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Letter to the Editor

First report of a NDM-producing *Providencia rettgeri* strain in the state of São Paulo



Dear Editor,

Carbapenemases are enzymes known to hydrolyse almost all types of β -lactam antibiotics and their spread among bacteria of clinical relevance are one of the main global challenges to be overcome in the next years. NDM stands for New Delhi Metallo- β -lactamase which was firstly identified in 2009 in a Sweden patient who had been previously hospitalized in New Delhi, India.¹ Although other types of metallo- β -lactamases are currently present in Brazil (until now SPM-1 has been the most prevalent in clinical isolates²), the first occurrence of NDM producer was reported in a clinical isolate of *Providencia rettgeri* in the beginning of 2013 in Porto Alegre/RS, Southern region of Brazil.³ Since then, other cases have been reported in Brazil.

A 55 year-old diabetic and hypertensive man was admitted to a tertiary public hospital (Hospital Heliópolis) in the São Paulo city to undergo amputation of the 4th toe due to osteomyelitis complication. The patient had a history of gastric surgery for peptic ulcer five years before, but no report of hospitalization or travel in the past 12 months. Four months earlier, the man reported a lesion in the same toe caused by a trauma with iron sheet and high temperature solder. One month after the initial trauma the patient presented worsening of pain and swelling of 4th right toe and was at that time admitted to a tertiary public hospital from city of São Paulo (Hospital Vila Alpina) where he received intravenous ciprofloxacin and clindamycin therapy to treat the bone infection (400 mg q12h and 600 mg q6h \times 14d, respectively) without success. During hospitalization at Hospital Heliópolis for amputation of the 4th toe the patient received intravenous ceftriaxone and clindamycin therapy (1 g q12h and 600 mg q6h \times 3d, respectively) and then was discharged with no signs of infection to be followed up in the outpatient service.

Results from bone culture of the amputated toe performed at Hospital Heliópolis revealed the presence of Gram-negative bacteria. The susceptibility tests showed a carbapenem resistance profile: Etest positive for imipenem (MIC >32 mg/L), meropenem (MIC >32 mg/L) (bioMérieux Clinical Diagnostics, France, according to CLSI 2015 breakpoints⁴) with Modified Hodge Test negative, and positive for metallo- β -lactamase (M β L) production (Carbapenembac-Metallo[®] kit). The bacterium was identified as *Providencia rettgeri*, according to MicroScan system (Beckman Coulter, Inc.), sensitive to

amikacin (MIC \leq 16 mg/L), gentamicin (MIC \leq 4 mg/L), and tobramycin (MIC \leq 4 mg/L). In order to identify the type of M β L produced by the clinical isolate and to confirm the previous results the strain was sent to a reference laboratory at Instituto Adolf Lutz – São Paulo. The presence of *bla*_{NDM} gene by Multiplex (KPC, NDM and OXA-48) and Simplex (NDM) PCR and the species identity was confirmed by Vitek-MS system (bioMérieux Clinical Diagnostics, France). The clinical isolate is under investigation in order to characterize molecular aspects of *bla*_{NDM} gene and its origin. To the best of our knowledge, this is the first official report of a NDM producer *Enterobacteriaceae* isolated in the state of São Paulo.

Worldwide dissemination of broad-spectrum carbapenemases is a real threat for the modern medicine. New Delhi Metallo- β -lactamase (NDM) is a new type of Metallo- β -Lactamase that precludes the use of last resort carbapenems. In Brazil, the occurrence of NDM is emerging, especially in the South and Southeast regions. In conclusion, the first NDM producer strain has been detected in the most populous state of Brazil with the largest economy, underscoring the need to urgently implement even more efforts to identify and prevent the spreading of this threat in Brazil.

Conflicts of interest

The authors declare no conflicts of interest.

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