TITLE: MOLECULAR CHARACTERIZATION AND CLONAL DYNAMICS OF CLINIC AND ENVIRONMENTAL *bla*$_{OXA-23}$ PRODUCING CARBAPENEM-RESISTANT *Acinetobacter baumannii* IN A HOSPITAL SETTING

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ABSTRACT:
Acinetobacter baumannii (Ab) is one of the leading pathogens in hospital infection and frequently show resistance to last-resort antimicrobials. This study aimed to investigate the genetic relationship, resistance mechanisms, and the ability to produce biofilms by clinical and environmental carbapenem-resistant Ab strains isolated from inpatients with ventilator-associated pneumonia (VAP) in an adult intensive care unit (ICU). Clonal diversity was analyzed by Pulsed Field Gel Electrophoresis (PFGE) and Multilocus Sequence Typing (MLST) in OXA-23 positive strains, while outer membrane protein (CarO) and efflux pumps (AdeABC, AdeFGH, AdeIJK) genes expression patterns were determined using qPCR array. Initial adhesion and biofilm formation were examined by quantitative assays and the results confirmed by scanning electron microscopy. Along with the extensively drug-resistant (XDR) phenotype, IS*Aba1*/OXA-51 (91.3%), IS*Aba1*/OXA-23 (52.2%), *carO* (82.6%), *pme33*-36 (100%), *adeB* (100%), *adeG* (100%), *adeJ* (100%) genes were widely found among this isolates and no differences were found between environmental and clinical strains. Among the genes evaluated by qPCR, only *adeB* was considered hyper-expressed. It was evidenced by PFGE that clones A and H was dominant among clinical and environmental strains, respectively. Seven reported sequence types (STs 227, 231, 233, 235, 258, 405, 1489) and one novel ST (1399), grouped into five clonal complexes (CC113, 109, 229, 231, 235) were found in this study. CC113 (40%) was the dominant followed by CC109 (20%), both disseminated in Brazil. All strains evaluated could adhere to an unmodified polystyrene surface and were also able to produce biofilm. This study showed a widespread of clonal complexes of XDR Ab strains harboring the *bla*$_{OXA-23}$ gene and its association with IS*Aba1* as the main mechanism of resistance to carbapenems followed by hyper-expression of the *adeB* pump in adult patients with VAP hospitalized in an ICU of a tertiary hospital.

Keywords: *Acinetobacter baumannii*, carbapenem-resistant, real time PCR, MLST, biofilm

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