Transmission patterns in CTX-M harbouring bacteria

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Worldwide spreading of CTX-M-type ESBLs has been shown to be related both to the dissemination of CTX-M-producing clones and to the diffusion of epidemic *bla*$_{CTX-M}$-harbouring plasmids among different clones and species. Clonal expansion of specific CTX-M-producing isolates, besides being responsible for local outbreaks involving high-risk wards and hospitals, has also been documented over large national and international boundaries. Horizontal transfer of *bla*$_{CTX-M}$-harbouring plasmids among unrelated clones and species has been documented to play a crucial role in the local persistence of specific CTX-M determinants, and transfer of epidemic *bla*$_{CTX-M}$-harbouring plasmids has also been observed among local and international epidemic clones. As an example of nation epidemiology, the different mechanisms of dissemination of CTX-M-1 and CTX-M-15 in Italy will be discussed.

A relevant issue in the epidemiology of CTX-M ESBLs is their presence in members of the commensal microbiota of humans and animals, which may act as important reservoirs of CTX-M-producing clones or *bla*$_{CTX-M}$-harbouring plasmids. A number of studies have observed the occurrence of fecal carriage of CTX-M-producing isolates in inpatients, outpatients and healthy volunteers in the community. This is a relevant issue, as it has been demonstrated that the risk of developing subsequent infections caused by CTX-M-producing pathogens is significantly higher in colonized individuals *vs*. non-colonized ones. Moreover, fecal colonization may favour environmental circulation and household transmission of CTX-M-producing isolates, especially in conditions of poor sanitation as often occur in resource-limited countries. Data concerning fecal carriage of CTX-M-producing *Escherichia coli* in healthy volunteers from Bolivia and Peru will be discussed.

CTX-M-producing isolates are often co-resistant to other potentially active drugs, such as fluoroquinolones and aminoglycosides, and carbapenems remain the only reliable therapeutic option. However, recent studies have documented that CTX-M-producing *Klebsiella pneumoniae* isolates may exhibit reduced carbapenem susceptibility due to the loss of an outer-membrane porin. The recent multifocal detection of a CTX-M-producing *K. pneumoniae* clone in Italy will be discussed.