EFFECT OF NON-Steroidal ANTI-INFLAMMATORY AND MUCOLYTIC AGENTS ON THE ADHERENCE OF PSEUDOMONAS AERUGINOSA AND STAPHYLOCOCCUS AUREUS

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ABSTRACT

The effect of different non-steroidal anti-inflammatory agents (salicylate, acetylsalicylic acid, diclofenac) and mucolytic agents (N-acetylcysteine, ambroxol, and bromohexine), on the adherence and biofilm formation of Pseudomonas aeruginosa and Staphylococcus aureus (each 12 clinical isolates) to plastic surfaces was studied. The presence of salicylate and N-acetylcysteine at concentration 0.5-4.0 mg/ml caused significant reduction in the adherence and biofilm formation of the tested strains to plastic surfaces, while other agents have no significant effect. The presence of salicylate reduced the optical density of the adherent cells of P. aeruginosa and S. aureus to a range of 95-74% and 94-71%, respectively, while the presence of N-acetylcysteine reduced the optical density to 82-55% and 76-47%, respectively. The antiadherent activity of both salicylate and N-acetylcysteine was also detected during studying their effects on the bacterial adherence to the surface of vascular catheter segments by using static adhesion technique and in-vitro model of vascular catheter colonization. On studying the effect of these agents on the initial bacterial adherence to the surface of the human lung epithelial A549 cells, it was found that salicylates, N-acetylcysteine, ambroxol and bromohexine (10-40 μg/ml) significantly reduced the number of the adherent bacterial cells, while, the other agents have no significant effect. An attempt was carried out to clarify the mechanism by which these agents prevent the initial bacterial adherence to the surface of A549 cells. The results showed that the antiadherent activity of the mucolytic agents (N-acetylcysteine, ambroxol and bromohexine) may depends on blocking the glycosaminoglycan receptor sites that present on the surface of these epithelial cells. The data obtained from the present study showed that both salicylates and N-acetylcysteine have the ability to reduce the adherence of P. aeruginosa and S. aureus to the surfaces of plastics, vascular catheters, and A549 cells. In addition, ambroxol and bromohexine have the ability to reduce the initial adherence of the tested strains to the surface of A549 cells.