Presented at Nanomed 2015

Chlorhexidine hexametaphosphate in novel wound care materials

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Wound care products with antimicrobial functionality are in widespread use. Some commercial materials are depleted of the antimicrobial within a short period, and thus protection against infection may not be sustained for the lifetime of the dressing. Chlorhexidine digluconate is a component of many of such dressings, selected for its broad spectrum bactericidal activity. Chlorhexidine hexametaphosphate (CHX-HMP) has recently been reported as a novel means of providing sustained maintenance of a chlorhexidine-rich environment over an extended period [1]. Here, CHX-HMP is investigated with respect to its use as a coating for a commercial wound care material.

Tegaderm wound care material (3M, Loughborough, UK) was used as the substrate material, and Tegaderm CHG (also 3M) which contains chlorhexidine digluconate was used for comparison. Unmodified, control Tegaderm (T-C), Tegaderm coated with CHX-HMP (T-P) and Tegaderm CHG (T-G) were investigated with regard to antimicrobial efficacy against common wound pathogens MRSA, *E. coli, K. pneumoniae, C. difficile* and *A. baumanii* at time zero and after 7 days' aging, to mimic a 7-day dressing change model. Pluronic gel with and without CHX-HMP was applied in a mouse wound model with outcome measurements of time to wound healing and presence of microbes.

T-P and T-G displayed effective microbial killing of all microbes investigated. For most microbes and both time points there were no significant differences between the performance of T-P and T-G, except *A. baumanii* where T-G had a greater efficacy. T-C had no microbicidal effect. CHX-HMP had no impact on wound healing rates, and presence of Enterococcus sp. was reduced in the CHX-HMP group with respect to the control group.

CHX-HMP may prove a useful, inexpensive and straightforward means of conferring antimicrobial efficacy on wound care materials, reducing microbial load without adversely affecting healing times.

References

[1] M.E. Barbour, S.E. Maddocks, N.J. Wood and A.M. Collins, Int. J Nanomedicine, 8, 3507 (2013)