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Sodium Hypochlorite Hydrogel Debrides Necrotic Wound Tissue

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Problem

Complete debridement of necrotic tissue is the first principal of wound care. Often mechanical debridement is not possible because of pain, provider skills, facility policies and patient noncooperation. Enzymatic debridement is an expensive alternative to mechanical debridement.

Sodium hypochlorite (NaOHCl) is the shelf-stable salt of hypochlorous acid (HOCl), long used for wound therapy. HOCl is used by white blood cells to kill bacteria. Synthesized by the myeloperoxidase enzyme, HOCl releases oxygen free radicals that kill bacteria without harming eukaryotic cells, which are protected by a lipid membrane.^{1,2}

Hypochlorite solution delivers reactive oxygen species that are: effective in controlling wound odor,³ a mild local anesthetic via disruption of nociceptive receptors,⁴ highly effective in controlling biofilm microorganisms which release inflammatory mediators that prevent wound healing and inhibit growth of epithelial migration precursor cells,^{5,6} theoretically involved in the early cell signaling that recruits bone marrow epithelial cell precursors, and vascular endothelial stem cells, to the wound bed.⁷

Reactive breaks bonds between proteins in a manner identical to hydrochloric acid (HCl) in the stomach, which directly breaks down proteins in digestion of

meat. We reported that pretreatment with HOCl solution, to break down protein bonds, enhances effective, humane, “soft debridement” of painful granulating wounds with terry cloth.⁸

This study asks, does commercially available hypochlorite gel function to debride wound eschar? Could hypochlorite gel serve as an alternative to enzymatic wound debridement?

Methods

Three chronic leg wounds present > 12 weeks were treated with hypochlorite gel under appropriate dressings to control biofilm bacteria.

Results

Photos document debridement and healing of all wounds. Pain and bioburden control is discussed.

Conclusion

Hypochlorite gel appears, in an anecdotal three patient series, to debride necrotic wound eschar when used under dressings for control of biofilm bacteria.

References

1. McKenna, SM; Davies, KJ (1988). Inhibition of bacterial growth by hypochlorous acid. Possible role in the bactericidal activity of phagocytes. *The Biochemical Journal* 254 (3): 685-92.
2. Dahlgren, A. Karlsson. Respiratory burst in human neutrophils. *J Immunol Methods* 232:3-14, 199
3. Jones J, Barr W, Robinson J, Carlisle C. Depression in patients with chronic venous ulceration. *Br J Nurs* 2006;15(11):S17-23.
4. Helm R, McKernan S., *Microvascular Skin Responses in Elderly People with Varicose Leg Ulcers*, *British Journal of Geriatrics, Age and Aging*, 1999, V20.2.pp124-128.

5. Phillips, R. Wolcott, J. Fletcher, G. Schultz. Biofilms Made Easy. Wounds International, 1(3): 1-6, 2010.

6. Wolcott RD, Rhoads DD. A study of biofilm-based wound management in subjects with critical limb ischemia. J Wound Care 2008; 17:145-8.

7. SR Thom, VM Bhopale, Stem Cell Mobilization by hyperbaric oxygen, Am J Physiology,290,p1378, 2006.

8. Winkler M., Wisnieski L., Hypochlorous Acid Enabled Soft Debridement Speeds Healing of Refractory Venous Leg Ulcers: simplicity, low cost and patient comfort are advantages. Symposium on Advanced Wound Care (SAWC), Dallas, TX, April 2011

[http://www.compressiondynamics.com/compress links/Abstract SAWC Hypochlorous Acid Enabled Soft Debridement Speeds Healing of Refractory VLU 04 2011.pdf](http://www.compressiondynamics.com/compress_links/Abstract_SAWC_Hypochlorous_Acid_Enabled_Soft_Debridement_Speeds_Healing_of_Refractory_VLU_04_2011.pdf)

* Anasept® Antimicrobial Skin & Wound Gel, Anacapa® Technologies, Inc., San Dimas, CA