Protective effect of hamamelitannin against biofilm production by methicillin-resistant Staphylococci isolated from blood of patients at Intensive Care Units

ABSTRACT

S. aureus and *S. epidermidis* are common pathogens in biofilm related infections of indwelling medical devices.

Aim: The aim of this study was to assess the efficacy of vancomycin and clindamycin alone and incombination with hamamelitannin as a quorum sensing inhibitor in preventing biofilm formation by *S. aureus* and *S. epidermidis*.**Methods:** The frequency of biofilm formation and its strength of 21 *S. aureus* and 26 *S. epidermidis* isolated by blood culture from patients admitted to intensive care units of Fayoum and Cairo University Hospitals was assessed by modified microtitre plate method. The minimum inhibitory concentrations (MICs) of vancomycin and clindamycin against 22 strains (11 Methicillin-Resistant *S. aureus* (MRSA) and 11 Methicillin-Resistant *S. epidermidis* (MRSE) were assessed by micro-dilution method in concentrations ranging from 0.25 µg/ml to 512 µg/ml. The ability of vancomycin and clindamycin alone and in combination with hamamelitannin as a quorum sensing inhibitor to prevent biofilm formation was detected. The presence of *icaA* and *icaD* genes was determined by polymerase chain reaction.

Results: 63.8% were strong biofilm producers, 25.5% were moderate and 10.6% were non biofilm producers. The MIC_{50} and MIC_{90} of vancomycin were 2 µg/ml and 4 µg/ml respectively against planktonic and sessile cells while those of clindamycin were 0.5 µg/ml and 8 µg/ml respectively against planktonic cells and 4 µg/ml and 32 µg/ml respectively against sessile cells. Hamamelitannin when combined with vancomycin and clindamycin in a concentration of 20 µg/ml succeeded to inhibit biofilm formation in all tested concentrations of both antibiotics.

Conclusion: Hamamelitannin could play a promising role in preventing biofilm formation in association with antibiotics. Lining of indwelling medical devices with a quorum sensing inhibitor may be a new prospect which requires future assessment