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Abstract (poster session)

Transmission of blaKPC-3 from ST512 Klebsiella pneumoniae to Escherichia coli ST43 in a single patient

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Objectives K. pneumoniae carbapenemase (KPC) was first reported from North-Carolina in 2001, and a global geographical dissemination of this enzyme is now being experienced. Our study concerns inter-species spread of blaKPC-3 gene between K. pneumoniae ST512 (E530) and E. coli ST43 (E558) originating from the same patient. The transposone and plasmid structures are also analysed. Material and methods. In October 2011 K. pneumoniae E530 (first) and E. coli E558 (one month later) were cultured from bile and abdominal drainage, respectively, of a patient hospitalized at the Verona University Hospital. MICs were performed by microdilution and interpreted by EUCAST criteria. Genes encoding for beta-lactamases (ESBL, KPC, MBL, OXA-type and plasmidic AmpC), plasmid-mediated quinolone resistance determinants (qnrA, qnrB, qnrS, qnrC, qnrD, qepA, aac(6')-Ib-cr variant) and 16S rRNA methylase (armA, rmtB, rmtC) were investigated by PCR. Strains were typed by PCR-based replicon typing (PBRT) and multi locus sequence typing (MLST). Investigation of blaKPC-3 genetic environment was performed by PCR primer walking. Conjugation experiments and Southern blot were also carried out. Results Strains were resistant to all beta-lactams - included carbapenems, monobactams, and fluoroquinolones - and susceptible to tigecycline. Both harboured blaKPC-3, blaTEM-1 and blaOXA-9. The E530 isolate also carried blaSHV-11 and aac(6')Ib-cr variant genes. With PBRT the strains proved to be positive for an FIIs-type plasmid, while the K. pneumoniae harboured also colE. The broth mating assay showed trans-conjugants. They were positive for blaTEM-1 and blaOXA-9 genes, besides blaKPC3. The blaKPC-3 gene was localised on the FIIs plasmid by Southern blot analysis. The transposone structures of both strains proved to be the same and matched with Tn4401a. K.pneumoniae E530 belonged to the ST512 clone (in turn belonging to CC258) while E. coli belonged to ST43. Conclusions A few studies have already dealt with the transmission of blaKPC gene between K. pneumoniae and E. coli in the same patient, a phenomenon that should be considered of both clinical and microbiological importance. To our best knowledge, this is the first report on the transmission of blaKPC-3 from ST512 K. pneumoniae to E. coli ST43 in a single patient.