TITLE: *CORYNEBACTERIUM STRIATUM* MATURE BIOFILM FORMATION ON ABIOTIC SURFACES: ENHANCEMENT OF PATHOGENICITY, INVASIVE POTENTIAL AND DISSEMINATION OF MULTIDRUG-RESISTANCE CLONES IN NOSOCOMIAL ENVIRONMENTS

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ABSTRACT:

Corynebacterium striatum has been associated with an increasing number of cases of invasive infections and nosocomial outbreaks. However, there are a few studies focused on virulence factors that may contribute to pathogenicity of multidrug-resistant (MDR) corynebacterial species related to health-care associated infections (HAIs), including *C. striatum*. The relevance of biofilm formation in development of nosocomial infections and effects of antimicrobial agents on these surface-attached communities need further investigation. In the present study, we investigated qualitative and quantitative features of biofilm formation on abiotic surfaces by different clones of *C. striatum* isolated from patients during a nosocomial outbreak in a university hospital located in the metropolitan area of Rio de Janeiro. Analysis of viability of bacterial sessile forms by c.f.u. quantification and morphology of biofilm structures by scanning electron microscopy (SEM) was performed according to previously described methods. Surface of glass and polyurethane, glass slides and catheters fragments were inoculated by immersion in 10^6 $CFU.ml^{-1}$ suspensions of bacteria grown in Trypticase Soy Broth medium. After incubation periods of 48h at 37ºC, formed biofilms were extracted by abrasion and quantified by c.f.u. counting. For SEM analysis, sections of glass coverslips and polyurethane catheters were fixed in 2.5% glutaraldehyde, post-fixed in 1% osmium tetroxide solution and dehydrated an ethanol gradient. Subsequently catheter segments were submitted to critical point drying with carbon dioxide, covered with 10nm gold layer and examined with a JEOL JSM 5310 scanning electron microscope. Results showed *C. striatum* ability to adhere to hydrophilic (glass) and hydrophobic polyurethane, abiotic surfaces at different levels. Additionally *C. striatum* strains showed biofilm formation in the polyurethane catheter surface 48h post-incubation. Data also showed maturation of biofilm resulting in the generation of a complex architecture with channels and pores that formed their three-dimensional structure, the presence of extracellular matrix. In conclusion, formation of mature biofilm on abiotic surfaces may favor pathogenicity of different *C. striatum* clones leading to invasive infections and dissemination of MDR strains through nosocomial environments.

Keywords: *Corynebacterium striatum*, Multidrug-resistence, Biofilm, SEM

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