عنوان مقاله:

Growth Rate and Biofilm Formation Ability of Clinical and Laboratory-Evolved Colistin-Resistant Strains of Acinetobacter baumannii

محل انتشار:

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خلاصه مقاله:

Introduction and Objectives: Two different mechanisms of resistance to colistin in Acinetobacter baumannii have been described. The first involves the total loss of lipopolysaccharide (LPS) due to mutations in the lpxACD operon, which is involved in the lipid A biosynthesis pathway. The second entails the addition of ethanolamine to the lipid A of the LPS resulting from mutations in the PmrAB two-component system. Materials and Methods: To evaluate the impact of colistin resistance-associated mutations on antimicrobial resistance and virulence properties, four pairs of clinical and laboratory-evolved colistin-susceptible/colistinresistant (ColS/ColR) A. baumannii isolates were used. Antimicrobial susceptibility, surface motility, in vitro and in vivo biofilm-forming capacity, in vitro and in vivo expression levels of biofilm-associated genes, and in vitro growth rate were analyzed in these strains. Results: Growth rate, in vitro and in vivo biofilm formation ability, as well as expression levels of biofilm-associated gene were reduced in ColR LPS-deficient isolate (the lpxD mutant) when compared with its ColS partner, whereas there were not such differences between LPS-modified isolates (the pmrB mutants) and their parental isolates. Mutation in lpxD was accompanied by a greater reduction in minimum inhibitory concentrations of azithromycin, vancomycin, and rifampin than mutation in pmrB. Besides, loss of LPS was associated with a significant reduction in surface motility without any change in expression of type IV pili. Conclusion: Collectively, colistin resistance through loss of LPS causes a more considerable cost in biological features such as growth rate, motility, and biofilm formation capacity relative to LPS modification.

Therefore, ColR LPS-modified strains are more likely to spread and transmit from one patient to another in hospital settings, which results in more complex treatment and control.

کلمات کلیدی:

Acinetobacter baumannii, colistin resistance, biofilm formation, growth rate, antimicrobial resistance