Epidemiology of mcr-1-producing Enterobacteriaceae clinical isolates from Argentina.


Abstract:
BACKGROUND: Mobile polymyxins (colistin –COL- and polymyxin B) resistance mediated by mcr-1 and mcr-2 were recently described worldwide. mcr-1 was mostly found in E. coli isolates recovered from raw meat, animals, but also from human samples. Recently we reported the first E. coli clinical isolates harboring mcr-1 from Argentina, these isolates were genetically unrelated (1). In February 2016, the NRL issued an alert about the presence of mcr in clinical isolates. AIM: To describe the epidemiology of mcr-1- Enterobacteriaceae (ETB) clinical isolates from Argentina.

METHODS: COL MICs were obtained by agar dilution (EUCAST). Other drugs were evaluated by disc diffusion and agar dilution (CLSI), except tigecycline (TIG) that was interpreted as reported (2). Resistance genes were detected by standard PCR, and allele-specific PCR for mcr-1 and mcr-2 genes. Genetic relatedness was assessed by XbaI-PFGE. Salmonella spp. M1744 was used as recipient for biparental conjugation assays.

RESULTS: Until Dec-2016, 85 COL-resistant ETB clinical isolates (83 E. coli, 1 Citrobacter amalonaticus and 1 Klebsiella pneumoniae) were confirmed at the NRL as positive for mcr-1, and negative for mcr-2. These isolates were recovered from urine sample (46; 54%), blood (13; 15%) and other sites (26). Isolates were submitted from 36 hospitals located in 8 provinces and Buenos Aires City. All strains were categorized as resistant to COL (MIC_{S90}/MIC_{G90}: 8/8 mg/L). Strains were non-susceptible to (%): ampicillin (88), nalidixic acid (82), ciprofloxacin (61), third generation cephalosporins (TGC) (53), trimethoprim-sulfamethoxazole (52), minocycline (26), gentamicin (24), nitrofurantoin (only UTI, 15), carbapenem (5) and amikacin (4). All isolates were susceptible to TIG. Resistance to TGC was associated to ESBLs (p<0.0001 Fisher’s exact test) (n): CTX-M (36); SHV (1), PER (1); plasmidic-AmpC (4). Two NDM (1 E. coli and 1 C. amalonaticus) and 1 KPC (E. coli) producers were detected. Sixty E. coli were analyzed by PFGE, 7 were repeatedly non-typeable, and the remaining 53 isolates were differentiated in 53 clonal types. COL resistance was transferred by conjugation and a ca. 60 kb plasmid was observed in a subset of nine E. coli isolates.

CONCLUSIONS: The clonal diversity of mcr-1-producing E. coli isolates suggest a key role of horizontal dissemination mediated by plasmids between human isolates. Emergence of mcr in carbapenemase producers and ETB species other than E. coli is an urgent health public issue.

Acknowledgments/ References:
1) Rapoport et al. 2016 AAC, 60:4412-3 ( 2) Pasteran et al. 2012 JIDC, 6:452-6

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