The use of Silver Antimicrobial Powder with Negative Pressure Wound Therapy

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Abstract

Often times open full thickness wounds pose a challenge in wound healing. Wounds can present with elevated levels of pro-inflammatory cytokines, increased levels of proteases, diminished levels of growth factors, may become chronic and have delayed wound healing. Ionic silver antimicrobial powder* was used in conjunction with negative pressure therapy** in wounds of mixed etiology. Case study results demonstrate that these wounds granulated, epithelialized, and had no infection. Utilizing controlled-released polymers, ionic silver antimicrobial powder delivers a constant stream of silver ions into the wound over a period of up to five days. In addition, this ionic silver antimicrobial powder has an alginate to help manage exudate, it also has the ability to reach into tunneling, undermining and sinus tracts. The alginate in the powder allows for the ionic silver to stay in contact with the wound bed throughout the entire therapy session and not be pulled into the tubing or the container. Ionic silver antimicrobial powder has shown to be effective against a broad range of fungi, gram positive and gram negative bacteria including S. aureus, P. aeruginosa, E. coli, C. albicans, A. niger, MRSA, and VRE. One may conclude that wound progression was achieved in a timely manner with no wound infection. The negative pressure therapy enhanced rate of tissue granulation and epithelialization.

*Arglaes is a registered trademark of Giltech, Ltd. Arglaes from Medline Industries, Inc. Mundelein, IL
**Vacuum Assisted Closure (VAC) is a registered trademark of KCI USA, San Antonio, TX
Method
Each patient was seen three times a week for wound care. Wound care included sharp debridement and irrigation with normal saline. Ionic silver antimicrobial powder was placed into all wound beds and allowed to dissolve 5-10 minutes prior to placement of negative pressure therapy dressings.

Case Study One
Patient is a 93 y/o female with a Stage III sacral-coccygeal pressure ulcer. She was unwilling to make lifestyle adjustments necessary to keep pressure off sacral area. Past medical history is significant for left total hip replacement, dehydration, and malnutrition. On 3-15-04 wound measured 3.5 cm x 2.5 cm x 2 cm, pale pink granulation tissue, scant amount of yellow slough along wound edges with a moderate amount of serous exudate, edges intact and no odor present. The wound was irrigated with normal saline and sharply debrided of nonviable tissue. Ionic silver antimicrobial powder was placed in the wound bed underneath the negative pressure therapy dressing. The wound has decreased in size and continues to progress.

3-15-04  3.5 x 2.5 x 2 cm
4-12-04  Approximately 2 x 2 cm
5-26-04  Continuing to improve
8-31-04  1.0 x 0.3
Case Study Two

Patient is an 85 y/o male with full thickness burns to the posterior left lower extremity on 4-6-04. He ambulates with assist and demonstrates overall left lower extremity weakness. He is unable to tolerate full weight bearing on the left extremity. Past medical history is significant for vascular insufficiency. Due to his hearing impairment, there is concern of his ability to understand his woundcare instructions. After sharp debridement on 5-18-04 the wounds were treated with silver anti-microbial powder and negative pressure therapy in preparation for a skin grafting procedure. Demling and DeSanti have concluded that silver released in a moist environment significantly increases the rate of re-epithelialization or take of a mesh skin graft when compared to a standard antibiotic solution. Our patient, with the use of ionic silver antimicrobial powder and the negative pressure therapy, showed similar results. He received a split thickness skin graft 6-8-04 to posterior left lower extremity and his wound has progressed significantly.

Case Study Three

Pt. is a 66 y/o minimally ambulatory male who suffered full thickness traumatic burns to bilateral buttocks on 1-8-04. His past medical history includes a CABG procedure, pacemaker placement, and long-term smoking. He was unwilling to make lifestyle adjustments necessary to keep pressure of the burned areas. On 1-19-04, the left buttock wound measured 5.8 x 4.5 x 3 cm and the right buttock wound measured 6.3 x 5 x 3.2 cm. Both wounds had moderate serous exudate, mild peri-wound erythema, red granulation tissue throughout with light layer of semi-adherent pale yellow slough, and without odor. The wound was irrigated with normal saline and sharply debrided of nonviable tissue. Ionic silver antimicrobial powder was placed in the wound bed under the negative pressure therapy dressing. Patient demonstrated good progress with full wound closure on 4-8-04. Seven months post injury, the wound is maturing very nicely.

Results and Conclusion

The case studies demonstrate that full thickness wounds were able to progress through the phases of wound healing in a timely manner with a satisfactory rate of granulation tissue formation, epithelialization, with no occurrences of wound infection. Each of these patients demonstrated complications that compromised their ability to heal. It has been hypothesized that the use of ionic silver can decrease levels of pro-inflammatory cytokines, decreased levels of proteases, and improve expression of growth factors. Use of ionic silver powder in chronic wounds combined with negative pressure therapy is safe and effective in moving these difficult chronic wounds toward closure.
References:


