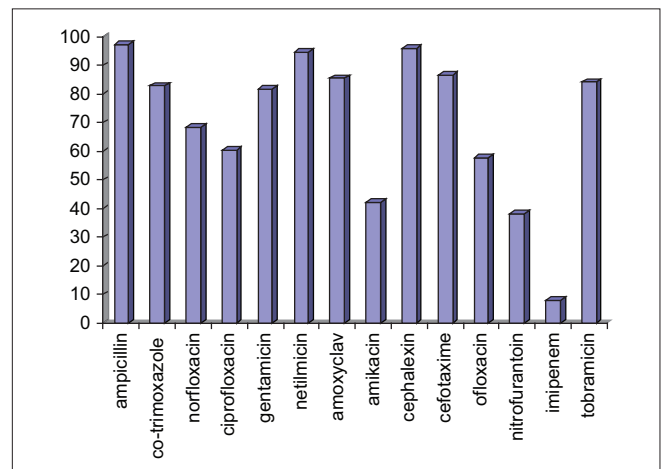


Figure 1: Antimicrobial resistance (%) of the *Citrobacter* isolates

usage of broad spectrum antibiotics leading to selective survival advantage of pathogens.

The emergence of this usually rare organism as the third most common urinary pathogen, which is resistant to commonly available antibiotics is alarming. The indiscriminate use of antimicrobial agents and frequent genitourinary instrumentation are possibly responsible for this situation. Many such infections could be prevented by selective judicious use of urinary catheters as well as careful attention to underlying abnormalities in the urinary tract and by continuously evaluating susceptibility pattern of uropathogens to traditional as well as new antimicrobials in well-defined populations and limiting inappropriate and injudicious use of antibiotics so as to prevent further emergence of drug resistance.

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