Carbenapenem-resistant *Klebsiella pneumoniae* Clinical Isolate Harboring a blaMP-4- and qnrS-resisting Plasmid, as well as a Congjugative blaKPC-2 Plasmid

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**ABSTRACT**

Enterobacteriaceae species producing extended-spectrum β-lactamase enzymes are often associated with community- and hospital-acquired infections. However, recently a clinical isolate of *Klebsiella pneumoniae* has been reported to harbor a carbapenemase-carrying plasmid. In this study, we report a clinical isolate of carbapenem-resistant *K. pneumoniae* (CRKP) that was isolated from a 58-year-old female hospitalized in China. The isolate was resistant to piperacillin/tazobactam, doripenem, meropenem, and imipenem, and was also harboring a fluoroquinolone resistance determinant, emphasizing the ability of this species for acquiring and expressing resistance determinants.

**MATERIALS AND METHODS**

**Bacterial strains.** During 2011, a total of 887 *Klebsiella pneumoniae* isolates collected from hospitalized patients in 12 medical centers in China were submitted to a central molecular genotyping laboratory of Clinical and Laboratory Standards Institute (CLSI) MTB-Atlas document. Bacterial inoculum density was standardized to allow colony counts to assure an adequate number of cells for each testing event. Vibration of the MIC values was estimated by calculating the standard deviation of testing of CLSI-recommended quality control (QC) reference strains. All QC results were within established acceptable ranges (0.005-0.050 μg/mL for MICs).

**Screening for antimicrobial resistance genes.** Enterobacteriaceae displaying elevated MIC values (≥2 mg/L) for a specific antimicrobial agent were selected for further investigation. Isolates were screened for the presence of plasmid-αβlactamases (ACC, ACT, AHB, CMY, DHA, FOX, and OXA) and ESBL genes (SHV, TEM, CTX, and BLA genes) by PCR using custom-designed primers. Amplicons were sequenced using a primer walking strategy. Genetic location of antimicrobial resistance genes. Ablative *bla* genes were named using the *bla* gene designation system recommended by the *E. coli* resistance gene nomenclature committee (http://www.pasteur.fr/recherche/genopole/PF8/mlst/Kpneumoniae.html).

**RESULTS**

Carbenapenem-resistant *Klebsiella pneumoniae* was isolated from a 58-year-old female patient hospitalized in China. The isolate was resistant to piperacillin/tazobactam, doripenem, meropenem, and imipenem, and was also harboring a fluoroquinolone resistance determinant, emphasizing the ability of this species for acquiring and expressing resistance determinants. Carbenapenem-resistant *K. pneumoniae* (strain 27243D) was selected for further investigation. Isolates were screened for the presence of plasmid-αβlactamases (ACC, ACT, AHB, CMY, DHA, FOX, and OXA) and ESBL genes (SHV, TEM, CTX, and BLA genes) by PCR using custom-designed primers. Amplicons were sequenced using a primer walking strategy. Genetic location of antimicrobial resistance genes. Ablative *bla* genes were named using the *bla* gene designation system recommended by the *E. coli* resistance gene nomenclature committee (http://www.pasteur.fr/recherche/genopole/PF8/mlst/Kpneumoniae.html).

**CONCLUSIONS**

This study reports the detection of a MDR *K. pneumoniae* co-harboring blaoPT-4 and qnrS-resisting plasmids. The 58-kojo2243D, carbapenem-resistant plasmid harbored a fluoroquinolone resistance determinant, emphasizing the ability of this species for acquiring and expressing resistance determinants. These findings have been previously reported. However, the blaoPT-4-resisting plasmid also harbored a fluoroquinolone resistance determinant, emphasizing the ability of this species for acquiring and expressing resistance determinants.