Identification of OXA-48-producing K. pneumoniae ST15 as an interhospital spreading clone in the South of Spain

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Background: During 2014 and 2015, several hospitals from the South of Spain detected OXA-48-producing K. pneumoniae in both community and hospitalized patients. Some of them were recovered through outbreaks investigations. The aim of the study was to characterize the resistance determinants, type of transposon composite Tn1999 (with or without insertion of IS1R into IS1999) and the population structure of these isolates.

Material/methods: A total of 59 isolates (1-19 isolates/hospital) were collected from 16 hospitals and referred to the Reference Laboratory (PIRASOA program). ESBLs, pAmpCs and carbapenemases were sought by phenotypic methods and PCR and sequencing. XbaI PFGE and MLST were used to assess the clonal relatedness. Tn1999 structure were characterized by using specific primers. Representatives of different CTX-M-15-producing pulsotypes were selected for blaCTX-M-15-carrying
plasmid analysis and were typed by the replicon PCR-based method in DH10B *E. coli* transformants.

**Results:** Forty-five (83%) isolates were recovered from clinical samples and 14 (24%) from surveillance samples. Most (90%) were OXA-48 producers, five (9%) OXA-245 producers and one (1%) OXA-181 producer. Forty-two (72%) isolates were also CTX-M-15 carriers, and two (3%) also CMY-2 carriers. Twenty-eight different pulsotypes and 16 sequence types (STs) were found. The most prevalent clone (n=30, 52%) was ST15, followed by ST11 (n=7, 12%), ST1 (n=3, 5%), ST147 (n=3, 5%) and ST392 (n=3, 5%). Among ST15 isolates, 7 different pulsotypes (>=2 bands of difference) were observed, of which one was detected in 5 hospitals and another in 2 hospitals. The transposon composite variant Tn1999.2 (the left IS1999 was truncated by IS1R) was more frequent (19 pulsotypes) than the variant Tn1999.1 (8 pulsotypes). In the clone ST15, Tn1999.2 was found in 4 pulsotypes and Tn1999.1 in 3 pulsotypes. Only 4 out of 11 *bla*<sub>CTX-M-15</sub>-carrying plasmids could be typed and corresponded to IncF-type, yielding K7:A-:B- formula.

**Conclusions:** 1) the spread in the South of Spain of OXA-48-producing *K. pneumoniae* is mainly (79%) due to known successful clones; 2) ST15 was the most prevalent clone during the 2-year study and inter-hospital dissemination of two pulsotypes of this clone was observed; 3) the genetic environment of *bla*<sub>OXA-48</sub> suggest different captures of this gene among lineages of the same clone.