Title: Emergence and diversity of carbapenemases-producing *baumannii* and non-*baumannii Acinetobacter* at a reference hospital, Northern Brazil

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ABSTRACT

A. baumannii is one of the most relevant pathogens of healthcare-associated infections (HAI), especially by the levels of antimicrobial resistance. On the other hand, the prevalence of non-*baumannii Acinetobacter* as HAI agents has increased, in addition to the emergence of multidrug resistance in these species. The main resistance mechanism to carbapenems is the production of carbapenemases, which has been widespread among Gram-negative bacteria. In this work, we present the susceptibility profile, species identification and carbapenemases detection in *Acinetobacter* isolates from patients, admitted between 2012 to 2014, at a neonatal and child reference hospital in Belém, Pará state, Northern Brazil. The drug-susceptibility testing (DST) was performed by disk-diffusion, detection of carbapenemases by PCR (OXA-23, OXA-24, OXA-58, OXA-143, KPC, IMP, VIM, SPM and NDM) and partial sequencing of *rpoB* gene for species identification. A total of 458 isolates were obtained. After *rpoB* gene sequences analysis, a wide variety of species were observed in the hospital under study. The three species of clinical relevance belonging to the *A.baumannii-calcoaceticus* complex (ABC) were the most prevalent isolates: 309 (67.5%) *A. baumannii*, 81 (17.7%) *A. nosocomialis* and 58 (12.7%) *A.pittii*. In addition, four non-ABC species were identified: *A. seifertii* (n = 5), *A. genome* 13 (n = 3), *A. bereziniae* (n = 1) and *A. soli* (n = 1). There was a

significant difference between *A. baumannii* and non-*baumannii Acinetobacter* regarding the prevalence of multidrug resistant isolates ($p < 0.0001$). Of the 309 isolates of *A. baumannii*, 229 (74%) were considered multidrug resistant. Among the non-*baumannii Acinetobacter* isolates, six presented a multidrug resistant profile: three *A. nosocomialis*, one *A. pittii*, one *A. bereziniae* and one *A. genomo 13*. All multidrug resistant isolates were positive for carbapenemases. The great majority (224 – 95%) was *A. baumannii* OXA-23-producing. The remaining isolates were positive for other carbapenemases: *A. baumannii* OXA-143, IMP and NDM-producing; *A. pittii*, OXA-72-producing; *A. nosocomialis* IMP and NDM-producing; *A. bereziniae* and *A. genomo 13* IMP-producing. These results highlight the emergence of several non-*baumannii Acinetobacter* species oxacillinase and metallo-β-lactamases-producing at a public reference hospital in Belém, emphasizing the relevance of these species as HAI agents and reservoirs of resistance genes.

Keywords: *Acinetobacter baumannii,* non-*baumanni Acinetobacter*, HAI, carbapenemases, multidrug resistance.

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