COMPARISON OF IN VITRO ANTI-BIOFILM ACTIVITIES OF A NEW POLY-ABSORBENT DRESSING WITH A SILVER MATRIX* AND A SILVER-CONTAINING CMC DRESSING¤

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AIM OF THE STUDY

This study was designed to evaluate the in vitro anti-biofilm activity of (i) a CMC dressing dressing which combines ionic silver, a metal chelating agent (EDTA) and a surfactant (benzethonium chloride or BC) and (ii) a poly-absorbent silver wound dressing which combines polyacrylate fibres and a silver lipido-colloid matrix* (TLC-Ag Technology) against methicillin-resistant Staphylococcus aureus (MRSA) and Pseudomonas aeruginosa biofilms.

METHODS

in vitro biofilm model with wound-like properties

• Bacterial strain: Staphylococcus aureus ATCC 43300 methicillin-resistant strain (MRSA) and Pseudomonas aeruginosa ATCC 9027
• in vitro biofilm model with wound-like properties*: biofilms were grown in the wells of a 24-well polystyrene microtitrator plate coated with collagen I using Tryptic Soy Broth (TSB). Mature biofilm were obtained after incubation at 35°C ± 2°C for 24 hours.
• Dressing application: Dressing samples (1 cm²) were pre-wetted with their saturation volume and were applied on mature biofilms during 24 hours with 0.5 mL of saline diluent (0.9 % NaCl). A control without dressing was performed.
• Evaluation of anti-biofilm activity: After 24 hours of exposure, the dressing samples were removed and the sessile cells were enumerated and the anti-biofilm activity was calculated

RESULTS / DISCUSSION

• Biofilms of S. aureus MRSA ATCC 43300

• Biofilms of P. aeruginosa ATCC 9027

CONCLUSION

• A single dressing application of both antimicrobial dressings significantly reduces the concentration of sessile cells of MRSA and P. aeruginosa in mature biofilms after 24-hours of exposure.
• In this in vitro model, the poly-absorbent silver wound dressing which combines polyacrylate fibres and a silver lipid-colloid matrix* has demonstrated higher anti-biofilm activity than the CMC dressing which combines ionic silver, EDTA and BC* after 24-hours of exposure.
• In these conditions, the anti-biofilm efficacy of the new poly-absorbent silver wound dressing* is 50 times stronger on MRSA biofilm and 100 times stronger on P. aeruginosa biofilm than the CMC dressing which combines ionic silver, EDTA and BC*.
• The combined action of polyacrylate fibres (mechanical action) and TLC-Ag matrix (bactericidal activity) of this new poly-absorbent silver wound dressing* enables a more rapid disruption of in vitro biofilms.

* UrgoClean Ag / ¤ AQUACEL® Ag+ Extra

Anti-biofilm activity (A) = log10 [sessile cells] of untreated biofilm – log10 [sessile cells] of biofilm exposed to dressing


Note: the anti-biofilm activities of both antimicrobial dressings were maintained throughout 7 days of contact (data not showed).

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