Title: *In Vitro* amikacin potency against *Pseudomonas aeruginosa* isolates from bloodstream and respiratory infections.

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Introduction: Determination of Minimal Inhibitory Concentration (MIC) in bacterial populations may improve treatment strategies, since higher tissue concentrations can be achieved in specific sites. Specifically, inhalational aminoglycosides in respiratory fluid may achieve concentrations as high as 5000 µg /mL. The purpose of this study is to determine amikacin potency against *Pseudomonas aeruginosa* associated to nosocomial bloodstream and respiratory infections.

Method: A total of 111 of *P. aeruginosa* isolated from patients admitted to 15 Brazilian Hospitals were analyzed. All isolates were previously identified by routine techniques and submitted to automated antibiogram in each institution, and 72 (64.8%) of them were screened as intermediate (= 32 µg /ml) or resistant (> 64 µg /ml) and 33 (29.7%) as susceptible (<16 µg /ml) by automated methods. All isolates were from bloodstream and respiratory tract nosocomial infections and were unique per patient. MICs were determined by agar dilution in the range of 4 to 4096 µg/ml. Furthermore, 26 carbapenem resistant isolates were also submitted for detection of genes encoding metallo-beta-lactamases by PCR (bla_{SPM}, bla_{VIM}, bla_{IMP}, bla_{NDM}).

Results: Overall 73% of isolates had MIC ≤ 128 µg /mL for amikacin, and of these 72% had MIC ≤ 64 µg / mL. High MICs ≥ 4096 µg / mL for amikacin were observed in 27% of isolates. The 26 carbapenem resistant isolates submitted to PCR for metallo-beta-lactamases carried bla_{SPM} gene and had high MICs for amikacin ≥ 4096 µg /ml. MICs ≥4096 µg /mL was more frequent in *P. aeruginosa* bla_{SPM} carriers compared to the other isolates (61.5% vs 16.5%, p = 0.05).

Conclusion: Considering that concentrations of inhaled amikacin in lung fluids achieves high concentrations, it is possible that part of the infections caused by high amikacin MIC isolates could be treated with an auxiliary inhalation therapeutic strategy. However, in the presence of bla_{SPM} isolates, this strategy may be limited. Further studies with pharmacodynamic modeling and characterization of amikacin resistance mechanisms in these isolates are needed.

Keywords: Amikacin, Carbapenens, Resistance, *Pseudomonas aeruginosa*

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