TITLE: First Report of NDM-Producing *Pseudomonas aeruginosa* in Brazil

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ABSTRACT:

NDM-1-producing *Pseudomonas aeruginosa* isolates were first reported in 2011, with two strains recovered from Serbia. In 2012, a single NDM-1-producing *P. aeruginosa* was isolated in France from a patient previously hospitalized in Serbia. More recently, NDM-1-positive *P. aeruginosa* isolates were recovered in India, Italy, Egypt, Slovakia. To date, no reports have emerged from Latin America. This report describes the first detection of NDM-1-producing *P. aeruginosa* strain in Brazil. In January 2019, one carbapenem-resistant *P. aeruginosa* strain was recovered from urine sample from a patient hospitalized in an intensive care unit in a tertiary care hospital located in Porto Alegre, Rio Grande do Sul, Brazil. Empirical therapy was initiated with cefepime. Susceptibility to amikacin, gentamicin, ciprofloxacin, ceftazidime, cefepime, piperacillin-tazobactam, imipenem and meropenem was tested by disk diffusion method according to BrCAST-EUCAST guidelines. Polymyxin B susceptibility was evaluated using the broth microdilution method and Brazilian´s Committee on Antimicrobial Susceptibility Testing breakpoints. Carbapenemase production was assessed using the Blue-Carba test. Phenotypic screening test for metalllo-β-lactamase expression was performed by combined-disk test comparing the inhibition zones of imipenem (10μg) and meropenem (10μg) and imipenem and meropenem plus EDTA (100 mM). The presence of bla_{KPC}, bla_{NDM}, and $bla_{OXA-48-like}$ genes was determined by real-time PCR. For bla_{NDM} the primers and probes used were NDM-F 5´ CTATCTCGACATGCCGGGTTT, NDM-R 5´ CCGCCATCCCTGACGAT and NDM-S-VIC-MGB 5' TCGCTTCCAACGGTTT. The isolate was resistant to all antimicrobial agents tested, except for polymyxin B (MIC equal to 1 μg/mL). The Blue-Carba and the phenotypic test using combined-disk with EDTA were positive. The bla_{KPC} and bla_{OXA-48} carbapenemase genes were not present; however, the bla_{NDM} gene was detected in the isolate.

The introduction of the bla_{NDM} gene in the *P. aeruginosa* in Brazil is worrisome and the active national surveillance studies are required to determine the real prevalence of bla_{NDM} in *P. aeruginosa* isolates.

Keywords: *Pseudomonas aeruginosa*, carbapenemase, bla_{NDM}

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