

Acinetobacter baumannii: a virulent pathogen in Device-associated Infections its adhesion associated virulence, biofilm formation, and antibiotic resistance

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Abstract

Acinetobacter baumannii is a crucial pathogen of nosocomial infection and an alarming threat to the medical community due to the high rate of mortality worldwide. Because of its highly contagious, biofilm-forming nature, virulence characteristics, and multi-drug resistance (MDR), it has been recognized as a red-alert pathogen on a global scale. The main components which strengthen the pathogenicity of A. baumannii are complex gram-negative cell wall structure and specialized virulence factors which facilitate its adhesion and infection spread in the host cells. Higher incidents of infections have been reported in hospitalized patients undergoing treatment with Intensive Care Unit aids and medical devices majorly causing Catheter-Associated Urinary Tract Infection (CAUTI) and Ventilator-associated pneumonia (VAP). This makes the biofilm-forming multi-drug resistant A. baumannii, the most hazardous pathogen in Device Associated Hospital Acquired Infections (DA-HAI). Several investigations unveiled that the outer membrane proteins (OMP) and other adhesion-associated virulence have an anchoring role in biofilm formation which majorly contributes to DA-HAI. Moreover, during the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) pandemic, the infection spread was further aggravated in DA-HAI. Hence, it is important to search for novel therapeutic approaches that will improve the treatment strategy and prevent device-associated infection. This review explores the relationship between adhesion-associated virulence and biofilm formation further it highlights the correlation between antibacterial resistance, and biofilm characterization to elucidate a novel therapeutic approach against this threatful pathogen.

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