

# RESISTANCE ON ANTIBIOTIC DRUGS AND INCIDENCE OF SOME BACTERIA SPECIES IN URINARY TRACT INFECTIONS

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## ABSTRACT

**Objectives.** The aim of our study was to determine the urinary infection incidence caused by different microbial species and the sensitivity to the different antibiotics classes.

**Materials and methods.** We observed a lot of 638 patients which were hospitalized in Gerota Hospital from Bucharest during six weeks for different pathologies (gastroenteritis, cardiovascular disease, pneumonitis, and urinary tract infections).

**Results.** From the total number of patients, 100 were done positive for urinary tract infections. The predominant species was *E. coli* (65%) followed by *Enterococcus* species (15%), *Proteus* species (10%), *Enterobacter* species (6%), *Pseudomonas aeruginosa* (3%) and *Staphylococcus aureus* (1%). The incidence *E. coli* species was 57% for women and 23% for men. Six strains were susceptibility only to imipenem and resistant to all antibiotics used (four *E. coli* strains and two *Enterobacter* strains). Five of these were from men and one from a woman. Incidence of antibiotic drugs resistance was 45% for gentamicin, 43% for cefaclor, 43% for tetracycline, 21.5% for ciprofloxacin, and 26% for amoxicillin and clavulanic acid for *E. coli* strains.

**Conclusion.** Most of identified strains belong to *Escherichia coli* species and have a great resistance to antibiotic drugs.

**Keywords:** *E. coli*, antibiotics, resistance

## INTRODUCTION

Although the spread of pathogens has been hindered by the discovery and widespread use of antimicrobial agents, antimicrobial resistance has increased globally. The emergence of resistant bacteria has accelerated in recent years, mainly as a result of increased selective pressure. *E. coli* and other commensally intestinal flora of mammals often form a beneficial symbiotic relationship with their host, providing nutrients, key signals for developmental and immune regulation, and protection against foreign pathogens (1). Antibiotics currently represent the most commonly prescribed treatment for urinary tract infection, and patient who had suffer from recurrent infection, having three or more infections a year, may be prescribed

antibiotics prophylactically. Antibiotic therapy may deleteriously affect patients commensally microbiota and lead to secondary infections post-treatment, such as vaginal yeast infection and gastrointestinal infection. It is being increasingly recognized that multiple drug resistance commensally bacteria in the gut of animals and humans are an important source of bacteria causing opportunistic infections or act as resistance gene reservoirs forming a source of spread to bacteria infecting humans (2). The predominant pathogen species isolated from urine sample remain *Escherichia coli* which is also responsible for asymptomatic bacteriuria and for recurrent cystitis. The pathogens traditionally associated with urinary tract infection are changing many of their features, particularly because of antimicrobial resistance.

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The aim of our study was to determine the urinary infection incidence caused by different microbial species and the sensitivity to the different antibiotics classes.

## MATERIALS AND METHODS

We observed a lot of 638 patients which were hospitalized in Gerota Hospital from Bucharest during six weeks for different pathologies (gastroenteritis, cardiovascular disease, pneumonitis, and urinary tract infections). They were under medical observation; urine culture and antimicrobial susceptibility tests for different antibiotics classes were done for positive cultures.

A quantitative urine cultures were collected from all patients. Organisms present at  $\geq 10^3$  CFU/ml in a urine sample were identified by standard microbiological techniques. Antibiotic resistance test of all strains was determinate by using patterns of antimicrobial susceptibility (antibiogram).

## RESULTS

From the total number of patients, 100 were done positive for urinary tract infections. The predominant species was *E. coli* (65%) followed by *Enterococcus species* (15%), *Proteus species* (10%), *Enterobacter species* (6%), *Pseudomonas aeruginosa* (3%) and *Staphylococcus aureus* (1%) (figure 1). The incidence *E. coli* species was 57% for women and 23% for men. Six strains were susceptibility only to imipenem and resistant to all antibiotics used (four *E. coli* strains and two *Enterobacter* strains). Five of these were from men and one from a woman. Incidence of antibiotic drugs resistance was 45% for gentamicin, 43% for cefaclor, 43% for tetracycline, 21.5% for ciprofloxacin, and 26% for amoxicillin and clavulanic acid for *E. coli* strains (figure 2). We observed one *E. coli* strain from a patient (75 years woman) which was resistant for all classes of antibiotic drugs used in this study.

## DISCUSSIONS

Surveillance data show that resistance in *E. coli* is consistently highest for antimicrobial agents that have been in use the longest time in human medi-

cine. A retrospective analysis of *E. coli* from urine specimens collected from patients during 1997–2007 showed an increasing resistance trend for ciprofloxacin, trimethoprim/sulfamethoxazole, and amoxicillin/clavulanic acid (3). It is commonly accepted that patients with symptoms attributable to the urinary tract and who have a positive culture are most likely to benefit from antibiotics.

The uropathogens isolated in this study were similar to those in other studies, however, significant changes were found with increasing age of the patients tested (4, 5). *Escherichia coli* remains the most often isolated (65%) followed by *Enterococcus species* (15%) then by *Proteus species* (10%). These data confirm other studies that shown a higher incidence of *E. coli* species in urine cultures (6).

Another study found that previous prescribing of amoxicillin and trimethoprim for 7 days or more in general practices is associated with an increased risk of ampicillin and trimethoprim resistance in urinary tract infections in the following 3 months and that in the case of ampicillin a higher prescribed dose may reduce this risk (7).

The tetracyclines are a class of antibiotics discovered more than 50 years ago. They are relatively inexpensive drugs with a broad spectrum of activity. Consequently, they have been extensively used in the prophylaxis and therapy of human infections. The dramatic increase in the number of species and genera that have acquired tetracycline resistance since the 1950s has led to a reduction in the efficacy and use of current tetracycline therapy for many diseases (8).

Amoxicillin–clavulanic acid is one of the most consumed antimicrobial agents in many countries, principally for respiratory and urinary tract infections. Increased AMC resistance coincided with growing AMC consumption at the community level (9). In urinary infections, previous treatment with AMC is a risk factor for the development of AMC resistance.

## CONCLUSIONS

Our study showed incidence and antibiotic drugs resistance of bacterial strains in hospitalized patients. Most of these belong to *Escherichia coli* species and have a great resistance to antibiotic drugs.

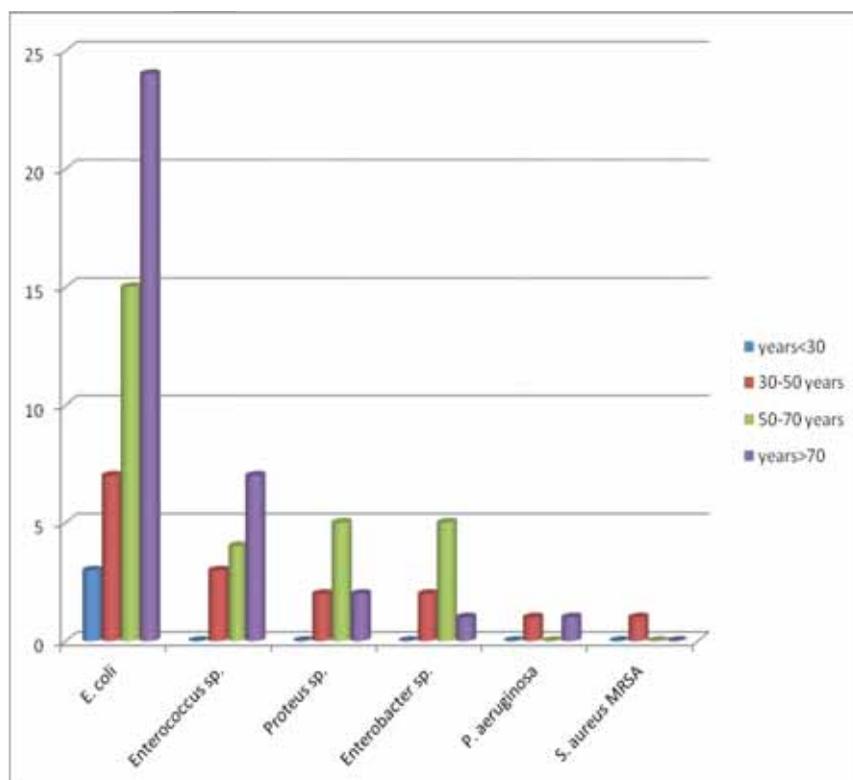


FIGURE 1. Number of uropathogens isolated for each age group

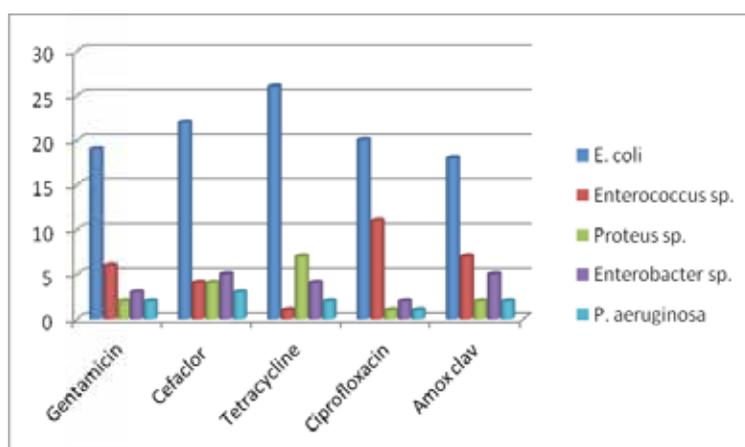


FIGURE 2. Incidence of antibiotic drugs resistance of isolated bacteria strains

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