A Hydrophilic Silver Antimicrobial Wound Dressing for Site Preparation and Maintenance of Human Skin Equivalent Grafts to Venous Leg Ulcers: Technical and Clinical Considerations

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Introduction

Venous leg ulcers (VLU) are the most commonly encountered chronic wound in the clinical setting. Numerous VLU's fail to respond to clinical intervention and remain as open areas despite the use of numerous interventional approaches at considerable cost to payers. Several studies have shown that surgical skin grafting over open areas may afford a means to achieve closure of these recalcitrant wounds. However skin grafting, whether split thickness autografts or cultured human skin equivalent (CHSE) tissues alone are not the panacea for closing these difficult wounds. It is not uncommon to experience either partial or complete loss of graft tissue following the procedure. It is well recognized that successful application of graft tissue requires a well granulated wound bed with minimal bioburden. Chronic VLU's typically carry a significant bioburden and are highly susceptible to the development of overt infection. It was hypothesized that a protocol directed towards development of granulation tissue along with elimination of bioburden may enhance CHSE graft takes. This pilot study was initiated to evaluate a protocol that called for the use of an absorbent polyacrylate silver antimicrobial wound dressing* during both the pre-grafting and post-grafting periods with an aim to minimizing the effects of resident bioburden on graft survival.

Method

Patient Enrollment: VLU patients with recalcitrant wounds that showed no sign of healing following at least 30 days of management were referred for surgical consults as candidates for CHSE closure of their wounds. CHSE graft candidates were informed of the procedure and enrolled in a pre-graft management protocol for a minimum of 7 days prior to grafting (see VLU protocol below).

SilvaSorb Antimicrobial Dressing: This high absorbency hydrophilic dressing contains antimicrobial silver that is released upon contact with wound exudate where it kills microorganisms (Figure 1). The matrix will also release silver to the intact skin surrounding wounds which is the predominant source of re-contamination of VLU's (Figure 2).

**SilvaSorb from Medline Industries, Inc. SilvaSorb is a trademark of AcryMed, Inc.*

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Rate of Bactericidal Activity of SilvaSorb

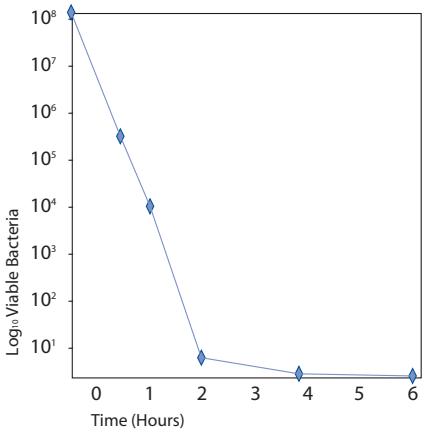


Figure 1. SilvaSorb silver sheet was cut into 2 x 2 cm squares before the application of suspension of E. coli. The samples were incubated for various time periods before processing to enumerate survivors. Specimens were exhaustively vortexed in saline before dilution plate counting to show surviving bacteria.

SilvaSorb Mediated Bioburden Reduction on Intact Skin

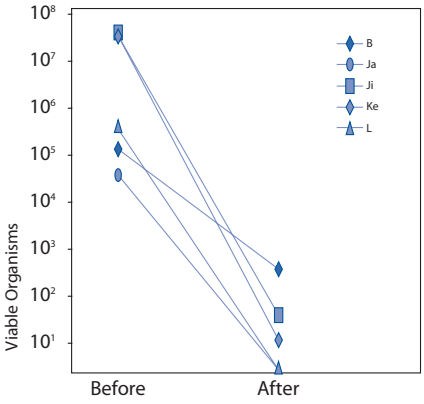


Figure 2. Silver liberated to intact skin results in the reduction or elimination of bioburden. Areas covered with plain polyacrylate matrix or silver containing polyacrylate were evaluated 24 h later for surviving bioburden on intact skin of volunteers by plate counting the skin washings.

VLU Bioburden from Patients Not on Systemic Antibiotics

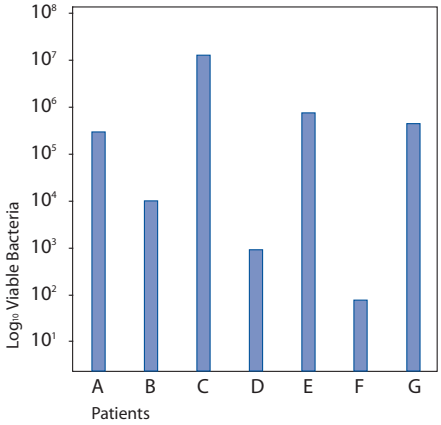


Figure 3. Wound bioburden was determined by the use of a calibrated semi-quantitative swab of cleansed wound area spread on blood agar plates.

VLU PROTOCOL

August 31, 2000

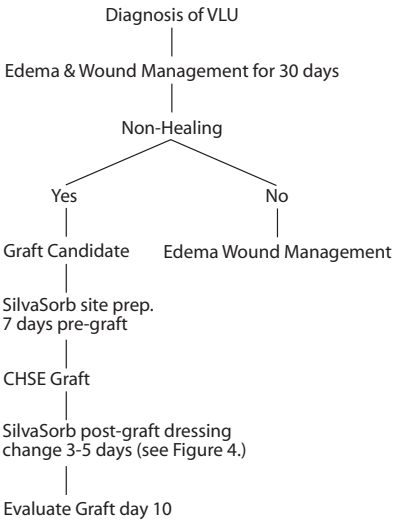


Table 1. Closure Success Prior to the Use of SilvaSorb

Total Patients	10 day Graft Survival	30 day Graft Survival
11	6/11	5/11

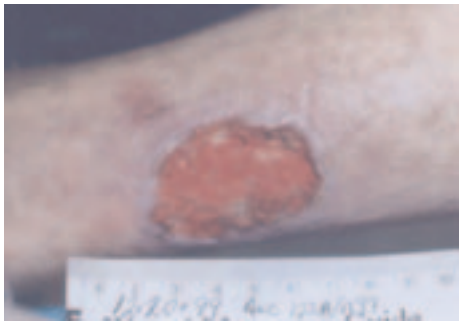
Table 2. Closure Success After the Use of SilvaSorb Protocol

Total Patients	10 day Graft Survival	30 day Graft Survival
13	11/13	11/13

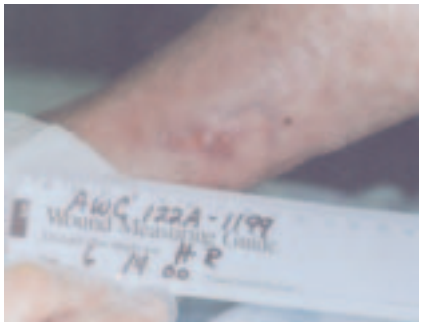
Case Examples

June 29, 2000

August 24, 2000



December 20, 1999



June 14, 2000

June 29, 2000

August 31, 2000

Conclusion

Skin grafting with cultured human skin equivalent is an effective method of achieving closure of non-healing VLU's. Care in preparation of the wound bed for graft application is a key step in the successful "take" of the graft tissue. The use of SilvaSorb Antimicrobial prior to and after graft application has coincided with an increase in the incidence of successful graft closure.

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