Emergence of NDM-1-producing Acinetobacter pittii in Brazil

Sir,

The New Delhi metallo-β-lactamase (NDM), initially reported in Klebsiella pneumoniae and Escherichia coli, is now disseminated worldwide mostly among Enterobacteriaceae [1]. The NDM carbapenemase has also been described in Acinetobacter baumannii, but only in sporadic cases in countries such as China, India, Egypt, Germany, Israel and, more recently, Brazil [1,2]. Noteworthy, recent studies reported NDM-producers among non-baumannii Acinetobacter spp., which may also be human pathogens. Here we report the first case of NDM-1-producing Acinetobacter pittii in Brazil.

A 66-year-old male patient with bladder carcinoma was admitted for radical cystectomy to a 900-bed tertiary care hospital in Porto Alegre, Southern Brazil, on 25 February 2013. Fifteen days later he presented an intestinal subocclusion and fever. Computerised tomography (CT) of the abdomen showed the presence of a collection in pelvis, which was drained surgically. This purulent secretion was cultured and a K. pneumoniae was identified (VITEK® 2 system; bioMérieux, La Balme-les-Grottes, France). Urine was also cultured and revealed the presence of Candida sp. (50,000 CFU/mL) and Acinetobacter sp. (>100,000 CFU/mL). The patient was treated with intravenous meropenem 500 mg every 12 h for 7 days, followed by cefepime 1 g every 24 h (doses adjusted to impaired renal function). Three subsequent urine cultures obtained 11, 28 and 44 days after the first culture were negative for Acinetobacter sp. The patient was therefore considered colonised by Acinetobacter sp. After 90 days the patient improved and was discharged from the hospital.

The Acinetobacter sp. isolate MP was identified as A. pittii by matrix-assisted laser desorption/ionisation time-of-flight (MALDI-TOF) (Bruker Daltonik, Bremen, Germany). gyrB multiplex PCR and 16S rRNA gene sequencing. Minimum inhibitory concentrations (MICs) of β-lactams, aminoglycosides, ciprofloxacin, fosfomycin, chloramphenicol, tigecycline, colistin and polymyxin B were determined (Etest® and microdilution method) and showed that the isolate was resistant to all β-lactams (with the exception of aztreonam), including carbapenems (MICs of imipenem, ertapenem, doripenem and meropenem >32 µg/mL). The isolate remained susceptible to amikacin, gentamicin, tigecycline, colistin, polymyxin B, ciprofloxacin and chloramphenicol. Carbapenemase genes were searched by real-time PCR (blaOXA-48, blaKPC, blaIMP, blaVIM and blaGES) and multiplex PCR (blaOXA-23-like, blaOXA-40-like, blalOXA-58-like and blaOXA-143). A positive signal was obtained only for the blaNDM gene, and sequencing identified the blaNDM-1 gene. To identify the location of this gene, electrotransformation assays were attempted using plasmid DNA extracts from A. pittii isolate MP using A. baumannii CIP7010 and E. coli TOP10 as recipients. Transfer of the blaNDM-1 gene by electrotransformation into these two recipient strains remained unsuccessful, suggesting that the gene might be chromosomally located in A. pittii MP, as reported in A. baumannii [3].

The genetic environment of the blaNDM-1 gene was determined by PCR mapping as described [3] and insertion sequence ISAb125 was identified upstream of the blaNDM-1 gene. However, attempts to identify another copy of ISAb125 downstream of blaNDM-1 remained unsuccessful, suggesting that the blaNDM-1 gene might be part of a truncated Tn125 transposon, as previously reported in A. baumannii [3]. Multilocus sequence typing (MLST) was performed according to the Institute Pasteur scheme (http://www.pasteur.fr) and A. pittii isolate MP was identified as ST119. Interestingly, two blaNDM-positive A. pittii isolates were recently identified in Paraguay [4], a neighbouring country of Brazil, but those isolates belonged to ST320 and ST321. The only reports of A. pittii ST119 isolates are from Japan, with isolates producing the carbapenemase IMP-19 [1].

Identification of blaNDM-positive non-baumannii Acinetobacter spp. is now increasingly reported worldwide, concomitantly with those of blaNDM-positive A. baumannii isolates. There are few reports of NDM-producing A. pittii, being from China, Turkey and recently Paraguay. This is of particular concern considering that Acinetobacter sp. may (i) act as reservoirs for blaNDM genes in non-human settings, as recently shown in several Chinese studies with identification of NDM-1 producers among Acinetobacter calcoaceticus and Acinetobacter jenii from environmental samples from livestock farms [1], Acinetobacter johnsonii from hospital sewage [1] and Acinetobacter houfii from chickens [1], but also (ii) act as a source of blaNDM genes then horizontally transferred to enterobacterial species as evidenced [5].

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Reference


Mariana Pagano, Laurent Poirel, Andrés Francisco Martins, Francieli P. Rozales, Alexandre Prehn Zavascki, Patrice Nordmann

Mariana Pagano \textsuperscript{a,b,c} 
\textsuperscript{a} Medical and Molecular Microbiology Unit 'Emerging Antibiotic Resistance', Department of Medicine, Faculty of Science, University of Fribourg, 3 rue Albert-Gockel, CH-1700 Fribourg, Switzerland
\textsuperscript{b} Programa de Pós Graduação em Ciências Farmacêutica, Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
\textsuperscript{c} Laboratório de Pesquisa em Resistência Bacteriana (LABRESIS), Centro de Pesquisa Experimental, Hospital de Clínicas de Porto Alegre (HCPA), Porto Alegre, Brazil

Laurent Poirel \textsuperscript{*}
\textsuperscript{a} Medical and Molecular Microbiology Unit 'Emerging Antibiotic Resistance', Department of Medicine, Faculty of Science, University of Fribourg, 3 rue Albert-Gockel, CH-1700 Fribourg, Switzerland

Andreza Francisco Martins, Francieli P. Rozales
\textsuperscript{a,b} Programa de Pós Graduação em Ciências Farmacêutica, Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
\textsuperscript{b} Laboratório de Pesquisa em Resistência Bacteriana (LABRESIS), Centro de Pesquisa Experimental, Hospital de Clínicas de Porto Alegre (HCPA), Porto Alegre, Brazil

Alexandre Prehn Zavascki
\textsuperscript{a,b} Programa de Pós Graduação em Ciências Farmacêutica, Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
\textsuperscript{b} Infectious Diseases Service, Hospital de Clínicas de Porto, Porto Alegre, Brazil

Afonso Luis Barth
\textsuperscript{a,b} Programa de Pós Graduação em Ciências Farmacêutica, Faculdade de Farmácia, Universidade Federal do Rio Grande do Sul (UFRGS), Porto Alegre, Brazil
\textsuperscript{b} Laboratório de Pesquisa em Resistência Bacteriana (LABRESIS), Centro de Pesquisa Experimental, Hospital de Clínicas de Porto Alegre (HCPA), Porto Alegre, Brazil

Patrice Nordmann
\textsuperscript{a,b} Medical and Molecular Microbiology Unit 'Emerging Antibiotic Resistance', Department of Medicine, Faculty of Science, University of Fribourg, 3 rue Albert-Gockel, CH-1700 Fribourg, Switzerland
\textsuperscript{b} HFR - Hôpital Cantonal de Fribourg, Fribourg, Switzerland

\textsuperscript{*} Corresponding author. Tel.: +41 26 300 9582. E-mail address: laurent.poirel@unifr.ch (L. Poirel)

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