Prêmio

33-1 Genetic risk markers for strong biofilm-formation in clinical methicillin-resistant Staphylococcus aureus and its the association with the clonal profile.


Resumo

Methicillin-resistant Staphylococcus aureus (MRSA) is one of the major human pathogens worldwide and its epidemiology has been the focus of numerous single and multicenter surveillance studies over the past years. In this study, a phenotypic and genotypic approach were used to determine the factors that influence adherence and biofilm production of the most common MRSA SCCmec types, and its relationship with antimicrobial resistance, virulence genes and the genetic background of S. aureus isolates. The strains used in this study were randomly selected from a collection of clinical MRSA strains recovered from patients hospitalized in the Teaching Hospital of the Federal University of Uberlândia, isolated from infections at various anatomical sites and evaluated for SCCmec type. Fifteen strains carrying different chromosomal cassettes were selected, five SCCmec II, five SCCmec III and five SCCmec IV, recovered predominantly from blood (67%), surgical site infections (27%) and pneumonia (6.0%). The SCCmec type and the presence of the virulence genes (icaA, icaD, fnbB, agr, IS256, bap) were assessed by PCR. The genetic relationship between the isolates and a possible association with the ability to form biofilm were investigated by pulsed field gel electrophoresis (PFGE). The initial adhesion and biofilm formation were examined by quantitative assays. To evaluate the correlation between the hydrophobicity and the ability of MRSA cell to adhere to an unmodified polystyrene surface, the surface tension and hydrophobicity of the strains were measured. SCCmec III and IV strains were less hydrophilic and adhered better than SCCmec II strains. The analysis of biofilm production showed that SCCmec III strains were characterized as strong biofilm producers; with the average biomass of biofilm from 0.53 ± 0.12 compared with 0.04 ± 0.04 those non-producers/weak producers (SCCmec II e IV). The analysis of this study showed five major pulsotypes according to the PFGE with a large genomic diversity observed by the number of subtypes in each pulsotype. The presence of the genes agr 1, fnb B and IS 256 in clinical MRSA SCCmec III strains, were considered as genetic risk markers for strong biofilm-formation in clinical by an ica-independent biofilm pathway. To our knowledge, this study is the first to demonstrate the biofilm formation by Brazilian clinical MRSA strains recovered from nosocomial infections including molecular characterization of strains. Agência Fomento: FAPEMIG e CAPES

Palavras-chave: MRSA, SCCmec, biofilm, hydrophobicity, PFGE