O117
2-hour Oral Session
MDR Enterobacteriaceae: clinical epidemiology and outcomes

Faecal co-colonization with different OXA-48 producing Enterobacteriaceae isolates is not a rare event in Madrid (Spain) and is mainly due to plasmid spread

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Background: Prevalence of carbapenemase-producing *Enterobacteriaceae* (CPE) faecal carriers is increasing worldwide and has become a matter of great concern. We study frequency of patients co-colonized with different OXA-48-producing *Enterobacteriaceae* admitted in a Hospital in Madrid (Spain) during an active surveillance screening program of extended spectrum β-lactamase (ESBL)-carriers (R-GNOSIS project). Population structure of CPE and different carbapenemases were also characterized.

Material/methods: A total of 10,554 rectal swabs from 4,939 patients admitted at two medical (MW) and two surgical wards (SW) were collected (March-2014-August-2015). Rectal swabs were obtained at admission, at discharge in patients staying >3 days, and weekly in patients staying >7 days. They were seeded on ChromoID-ESBL, -CARBA and -OXA-48 chromogenic agars (BioMèrieux, France). Growing colonies were identified by MALTI-TOF MS (Bruker Daltonics, Germany). Carbapenemase production was detected by the Modified Hodge, CarbaNP and KPC/MBL/OXA-48 Confirm Kit tests (Rosco Diagnostica, Germany). *bla*$_{VIM}$, *bla*$_{KPC}$, *bla*$_{NDM}$, *bla*$_{OXA-48}$ and *bla*$_{ESBL}$ genes were characterized (PCR, sequencing). Population structure was established by PFGE and MLST. Plasmids carrying carbapenemase genes were studied by conjugation, S1-PFGE, RFLP, and the *rep*A, *tra*U and *par*A genes were detected by PCR to relate the OXA-48-enconding plasmids to the pOXA-48a IncL/M plasmid. Patient`s chart were also reviewed.

Results: A total of 147 CPE isolates were recovered from 113/4,939 patients (2.2%). Fourteen patients (12.4%; 14/113) (median age 81, range 38-98 years; 8 male) were co-colonized by two (12/14), three (1/14) or four (1/14) different OXA-48-producing Enterobacteriaceae isolates (n=31). The median days of hospital stay until the detection of the first CPE isolate was 8 days (range: 2-26 days) and 20 days (range: 14-37 days) until the detection of OXA-48 in other bacterial species. Although OXA-48+CTX-M-15-*K. pneumoniae* and OXA-48-*E. coli* was the most frequently detected co-colonization (10/14 patients), both species were also recovered along with *Kluyvera ascorbata* (n=1), *Enterobacter asburiae* (n=1), *Klebsiella oxytoca* (n=1) and *Citrobacter freundii* (n=1). Moreover, co-colonization with *K. ascorbata* and *Raoultella ornithinolytica* was also found in one patient. PFGE and MLST revealed a high genetic diversity among the CPE isolates. Nevertheless, the high-risk clone ST11-OXA-48+CTX-M-15-producing *K. pneumomiae* was detected in 3 patients. OXA-48 genes were located in a 60 kb plasmid in all wild-type isolates. Conjugation assays demonstrated transferability in a total of 15/31 OXA-48-producing isolates (7 *K. pneumoniae*, 6 *E. coli*, 1 *C.freundii* and 1 *R. ornithinolytica*) belonging to 9 patients. $bla_{\text{OXA-48}}$ was located on a ~60Kb transferable plasmid with a pOXA-48a-IncL/M backbone, showing identical restriction profiles by DraI and HpaI-digestion in all transconjugants.

Conclusions: We highlight frequent co-colonization with OXA-48-producing *Enterobacteriaceae* isolates that might be due to the in vivo inter-species transfer of a dominant pOXA-48a-IncL/M plasmid. This inter-species spread depicts a complex epidemiology of CPE in our institution.