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Antimicrobial resistance

FIRST DESCRIPTION IN EUROPE OF A CIPROFLOXACIN RESISTANT *SALMONELLA* TYPHIMURIUM HARBOURING AAC6'-IB-CR AND OQXAB IN AN INCHI2 PLASMID

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Background

Fluoroquinolones are critical antibiotics (AB) for the treatment of *Salmonella* non-typhoid infections. Plasmid-mediated quinolone resistance (PMQR) genes have been often associated with decreased susceptibility to these AB worldwide, but concomitant presence of *oqxAB* and *aac6'-Ib-cr* genes, increasingly described in Asia, is still scarce in Europe.

Objectives

To characterize the genetic background (clonality, AB resistance genes, their transferability and genetic environment) of ciprofloxacin resistant *S. Typhimurium* clinical isolates.

Methods

Two clinical isolates of *S. Typhimurium* resistant to ciprofloxacin [young children (feaces)/one hospital/2012/Portugal] were studied. Susceptibility to AB and detection of ESBL were assessed by disk diffusion and/or Etest methods (CLSI/EUCAST). Characterization of AB resistance genes, including topoisomerases (*gyrA/gyrB/parC/parE*) and PMQR [*qnrA/qnrB/qnrC/qnrD/qnrS/qepA/aac(6')-Ib-cr/oqxAB*] genes, and metals (copper/silver/mercury/arsenic/tellurite) tolerance genes was performed (PCR/sequencing). Clonality (*Xba*I-PFGE/MLST), class 1 integron, plasmid characterization (PCR/sequencing), conjugation/transformation assays and genomic location (*I-Ceu*I/S1-PFGE hybridization) were also performed.

Conclusions

Presence of multidrug-resistant IncHI2-~180Kb plasmid encoding *oqxAB* and *aac-6'-Ib-cr* in a ciprofloxacin resistant *S. Typhimurium*/ST34, also carrying *gyrA* mutation (Asp87Asn), is here firstly described in Europe. Co-resistance to nalidixic acid,

chloramphenicol-*cmlA/floR/catB3*, gentamicin-*aac(3)-IV*, kanamycin-*aphA1*, streptomycin-*aadA/strA-strB*, sulfamethoxazole-*sul1/sul2/sul3*, tetracycline-*tetB*, trimethoprim-*dfrA12*, ampicillin-*bla_{TEM}/bla_{OXA-1}* and genes coding for metals tolerance (*merA/silA/pcoD/terF*) were found. Transformation of PMQR carrying plasmid was associated with resistance acquisition to several antibiotics (*cmlA/floR/catB3/aac(3)-IV/aphA1/aadA/sul1/sul2/sul3/dfrA12/bla_{OXA-1}*) and an eight-fold increase on ciprofloxacin MIC. Interestingly, the IncHI2 plasmid carried *oqxAB* genes flanked by IS26 and an incomplete class 1 integron containing *aac-6'-Ib-cr-bla_{OXA-1}-catB3-arr3-qacEΔ1-sul1*, atypical *sul3*-integron and *terF*. A similar PMQR genetic environment in *Salmonella* with IncHI2 circulating in Asia was observed, highlighting the role of these plasmids in *oqxAB* and *aac-6'-Ib-cr* global spread.