pure&clean® | CASE STUDY

Using a Novel Spray-On Antimicrobial Hydrogel to Reduce Wound Bioload and Prevent Wound Bed Dehydration for Lower Extremity Chronic Wounds a Case Series

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Background and Objective

Stabilized hypochlorous acid (HOCl) is a potent wound and environmental antimicrobial agent but short exposure times often limit its effectiveness.[1] Recent studies have shown that HOCl achieved greater antibacterial efficacy against planktonic bacteria and biofilms as treatment times and irrigating volumes are increased.[2,3]

Although wound cleansers come in many forms, they all derive from liquid components. From saline to peroxides to povidone, all antimicrobials are liquids that require spray-on or swab application. Applied antimicrobials come as gels, ointments, or pastes that can be difficult to apply to a dressing or wound.[4] Single-use tubes are expensive, and larger more cost-effective tubes are not designed for multi-use in clinics. Recently, hydrogel alternatives have become increasingly popular. Their absorptive and moisture-exuding properties prevent wound desiccation and maintain optimal conditions for wound healing.[5] With direct application into the wound, Hydrogels promote autolytic debridement by hydrating necrotic tissue and promote granulation from the wound base upward.[5]

Development of a novel, spray-on, hypochlorous acid (HOCl) Pure&Clean® Hydrogel now facilitates quick administration, even distribution, easy access to deeper wounds, and minimal discomfort to the patient.[6] This administration method decreases contamination risk from direct contact with the patient, and therefore, has multi-use functionality that can be applied independent of secondary bandaging. Hydrogel viscosity allows for layered application with minimal product waste.

HOCl is a naturally occurring chemical produced by our own neutrophils to eliminate bacteria encountered in the tissues, with both antipruritic and anti-inflammatory properties. HOCl is microbicidal but shows no signs of cytotoxicity in concentrations used for wound treatment. The superior antimicrobial properties of HOCl has been extensively documented in diabetic foot ulcers. It helps resolve infection and improves wound healing conditions by, most notably, preventing unwanted biofilm formation.[7,8,9] Presented are four cases in which Pure&Clean® HOCl spray-on Hydrogel was applied and subsequent photographs after several days of use.

The objective of this investigation was to assess the efficacy of Spray-On Antimicrobial Hydrogel® in reducing wound bioload for lower extremity chronic venous stasis ulcers.

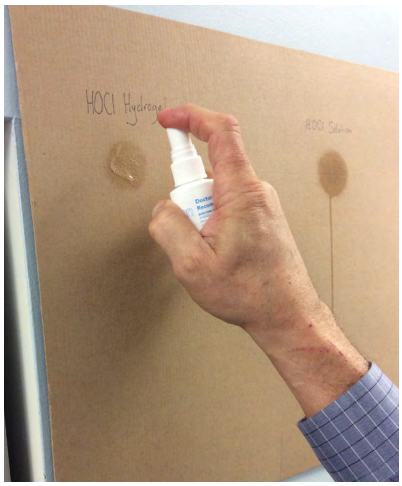
Methodology

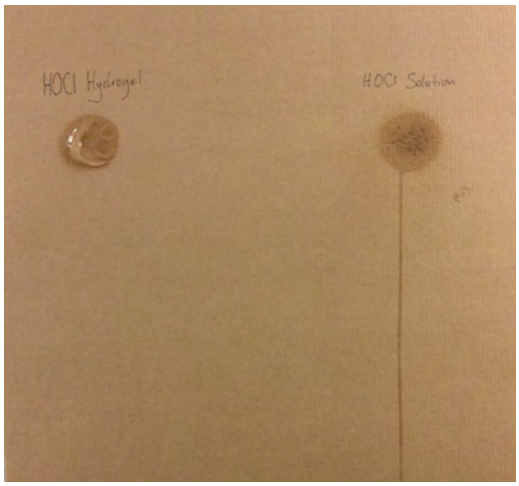
A sample size of four patients with lower extremity chronic venous stasis ulcerations was used for evaluation. The spray-on gel was initially used on pieces of cardboard hung on the wall to demonstrate for patients the layering effect and viscosity of the Pure&Clean® Hydrogel. With patient consent, the spray-on gel was then applied directly to the wound bed, layering as necessary in a horizontal or vertical fashion. The areas of application were observed for dripping or running, and the wounds were then dressed appropriately using standard bandaging methods. The bottles never came in contact with the patient and the gelling feature allowed it to be applied independent of the whole bandaging process. Very little of the gel was wasted in the clinic and no single-use applications were performed. Patients were instructed to maintain all dressings intact until follow-up assessment several days after which photographs of the wounds were obtained.

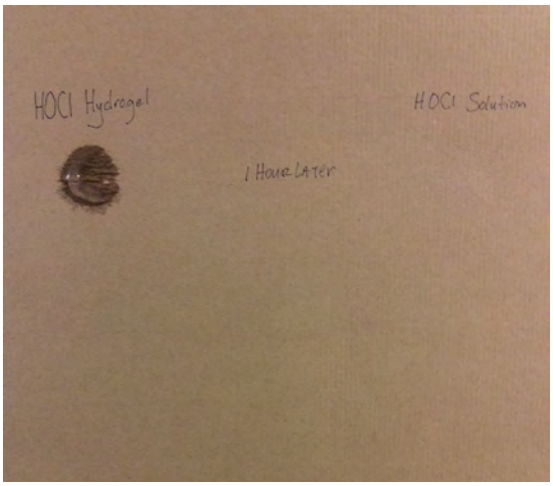
Case Presentation

Patient 1-4: Each patient presented with a chronic venous stasis ulcer on the leg of several months duration, presented with an increase in wound odor and drainage secondary to a biofilm development under the dressing after one week of compression with a short stretch dressing. Treatment in each case consisted of an HOCl cleansing Pure&Clean® Wound Cleanser and application of Pure&Clean® Hydrogel to the wound bed, a hydroconductive absorptive dressing, and a new short stretch compression dressing twice each week.
Photos were taken after one week of treatment (2 applications).

Results







Results (cont.)

Wound #1

Wound #3

Wound #2

Wound #4

Discussion

The purpose of this study was to evaluate the effect of application of a novel hypochlorous acid spray-on Pure&Clean® Hydrogel to decrease wound colonization and biofilm formation under an extended wear compression dressing. A spray-on hydrogel was applied to prevent bacterial accummulation on the wound surface. The spray-on feature prevents direct contact with the patient and provides multi-use functionality for increased economic value.

First, the spray-on form of the gel demonstrated efficient and easy application. It can be applied and built up in layers on the wound, both horizontally or vertically, without the fear of the gel running down the leg and off of the wound surface. This feature allows the Hydrogel to remain in place and prevent wound desiccation while maintaining a wound environment optimal for autolytic debridement and moist wound healing.[1] Furthermore, the Hydrogel bottles never come into direct contact with the patient and the gelling feature allows it to be applied independent of the whole bandaging process, preventing risk of cross contamination. The ease of application also makes a difficult process easier for patients performing dressing changes at home in between appointments. The spray-on feature facilitates easy, even application and access to deeper wounds with minimal patient discomfort.[6]

Second, the superior antimicrobial properties of hypochlorous acid can be applied to the wound to prevent unwanted biofilm formation between sharp debridements. HOCl is a naturally-occurring, microbicidal chemical produced by neutrophils in the body with both antipruritic and anti-inflammatory properties.[3] Studies have shown HOCl to be highly reactive and effective against biofilm formation without causing cytotoxicity.[7,8,9] Furthermore, studies show that increasing treatment times and irrigating volume increase the antibacterial efficacy of HOCl against planktonic bacteria and biofilms.[2,3]

Until this novel spray, HOCl solutions would only remain stable for about 90 minutes before turning back into salt water, and therefore, were not useful in gels.[2] The absorptive and moisture-exuding properties of hydrogels make them ideal in prevention of wound desiccation and maintaining a conducive environment for wound healing.[2] Hydrogels work by promoting natural debridement through hydration of necrotic tissue, encouraging autolytic debridement and promoting healing from the wound base outward.[2]

References

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