Wound Management & Prevention

EMPIRICAL STUDIES

Using a Castor Oil-Balsam of Peru-Trypsin Ointment to Assist in Healing Skin Graft Donor Sites

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Skin graft donor sites frequently are more painful after surgery than the areas receiving the skin grafts. Bleeding may occur from the donor sites, and dressing changes may cause even more pain. Donor sites may heal slowly and become infected or malodorous.[1]

Despite the frequency of the skin graft procedure, no standard approach to treating donor sites exists. Donor site treatment may be poor because patients and caregivers focus on the area grafted and because donor site care is painful. To this day, a common method of managing donor sites includes leaving a dressing such as petroleum gauze or tape adherent to the wound for days or weeks. The dressings usually dry out, defeating the goal of moist wound care, and can become incorporated into the wound bed, causing pain and bleeding when removed.[1]

In the authors' practice, initial experiences with castor oil-balsam of Peru-trypsin ointment in partial-thickness wounds donor sites

mild debriding agent that, at the concentration employed, does not affect cell viability.[3]

Trypsin is a discriminating proteolytic enzyme in terms of the number of chemical bonds that it will attack. Chemists interested in determining the amino acid sequence of proteins have made good use of this fact; trypsin is widely employed as a reagent for the orderly and unambiguous cleavage of such molecules.[4]

The other ingredients in the ointment are basically moisturizing and protective substances that help provide a moist healing environment and reduce drying and topical trauma.[5,6] Balsam of Peru has a long and colorful history. According to the literature, in pre-Columbian times the natives of the central Americas and Mexico put balsam-soaked cloths on their wounds. Today in South America, the balsam still is used to promote wound granulation, especially because it seems to act as both antiseptic and disinfectant. It has been used for skin ulcers and other wounds.[7]

Castor oil is one of the world's oldest commercial products and has been used as a skin conditioner for thousands of years.[8] It often has been used as an ingredient to penetrate cornified epithelium.

Patient population. During the 6-month study period, data from 36 consecutive patients (age range: 41 to 89 years) with chronic wounds who had split-thickness skin grafts (1/10,000 to 1/15,000 inch thickness) taken from their thighs and applied to their lower legs or feet were obtained and included in this study. Except for one patient, all donor wounds and recipient wounds were on the same leg. Grafted areas ranged from 25 cm^2 to 410 cm^2 with an average of 105 cm^2; specifically, lower leg areas ranged from 28 cm^2 to 450 cm^2; whereas, ankle and foot areas ranged from 25 cm^2 to 100 cm^2. Sixteen (16) of the 36 patients were women and the majority (23) did not have diabetes mellitus. Ten (10) patients had a traumatic wound, seven had an infection, and six required a graft to repair a dehisced surgical wound. Thirteen (13) patients had diabetes and had wounds secondary to neuropathy (seven), pressure ulcer formation during hospitalization (four), and infection (two). Fifteen (15) of the patients' limbs had findings of ischemia

in the limbs with wounds, but 14 had an ankle-brachial Doppler arterial pressure index of 0.6 or more, which is generally consistent with healing. One patient with a dehisced wound following removal of an infected vascular graft had an ankle-brachial Doppler arterial pressure index of 0.4. Fourteen (14) patients had a history of tobacco use.

All grafts were performed in the operating room under surgically sterile conditions. Thirty-one patients (31) were given prophylactic antibiotics (cephalothin) at surgery only. Five (5) patients whose recipient sites contained methicillin-resistant *Staphylococcus aureus* received vancomycin at surgery. All grafts were successful (95% to 100% initial graft take). All patients provided informed consent for their procedures and treatments.

Donor site treatment. After bleeding was well controlled by pressure and occasional focal cautery, the donor sites were dressed at surgery with castor oil-balsam of Peru-trypsin ointment and a thin layer of plain nonadherent gauze and tape. After 2 days, the sites were cleaned with a mild detergent wound cleanser and/or saline. Thereafter, daily wound dressings consisted of applying a thin layer of castor oil-balsam of Peru-trypsin ointment and nonadherent gauze for at least 4 days, followed by the daily application of a thin layer of castor oil-balsam of Peru-trypsin ointment only until healing. Twenty (20) patients also had nonadherent gauze applied; 16 patients received no other covering.

Treatment continued until the site was fully epithelialized as judged by inspection under 2.5 x magnification. Often, within the healing time frame, many patients felt comfortable enough to apply the ointment to themselves. Subsequently, the treatment evolved to application of a moisturizing cream or lotion.

Results

All donor site wounds were epithelialized after 11 days (mean 8, range 6 to 11) (see Figures 1, 2, and 3). Age, sex, comorbidity, or wound type did not affect time to re-epithelialization. Complications such as bleeding, infection, excessive pain, or nonhealing problems were not observed at the donor sites, and foul odor was not noted. Ten (10) patients reported a mild stinging with the

donor sites. The ointment appears to help protect the area as well as provide a moist healing environment. In the 36 cases evaluated, wounds healed within 11 days (mean = 8 days), which is well within reported times of 10 to 16 days using other, moist and non-moist healing methods.[1,9,10,12-14] No donor site infections occurred. Moreover, patients were comfortable using the product and appeared to have little pain during dressing changes. This seems to be an improvement over results using standard gauze and other complex, multilayered, or composite dressings.[1,9,10,12-14] Although balsam of Peru can cause topical allergic reactions, this particular formulation did not cause topical allergic reactions in the current group of patients.[7]

After trying a variety of silver impregnated gauze dressings and collagen sheets, the castor oil-balsam of Peru-trypsin ointment is currently the preferred treatment of skin graft donor sites in the authors' facility, in part because many patients can readily adopt the methods used to assist in their own dressing changes. The treatment is also less costly than some other dressing methods. One tube of castor oil-balsam of Peru-trypsin ointment contains more than enough product to treat even larger donor sites until healed. This compares to one-half or less the amount that would be spent purchasing silver, collagen or complex layered dressings for the same sites based on retail costs in this facilities' geographical area.

This study is limited by its retrospective design, small sample size, and lack of concurrent controls.

Conclusion

Castor oil-balsam of Peru-trypsin ointment was used successfully in a small cohort of patients to heal donor sites for split-thickness skin grafts. The product appears to provide comparable efficacy and seems cost-effective while enabling active patient participation. Additional study is warranted.

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