TITLE: EVALUATION OF THE NG TEST CARBA 5 FOR THE DETECTION OF PREVALENT CARBAPENEMASES IN BRAZIL

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The emergence of carbapenemase producing Gram negative bacteria are a great public health concern. A rapid detection and identification of carbapenemases is essential to prevent further spread and provide appropriate antimicrobial therapy. Identification of carbapenemases is based on molecular tests, but that are expensive, require equipment and trained staff. In addition, several phenotypic confirmation tests have also been developed, but usually require 24h. The aim of this study was evaluating the accuracy of a multiplex Lateral Flow Immunoassay in detect NDM, KPC, VIM, OXA-48-like and IMP-type of carbapenemases. A total of 118 carbapenem resistant Gram-negative bacilli (73 Enterobacterales, 2 Acinetobacter baumanni and 43 Pseudomonas aeruginosa) previously characterized, were tested by NG-test CARBA 5 (NG Biotech, Guipry, France). The NG-Test CARBA 5 identified all KPC (n=25), NDM (n=22), VIM (n=21), OXA-48-like (n=2), NDM + OXA-48-like (n=3) and KPC + NDM (n=2) producers. IMP carbapenemases were detected in 20/34 isolates. GES (n=1), SPM (n=1), OXA-23 (n=1) and carbapenem-resistant isolates without carbapenemases (n=6) were correctly identified as negative with no false-positives. The NG-Test CARBA 5 assay was easy to perform and set-up took 5 minutes per isolate. Tests performed had easy reading, except for 6 IMP isolates that presents a weak line. The results not change after recommended reading time. Test accuracy was 98%, considering each NG-Test CARBA 5 assay as five individual tests (101 true positive and 475 true negatives in 590 tests). The fail in detect IMP producers were described by other authors, using Immunoassay and using Cepheid Xpert Carba-R assay. These results could be attributed to sequence diversity within the IMP family and the even distribution of mutations throughout the sequence that make it difficult to design primers or imunological markers sets that can detect all variants. As Brazilian institutions have a high predominance of KPC, followed NDM carbapenemases, we considered NG-Test CARBA 5 assay an efficient, rapid and easy test to implement in routine of microbiology laboratories. Discrimination of OXA-48-like and KPC or NDM carbapenemases could rapidly guide treatments with ceftazidime/avibactam, prevent antibiotic misuse and provide efficient tools to contain the spread of these bacteria in hospital settings.

Key words: Carbapenemases, Immunoassay, antimicrobial resistance