Title: DETECTION OF CARBAPENEM-HYDROLYZING OXACILLINASES AND GENETIC DIVERSITY AMONG Acinetobacter spp. ISOLATED IN THE STATE OF RIO DE JANEIRO

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Abstract:

In Brasil, the main mechanism of carbapenem resistance in Acinetobacter spp. is the production of carbapenem-hydrolyzing oxacillinases (OXA), particularly the OXA-23, followed by OXA-143. The aim of this study was the detection of oxacillinases production among Acinetobacter spp. isolates and the analysis of the genetic diversity among the OXA-producing strains. A total of 130 Acinetobacter spp. isolates were recovered from March to December 2013 from patients attending three tertiary hospitals: two located in the city of Niterói, RJ: Hospital Universitário Antônio Pedro (HUAP; n = 62) and Clínica de Saúde e Maternidade Santa Martha (CSMSM; n = 61) and one, in São Gonçalo, RJ: Hospital São José (HSJ; n = 7). Acinetobacter spp. isolates were identified using a VITEK 2 automated system (bioMerieux) and antimicrobial susceptibility was determined by disk diffusion. The presence of genes encoding carbapenem-hydrolyzing oxacillinases was detected by PCR using specific primers for the genes: blaOXA-23, blaOXA-24, blaOXA-51, blaOXA-58 and blaOXA-143. The genetic diversity of OXA-positive isolates was analyzed by pulsed field gel electrophoresis (PFGE). High rates of resistance to the carbapenems tested (imipenem: 91.5%; meropenem: 90.8%) were observed. The blaOXA-23 gene was detected in 109 (83.8%) of the 130 isolates and all of them, except three, were carbapenem resistant. In addition, the majority of the isolates (90%) were positive for blaOXA-51 gene and one isolate simultaneously presented the blaOXA-58, blaOXA-51 and blaOXA-23 genes. A total of 49 OXA-23-producing strains (HUAP, n = 28; CSMSM, n = 21) were analyzed by PFGE. A high genetic diversity was found as well as the occurrence of predominant clonal groups among the OXA-23 positive strains analyzed: group A (7/28; 25%) and group B (5/28; 11.7%) were observed in HUAP and group G (11/21; 52.4%), in CSMSM. Although the intra-hospital spread was observed, there was no inter-hospital spread. The results obtained in this work indicated that OXA-23 production was the main mechanism of carbapenem resistance among the studied population. The presence of predominant clonal groups in HUAP and CSMSM points to their importance in raising the rate of resistance to carbapenems in these hospitals.

Key words: Acinetobacter spp, carbapenem-hydrolyzing oxacillinases, genetic diversity

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