

Case study: neuropathic heel ulcer

Foley L

This case study was a winning entry in the inaugural Paul Hartmann /AWMA Advanced Wound Care Course Scholarships in 2006. Winners were chosen following a rigorous assessment process by the AWMA Executive Committee members and AWMA Education and Professional Development Subcommittee members.

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Presentation

Mrs B, an obese but otherwise healthy 35 year old female who worked as a part-time shop assistant was referred to the Fremantle Hospital and Health Service (FHHS) multi-disciplinary foot wound clinic for review of her chronic plantar heel ulcer. The ulcer of 2.5 years' duration was a secondary complication from peripheral nerve injury of the left foot sustained during a motor vehicle accident (MVA) in 1990.

Medical history

At the time of the accident, Mrs B sustained fractures of the upper arm, jaw and comminuted fractures of lower tibia and fibula (ORIF). This left her with a shortened left leg. She has three children, two by caesarean section. For the previous 5 years, episodes of ulceration and cellulitis were associated with her heel ulcer. The only medication Mrs B was taking currently was the contraceptive pill.

Wound profile

Mrs B's wound (Figure 1) was a deep circular wound of the plantar left heel. The base of the wound was soft and granulating. In contrast, the peri-wound area was callused. The wound, which measured 15x18mm in length and 14mm in depth was slightly malodorous, and highly exudating of haemorrhagic fluid. The severity of the wound was rated 1A-2A as per the University of Texas Wound Classification System¹. X-rays showed no evidence of osteomyelitis.

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Treatment aims

The aims of treatment were to control for any signs and symptoms of superficial or deep infection and promote healing of the ulcer with aggressive offloading.

Management

The management of Mrs B's ulcer was determined following a comprehensive assessment of the ulcer and consideration of her familial and work related activities.

Treatment plan

The TIME principles of wound management were applied². The standard practice for a chronic wound of this nature is to debride the peri wound area and the wound bed of any redundant tissue. To control superficial bacterial colonisation of the ulcer, second daily applications of Iodosorb paste with a foam dressing were used. The presence of a deeper infection such as osteomyelitis was excluded with x-ray examination.

Appropriate offloading of the area was commenced to promote wound healing. Offloading proved to be problematic in this case given the need for the patient to work and care for three children. Rigid materials combined with splints or casts were therefore deemed unsuitable. Low density Plastazote (3mm) was cut for plantar protection, with 5mm moulded for the circumference of the heel. The plantar section was ground off the 5mm thickness so as to limit direct pressure on the area without using an aperture which could have caused herniation of the wound bed. Armstrong, Liswood & Todd³ showed how pressure over an area can be redirected but increased at the periphery. Once the padding was consistently bandaged to the foot, the wound bed changed shape and dimension and commenced to heal from the base (Figures 2, 3 & 4).

Progress and follow-up

Regular reviews were conducted in both the podiatry and the multi-disciplinary foot wound clinics between July 2000 and August 2003 until the wound was healed.

Discussion

The referral from Mrs B's general practitioner highlighted that the treatment Mrs B had previously received from another tertiary service had been less than optimal. Wound assessment and the principles of offloading were apparently non-existent in previous treatment plans.

This case study emphasises the need to assess wounds and wound tissue accurately, including observation of tissue mechanics and the effects of tissue offloading. Simple padding of the heel had proven to be inadequate in this case. Even when more mouldable materials were used in a post-op shoe, only minor changes were noted in the wound bed.

The patient used ankle high boots on a daily basis; these were considered useful as the vehicle for a heat mouldable material. Plastazote, a closed cell cross-linked polyethylene foam, was chosen. A 3mm thick section was heated and moulded into the heel seat of a Darco shoe (Figures 2 & 3). This was cut and modified to fit into her boot. The patient was instructed to use a heavy crepe bandage to keep the device close to the plantar heel of the foot (Figure 5). This reduced some of the heavy heel contact and repetitive tissue damage during gait. Iodosorb was used to reduce the bacterial load of the wound and ensure a clean wound bed. As healing progressed (Figures 6, 7 & 8), the changing shape of the ulcer was noted and a more durable material was used to enhance offloading.

Figure 1. First visit.



Figure 2. Heel offloading device, heated and molded into a Darco shoe.



Figure 3. Heel offloading device.



Figure 4. Heel offloading device, ready to be applied to the foot.



Figure 5. Heel offloading device, secured to the foot.



Neuropathic heel ulcers are often difficult to offload successfully. Patients have difficulty maintaining balance whilst trying to keep weight off the heel. Any device applied externally creates problems when climbing stairs and driving. Mrs B had a very young family, one of whom had behavioural problems, and the usual offloading strategies were felt to be unsuitable for her.

On the occasion that the patient neglected to bandage the heel padding to her foot as instructed, the wound deteriorated. The decrease in the wound depth and circumference emphasised how important it was to have the offloading device in close contact with the plantar heel and peri wound tissue to make it more effective (Figure 9). It also reinforced the importance of a bio-mechanical assessment of the foot and shoe and the need to review and consider both the home and work environments to enable wound healing (Figure 10).

Figure 6. As the ulcer changed shape, a 'stiffer' offloading material was used. The 'blue' additions reflect the shape of the ulcer and the need to offload at right angles to the axis of the ulcer.



Figure 7. 6 months later.



Figure 8. Ulcer changing shape.



Summary

In summary, accurate wound assessment done in the context of a multi-disciplinary team and holistic approach to patient care facilitated best practice in providing Mrs B with correct wound management and pressure offloading modalities, which improved the chances of healing her wound.

Recommendation

This case highlights the need to ensure all neuropathic heel wounds are appropriately assessed, the heel is well offloaded based on appropriate bio-mechanical assessment, and other broader patient and environmental factors are considered.

Declaration

No products used in the treatment of this patient were directly supplied by a manufacturer. All dressings and materials were stock items of FHHS. At the time these pictures were taken 2000-2003, signed declarations from patients were not required by the FHHS. Verbal permission was obtained from the patient and witnessed by the health care worker. Patients understood that pictures of their wounds would be used for teaching and publication purposes.

References

1. Lavery I, Armstrong D & Harkless L. Classification of diabetic foot wounds: The University of Texas San Antonio Diabetic Wound Classification System. *Ostomy/Wound Manage* 1997; **43**(2):44-52.
2. Foley L. The application of TIME (wound bed preparation principles) in the management of a chronic heel ulcer. *Primary Intention* 2004; **12**(4):163-166.
3. Armstrong D, Liswood P & Todd W. Potential risks of accommodative padding in the treatment of neuropathic ulcers. *Ostomy/Wound Manage* 1995; **41**(7):44-49.

Figure 9. The next phase of healing,



Figure 10. Healed ulcer. Note extensive scar tissue.

