TITLE: Characterization of carbapenemase-producing *Pseudomonas aeruginosa* in Brazil.

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Bacterial resistance is a frequent and important problem in the hospital setting. Increased resistance to carbapenems in *Pseudomonas aeruginosa* may be due to the presence of carbapenemases or mutational processes. Carbapenemases are epidemiologically more important because of their easy dissemination via mobile genetic elements. During the period from 2013 to 2016, the Laboratório de Pesquisa em Infecção Hospitalar (IOC/fiocruz) investigated the presence of carbapenemase genes in 1838 *P. aeruginosa* isolates recovered from health institutions throughout Brazil. A total of 398 (21,6%) isolates were positive for carbapenemase genes, like bla_{SPM} (83,7%, n=333), bla_{KPC} (9,0%, n=36), bla_{VIM} (6,8%, n=27) and bla_{IMP} (0,5%, n=2). In order to assess the clonality and antimicrobial susceptibility profile of isolates, 62 *P. aeruginosa* isolates (26 bla_{KPC}-positive, 13 bla_{VIM}-positive, 12 bla_{SPM}-poitive, 2 bla_{IMP}-positive and 10 carbapenemase-negatives) were selected. By E-test, all isolates were resistant to imipenem (MIC_{50} ≥32 µg/ml) and susceptible to polymyxin (MIC_{50} 1 µg/ml). By disc-diffusion method, the SPM and VIM-producing isolates showed higher resistance rates to beta-lactams, fluoroquinolones and aminoglycosides. The phenotypic test for carbapenemase detection, using inhibitors, correctly identify 88.8% (n=24) of class B carbapenemases and 73.1% (n = 19) of class A carbapenemases. The clonality evaluated by PFGE showed 33 clonal groups. KPC-producing isolates belonged to 14 clonal groups, with prevalence of pulsotype R (n=7) recovered from Rio de Janeiro and Espírito Santo states. In the SPM-producing isolates, 4 clonal groups were observed with the prevalence of clonal group A (n = 8) present in Minas Gerais, Goiás and Rio Grande do Sul. The 2 IMP-producing isolates belonged to the same pulsotype (pulsotype B) and the VIM-producing isolates belonged to 7 clonal groups with the prevalence of clone T (n=4) in Bahia. Interestingly, some isolates carrying bla_{KPC} (n=1), bla_{SPM} (n=1) and bla_{VIM} (n=1) were grouped in the same clonal group in Minas Gerais and Espírito Santo (clone S). Although the great genetic diversity found in *P. aeruginosa*, the production of carbapenemases remains an imminent problem. Phenotypic identification is not always correct and the great genetic plasticity in *P. aeruginosa* ensures a polyclonal structure difficult to detect, requiring constant vigilance to contain its spread.

Keywords: *Pseudomonas aeruginosa,* carbapenemases, clonal diversity.

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