Prospective Case Series on the Efficacy of Antimicrobial Laminated Poly Electric Scaffold on Bacterial Loads of Chronic Ulcerations through Fluorescence Imaging

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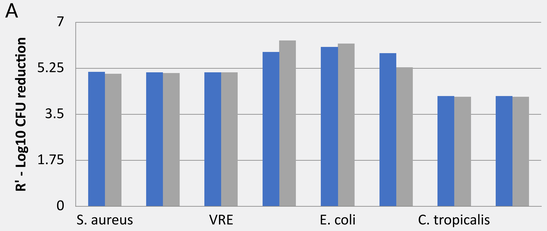
BACKGROUND

Bacterial loads or bioburden of hard-to-heal ulcerations have prolonged and stalled healing rates, which could lead to complications and increased costs, such as prolonged care and hospitalizations. Decreased bacterial loads have improved healing rates in all chronic ulcerations. We want to show the effectiveness of this novel scaffold on bacterial load through fluorescence imaging and decreased wound measurements.

A



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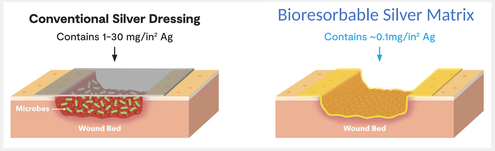

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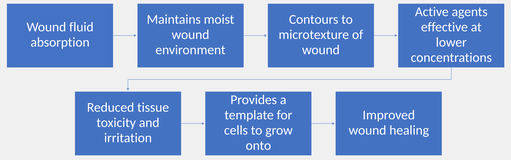


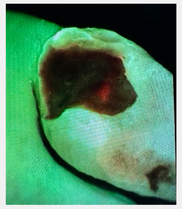
Figure 1: A) The Matrix provides a 4- to 6-log reduction in a variety of bacteria and yeast, including MRSA and VRE. [1,2] B) Mechanism of action of a bioresorbable silver matrix. Unlike conventional silver dressings, the Matrix contours to the microtexture of the wound bed allowing active ingredients to be effective at low doses.[3] C) The mechanism of action of the Matrix is designed to facilitate improved wound healing.[3]

METHODS

Complex community patients with chronic ulcerations were enrolled in a prospective case series to evaluate the effectiveness of a synthetic antimicrobial poly-electrolyte matrix over one month, and patients were followed for 30 days. The primary endpoint was wound closure, with a secondary outcome of controlling wound bioburden between clinic visits (seven days). Real-time diagnostic fluorescence imaging was used to evaluate bioburden in the wound at each weekly clinic visit. Data on clinical outcomes at one-week time points with photos were obtained for each patient visit.

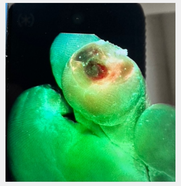
RESULTS

Picture 1: Patient 1 Initial wound size



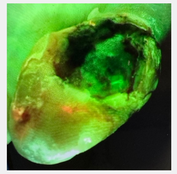
Picture 4: Patient 1 initial Florescence image

Picture 7: Patient 4 Initial wound size



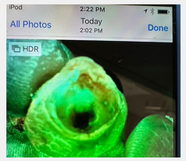
Picture 10: Patient 4 initial Florescence image

Picture 2: Patient 1-1 week wound size



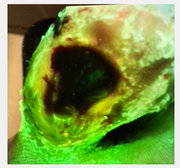
Picture 5: Patient 1 1 week Florescence image

Picture 8: Patient 4 1 week wound size



Picture 11: Patient 4 1 week Florescence image

Picture 3: Patient 1 4 week wound size



Picture 6: Patient 1 4week Florescence image

Picture 9: Patient 4 4 week wound size

Picture 12: Patient Healed— No diagnostics image

RESULTS

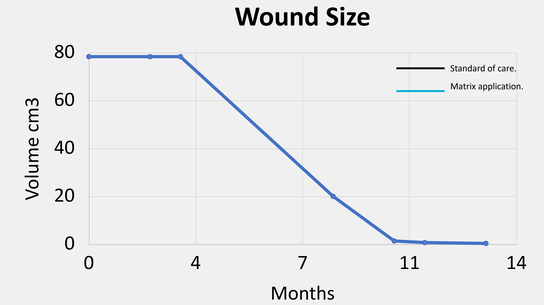


Figure 3: The healing trajectory of the wound over ___ months. Bright blue lines indicate period of Matrix application.

SUMMARY

Eight patients with recalcitrant ulcerations previously treated with standards of care were prospectively enrolled in the case series and followed for 30 days. It was observed that wound bioburden was controlled at one-week intervals when applying an antimicrobial laminated poly-electrolyte scaffolding. Clinically, the bacterial loads were not detectable after weekly applications of polyelectrolyte scaffolding in these contaminated wounds. Additionally, 75% (6 of 8) of previously stalled complex wounds resistant to current standards of care progressed to complete wound closure in 30 days.

CONCLUSIONS AND FUTURE DIRECTIONS

Bioburden in wounds has been proven costly and has a prolonged effect on wound healing rates. In this case series, adding an antimicrobial laminated poly-electric scaffold to the standard of care reduced the level of bacteria load, wound measurements and improved healing rates on recalcitrant complex wounds.

REFERENCES

1. A Agarwal, et al., Surfaces modified with nanometer-thick silver-impregnated polymeric films that kill bacteria but support growth of mammalian cells. Biomaterials, 2010. 31(4): p. 680-690.
2. M Herron, et al., Reduction in wound bioburden using a silver-loaded dissolvable microfilm construct. Advanced healthcare materials, 2014. 3(6): p. 916-928.
3. SW Manning, et al., Efficacy of a bioresorbable matrix in healing complex chronic wounds: An open-label prospective pilot study. Wounds, 2020. 32(11).