Plasmid-Mediated Colistin-Resistant *Escherichia coli* in Bacteremia in Switzerland

To the Editor—Very recently the first plasmid-mediated colistin resistance (MCR) mechanism Enterobacteriaceae was reported from animals, food, and patients [1–4]. Then a series of short studies, based mainly on retrospective data and established enterobacterial strain collections, reported further identifications of this transmissible colistin-resistant determinant, namely the MCR-1 enzyme, from worldwide. We coauthored reports of a urinary tract infection due to an *Escherichia coli* strain coexpressing plasmid-mediated carbapenemase and colistin resistance genes [5] and a series of MCR-1–positive isolates among a retrospective collection (2004–2005) of *E. coli* isolates from diarrheic veal calves in France [6].

Here, we report 2 cases of bacteremia associated with *E. coli* isolates producing MCR-1 from patients hospitalized at the regional hospital in Neuchatel, Switzerland. A 59-year-old man was treated for acute myeloid leukemia that did not respond to palliative anticancer treatment. He was hospitalized in December 2015 for neutropenic fever of unknown origin. An *E. coli* isolate (strain N-A) susceptible to broad-spectrum cephalosporins grew in blood cultures. The patient was rapidly discharged with a ceftriaxone-containing ambulatory treatment. Two weeks later, bacteremia developed again with the same bacterial isolate, which had also acquired an extended-spectrum ß-lactamase (ESBL) gene.

In December 2015, bacteremia with an *E. coli* isolate (strain N-B) developed in an 88-year-old man. The patient had a history of multiple urinary tract infections with a recent 3-week-long treatment with ciprofloxacin for suspected *Enterobacter cloacae* prostatitis. He was empirically treated with ceftriaxone, later relayed with ertapenem after identification of ESBL production. Neither of those 2 patients had received previous treatment with polymyxins, and neither had traveled abroad in the past few years or had exposure to farm animals.

Minimal inhibitory concentrations of colistin were determined and interpreted by mean of broth microdilution according to the Clinical and Laboratory Standards Institute guidelines [7], showing that *E. coli* isolates N-A and N-B were resistant with minimal inhibitory concentrations of 4 and 16 mg/L, respectively. In addition, *E. coli* isolate N-A was resistant to aminopenicillins and ureidopenicillins, whereas *E. coli* strain N-B was resistant to all ß-lactams except cephamycins and carbapenems and to nalidixic acid, gentamicin, and trimethoprim-sulfamethoxazole.

Polymerase chain reaction amplification was performed with whole-cell DNA of both strains using primers specific for the *mcr-1* gene, and results were positive. Sequencing of the polymerase chain reaction products identified the *mcr-1* gene in both isolates. Plasmid analysis identified *mcr-1*–bearing plasmids of about 30 and 80 kb for *E. coli* isolates N-A and N-B, respectively, both belonging to the IncFIB incompatibility group [8]. Those plasmids significantly differed from the *mcr-1*–positive plasmid reported from the pioneer Chinese study [1]. In addition, *E.* coli isolate N-A possessed the narrow-spectrum ß-lactamase gene $bla_{\text{TEM-1}}$ whereas *E. coli* isolate N-B possessed the ESBL gene $bla_{\text{TEM-52}}$.

This report further highlights the silent spread of the plasmid-mediated *mcr-1* gene in community-acquired *E. coli*. The extent to which the *mcr-1* gene has disseminated among Enterobacteriaceae remains to be determined; it will be complicated given that MCR-1 confers a low level of resistance to polymyxins in *E. coli* and the common techniques for determining polymyxin susceptibility in routine laboratories are not reliable. Such difficulty in detection may explain why plasmid-MCR has remained silent until recently, although we now know it has been circulating for at least for 10 years [6]. Finally, the rapidity and ease with which we identified those 2 additional cases of MCR-1–producing *E. coli* strains in Switzerland is actually very alarming, given the global implications.

Notes

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