Selection of a Cost Effective Debriding Alternative to a Pharmaceutical Enzymatic Agent at One County Long Term Care Facility

INTRODUCTION

The purpose of this investigation was to confirm reports that active Leptospermum honey impregnated calcium alginate dressings* (HICADs) are a cost-effective, non-cytotoxic alternative to enzymatic debridement for wounds with eschar, particularly when residents are not surgical candidates.¹⁻³

CLINICAL PRESENTATION

This case study describes an 89 year-old male with multiple co-morbidities. Past medical history included coronary artery disease, diabetes mellitis, and hemodialysis dependent chronic renal failure. He sustained a fractured right hip and a bipolar hemiarthroplasty was performed. He was discharged to long term care (LTC). Upon admission to LTC, a community acquired suspected deep tissue injury (DTI) of the sacral area was noted. The suspected DTI quickly evolved into an unstageable, sacral pressure ulcer with a 10 cm² x 9.5 cm² black eschar. The inferior border of the ulcer extended to the anal verge, leaving little periwound surface tissue for securing an adherent dressing. The patient had loose and liquid bowel movements one to two times each shift requiring frequent dressing changes.

DEEP TISSUE INJURY

The National Pressure Ulcer Advisory Panel has provided the following description of suspected deep tissue injury:

Suspected deep tissue injury is defined as an area of purple or maroon localized area of discolored intact skin or blood-filled blister due to damage of underlying soft tissue from pressure and/or shear. The area may be preceded by tissue that is painful, firm, mushy, boggy, warmer or cooler as compared to adjacent tissue.⁴

Deep tissue injury may be difficult to detect in individuals with dark skin tones. Evolution may include a thin blister over a dark wound bed. The wound may further evolve and become covered by thin eschar. Evolution may be rapid exposing additional layers of tissue even with optimal treatment. ⁴

METHODOLOGY

Active Leptospermum HICADs were selected as a non-caustic alternative to pharmaceutical enzymatic agents for debridement. The HICAD was applied daily (or more frequently if soiling occurred) and covered with a foam dressing. Within two weeks the black eschar transitioned to thick tenacious slough. Within eight weeks the wound was beefy red, with surrounding tissue healed enough to permit adherence of a dressing. Dressing changes were decreased to 3 times weekly.

DEBRIDING PROPERTIES OF HONEY

Active Leptospermum honey helps to painlessly lift necrotic eschar and slough from wound tissue. Some of the mechanisms of action have been reported as follows:

A moist environment aids in the process of autolysis. In addition, the high osmolarity (high sugar content) of honey facilitates movement of fluid from an area of higher concentration to an area of lower concentration. This outflow of fluid, known as an osmotic affect, draws lymph fluid from the deeper tissues, which bathes the wound and cleanses debris from the wound surface and promotes strong autolytic debridement.

Another likely explanation of the debriding effect of honey is that inactive plasminogen is converted within the wound matrix to the active enzyme form, plasmin. Plasmin is known to break down fibrin clots which enhance adherence of slough and eschar to the wound bed. It is common to find fibrin in chronic wounds. (Chronic wounds and a state of inflammation prevent plasminogen from being converted to active plasmin in the wounds. The anti-inflammatory effect of honey allows plasminogen to be converted to the active enzyme plasmin.)³

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COST SAVINGS

This LTC facility typically applies an enzymatic debriding agent twice daily. A wound measuring 10 cm² x 9.5 cm² would require one-half of a 15 ml. tube at each dressing change. At a cost of \$65.00 per tube this amounts to \$65.00 per day. Instead, once daily HICADs were initiated with a dressing cost of only \$10.00 and one-half the number of dressing changes. Using HICADs for this case eliminated the need for a pharmaceutical agent resulting in significant cost savings.

RESULTS

Black eschar was rapidly debrided with the HICAD. Cost savings included the amount and cost of product, decreased nursing time due to ease of application during dressing changes, and ultimately the avoidance of wound infection.

Despite multiple co-morbid factors the necrotic tissue was replaced with healthy granulation tissue and there was a 77.7% reduction in wound size. The patient was lost to follow-up due to a medical emergency.

CONCLUSION

Active Leptospermum HICADs enhanced wound healing in this resident with multiple co-morbidities. The dressing provided a pain-free, cost-effective alternative to an enzymatic debriding agent, and it was easy for staff to apply. Granulation tissue was enhanced, and no overgrowth of microorganisms was noted.



5/2/08 – 10 cm² x 9.5 cm²

A skin assessment was performed upon admission to the facility. An area of suspected deep tissue injury (DTI) was noted. The tissue evolved into a black eschar. Daily active *Leptospermum* HICADs were initiated.



5-23-2008 –10.0 cm² x 9.5 cm² x 1.6 cm² Within three weeks the eschar was eradicated. The base of the wound is covered with thick adherent yellow and tan slough. The patient experienced frequent episodes of incontinence (bloody diarrhea.) The frequency of the HICAD changes were changed once daily and as needed for soiling.



7-25-2008 – 7 cm² x 5.5 cm² x 1.6 cm² Less than 25% of the wound base has slough remaining. The edges are contracting and the periwound skin is intact.



8-22-2008 – 6.5 cm² x 5.5 cm²

*MEDIHONEY Active Leptospermum Honey Absorbent Calcium Alginate Dressing, Derma Sciences, Inc., Princeton, New Jersey. Funding for cost associated with this poster provided by Derma Sciences, Inc., Princeton, New Jersey.

References

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4. National Pressure Ulcer Advisory Panel (2007). National Pressure Ulcer Advisory Panel Updated Staging System. Retrieved March 8, 2009 from http://www.npuap.org/pr2.htm.



6-13-2008 – 7 cm² x 8 cm² x 2.3 cm²

Less fibrin and thick adherent slough is evident in the wound bed. Undermining is present at the 11 o'clock position. Epithelial tissue is noted to be migrating at the wound edges. No evidence of infection is noted.



9-05-2008 – 4.5 cm² x 4.7 cm² The wound remained infection free and the size decreased despite multiple co-morbid factors. The patient was lost to follow-up due to a medical emergency.