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Spread of extended spectrum beta-lactamases producing *Enterobacteriaceae* in a tertiary care hospital from Romania

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Background: Antimicrobial resistance represents an enormous global health crisis and one of the most serious threats humans face today. Enterobacteria-producing extended-spectrum beta-lactamases (ESBL) play an important role in healthcare infections, increasing hospitalization time, morbidity and mortality rates. Among several ESBLs that emerge from these pathogens, CTX-M-type enzymes had the most successful global spread in different epidemiological settings. We aimed to identify the beta-lactamases circulating encoded by the genes blaCTX-M-15, blaSHV-1 and blaTEM-1 in *Escherichia coli (E. coli)* and *Klebsiella pneumoniae* (*K. pneumoniae*) strains. We established the associated resistance phenotypes among patients hospitalized in County Clinical Emergency Hospital of Craiova, Romania.

Methods: A total of 92 non-duplicated bacterial strains (28 strains of *E. coli* and 64 strains of *K. pneumoniae*), which were resistant to ceftazidime (CAZ) and cefotaxime (CTX) by Kirby–Bauer disk diffusion method, were identified using the automated VITEK2 system. Detection of ESBL-encoding genes and other resistance genes was carried out by PCR.

Results: *E. coli* strains were resistant to 3rd generation cephalosporins and moderately resistant to quinolones, whereas *K. pneumonia* strains were resistant to penicillins, cephalosporins, and sulfamides, and moderately resistant to quinolones and carbapenems. Most *E. coli* strains harbored blaCTX-M-15 gene (20/28 strains), two strain had the blaSHV-1 gene, but 11 strains harbored blaTEM-1 gene. In *K. pneumoniae* strains we detected blaCTX-M-15 in 50 strains, blaSHV-1in all strains and blaTEM-1 in 24 strains.

Conclusions: The high frequency of the CTX-M-1 group and a high rate of ESBL co-production are changing the epidemiology of the ESBL profile in hospitals. This epidemiology is a constant and increasing challenge, not only in Romania, but worldwide.

Biography

Mr. Ovidiu Zlatian graduated the Medical School in 200, with the graduation thesis "Molecular mechanisms of mithocondrial diseases with neurological manifestations". From 2002 he is a specialist physician in laboratory medicine. His PhD project was entitled "Tumoral heterogeneity detected through phenotypic methods and molecular tests". Currently, he works as laboratory physician in the Clinical Emergency County Hospital of Craiova, Romania, one of the biggest hospitals which deserves the South-West Oltenia region of Romania. He is also a lecturer in the Microbiology department of the University of Medicine and Pharmacy of Craiova, Romania. The main research interest is epidemiology of infectious diseases and transmission of hospital infections. Also he has many articles about the antibiotic resistance of hospital strains, its dynamics and association with antibiotics consumption. Also he studies effects of various compounds on bacterial growth, as plant extracts, metals or nanoparticles. He has a particular interests in infections produced by biofilm-forming bacteria as medical implant associated infections. He is a member of the European Society of Clinical Microbiology and infectious diseases, American Society of Microbiology, Romanian society of Microbiology and Romanian Society of Immunology.

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