



Comparative outcomes of deroofing versus aspiration for burn blister management in a 61-year-old man with diabetes following religious firewalking in India: a case report

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ABSTRACT

This report describes a rare case of bilateral foot burns in a 61-year-old man following a religious firewalking ceremony, an event scarcely documented in the literature. The patient presented with multiple painful foot blisters and ulcers 2 days after the ceremony, accompanied by marked discomfort and impaired mobility. On examination, the right foot showed a large deroofed blister with mild slough, whereas the left foot had an intact, tense bleb. The primary diagnosis was bilateral foot burns complicated by diabetes mellitus. Management included deroofing and dressing the right foot blister, while the left foot blister was aspirated, enabling a direct comparison of two treatment strategies within the same patient. Glycemic control was optimized by adjusting insulin dosages, and wound care was tailored to the clinical condition of each foot. Early multidisciplinary consultation guided infection monitoring and pressure offloading. The outcomes underscored the challenges of burn management in diabetic patients, particularly with regard to delayed wound healing and heightened infection risk. This case highlights the importance of individualized burn blister management and the methodological value of comparing deroofing versus aspiration in a controlled clinical context. The key implication is the need for further research to establish best practices for burn care in high-risk populations, especially following unusual injury mechanisms such as firewalking.

Keywords: Blister; Burns; Diabetes mellitus; Foot injuries; Wound healing; Case reports

INTRODUCTION

Numerous anecdotal reports in the global literature describe foot burns in patients with diabetes, most often resulting from heating pads, foot spas, or hot water baths. However, burns sustained during religious firewalking are rarely documented. Firewalking ceremonies are practiced in several countries, including India, China, Spain, Japan, Fiji, and Tahiti, for purposes such as celebrating good harvests, achieving

purification, proving innocence, or demonstrating faith [1]. Firewalking typically involves crossing burning logs, stepping on heated stones, or withstanding contact with fiery torches.

Health professionals hold differing views regarding optimal management of foot blisters, both in healthy individuals and in high-risk populations such as those with diabetes. Patients with diabetes face an increased risk of infection even in clean wounds and tend to experience delayed healing, particularly in the distal extremities [2,3]. Current management of diabet-

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ic foot burns requires a multidisciplinary approach involving optimization of glycemic control, meticulous wound care with debridement and infection prevention, pressure off-loading, and the potential use of advanced modalities such as negative pressure wound therapy and hyperbaric oxygen therapy [4].

Diab et al. [5] reported that individuals with diabetes were 3.8 times more likely to sustain contact burns than those without diabetes ($P < 0.001$), and their hospital stays were significantly longer. They emphasized the importance of a multidisciplinary strategy in managing burns among patients with diabetes.

Given the limited evidence and lack of consensus among healthcare professionals, further research is needed to determine the optimal management of burn blisters. Approaches vary, leaving blisters intact, aspirating the fluid while preserving the overlying skin, or completely removing the blister roof. In light of these uncertainties, this report offers a direct comparison between deroofting and aspiration in the same patient, providing methodological clarity and clinical relevance, especially for burn management in individuals with diabetes.

We aimed to present the case of a 61-year-old man with diabetes who developed bilateral foot burn blisters after participating in a firewalking ceremony. Management compared deroofting of the blister on the right foot with aspiration of the blister on the left foot to evaluate the outcomes of these two approaches.

CASE PRESENTATION

Ethics statement

Informed consent for publication of the research details and clinical images was obtained from the patient. All study procedures were conducted in accordance with the principles of the Declaration of Helsinki.

Patient information

A 61-year-old man developed multiple foot ulcers and blisters 2 days after participating in a firewalking ceremony. He presented with large blisters on the anterior plantar surface and several smaller blisters on the posterior aspect of both feet. The patient initially visited a local healthcare facility, where the blister on the right foot was ruptured, deroofted, and dressed with Vaseline gauze (Unilever). The blisters on the left foot remained intact, and the patient was brought to our tertiary care center the following day by his relatives. He

had a 13-year history of diabetes mellitus and was receiving both oral hypoglycemic agents and insulin (18 units before breakfast and 10 units before dinner).

Clinical and diagnostic findings

On examination, the right foot showed a 7×4-cm raw area with mild slough on the plantar surface (Fig. 1A, B). The left foot had an unruptured 8×4-cm bleb near the metatarsal head and a few smaller blebs without signs of inflammation. The dorsalis pedis pulses were palpable bilaterally. Visual analog scale (VAS) scores were 8 for the right foot and 7 for the left foot.

Laboratory tests revealed a white blood cell count of $13.8 \times 10^9/L$ and a C-reactive protein level of 90 mg/L. The patient's fasting blood glucose level was 146 mg/dL, and the



Fig. 1. Images of the patient on examination. (A, B) A 7×4-cm raw area with mild slough on the plantar aspect of the right foot. (C) On day 3, slough formation was observed on the right foot.

hemoglobin A1C level was 7%. After a bedside consultation with the diabetes clinic, his insulin dosage was increased from 18 to 24 units before breakfast. The clinical diagnosis was bilateral foot burns complicated by diabetes mellitus.

Therapeutic intervention

The raw area on the right foot was dressed with a dry collagen sheet under aseptic conditions. The blister on the left foot was aspirated using a sterile technique (Fig. 2A), allowing the raised epidermis to serve as a biological dressing for the underlying raw surface. A Vaseline gauze dressing was then applied to the aspirated area. The patient was advised to maintain bed rest with leg elevation and to attend regular follow-up visits at the outpatient department.

By day 3, the right foot showed slough formation (Fig. 1C), while the left foot demonstrated minimal inflammation with mild fluid reaccumulation beneath the epidermis. The sub-



Fig. 2. Images of the patient after treatment. (A) The wound on the right foot was covered with a dry collagen sheet under sterile conditions. The blister on the left foot was aspirated aseptically. (B) The right foot continued to show small unhealed areas, whereas the left foot had completely healed.

epidermal fluid was re-aspirated, and the dressing was reapplied as before. Swab samples from the edge of the deroofed blister and aspirated fluid were sent for culture and sensitivity testing, which revealed *Staphylococcus aureus* growth from the deroofed blister specimen.

On the 10th post-procedure day, examination of the right foot still showed areas of slough, whereas the left foot appeared healthy apart from slight epidermal shriveling at the previous blister site. VAS scores were 5 for the right foot and 3 for the left foot. The dried blister skin on the left foot was gently peeled away, revealing a pink, smooth, healed epidermis underneath.

Follow-up and outcomes

By the end of week 2, the slough on the right foot had diminished, though a raw area persisted, while the left foot had healed completely. At this point, the patient was instructed to apply a topical antibiotic ointment (ciprofloxacin 0.2%) to the exposed area on the right foot and to moisturize the healed left foot (Fig. 2A). VAS scores were 4 for the right foot and 1 for the left foot (Fig. 3). By the third week, the right foot still exhibited a small unhealed area, whereas the left foot remained fully healed (Fig. 2B). Complete healing of the deroofed blister occurred within 28 days (Fig. 4). The absence of slough, formation of granulation tissue, and subsequent epithelialization confirmed full recovery.

Patient perspective

During rehabilitation, the patient expressed regret about participating in the religious firewalking ceremony and reported greater pain in the right foot. Overall, he expressed satisfaction with the treatment and care received at our tertiary care

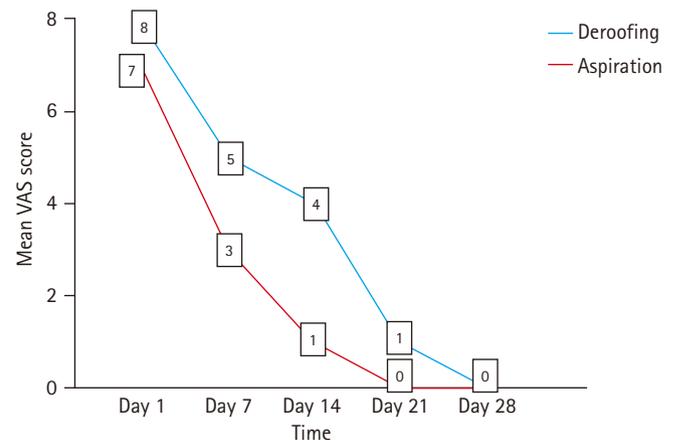


Fig. 3. Visual analog scale (VAS) pain scores between the deroofed and aspirated sites at various time points.

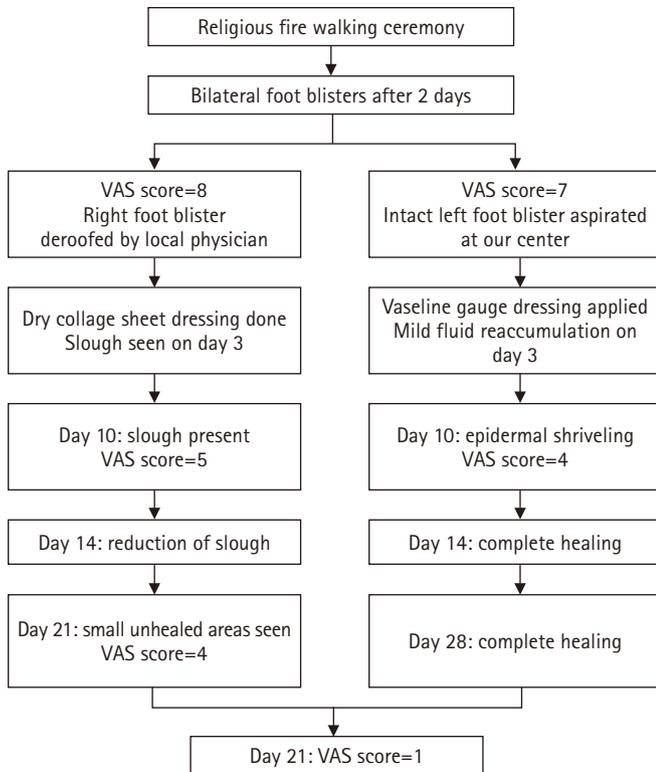


Fig. 4. Flow diagram summarizing the clinical timeline, including key events such as firewalking, initial treatment, hospital presentation, aspiration, healing progression, and follow-up. VAS, visual analog scale.

center.

DISCUSSION

This case compared two therapeutic methods providing a direct internal control within the same patient: deroofing versus aspiration. Aspiration of the fire burn blister demonstrated advantages over deroofing in terms of faster wound healing, reduced bacterial colonization, lower VAS scores, and quicker pain resolution.

The management of burn blisters remains a matter of debate, with no universally accepted guidelines, particularly for patients with diabetes. Swain et al. [6] compared three management approaches (deroofing, aspiration, and leaving blisters intact) and found that intact blisters exhibited the least bacterial colonization. They also observed a significant reduction in VAS scores for aspirated blisters compared to deroofed ones, findings that align with our results.

Deroofing exposes the underlying dermis, increasing the risk of infection and pain, and often necessitating frequent dressing changes, which further elevate infection risk. Adher-

ing to strict aseptic technique, ensuring meticulous wound care, and administering antibiotics based on culture and sensitivity testing can help minimize bacterial colonization. Previous studies indicate that superficial burns generally heal within 5 to 7 days [7].

The influence of preexisting diabetes and ongoing diabetic therapy on burn outcomes remains unclear. In patients with diabetes, burns typically heal more slowly, resulting in prolonged hospital stays. Shalom et al. [8] reported that diabetic patients had significantly longer hospitalizations than controls (17.1 ± 2.0 days vs. 8.9 ± 1.0 days, $P < 0.001$). Similarly, Dolp et al. [9] found that diabetes was associated with longer hospital stays and higher morbidity, regardless of prior antidiabetic therapy. Overall, diabetes substantially increases morbidity in burn patients. In our report, complete healing was achieved within 28 days for the deroofed foot and within 14 days for the aspirated foot.

A randomized trial by Ro et al. [10] reported mean healing times of 12 days for aspirated blisters and 12.55 days for deroofed blisters. The longer healing duration in our case was expected due to the patient's diabetes and suboptimal glycemic control. In our case, the mean VAS score was 3.6 ± 3.2 for deroofed feet and 2.4 ± 2.7 for aspirated feet, with pain resolving earlier in the aspirated foot (Fig. 3). The randomized controlled trial of Ro et al. [10] also found higher VAS scores for deroofed blisters compared to aspirated ones, consistent with our findings. Their study evaluated both superficial and deep burns of the palms and soles in a larger cohort ($n=40$).

This report describes a single case rather than a randomized controlled trial. Nevertheless, it is notable for being the first to document and directly compare deroofing and aspiration performed on the same patient with bilateral fire burn injuries. Further studies with larger cohorts are warranted to validate these findings and to assess long-term outcomes associated with different blister management techniques.

Both deroofing and aspiration have distinct advantages and disadvantages. Deroofing facilitates assessment of burn depth and may be necessary for functional reasons, but carries a higher risk of infection, pain, and scarring. Aspiration, by contrast, relieves pressure and pain, minimizes wound exposure, and may reduce infection risk. Current evidence suggests that aspiration could provide better long-term pain relief and superior scar outcomes.

ARTICLE INFORMATION

Author contributions

Conceptualization: all authors; Investigation: all authors; Methodology: RB, BP, DPM; Writing–original draft: RB; Writing–review & editing: all authors. All authors read and approved the final manuscript.

Conflicts of interest

The authors have no conflicts of interest to declare.

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Data availability

Data sharing is not applicable as no new data were created or analyzed in this study.

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