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Prevalence of carbapenemase-producing Klebsiella pneumoniae during a 4-year period in a tertiary care hospital in Greece

Alexandra Miari[1], Constantina Gartzonika[1], Ephthalia Priavali*[1], Christos Kittas[1], Hercules Sakkas[2], Stamatina Levidiotou[1]

[1]*Department of Microbiology, Faculty of Medicine, University of Ioannina*

[2]*University of Ioannina, Medical School, Microbiology Department; Microbiology*

Background: Prevalence of carbapenem-resistant *Klebsiella pneumoniae* (CR-KP) strains in Greece tertiary care hospitals has been escalating during the last years. Given the limitations imposed on therapeutic options as well as the serious consequences on patients' outcome originating from CR-KP's multi-drug resistance, close monitoring of their prevalence and their antibiotic resistance patterns is required.

Material/Methods: Between January 2013 and November 2016, 627 non-repetitive CR-KP clinical isolates were examined for the production of carbapenemases. Species identification and MIC determination were performed using VITEK 2 and E-test (bioMerieux, France). Detection of carbapenemase production was performed following phenotypic screening for class A and B carbapenemases, with the combined phenylboronic acid and EDTA zone inhibition enhancement double disk test using meropenem as substrate. A significant number of phenotypically detected KPC (*Klebsiella pneumoniae* carbapenemase) and MBL (metallo-β-lactamase) producing strains were assayed by PCR in order to identify genes encoding KPC and MBL carbapenemases and extended spectrum β-lactamases (ESBLs).

Results: The percentage of carbapenemase-producing *Klebsiella pneumoniae* (CP-KP) in respect to the total number of KP isolates retrieved was 40.9%. Correlating the four years period, a reduction in the annual percentage of CP-KP was observed: from 44.06% in 2013 to 35.4% in 2016. Phenotyping screening detected 63.2% KPC and 36.8% MBL producers. According to the susceptibility testing, 135 out of 627 (21.5%) CP-KP isolates were found not susceptible to colistin compared with just 1.6% not susceptible to tigecycline. Of the 88 MBL producing strains tested with PCR, 80 (90.9%) carried bla_{NDM-1} gene and 8 (9.1%) bla_{VIM} gene. Most of the isolates co-harboured also the $bla_{CTX-M-15}$ and bla_{TEM-1} genes. Among 90 KPC-possessing KP isolates, which were assayed by PCR, 72 (80%) co-

harboured bla_{TEM-1} gene whereas 10 (11.1%) co-harboured $bla_{CTX-M-15}$ gene. None of the CR-KP isolates studied by PCR co-harboured KPC and MBL genes.

Conclusions: As CP-KP infections become wide spread in our region leaving clinicians with limited choices of antibiotics for their treatment, close monitoring of their prevalence and resistance patterns by molecular methods and implementation of effective measures for preventing dissemination in the hospital setting are required.