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Abstract (poster session)

Phenotypic and genetic screening of beta-lactamases mediated resistance amongst clinical isolates of Gram-negative bacilli from Romanian hospitals

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The purpose of this study was the detection of various types of beta-lactamases in Gram-negative rods (GNR) isolated from intensive care units (ICU). Material and methods: a number of 531 GNR strains (334 Enterobacteriaceae and 197 Pseudomonadaceae) were isolated from 1166 positive clinical samples collected from patients hospitalized during 2011, in the ICUs of two big hospital from Buhcarest, Romania. Their resistance phenotypes were established using: disk diffusion test, double-disk diffusion test (DDST) with amoxicillin-clavulanic acid (AMC), cefotaxime (CTX) and ceftazidime (CAZ), DDST with AMC plus EDTA, imipenem (IPM) and IMP plus EDTA, Modified Hodge Test (MHT) and E-test ESBL, MBL and AmpC. The genetic support of the beta-lactam resistance mediated by enzymatic mechanisms was investigated by simple (blaampC, blaTEM grup, blaSHV grup, blaPSE grup, with PSE-1, PSE 4, CARB-3 alleles, blaIMP) and respectively multiplex PCR (blaVIM, blaSIM si blaSPM). Results and discussion: GNR strains constituted the most frequent etiology of infections occurred in hospitalized patients, representing 45.5% from the total number of positive cases. Out of these, 64% of the Enterobacteriaceae and 36% of the Pseudomonadaceae strains expressed resistance to beta-lactam antibiotics. The extended spectrum beta-lactamases (ESBL) phenotype was present in 35.8%, while the metallo beta-lactamases (MBL) one in 34% of the tested GNR strains. A significant percentage (9.4%) of the tested strains exhibited simultaneously ESBL and MBL profiles. Some of the Enterobacter sp. strains expressed inducible cephalosporinases and extended spectrum AmpC cephalosporinases. The molecular study revealed, in decreasing frequency order, the presence of blaSHV, blaTEM and blaPSE genes. More than half of the Pseudomonas aeruginosa strains resistant to carbapenems exhibited the blaVIM gene. Conclusion: the beta-lactam resistance profiles of Enterobacteriaceae and Pseudomonadaceae strains, mediated by beta-lactamases production, become more complex, especially in hospital units with high selective pressure, such are the ICUs. The high percent of ESBL and MBL producing strains suggests the necessity of resistance genotyping of key Gram-negative pathogens isolated from our geographical area, that will substantially contribute to the understanding of the genetics of antibiotic resistance and of the spread of resistance determinants in the hospital environment.