CASE STUDY

Complete Closure of Extensive Third-Degree Burn Wound Using Polymeric Membrane Dressings*

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PROBLEM

A middle-aged subsistence farmer presented with a third-degree chemical burn on the dorsum of his hand extending 17.5 cm up his arm. With no prior treatment, the exposed tendons had become dark brown and foreshortened. An herbal poultice applied by a shaman for an abscess produced the burn three weeks earlier. Copious foul drainage dripped from an 8 cm long tunnel superior to the open wound. The farmer's distal fingers were swollen with very limited range of motion in his fingers and wrist. At the time, skin grafts were not an option in this area of rural northern Ghana. The clinic's petrolatum-gauze supply was exhausted after four weeks of treatment. The patient's livelihood depended upon his ability to farm using a locally-made hoe during treatment; severe pain hindered his grip.

RATIONALE

The patient's dressing needed to reduce the pain that prevented him from sleeping or gripping his hoe and be elastic enough to stay in place during farming. The exposed tendons and muscle tissue needed additional moisture to prevent further damage, but the exudate from the tunnel required an absorptive dressing. Use of conventional modern dressings led to dramatic fungal and bacterial infections in this very warm setting. But, polymeric membrane dressings cleanse wounds continuously, pulling loosened slough into the dressings through their hydrophilic action. When these flexible dressings were used in our clinic, wounds had a tendency to stay clean and granulate quickly. These dressings also donate moisture to dry wounds while absorbing excess drainage, and they can reduce wound pain by inhibiting the nociceptor response.

Note:

At one point (July 4, 2003) the clinic's supply of polymeric membrane dressings was exhausted, so another modern foam dressing was used for one dressing change. The wound bed became much dirtier than it ever was using the polymeric membrane dressing.

METHODOLOGY

Treatment included teaching on nutrition, range of motion and elevation of the wound; prayer; brief courses of oral antibiotics on six occasions and direct wound care. Initially the wound was cleansed by spraying a mild cleanser on the surface and into the tunnel when the dressings were changed. The tunnel was treated with triple-antibiotic-ointment soaked packing strips. Standard polymeric membrane dressings were changed every two-to-three days when they were saturated. Heavy farming activity resulted in copious serous drainage, requiring daily dressing changes at times. During the wettest part of the farming season, the dressings were often rain-soaked and maceration became a problem; zinc oxide ointment was used then to protect the surrounding skin.

After extra-thick polymeric membrane dressings became available and the tunnel was closed, wound cleansing was necessary only when the wound became grossly contaminated through farming activities. When polymeric membrane cavity filler became available, it was cut into small pieces to fill contours in the wound surface. Silver polymeric membrane dressings were used some late in the course of treatment.

PURPOSE / OBJECTIVES

1. Review how polymeric membrane dressings were able to donate enough moisture to rehydrate the desiccated exposed tendons, while simultaneously absorbing substantial exudate and helping reduce pain.
2. Consider the advantages of using polymeric membrane dressings, which provide passive continuous cleansing of the wound bed, often eliminating painful and time-consuming manual wound bed cleansing at dressing changes.
3. Identify polymeric membrane dressings as a moist wound healing dressing choice that can maintain good contact with the wound bed in mobile, working patients.
4. Formulate a treatment plan for a large third-degree burn without the use of grafting.

RESULTS

Shortly after the initiation of polymeric membrane dressing treatment, pain was dramatically reduced, allowing the patient to sleep, hoe in his farm and sow his crop. He continued manual farming throughout the treatment. The dry tendons rapidly rehydrated. Granulation tissue formed quickly and the wound moisture became appropriate without the tunnel infection spreading to the open areas. Wound healing was slowed due to wound contamination and trauma during farming, inability to keep the hand elevated, poor communication resulting in the dressing being wet constantly during the rainiest month, a broken wrist at about 40 weeks and severe protein malnutrition which was never resolved. None-the-less, the wound healed completely in 56 weeks with a satisfactorily functional hand and wrist.

CONCLUSION

Polymeric membrane dressings provided effective wound management for this third-degree chemical burn to complete wound closure, surpassing triple-antibiotic-ointment soaked petrolatum gauze in healing, moisturizing tendons and in pain relief. Use of extra-thick polymeric membrane dressings decreased the necessity of wound cleansing and the frequency of the dressing changes.

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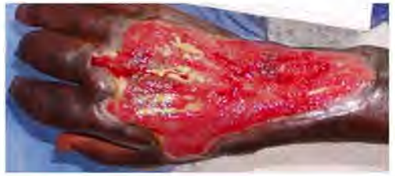
11 June

Began treatment with polymeric membrane dressings. Up to this point, the tendons remained dry despite the use of triple-antibiotic-ointment soaked petrolatum gauze.

16 June

Only five days after switching to polymeric membrane dressings the tendons are moist and the medial and superior edges are granulating.



4 July

Less than a month after initiation of polymeric membrane dressings, the tendons are almost completely covered.

6 Aug

A month later, the muscle tissue over the tendons has deepened; the wound edges are filling in.

17 Nov

The wound is deeper and has less granulation tissue because the dressing was rain-soaked for much of September, but it is now healing again.

21 April

The patient broke his wrist on 7 April; the wound continued to heal, but at a slower pace. Complete wound closure occurred in June.

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