

TITLE: ACINETOBACTER CALCOACETICUS-ACINETOBACTER BAUMANNII COMPLEX: THE ROLE OF THE GENETIC ELEMENTS *bla*_{OXA} AND IS*Aba*1 IN THE RESISTANCE TO CARBAPENEM ANTIBIOTICS

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ABSTRACT

Members of the *Acinetobacter* genus are key pathogens that cause healthcare-associated infections. Oxacillinases are the primary factor underlying resistance to carbapenem antibiotics. Higher rates of carbapenem hydrolysis may derive from insertion sequences, such as the IS*Aba*1 sequence, near the *bla*_{OXA} genes. The present study examined the occurrence of the genetic elements *bla*_{OXA} and IS*Aba*1 and their relationship with susceptibility to carbapenems in clinical isolates belonging to the *Acinetobacter calcoaceticus*-*Acinetobacter baumannii* complex. Isolates identified over six consecutive years in a general hospital in Joinville, Southern Brazil, were evaluated. A pair of primers specific to the *A. calcoaceticus*-*A. baumannii* complex was used to amplify a single 722 bp segment of the *gltA* gene, which encodes the bacterial citrate synthase, in order to determine its viability for use in the subsequent genotypic analyses. The investigation of five families of genes encoding oxacillinases and the IS*Aba*1 sequence location relative to the *bla*_{OXA} genes was also conducted using polymerase chain reaction. All isolates presented the *bla*_{OXA-51-like} (n = 78) gene and 91% tested positive for *bla*_{OXA-23-like} (n = 71). The presence of IS*Aba*1 was exclusively detected in the isolates carrying the *bla*_{OXA-23-like} gene. All isolates in which IS*Aba*1 was found upstream of the *bla*_{OXA-23-like} gene (n = 69) showed resistance to carbapenems, while the only isolate in which IS*Aba*1 was not located near the *bla*_{OXA-23-like} gene was sensitive to carbapenems. Another *bla*_{OXA-23-like}-positive isolate was inconclusive regarding the IS*Aba*1 sequence position. The isolates exclusively carrying the *bla*_{OXA-51-like} gene (n = 7) showed sensitivity to carbapenems. The IS*Aba*1 sequence located upstream of the *bla*_{OXA-23-like} gene was strongly associated with carbapenem resistance in isolates of the *A. calcoaceticus*-*A. baumannii* complex in the hospital center studied. The emergence and spread of variants of the *bla*_{OXA} gene encoding carbapenemases and of ISs capable of increasing *bla*_{OXA} expression in *A. baumannii* in Brazil underscore the need for the medical community and health managers to remain alert to the potential threat of outbreaks of carbapenem-resistant isolates, especially those with the IS*Aba*1 sequence upstream of the *bla*_{OXA-23-like} gene.

Keywords: *Acinetobacter calcoaceticus*-*Acinetobacter baumannii* complex. *bla*_{OXA}. IS*Aba*1. Carbapenem antibiotics.

Development agency: FAP-UNIVILLE.

