The Management of Wounds with Exposed Tendon and Bone using Innovative and Complementary Technologies: Ovine Extracellular Matrix and Gentian Violet/Methylene Blue Antibacterial Foams

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INTRODUCTION

Wounds with exposed tendon and bone are a major challenge due to the degree of damaged or missing tissue, where the void requires reconstruction and re-epithelialization. As such, these wounds present a high risk of wound infection. The objective of this study was to describe the use of a treatment bundle that includes extracellular matrix (ECM) technology and Gentian Violet/Methylene Blue (GV/MB) antibacterial foam dressings. The ECM technology is protected from microbial contamination, prevents biofilm formation, as well as being able to modulate wound proteases and build tissue [1]. GV/MB polyvinyl alcohol (PVA) foam dressing* is a complementary technology which is non-cytotoxic and does not inhibit growth factors. Its unique capillary action continuously pulls harmful bacteria-laden exudate, slough and debris away from the wound. It also helps to flatten rolled wound edges facilitating re-epithelization.

METHODS

Wounds (n=11), including VLU (2) DFU (1), PI (2), surgical (2), traumatic (2) and other (2) were included in the study. The average wound size was 4 cm^2, range 1 to 17.5 cm^2. The average wound age was 6 weeks (range 0 to 24 weeks). All wounds received debridement per institutional guidelines. Ovine ECM/Ag† was applied and covered with either GV/MB antibacterial polyvinyl alcohol (PVA) foam* or GV/MB polyurethane (PU) foam dressingϕ depending on the level of exudate. Following an initial lead in with ECM/Ag, wound management was switched to non-antimicrobial ECM#. Wounds were measured and imaged at each visit.

RESULTS

Of the 11 wounds enrolled in the study, 6 were lost to follow-up during the course of management. All wounds responded well to the treatment bundle with 73% (8/11) of wounds classified as 'responders', achieving a >50% reduction in wound area by 4 weeks. At 12 weeks 43% of wounds had closed, and this increased to 100% when wounds lost to follow-up where removed from consideration. The average percentage wound area at 4 weeks was 36% of the starting wound size. While only 45% of wounds closed (n=5/11), the closure rate was masked by wounds either lost to follow-up or still undergoing management.

CONCLUSIONS

The combination of GV/MB foams and ECM technology was effective in the management of wounds with exposed tendon and bone, and helped overcome the inflammatory phase. As the products can be used interchangeably, treatment can be tailored to a specific wound at any phase of healing.

"Responders" at 4 weeks:

73%

>50% reduction in wound area at 4 weeks; n=8/11

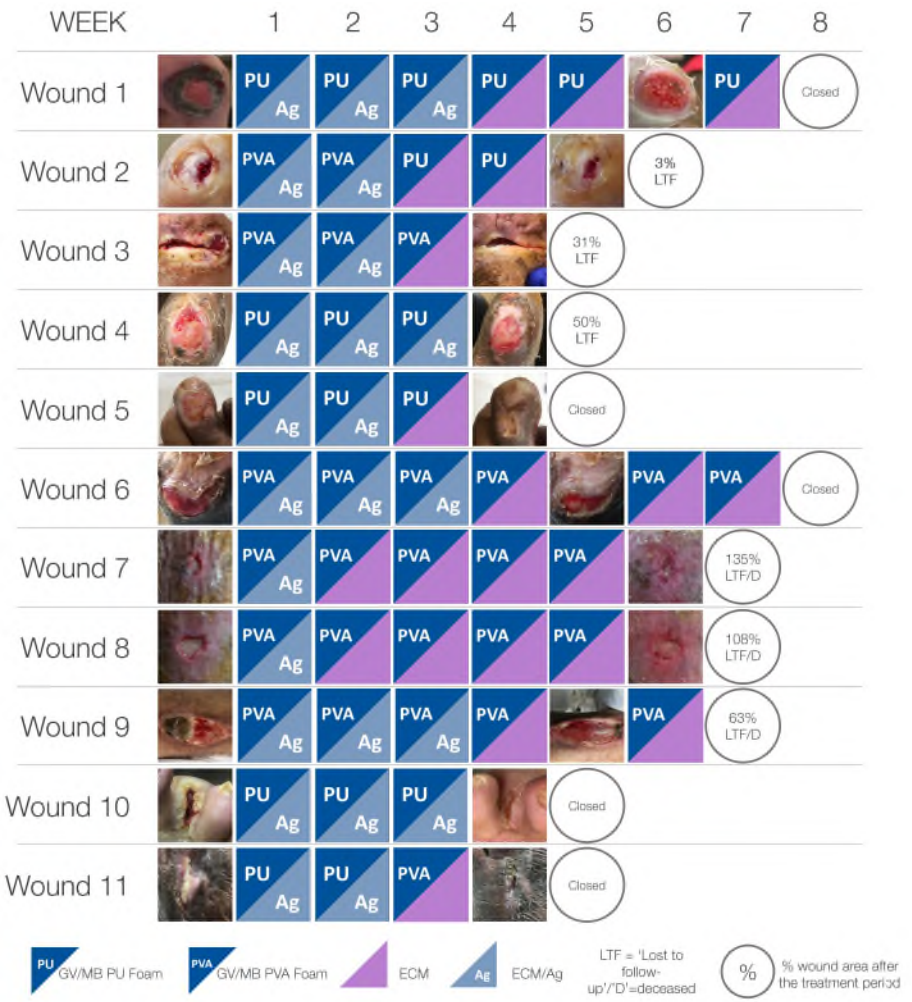
Average % wound size reduction at 4 weeks:

64%

Wounds closed at 12 weeks:

100%

Excluding those lost to follow-up



Financial support was provided by Appulse Medical (www.appulsemed.com). Product was provided by Hydrofera LLC (CT) and Aroa Biosurgery LTD (New Zealand). †Endoform Antimicrobial Dermal Template; #Endoform Natural Dermal Template; *Hydrofera Blue CLASSIC Foam dressing; ϕHydrofera Blue READY Foam dressing.

1. Karnik, T., S. G. Dempsey, M. J. Jerram, A. Nagarajan, R. Rajam, B. C. H. May and C. H. Miller (2019). "Ionic silver functionalized ovine forestomach matrix - a non-cytotoxic antimicrobial biomaterial for tissue regeneration applications." Biomater Res 23: 6.