TITLE: DETECTION OF CARBAPENEMASE IN *Pseudomonas aeruginosa* BY PHENOTYPIC METHODS: REALITY IN A PEDIATRIC HOSPITAL.

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ABSTRACT:

Pseudomonas aeruginosa is a significant cause of healthcare-associated infections (HAIs) in adults and pediatric patients. It shows multiple virulence factors as well as intrinsic and acquired resistance mechanisms to a broad range of antimicrobials, including carbapenems, which may cause infections difficult to treat and lead to high rate of morbi-mortality. Geographically, their resistance patterns vary considerably. Over time, phenotypic and genotypic methods have been developed to detect carbapenemases. In this context, genotypic methods are still not a reality for most routine laboratories and, although phenotypic tests are successfully used for screening in Enterobacterales they remain a challenge for *P. aeruginosa*. This study aimed to evaluate carbapenemase production by mCIM/eCIM and combined disk in a collection of carbapenem-resistant *P. aeruginosa* (CRPA) isolates from pediatric patients, previously characterized by qPCR and/or immunochromatographic. Forty single isolates of CRPA obtained from November 2016 to December 2020 were evaluated, out of them, 21 were positives – SPM (18), IMP, VIM, and KPC (one single isolate each) and 19 were negative for the tested enzymes. The mCIM test was performed as described by CLSI. Simultaneously, the eCIM test was carried out using the concentration of 40 mM EDTA. The combined disk test was performed using imipenem disk (10 µg) with and without inhibitors to serine and metallo β-lactamases (MBL), 600 µg of aminophenyl boronic acid (AFBA), and 0,1 M EDTA, respectively. The sensitivity and specificity of mCIM/eCIM tests were 84% and 90%, respectively, with two false positives (one for serine and the other for MBL) and four false negatives, all of them for MBL. While, the sensitivity and specificity of the combined disk test were 100% and 48%, respectively. The low specificity observed in this test was due to a large number of false positives for serine carbapenemase (n = 19). Although it is a small study with a high prevalence of SPM, the mCIM/eCIM methods presented good resistance screening results. Due to the high prevalence of infections caused by CRPA in adult and pediatric patients, validating simple phenotypic methods for CRPA screening is important because its a simple method that can be performed in routine Microbiology Labs, including small laboratories, and assist in the treatment and clinical management of patients.

Keywords: *Pseudomonas aeruginosa*, antimicrobial resistance, carbapenem-resistant, phenotypic tests.

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