TITLE: DIVERSITY OF *bla*$_{OXA}$ GENES, GR-PLASMIDS AND IS*ABA1* IN CARBAPENEMASE-PRODUCING *ACINETOBACTER BAUMANNII* FROM BRAZIL

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ABSTRACT

Acinetobacter baumannii is one of the most important multi drug-resistant (MDR) pathogens causing worrisome nosocomial infections. Plasmid-mediated carbapenemases genes have been also associated to *A. baumannii*, mainly OXA-carbapenemases. We studied 50 carbapenem resistant *A. baumannii* isolated from inpatients of a tertiary hospital in Brazil. We investigated the presence of extended-spectrum beta-lactamases (ESBL) (*bla*$_{CTX\text{-}M\text{-}groups\text{-}1,\text{-}2,\text{-}8,\text{-}9\ and\ 25}$, *bla*$_{GES}$, *bla*$_{BEL}$, *bla*$_{VEB}$, and *bla*$_{PER}$) and carbapenemase genes (*bla*$_{KPC}$, *bla*$_{SPM}$, *bla*$_{NDM}$, *bla*$_{IMP}$, *bla*$_{VIM}$, and *bla*$_{OXA}$). The presence of the *bla*$_{OXA\text{-}51}$ was used to confirm the identification of *A. baumannii* (Ab) species. Zone 1 of the *rpoB* gene was sequenced for the isolates carrying epidemiologically important carbapenemases. All 50 Ab isolates studied presented *bla*$_{OXA\text{-}51\text{-}like}$ as expected; 37 of the 50 Ab also presented the *bla*$_{OXA\text{-}23\text{-}like}$ gene whereas 6/50 presented *bla*$_{OXA\text{-}143\text{-}like}$ and 1/50 presented *bla*$_{OXA\text{-}58\text{-}like}$. 11 isolates presented only *bla*$_{OXA\text{-}51\text{-}like}$, however, most isolates carried more than one *bla*$_{OXA}$ resistance gene. Besides, we investigated the presence of the insertion sequence IS*Aba1* in all isolates. Only 5 Ab did not present IS*Aba1*. In all 37 isolates carrying *bla*$_{OXA\text{-}23\text{-}like}$ we found IS*Aba1* located upstream of *bla*$_{OXA\text{-}23\text{-}like}$. No ESBL and other carbapenemase genes investigated were identified in any of the 50 isolates studied. For the 7 Ab carrying *bla*$_{OXA\text{-}143\text{-}like}$ and/or *bla*$_{OXA\text{-}58\text{-}like}$ we also investigated the presence of 19 AB-GR plasmid groups using AB-PBRT. More than one AB-GR was found per isolate, with exception of the Ab carrying *bla*$_{OXA\text{-}58\text{-}like}$ that presented only the GR3, being GR-3 followed by GR-8 the most frequently AB-GR detected. Interestingly, none of the isolates showed GR6 which is the most widespread GR group across Europe, China and Taiwan, and most often associated with the *bla*$_{OXA\text{-}23\text{-}like}$ and *bla*$_{OXA\text{-}58\text{-}like}$ genes. The presence of IS*Aba1*, a recognized strong promoter for *bla*$_{OXA}$ genes, could increase the *bla*$_{OXA}$ carbapenemase activity in the isolates studied. Besides, the wide variety of AB-GR plasmids certainly contributes to dissemination of plasmid-mediated *bla*$_{OXA}$ genes and could also facilitate the spread of other resistance genes beyond *A. baumannii*. Thereby, plasmids surveillance and characterization in bacteria other than *Enterobacteriaceae* could improve knowledge and control of antimicrobial resistance.

Keywords: *Acinetobacter baumannii*, *bla*$_{OXA}$, GR-plasmids, IS*Aba1*

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