TITLE: Co-production of \( \text{bla}_{\text{NDM-1}} \) and \( \text{bla}_{\text{OXA-23}} \) in multidrug resistance *Acinetobacter baumannii* clinical isolates from Brazil


ABSTRACT:

*Acinetobacter baumannii* species stand out as one of the major pathogens involved in infections in hospitalized patients, particularly in intensive care units. In addition, has a great capacity to acquire antimicrobial resistance mechanisms. This study describes NDM-1 and OXA-23-producing *Acinetobacter baumannii* isolates clinical from Natal, northeastern Brazil. Four isolates collected from patients admitted to private hospitals were identified as *Acinetobacter baumannii* through conventional biochemical tests, confirmed by the \( \text{bla}_{\text{OXA-51}} \) gene and MALDI-TOF system. All isolates were characterized by antimicrobial susceptibility testing by disk-diffusion for 12 antibiotics commonly used in clinical practice, E-test (tigecycline) and broth-microdilution (polymyxin B). Investigation of phenotypic production of Metallo-\( \beta \)-lactamases was assessed by using the EDTA-modified carbapenen inactivation method (eCIM). In addition, search for carbapenemases genes such as \( \text{bla}_{\text{NDM-1}}, \text{bla}_{\text{VIM-1}}, \text{bla}_{\text{IMP-1}}, \text{bla}_{\text{OXA-23}}, \text{bla}_{\text{OXA-58}}, \) and \( \text{bla}_{\text{OXA-143}} \) genes were screened by PCR. The isolates were resistant to all \( \beta \)-lactams including carbapenems. None was resistant to polymyxin B (MIC=0,5 to 2 \( \mu \)g/ml) and tigecycline (MIC=0,5 to 1mg/L). All isolates were phenotypically positive for metallo-\( \beta \)-lactamases. The PCR results were positive only to \( \text{bla}_{\text{NDM-1}} \) and \( \text{bla}_{\text{OXA-23}} \) genes in all isolates and the presence of \( \text{bla}_{\text{NDM-1}} \) was confirmed by sequencing. This is the first case of co-production of \( \text{bla}_{\text{NDM-1}} \) and \( \text{bla}_{\text{OXA-23}} \) in *Acinetobacter baumannii* strains isolated from northeastern Brazil. This description emphasizes the need for new strategies to prevent and control the spread of *Acinetobacter* that harbor both important genes in the same isolates since this profile may compromise the treatment of infections by this microorganism, which are associated with a high mortality rate.

Key words: *Acinetobacter baumannii*; \( \text{bla}_{\text{OXA-23}} \); \( \text{bla}_{\text{NDM-1}} \)

Development Agency: CAPES