

Favorable Treatment Outcome Utilizing Combined Active *Leptospermum* Honey with NPWT to Enhance Removal of Devitalized Tissue and Potentiate Wound Healing

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MEDICAL HISTORY

A 69 year-old female with a past medical history significant for gastric bypass, hypertension, and atrial fibrillation had an umbilical hernia repair performed on March 25, 2009. Following the hernia repair and subsequent staple removal, she developed significant diarrhea, resulting in hypotension and worsening of cardiac status requiring acute hospitalization. Abdominal wound dehiscence with feculent abdominal wall discharge was noted. Computerized axial tomography was performed and revealed a phlegmon along the lower anterior wall, and gas adjacent to the site of hernia repair and surgical mesh, consistent with necrotizing fasciitis. The patient required multiple episodes of wide surgical debridement, abdominal irrigation procedures, removal of infected mesh and several weeks of intravenous antibiotic therapy. A negative pressure wound therapy (NPWT) dressing was applied to the abdominal wound following each surgical debridement. Once the patient was medically stable she was transferred to our acute care rehabilitation facility for wound management. She presented with a large, painful, full thickness mid-abdominal wound and a connecting right lateral relief incision. The wound contained a considerable amount of slough.

OBJECTIVES

1. Identify a wound treatment modality that would minimize the accumulation of slough and potentiate the function of NPWT, thus hastening wound healing.

THEORY

Complicated wounds with a significant amount of slough require prolongation of treatment, numerous surgical debridement procedures and extended patient hospitalization. Combining wound treatments may improve the rate of healing and result in decreased burden for both the patient and the healthcare system.

Devitalized tissue, such as slough, interferes with the maximum benefit of NPWT. Active *Leptospermum* honey (ALH) is a proven modality used to promote debridement of slough and assist in the maintenance of a moist environment for optimal wound healing. The combination of topical medical grade ALH and NPWT is thought to minimize the amount of devitalized tissue and potentiate wound healing.

DEBRIDING PROPERTIES OF HONEY

The mechanisms by which ALH promotes debridement include autolysis and an osmotic effect. Application of ALH provides a moist environment which facilitates the process of autolysis. In addition the high sugar content of honey promotes movement of fluid from an area of high concentration to an area of low concentration, which promotes an outflow of fluid. The outflow of fluid, or "osmotic effect", draws lymph fluid to the wound surface. In addition to bathing the wound, circulating plasminogen is drawn to the wound surface in the lymph fluid. Plasminogen is converted to plasmin, an enzyme, which disrupts the bonds that tether necrotic tissue to the wound bed.

ANTI-INFLAMMATORY EFFECT

Excess inflammation prevents healing and causes further tissue damage. Reduced inflammation following application of ALH has been noted in biopsies of tissue treated with ALH. This is not solely attributed to honey's antimicrobial or debridement effect, but rather it is attributed to mechanisms and components which stimulate cytokine induction and modulation of the inflammatory response.¹ The anti-inflammatory effect reduces pain and the opening of blood vessels thereby reducing edema and exudates.²

METHODOLOGY

A retrospective case study evaluating the combined application of ALH placed directly onto the wound bed followed by the application of NPWT, at 125 mm Hg, continuous suction, with wound care changes occurring every 72 hours for a total of three weeks (nine applications). Outcome measures included improvement in wound measurements and changes with respect to wound characteristics such as undermining, tunneling, percent of slough, exudates and amount of pain. At the endpoint of this study there was 95% reduction in slough combined with significant contraction of the wound bed. NPWT treatment was used solely for three weeks then discontinued. A topical silver non-adherent foam dressing was used until the wound completely healed by the time of final discharge.

OUTCOMES

The combined use of ALH and NPWT for three weeks resulted in the almost complete obliteration of slough, decreases in undermining and wound connection, promotion of granulation tissue, concurrent decrease in wound pain and significant decrease in wound dimensions. Once the ALH was initiated adjuvant surgical debridement was no longer required to achieve or enhance results. There was no adverse effect from this combined modality. Once the wound bed achieved significant reduction in amount of slough and the appearance of the granulation tissue improved, the combination of ALH and NPWT was discontinued. NPWT treatment was then used solely for three weeks. When the wound had fully granulated to the surface, NPWT was discontinued and a silver, non-adherent foam dressing was applied three times weekly. Complete healing was achieved by the time of discharge.

CONCLUSION

ALH combined with NPWT decreased pain, inflammation, and exudates and was a safe and efficacious technique to limit the amount of devitalized tissue, and promote faster wound healing. This is a single case study and larger trials are recommended to further ascertain the exponential benefits of combination therapy utilizing ALH and NPWT.



WEEK 1

Tender full thickness mid abdominal wound with complete tunneling towards right lateral relief, moderate exudates, undermining and significant amount of slough. Measurements: 20.0 cm x 27.0 cm x 4.0 cm, lateral wound 5.0 cm x 3.0 cm x 0.1 cm.



WEEK 2

Non tender, full thickness mid abdominal wound with reduction of wound dimensions, resolving tunneling towards right lateral relief, light exudates, reduction of undermining and slough. Measurements: 18.0 cm x 26.3 cm x 3.6 cm.



WEEK 3: 5-4-09

Non tender, contracting full thickness mid abdominal wound with continued resolution of tunneling towards right lateral relief, light exudates, and further reduction of undermining and slough. Measurements: 17.9 cm x 26.0 cm x 3.3 cm



WEEK 3: 5-6-09

Healing, non tender, full thickness mid abdominal wound with resolution of tunneling towards connecting right lateral relief, continued reduction of undermining, reduction of wound dimensions and exudates, minimal slough.

*MEDIHONEY®, Derma Sciences, Inc., Princeton, *MEDIHONEY®, Derma Sciences, Inc., Princeton, NJ. **VAC™, Kinetics Concepts, Inc., San Antonio, TX. *** Mepilex® Ag Foam, Mölnlycke Health Care, Norcross, GA.

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