P0902 Evaluation of metallo-beta-lactamase-producing Pseudomonas aeruginosa isolated from blood culture in haematological patients

Anna Korobova¹, Galina Klyasova*¹, Anastasia Fedorova Mironova¹, Svetlana Khrulnova¹, Irina Frolova¹

¹ Laboratory of Clinical Microbiology, Mycology and Antibiotic Treatment, National Research Center for Hematology, Moscow, Russian Federation, Moscow, Russian Federation

Background: The aim of this study was to determine metallo-β-lactamase (MBL) genes among P. aeruginosa for 15 years.

Materials/methods: Prospective multicenter study included P. aeruginosa isolated from blood cultures in hematological patients from 2003 to 2017. Susceptibility was determined by the broth microdilution method (CLSI, 2018). MBL activity was detected by ETEST® MBL (MBL IP/IPI, BioMerieux), followed by real-time PCR for the presence of MBL genes (blaNDM-like, blaVIM-like and blaIMP-like).

Results: A total of 347 P. aeruginosa isolates were evaluated of those 151 (44%) isolates were non-susceptible to meropenem and/or imipenem. Genes of MBL were detected in 38% (58/151) carbapenem non-susceptible (carba-NS) P. aeruginosa. Distribution of MBL genes in MBL-producing isolates (n=58) was as follows: blaVIM-like (98%, n=57), blaIMP-like (2%, n=1). MBL-positive isolates were non-susceptible to both carbapenems. The remaining 93/151 (62%) carba-NS P. aeruginosa harbored none of the tested MBL genes. The rate of resistance to antibiotics was higher in MBL-producing isolates compared to MBL-negative isolates: 93% vs. 46% to amikacin, 83% vs. 62% to ceftazidime, 74% vs. 50% to cefepime, 60% vs. 47% to piperacillin-tazobactam. In 2016 one colistin resistant MBL-negative carba-NS P. aeruginosa isolate was detected. All MBL-producing isolates were susceptible to colistin.

The trend of carbapenems resistance and producing of MBLs among P. aeruginosa is presented in Figure. Carbapenem resistance increased from 35% in 2003-2005 to 44-50% in 2009-2011 and decreased to 28-32% in 2015-2017 (p>0.05). First MBL-producing P. aeruginosa isolates (n=2) were detected in 2005. The rate of MBL detection increased significantly from 4% in 2003-2005 to 18% in 2006-2008 (p=0.03) then it stayed the stable (22-23%) for 2009-2014 and decreased to 13% in 2015-2017.

Conclusions: The rate of carba-NS P. aeruginosa was 44% for the study period. MBL-producers were detected in 38% of carba-NS P. aeruginosa. The prevalent type of MBLs was VIM. MBL-producing P. aeruginosa isolates demonstrated higher level of resistance compare to carba-NS MBL-negative isolates.
Figure. The trend of carbapenems non-susceptibility among *P. aeruginosa* for the study period.