

TITLE: Emergence of *bla*_{VIM-2} and detection of *bla*_{VIM-24} in *Pseudomonas aeruginosa* isolates from clinical samples in Brazil.

AUTHORS: Santos, I.O.C.; Perreira, N. F.; Rodrigues, T.I.R.; Costa, B. S.; Oliveira, J.B.M.; Tavares-Teixeira, C. B.; Conceição-Neto, O.C.; Rodrigues, T. I. R.; Rocha-de-Souza, C.M.; Carvalho-Assef, A.P.D.

INSTITUTION: IOC – FIOCRUZ. - Instituto Oswaldo Cruz, Fundação Oswaldo Cruz (Av. Brasil No. 4365, Mangueiras - Rio de Janeiro, RJ – Brasil); ² UERJ - Universidade do Estado do Rio de Janeiro (R. São Francisco Xavier, 524 - Maracanã, Rio de Janeiro RJ – Brasil).

ABSTRACT:

Pseudomonas aeruginosa is an opportunistic bacterium causing a wide spectrum of infections mainly involving patients immunocompromised. The presence of carbapenemases makes treatment with beta-lactams unfeasible and is often an indicator of multiresistant isolates. The most common carbapenemases in *P. aeruginosa* is metallo-β-lactamase (class B) like SPM, VIM and IMP. During the period from 2015 to 2017, 15 carbapenem-resistant *P. aeruginosa* isolates, received by Laboratório de Pesquisa em Infecção Hospitalar (LAPIH/IOC), were positive for *bla*_{VIM-like} gene by PCR. These isolates were from Bahia (n=7), Espírito Santo (n=1), Minas Gerais (n=3) and Rio Grande do Sul (n=4) states. The *bla*_{VIM} was amplified by PCR and sequenced in both directions using the ABI Prism 3700 DNA Sequencer. The evaluation of carbapenemase activity was performed by CARBA NP, Blue Carba and mCIM/eCIM. The antimicrobial susceptibility was evaluated by disk diffusion method and broth microdilution test for polymyxin B according the BrCAST. Molecular typing was performed using PFGE. The allelic variant found among the isolates were *bla*_{VIM-2} (n=14) and *bla*_{VIM-24} (n=1) isolated in ???. All of them presented activity of MBL by CARBA NP, thirteen by mCIM/eCIM, but the Blue Carba identified them as serino-carbapenemase. All isolates were resistant to imipenem and meropenem (100%), followed amikacin (93,3%), doripenem (93,3%), cefepime (86,6%), ciprofloxacin (86,6%), levofloxacin (68,6%), ceftazidime (80%), gentamycin (73,3%), piperacillin/tazobactam (66,6%), and Aztreonam (33,3%). The lowest non-susceptibility rate was for Aztreonam (33,3%). All VIM producers showed susceptibility to polymyxin (MICs 0,25-1 mg/L). PFGE analyses revealed 10 different pulsotypes with the predominance of a clone in Bahia (n=5). The results suggest the dissemination of *bla*_{VIM-2} and the first description of *bla*_{VIM-24} in Brazil. Blue carba did not show good results for VIM detection. The most common metallo-β-lactamase in Brazil has been SPM but here indicate an increase in the detection of *bla*_{VIM-2}. They also indicate that increased surveillance of *bla* VIM-2 is urgently needed in Brazil.

Keywords: *Pseudomonas aeruginosa*, Resistance, VIM, Dissemination.

Development Agency: CAPES, CNPQ.