Título DYNAMIC OF BIOFILM FORMATION ALONG THE GROWTH CURVE IN SURGICAL CLAMPS BY Staphylococcus aureus AND Acinetobacter baumannii strains

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Resumo:

Biofilms are an aggregate of microbial cells attached to a biotic or a non-biotic surface enclosed in a matrix of extracellular polymer. Biofilms may have different bacteria as well as yeasts, and it has importance on the matrix formation and composition. Hospital-acquired infections are responsible for significant morbidity and mortality in healthcare environment; many of them are related with contamination by bacterial pathogens that grow as biofilms on medical devices. This study aimed to evaluate the dynamics of biofilm formation by Staphylococcus aureus ATCC 25923 and Acinetobacter baumannii ATCC 19606 together and separately, in surgical clamps. The clamps were incubated, in duplicates, on tryptic soy broth (10⁶ CFU/ml), under shaking for 2, 4, 6, 8, 12 and 24 hours at 37°C. After the incubation, the clamps were sonicated and the attached bacteria were counted. The obtained data were similar to S. aureus at time of 2h and 4h (6.8 x 10² CFU/ml); a successive increasing could be observed from 6h (90.7 x 10² CFU/ml) reaching the higher value at 12h (408.25 x 10² CFU/ml) that remained stable until 24h. A. baumannii reached 24 x 10² CFU/ml after 2h and 4h, of incubation, with a significant increasing in 6h (205.24 x 10² CFU/ml); value that remained stable until 12h. We also evaluated the growth of these two strains together and detected that A. baumannii reached higher numbers than S. aureus at the times of 2h and 4h (45.27 x 10² CFU/ml and 36.1 x 10² CFU/ml respectively). The implantation changed its profile after that time and after 6h of incubation, A. baumannii exceed the numbers S. aureus of (127.4 x 10² UFC/ml and 138.1 x 10² UFC/ml respectively) . The quantitative evaluation of bacteria strains through the growth curve showed that these bacteria had the same behavior in the lag- (2h-4h) and early-log- (6h) phases, with significant higher numbers of A. baumannii. A. baumannii strain also achieve stationary phase faster (8 hours) than S. aureus 12 h. The assay with both strains showed that the establishment of this polymicrobial biofilm may be determinated by the A. baumannii, suggesting that these bacterium affects the biofilm formation by S. aureus. Interactions between strains or species bring beneficials from one or both, include coaggregation of cells and protection against antimicrobial compounds. These and other mechanisms are likely to deliver synergistic effects that result in cooperative biofilm formation.

keywords: Biofilm, Hospital infections, Surgical clamps, Acinetobacter baumannii, Staphylococcus aureus.

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