Wound Therapy **SCIENTIFIC CASE STUDY**

Spira-Wash® Gel

Hand Burn in an Immunocompromised Adult

SUMMARY: Thermal burns on hands are generally considered severe and patients are usually referred to a burn clinic. The purpose of this case study is to evaluate the effectiveness of a Spira-Wash® Gel formula in managing hand burn wounds in an immunocompromised patient. The Burnt Hand Outcome Tool (BHOT) was the research instrument used to evaluate the clinical outcome. Following application of the Spira-Wash Gel formula for 14 days, the total BHOT score decreased from a moderate impairment score of 51 to the baseline score of 21. This case study demonstrated a fast and safe wound healing process in a high-risk burn patient by using this compounded formula.

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Introduction:

Burn injuries are one of the most common types of trauma and a leading cause of unintentional death and injury in the US[1]. Scald is burn that resulted from hot liquids, and accounts for 35% of burn clinic visits in the US in 2017[2]. Severity of cutaneous burns is classified by the depth of tissue injury. First, second and third degree of burns refer to superficial, partial thickness, and full thickness skin damage, respectively. Goals of burn wound care is to maintain a moist environment at wound surface, promote wound healing and limit wound progression while minimizing discomfort for the patient. It usually takes 2-3 weeks for a 2nd degree burn wound to heal, and sometimes surgery is required for a 3rd degree burn[3].

Hand and foot burns are not generally considered minor because insufficient treatment may hinder recovery of function and even cause disability[3]. Burns in transplant patients, in particular, are extremely dangerous because the immunocompromised state predisposes burn patients to infectious complications. In addition, to reach functional and cosmetic recovery, fast wound healing is also critical for this vulnerable patient population.

The purpose of this case study is to present the effectiveness of a compounded formula in managing hand burn wounds in an immunocompromised patient.

Rx	
Phenytoin	5%
Misoprostol	0.0024%
Arginine Hydrochloride	1%
Base C (Polyehylene Glycol)	10%
Base, PCCA Spira-Wash® Gel	q.s.30 g

Table 1. Compounded medication applied to burn wounds (PCCA formula 10948).

Case Report:

A 54 year-old Caucasian male accidently burned his right hand with a hot liquid of about 300 F° at the workplace. He was a transplant patient and was taking immunosuppressive agents, so he presented to ER immediately. Upon examination, the patient's was diagnosed with a 3rd degree burn on the thumb, 2nd to 3rd degree on the ring finger, and 2nd degree on the little finger, as shown in *Figure 1*. At the ER he received Mepilex Ag, applying daily with dressing for 4 days to prevent infection. Then the PCCA formula 10948 (*Table 1*) was started on wounds 3 times daily for 5 days, followed by 2 times daily for a total of 14 days. The compounded formula was the only medication that was used for wound treatment during the 14 days, which includes 5% phenytoin, 0.0024% misoprostol and 1% arginine in PCCA Spira-Wash Gel. There was no change in his immunosuppressive regimen during burn treatment.

Figure 1. Digital images of patient's hand burn wounds before treatment, during (day 7) and after 14 days treatment with the compounded formula. (A). Thumb. (B) Ring finger and little finger.

After 14 days, during a follow-up visit at the burn clinic, the outcome was considered successful after evaluation. Patient continued to use the compounded formula for 2 more days and then switched to scar treatment. Figure 1 shows changes of burn wounds during the 14 days treatment.

Methodology:

The Burnt Hand Outcome Tool (BHOT)[4] was implemented to evaluate the clinical outcome of the compounded formula in burn wound management. The BHOT questionnaire is a comprehensive and specific tool for burns on hand in adults[4]. This instrument consists of 20 items, covering 4 categories that address physical and physiological impairments experienced by the patient during

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the preceding 7 days, with a minimum score of 20, meaning no impairment, and a maximum score of 100, associated with the highest level of impairment in all categories. The BHOT is self-explanatory and it should be completed by the patient to ensure objectivity.

The patient was instructed to complete the BHOT questionnaire retrospectively before and after treatment. Patient was also asked to score his overall severity of symptoms on a 0-10 scale. Written informed consent was obtained from the patient for publication of this case study and the associated digital images.

Results:

The patient completed all questions of BHOT before and after 14 days treatment. Total BHOT score decreased from 51 to 21 (out of 100), suggesting patient improved from moderate impairment due to hand injury to no impairment at all in hand function, sensation and emotion after treatment, except for slight color difference on injured skin. Score from each category is listed in table 2. The area that showed most improvement was the ability to carry out activities that require both strength and dexterity. The patient rated his overall severity of symptoms 0/10 after treatment, compared with 8/10 before treatment, which is consistent with outcome measured by BHOT and visual improvement shown in *Figure 1*. The results show that patient's hand function was completely recovered and appearance of hand was only minimally altered in less than 3 weeks after burn accident. No events of infection or adverse reactions to the compounded formula were reported.

	Before Treatment	After Treatment
A. Task specific (e.g., open a jar, button a shirt, etc.)	**8**	**5**
B. General ability to carry out activities (e.g., card playing, golf, etc.)	**19**	**5**
C. Appearance, scars, pain and sensation	**12**	**6**
D. Emotional, social and work impact	**12**	**5**
Total (/100)	**51**	**21**

Table 2. Four categories of impact assessed in BHOT on patient suffering from hand burn. Each category includes 5 items (not listed here), each to be rated by the patient on a 1-5 scale. A score of 5 in each category (1 point from each item) represents baseline, and a score of 25 in each category implies the worst impact on the patient due to hand burn.

Discussion and Conclusions:

A hand burn in a transplant patient is a complicated situation, as immunosuppressive therapy not only predisposes the patient to high risk of infection, but also adversely affects wound healing process through interaction with inflammatory mediators[5]. Moreover, the patient in this case had a Hand Burn Severity (HABS) score of 6, suggesting the injury was severe and the patient very likely needed surgery to recover[6]. In this case, the compounded formula alone following immediate management in emergency department showed significant effects in promoting wound healing and function recovery. In this formula, topical phenytoin is known to heal wounds by stimulating fibroblast proliferation, promoting collagen deposition, neovascularization, and decreasing bacterial contamination[7, 8]. Misoprostol is a synthetic prostaglandin E1 analogue that has anti-inflammatory activity as well as increasing collagen formation[9]. Arginine, a nonessential amino acid, is metabolized to ornithine and polyamines to regulate cell proliferation, and is converted to nitric oxide to facilitate blood flow[10, 11]. Base of the formula is Spira-Wash Gel, which is water-washable and adherent to maintain a moist environment at wound site. It also contains meadowsweet flower extract, which has shown antimicrobial, antioxidant and anti-inflammatory effects in many studies[12, 13]. As a result, this compounded formula successfully healed wounds within 2 weeks, which may provide an alternative effective therapy for future burn wound management.

References:

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