

TITLE: EVALUATION OF ALTERNATIVE PHENOTYPIC METHODS FOR DETECTION OF POLYMYXIN RESISTANCE AMONG *Enterobacteriaceae* ISOLATES

AUTHORS: SOUZA, L.S.Z.¹; FERNANDES, D.G.G.¹; LIMA, B. D.¹; FERREIRA, D.G.³; REBELLO, N.A.C.C.³; CHAGAS, T.P.G.^{1,2}; MENDONÇA-SOUZA, C.R.V.¹.

INSTITUTION: ¹ DEPARTAMENTO DE PATOLOGIA, FACULDADE DE MEDICINA, UNIVERSIDADE FEDERAL FLUMINENSE, NITERÓI, RJ (R. MARQUÊS DE PARANÁ, 303 - CENTRO, NITERÓI - RJ, 24220-000, BRASIL).

² LABORATÓRIO DE EPIDEMIOLOGIA MOLECULAR E BIOTECNOLOGIA (LEMB/LURA), UNIVERSIDADE FEDERAL FLUMINENSE, NITERÓI, RJ (R. DR. MARIO VIANNA, 523 - SANTA ROSA, NITERÓI - RJ, 24241-000, BRASIL).

³ HOSPITAL UNIVERSITÁRIO ANTÔNIO PEDRO, UNIVERSIDADE FEDERAL FLUMINENSE, NITERÓI, RJ (R. MARQUÊS DE PARANÁ, 303 - CENTRO, NITERÓI - RJ, 24220-000, BRASIL).

ABSTRACT:

Enterobacteriaceae is an important family of gram-negative bacteria responsible for a variety of healthcare-acquired infections (HAI). In Brazil, the prevalence of HAIs is relatively higher and those caused by multidrug-resistant *Enterobacteriaceae* are quite common. The emergence of multidrug-resistant *Enterobacteriaceae* and the increased use of polymyxin B to treat infections caused by these microorganisms may have contributed to the spread of polymyxin resistance. Currently, the reference method for detecting this resistance is broth microdilution but it is difficult to implement in microbiology laboratories due to its high cost and complexity. Alternative phenotypic methods for detecting polymyxin resistance have been studied. The main objective of the study was to evaluate the performance of the broth disk elution method, the drop test (Colispot) and the broth microdilution. A total of 16 *Enterobacteriaceae* clinical isolates were included: *K. pneumoniae* (n=14), *Citrobacter freundii* (n=1) and *Enterobacter bugandensis* (n=1). Our bacterial collection comprised 13 polymyxin-resistant (*K. pneumoniae* = 12; *C. freundii* = 1) and three susceptible isolates (*K. pneumoniae* = 2; *E. bugandensis* = 1) according to the broth microdilution method. For the broth disk elution method, the categorical agreement (CA) and very major errors (VME) obtained were 75% and 25% respectively. For the drop test, the CA and VME obtained were 81,2% and 18.8% respectively. None of the techniques presented major errors (ME). The sensitivity/specificity obtained were 69%/100% and 76%/100% for the broth disk elution method and the drop test respectively. Our results demonstrated an inadequacy of both methods for detecting resistance to polymyxins, since the acceptable percentages of CA and VME are > 90% and < 3%, respectively. Complementary studies involving a larger bacterial collection will be developed to improve our analysis about the performance of these alternative phenotypic methods.

Keywords: *Enterobacteriaceae*, Polymyxin resistance, Laboratorial detection.