Silver Antimicrobial Absorbent Wound Dressing Can Contribute to Cost Control in Home Care

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Background

Heavy draining chronic wounds of home care patients tax the resources of home health agencies. Greater than 70% of visit cost is for travel, overheads, and nursing time. Therefore, real cost savings may be achieved by the use of wound management products that extend wear time thereby justifying their cost over gauze-type dressings.

Methodology

Product Evaluation: Silver containing primary wound contact materials were evaluated for moisture absorbency and antimicrobial activity under laboratory conditions. Since nursing staff generally "size" dressing materials to appropriately fit the wound, product comparison was carried out using equivalent sizes of product rather than weight.

Patient inclusion: Home care patients with chronic recalcitrant wounds greater than 4 cm^2 were included in the study. Wound type and secondary causal factors were not considered since the objective of the evaluation was to determine materials and protocols to decrease visit frequency.

Data Collection: The frequency of home care visits for the patient population was retrieved from patient visit records prior to and after the initiation of the evaluation. The visit frequency before initiation was based on an average frequency over the proceeding 4 weeks. The visit frequency following institution of the silver absorbent antimicrobial materials was the average frequency of the succeeding 4 weeks.

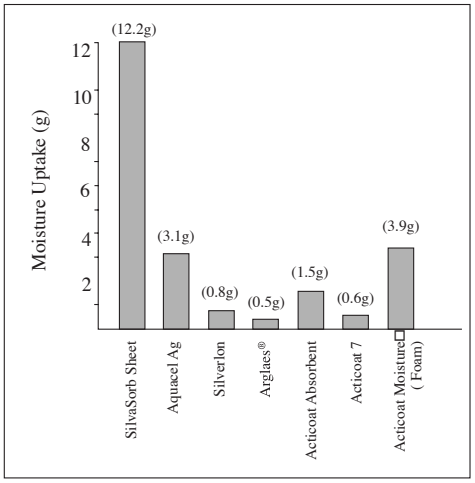

Figure 1. *Absorbency of wound care products. Samples were prepared into equivalent sizes appropriate to cover 4 square inch area of skin (2 x 2 inch equivalents). The samples were pre-weighed and then immersed into saline for 8 hours. The samples were then transferred to tubes containing a non-absorbent support mesh and centrifuged at 75 g for 5 minutes before re-weighing for moisture absorbency.*

1. *Aquacel Ag is a registered trademark of E. R. Squibb & Sons.*
2. *Silverlon is a registered trademark of Argentum International.*
3. *Acticoat Absorbent, Acticoat 7 and Acticoat Moisture are registered trademarks of Westaim Biomedical, Inc.*
4. *SilvaSorb is a trademark of AcryMed, Inc.*

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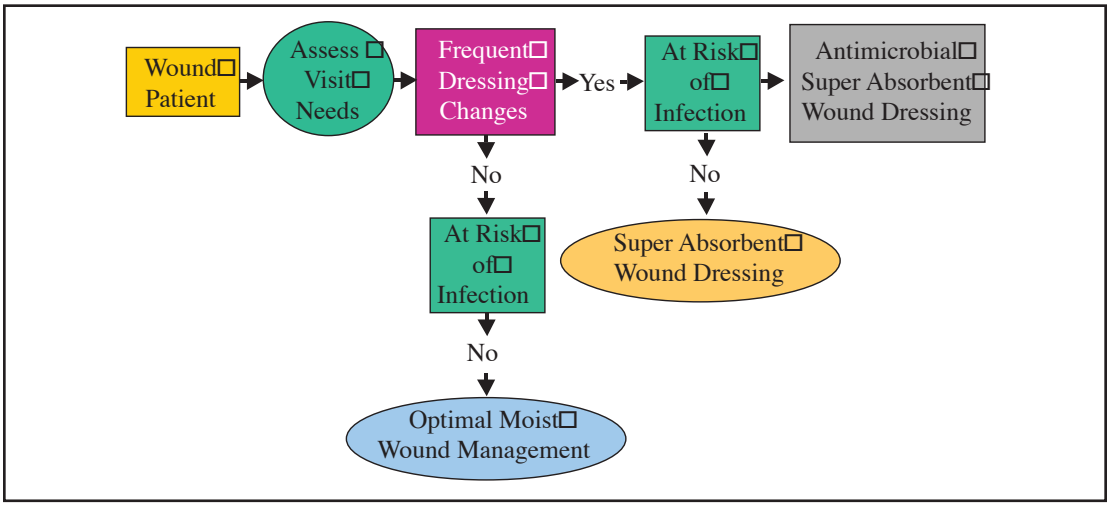
Product Selection:

SilvaSorb Antimicrobial Wound Dressing was selected for use in the study because:

- Superior Absorbency of moisture to other products tested
- Comparable antimicrobial range of activity to other products
- Available in formats suitable for the wide variety of wounds found in Home Care

EXUDATE MANAGEMENT DECISION TREE TO AID DECREASING DRESSING CHANGE FREQUENCY



ANTIMICROBIAL DRESSINGS ZONE OF INHIBITION TEST

Cultures	Acticoat Absorbent	Arglaes Film	Silverlon	SilvaSorb	Control
E. coli ToP 10F	12	9	10	12	0
E. coli 8739	10	8	8	10	0
K. pneumoniae 33472	9	8	8	9	0
K. pneumoniae 33475	9	8	7	9	0
S. aureus 25923	11	9	10	13	0
S. aureus MRSA	10	8	9	11	0
S. aureus	10	8	10	13	0
S. aureus(coag neg)	13	8	10	14	0
P. aeruginosa 27853	11	9	10	13	0
P. aeruginosa 9027	10	8	9	11	0
Proteus mirabilis	5	6	5	9	0
B. subtilis	9	8	9	11	0
Strep Group A	11	8	11	15	0
Enterobacter cloacae	8	7	7	9	0
E. faecalis 29212	9	8	8	11	0
E. faecium VRE	12	8	10	12	0
E. faecium	10	8	10	12	0
S. marcescens	10	8	8	11	0
L. monocytogenes 10403	14	8	13	15	0
C. parapsilosis	13	8	10	12	0
C. albicans	12	8	11	12	0
C. albicans 10231	11	8	9	11	0
A. niger 16404	14	9	13	14	0

Figure 2. Zone of Inhibition Analysis on Silver Antimicrobial Dressings. *The silver antimicrobial dressing products evaluated for this study were punch cut into 5 mm diameter circles for application onto Mueller-Hinton Agar plates freshly inoculated with the test organisms. The plates were incubated for 24 h at 37°C (except for Asp. niger @ 72 h) before examination. The zones of inhibition were then measured and recorded.*

COMPARISON OF DRESSING CHANGE FREQUENCIES PRIOR TO AND AFTER USE OF AN ABSORBENT SILVER DRESSING.

Total number of Patients	**10**
Average Number of Dressing Changes Prior to Study	62/wk
Average Number of Dressing Changes After initiation of SilvaSorb	38/wk
Percentage Reduction in Dressing Changes	41%

CALCULATED COST SAVING FOR THE STUDY PATIENTS.

Average Cost of Home Care Visit	**$141/visit**
Mean Number Visits Prior to Study Initiation	48/wk
Average Number Visits After initiation of Silver Absorbent Dressing	38/wk
Percentage Reduction in visits	21%
Savings @ $141/visit	$1410/wk

Results and Conclusion

It has been estimated that the cost of product for the management of chronic wounds in the home care setting is approximately 5% of the total cost of a visit. Decreasing the visit frequency therefore is a viable strategy for containing the burgeoning costs to home health care agencies. This study evaluated the several silver containing wound care products for antimicrobial activity and absorbency. Antimicrobial activity was confirmed in all products tested. However there was a vast difference in absorbent quality. For example Arglaes®, Silverlon® and Acticoat Burn dressing demonstrated minimal moisture management capability. Aquacel Ag and Acticoat Moisture Management were comparable, absorbing 3.1 and 3.9 g moisture respectively per 2 x 2 inch equivalent. The absorbency of SilvaSorb exceeded all other products, absorbing 12.2 g in the same equivalent size of matrix. Since all products were shown to be antimicrobial the deciding factor was moisture management. Control of exudate was expected and confirmed to prolong wear time for the patient group. The study decreased visit frequency by 21% following the initiation of the study dressing. This resulted in a cost savings of greater than a thousand dollars per week for this patient group. Although not directly measured by this study; patient outcomes were observed to be consistently positive.

Summary

- Prolonged wear time results in significant savings for home care management of patients.
- No incidences of infection were noted in this high risk patient group during evaluation.
- Patient and care givers reported improvement in comfort during dressing changes.
- The characteristics of high absorbency and antimicrobial activity in this dressing were associated with reduction of dressing change frequency.

References

Bower PG and Davies BJ (1999). "The Microbiology of Acute and Chronic Wounds." *Wounds* 11:72-78.

Dow G, Browne A and Sibbald RG (1999). "Infection in Chronic Wounds: Controversies in Diagnosis and Treatment." *Ostomy Wound Management*; 45(8): 23-7, 29-40.

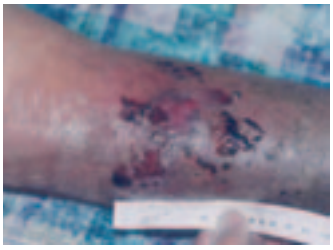
Hughes SC (2002). "The Cost-Effective Use of Multi-Layer High Compression in Home Care Under PPS." *Remington Report* 10:4-6 (supp).

Sibbald RG, et al. (2000). "Preparing the Wound Bed-Debridement, Bacterial Balance, and Moisture Balance." *Ostomy and Wound Management*. 46(1):14-35.

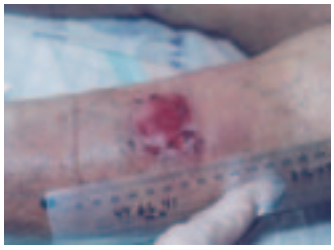
Case Studies

Patient N *An 82 year old female patient seen for recurrent bilateral lower extremity ulcers located over the pre-tibial areas. Review of records showed a history of Rheumatoid Arthritis, Basal Cell Cancer, Congestive Heart Failure, Atrial Fibrillation, Hypertension, CVA, Dementia, and Venous Insufficiency and history of combativeness. The superficial ulcers were considered to be traumatic in origin and edema was easily managed with light compression over padding. The wounds, prior to consult, were being treated with a silver impregnated mesh dressing and nurses reported difficulty with adherence during removal accompanied by loss of new tissue and complaints of pain. Due to a history of recurrent infection, an antimicrobial dressing with characteristics facilitating atraumatic removal was indicated, therefore, SilvaSorb perforated sheet dressing was selected for use. Dressing change frequency was reduced from 2x per week to weekly until complete closure. Nursing staff reported greater cooperation with dressing changes by the patient with few expressions of discomfort noted.*

Right leg 8-2-02, pre-study



Right leg 8-23-02



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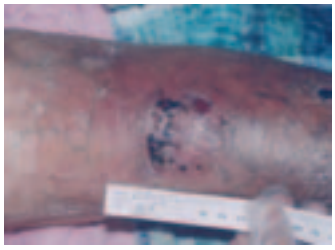
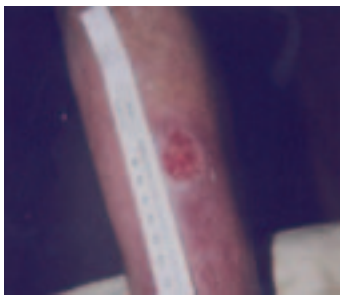


left leg 8-23-02

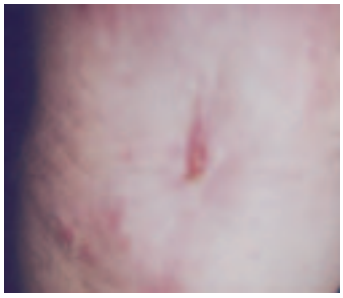
Patient D *This 76 year old female was seen for a left pre-tibial ulcer which had failed to show signs of closure. Co-morbidities were significant for severe COPD and CHF with dependent edema. The patient was maintained on supplemental oxygen and chronic steroids. The open area did not appear overtly infected, however increased bioburden was identified as a potential factor in failure to heal. Dressing changes prior to consult, consisted of calcium alginate and foam that was changed twice per week. Given this patient's tissue paper like skin, and the decision to optimize bioburden control, SilvaSorb sheet dressing was selected for use. Closure of the open area was achieved in 4 weeks.*



June 6, 2002

July 5, 2002

Patient L *A 64 year old male with a dehiscence of a L knee incision was seen on consult. The wound was being treated three times per week with antibiotic ointment and calcium alginate followed by a bulky gauze dressing. Measurement at time of consult was 1.1cm x 0.6cm with no measurable depth. Co-morbidities included hypertension, obesity, asthma, coronary artery disease and lymphedema of both lower extremities. There were no overt signs of infection however, because there had been minimal progress since start of care and there was a history of prior infection an antimicrobial dressing was indicated. Further, since the wound base was relatively low exudating, a dressing which could donate moisture as well as absorb exudate was desirable for optimal management. SilvaSorb sheet dressing was started and closure was achieved in 3 1/2 weeks.*



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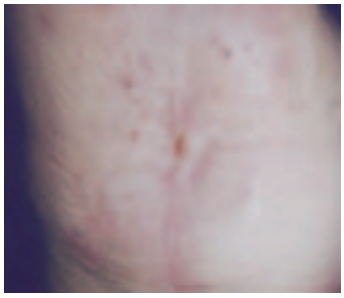

August 8, 2002