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Abstract (oral session)

Molecular characterisation and epidemiology of Klebsiella pneumoniae KPC-3 producers isolated in Rome, Italy

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Objectives: A prospective study is currently ongoing in 10 hospitals of Rome aimed to evaluate the incidence and risk factors for infections sustained by K. pneumoniae (KP) producing carbapenemases. The aim of the study was to fully characterize the carbapenem resistant KP strains. Methods: From February to June 2011, 103 KP strains with ertapenem MIC >= 1 mg/L were isolated from 101 patients and screened for carbapenemase production by the modified Hodge test, PCR-sequencing of carbapenemase and ESBL genes, plasmid replicons, and OmpK35, OmpK36 porin variants. Genetic relatedness of isolates was determined by PFGE and MLST. Results: On 103 strains analyzed, 95 carried blaKPC-3 (94%), 3 strains blaVIM and 5 were positive to the blaCTX-M-15 ESBL gene associated to porin defects. In the same period, only 16 strains of KP-carbapenem-susceptible were isolated in the same hospitals. We observed both the carriage of similar KPC-harboring plasmids within genetically distinct strains and the inter-hospital spread of the two major clones ST258 and ST512, belonging to CC258. KPC-3 was also identified in clones ST646, ST650 and ST14 . The blaVIM gene was identified in clones ST646, ST647 and ST648. The blaKPC-3 gene was located on plasmids similar to those previously described in clone ST258 from Israel. The ST258 clone identified in two hospitals harbored an additional IncA/C plasmid, carrying the CMY-2 AmpC beta-lactamase. One patient had an intra-abdominal infection sustained by a ST258 KPC-3-producing clone, but during the treatment with colistin a carbapenem susceptible isolate lacking the plasmid carrying KPC-3 was isolated from the same site and successfully treated with carbapenems. Another patient developed sepsis sustained by a ST512 KPC-3-producing clone, but on the same day a ST512 strain, susceptible to carbapenems and negative to KPC-3, was isolated from urines. In this strain a rearrangement occurred on plasmid, causing the loss of the blaKPC-3 gene. Conclusion: Our findings evidenced an unexpected and high spread of carbapenemase- producing KP in our urban area. Different strains were identified carrying the KPC-3 gene, but all of them were associated to a common plasmid of the pKpQIL type. This plasmid represents the major vehicle of diffusion of KPC-3 among the different strains circulating in this area. However, two major clones where identified: ST512 and ST258, also indicating suggesting inter and intra-hospital spread.