TITLE: IMP-16 PRODUCING *Pseudomonas* spp: MOLECULAR EVIDENCE OF THE CLONAL DIVERSITY AMONG CLINICAL AND ENVIRONMENTAL ISOLATES

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ABSTRACT:

Carbapenems are considered important therapeutic options for treating serious infections associated with multidrug-resistant (MDR) *Pseudomonas* spp. Whereas, acquired resistance to carbapenems can be mediated by the production of carbapenemases such as the metallo-β-lactamases (MBLs) IMP, VIM and SPM which are frequently reported in *Pseudomonas* spp and considered the most clinically significant mechanism of carbapenem resistance in this genus. IMP-16-producing *Pseudomonas aeruginosa* was first reported in Brazil in 2004 recovered from tracheal fluid of an patient in Brasilia and since then studies related clinical and environmental bacterial isolates harbouring the *bla*$_{\text{IMP-16}}$ gene in this specie and others species of this genus too. This research aimed to evidence the clonal relation of a collection of IMP-16-producing *Pseudomonas* spp recovered from clinical specimens obtained along of thirteen years (2003-20016) at University Hospital of Londrina (UHL) and environmental isolates obtained from the Southern Treatment Plant Sewage of Londrina in 2012 and 2013. The identification and antimicrobial susceptibility tests of ten isolates (6 clinical and 4 environmental) were performed by automated and conventional biochemical tests and interpreted according to Clinical and Laboratory Standard Institute guidelines. The antimicrobial resistance genes were screened by multiplex PCR to the carbapenemases of A, B and D Ambler classes and clonal relatedness was determined by ERIC PCR. The dendrogram analysis displayed 7 clusters (A-G), which revealed the maintenance of the clone A at the UHL in 10 years exhibiting the same resistance profile: total resistance to ceftazidime, intermediate resistance to imipenem and susceptibility to meropenem implying that this clone was well adapted at our hospital. However, in the last two years the new clones (B and C) presented two extensively resistant isolates which were resistant to all antimicrobial tested with exception of polymyxins, indicating that the acquisition of the *bla*$_{\text{IMP-16}}$ gene added to additional intrinsic resistance mechanism can contribute to the resistance to carbapenems. Furthermore, the *bla*$_{\text{IMP-16}}$ gene was verified in extensively resistant isolates belonging to other clones (B-G) recovered at the environment, suggesting that individual clones present in the hospital can acquire the *bla*$_{\text{IMP-16}}$ gene from the environmental strains and adapt to the hospital units.

Keywords: Clonal diversity, IMP-16, *Pseudomonas* spp

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