O249
1-hour Oral Session
Escherichia coli ST131: successful and intriguing

Emergence of KPC-type producing Escherichia coli ST131 from three acute care hospitals and two long term and rehabilitation facilities in northern Italy

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Background: Although carbapenem resistant *Escherichia coli* remains uncommon in Europe, Italy is one of the four countries showing the highest resistance percentages, with 2010-2013 increasing trends reported. The aim of the study was to investigate the population structure and beta-lactamases (BLs) content of nine KPC-2 and three KPC-3 *E. coli* strains from five hospitals in Northern Italy.

Material/Methods: In the period April 2011-May 2013, 12 MDR *E. coli* isolates obtained from five Northern Italy Facilities were studied using PFGE, DiversiLab automated rep-PCR system, MLST and Phylogenetic group analysis. Conjugation and replicon typing were also performed. Carbapenem MIC values were evaluated by Etest. Other BLs presence was assessed by *bla*CTX-M/SHV/TEM/OXA genes amplification and sequencing.

Results: Out of the 12 strains, six were from rehabilitation wards, four from intensive care units (ICUs), and two from nephrology and neurosurgery wards, respectively. Nine KPC-*E. coli* were from urine, two from sputum samples and one from blood. Two isolates retained susceptibility to ertapenem, eight to meropenem and nine to imipenem (EUCAST 2015 breakpoints).
*bla*CTX-M-group 1 (*bla*CTX-M-15) and *bla*CTX-M-group 9 genes (*bla*CTX-M-27) were detected in 4/12 strains only, while *bla*TEM-1 and *bla*OXA-9 determinants were detected in 9/12 and 10/12 isolates respectively. All but one strain resulted of phylogenetic group B2. Eight different PFGE profiles (A-H) and four rep-PCR profiles were distinguishable, while five MLSTs (ST131, ST3948, ST3426, ST5839, ST3861) were detected. All KPC-2 strains, detected in each hospital, belonged to ST131 Complex (Cplx), being 8/9 of ST131 and 1/9 of ST3948, while five different pulsotypes were distinguishable. The three KPC-3 *E. coli* showed unique PFGE fingerprints and belonged to the here newly identified ST5839 and ST3681, in addition to the already reported ST3426, occurring in 2012 in UK.

IncF, IncFII, groups were detected in all but one cases; the ST3426 KPC-3 strain showed, in addition to IncF, IncU and IncX1 plasmids. Carbapenem resistance gene transfer was obtained in three cases; for two of the above cases, the acquisition of the conjugative plasmid from a *Klebsiella pneumoniae* previously responsible for a patient's infection, was ascertained. The PFGE clone F, that caused an intra-hospital outbreak during the period June 2012-May 2013 at a Long Term and Rehabilitation Facility (LTCF), showed the highest inter-hospital spreading potential, being identified also in an ICU of an Acute Care Hospital (ACH), over the same period.

Conclusions: Here we report the spread of several clones of KPC-positive *E: coli* isolates both from ACHs and LTCFs in Northern Italy. While KPC-2 *E. coli* resulted linked to the ST131 Cplx, the KPC-3 strains showed a multi-clonal dissemination. The low meropenem and/or imipenem MIC values contributed to the inter-hospital dissemination and an underestimation of the real presence of such pathogen in these settings.