Effect of Subminimum inhibitory concentrations of different bioactive compounds on biofilm formation and virulence factors of clinical isolates of *Acinetobacter baumannii*

Mona Hassan Mahmoud¹, Magdy A Amin², Mai M Zafer¹, Aly M Fahmy³ and Rania I Shebl¹

¹Ahram Canadian University, Egypt
²Cairo University, Egypt
³VACSERA, Egypt

*Acinetobacter baumannii* is a remarkable hospital pathogen, the virulence factors of this organism such as biofilm formation, bacterial adherence and invasion help the bacterium to survive in adverse environmental conditions and facilitate the development of an infection. Antiseptics are frequently used for the management of MDR pathogens and their consistent use in hospitals has elevated concerns about its resistance. The aim of this study was to determine the effect of sub-minimum inhibitory concentrations (sub-MICs) of selected antimicrobial agents (Amikacin, imipenem, benzalkonium chloride (BZC) and chlorhexidine) and natural product (garlic) on virulence factors and the emergence of resistance among *A. baumannii* clinical isolates. Susceptibility profiles of 50 *A. baumannii* isolates to eight antibiotics were investigated. MIC of various antimicrobial agents was measured by the broth microdilution method. Quantification of biofilm formation was carried out using a microtiter plate assay. The ability of test compounds to affect the bacterial adherence and invasion was investigated using type-II pneumocyte cell line (A549) and the bacterial cells count was determined using flow cytometer. Screening for the presence of *qacA/B* gene was done using PCR. Our results showed that 10 isolates were found to have variation in their susceptibility toward both amikacin and imipenem where 6 isolates were amikacin sensitive and imipenem resistant (ASIR) while 4 isolates were amikacin resistant and imipenem sensitive (ARIS). The sub MIC of BZC markedly increased the biofilm formation by 4.7 and 7.8 folds for ASIR group and ARIS group respectively. An induction in the bacterial adherence post treatment with sub-MIC of amikacin in both groups by 3 folds. Bacterial invasion was markedly increased post treatment with BZC and imipenem by 7 and 4 folds respectively in ASIR isolates, BZC showed the greatest effect ARIS isolates as it was increased by 12 folds. Amikacin had the highest effect in ASIR isolates where BZC and garlic had the highest effect in ARIS isolates 5 hours post treatment. The *qacA/B* gene was detected in 6 isolates. In conclusion, sub-MICs of antibiotics and antiseptics can lead to emergence of resistance. Therefore, careful evaluation of sub-MIC effects on bacterial physiology is needed prior to the therapeutic use.

Biography

Mona Hassan Mahmoud is currently a Teaching Assistant of Microbiology and Immunology at Faculty of Pharmacy, Ahram Canadian University with 4 years of teaching experience to undergraduate pharmacy students. She has completed Bachelor’s degree in Pharmaceutical Sciences at Faculty of Pharmacy, Cairo University in 2011. She is fascinated in the continued importance of focusing my future studies on antimicrobial resistance because it is a growing threat to the control of infectious disease globally and particularly there is an encountered increase in antimicrobial resistance in our hospitals all over Egypt, therefore her primary interest lies in the field of healthcare-associated infections and antimicrobial resistance.

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