A REAL LIFE CLINICAL PRACTICE STUDY ON THE EFFICACY OF A POLIHEXANIDE CONTAINING BIOCELLULOSE DRESSING IN THE TREATMENT OF BIOFILMS IN WOUNDS

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Materials and methods:
The antimicrobial, polyhexamethylene (PHMB), has been shown to have microbicidal activity when applied to chronic wounds and burns (3). It contains polyhexamethylene biguanide, as a surface-active substance that penetrates difficult coatings and removes debris and bacteria (2,4-8). BWD has been shown to be effective in the treatment of chronic non-healing wounds. It may be combined with PHMB for continuous antimicrobial treatment (4-6). N= 28 patients from the outpatient wound clinic, with non-healing infected and/or critically colonized wounds of various etiologies that showed clinical signs of biofilm, were included in the study. Fig.2

Clinical feature of biofilms in wounds is described as a shiny translucent slimy layer on a non colonized wound surface. These biofilms are composed of cells, extracellular polymeric substance (EPS), and extracellular DNA, proteins, and polysaccharides (Fig. 1). Bacteria living in a biofilm have significantly different properties from free-floating bacteria of the same species, as the dense and protected environment of the film allows them to cooperate and interact in various ways. Pseudomonas aeruginosa is not only an important opportunist pathogen but can also be considered a model organism for the study of diverse bacterial mechanisms that contribute to bacterial persistence in relation to biofilms. Interaction between aerobic and anaerobic bacteria in a biofilm, is due to increased pathogenic effect and leads to delayed wound healing (1,2).

Discussion:
The presence of biofilms in infected wounds may further strengthen the pathogenic properties of the bacteria present. Various studies have indicated in-vitro that topical silver and povidone iodine have little effect on these biofilms (2,4,6). Clinical studies have shown that PHMB may have a positive impact on biofilms in infected wounds (3,5). The interim results of the present study confirm these results.

Conclusion:
It was shown that continuous application of PHMB using BWD was safe. The dressing seems suitable for moderate to light exuding wounds, hence 4 patients were removed from the study due to copious exudate production. The study continues until N = 35 patients have completed treatment with BWD + PHMB.

References:

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Results:
N= 16 (9 female) with a mean age of 60.9 years (SD ± 21.59) were included in the interim analysis, n=4/28 discontinued for not study related events, n=4/28 dropped out due to copious exudate, which could not be handled by BWD and n=4/28 were lost to follow up. (Fig. 2). The included wound types are shown in Fig. 3. In n=6/16 Pseudomonas aeruginosa was confirmed. The mean wound duration was scored in two groups and was 216 weeks (> 100 weeks (n=4), and 6.8 weeks (< 30 weeks (n=12). Dressing changes took place 2 to 3 times per week, depending on wound condition and exudate production. Of the 16 patients n=10 had a good reduction of the biofilm, n=5 scored moderate and n=1 had no reduction.

The mean wound size at week 0 (start) was 15.3 cm² (SD ± 14.54) and had reduced at week 24 (end) to 6.0 cm² (SD ± 13.04). The mean % of red tissue present at week 0 was 38.3%, for slough this was 61.7%.

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Introduction:
Of non healing and critically colonized wounds, 65-80% is associated with biofilms, leading to chronic inflammation and delayed wound healing (1). A biofilm is an aggregate of microorganisms in which cells adhere to each other and/or to a surface (1). These adherent cells are frequently embedded within a self-produced matrix of extracellular polymeric substance (EPS), which is generally composed of extracellular DNA, proteins, and polysaccharides (Fig. 1). Bacteria living in a biofilm usually have significantly different properties from free-floating bacteria of the same species, as the dense and protected environment of the film allows them to cooperate and interact in various ways. Pseudomonas aeruginosa is not only an important opportunistic pathogen but can also be considered a model organism for the study of diverse bacterial mechanisms that contribute to bacterial persistence in relation to biofilms. Interaction between aerobic and anaerobic bacteria in a biofilm, is due to increased pathogenic effect and leads to delayed wound healing (1,2).

This paper presents the interim results of a real life clinical practice study on the efficacy of a polihexanide containing BioCellulose Wound Dressing (BWD) applied on infected wounds, containing a biofilm.

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