

The use of VAC[®] therapy, offloading techniques and sharp debridement to manage a neuroischaemic foot

Tania Woodrow is Specialist Podiatrist Diabetes, Diabetic Foot Clinic, Cornwall and Isles of Scilly Community Health Services

The following case report outlines the management of a neuroischaemic diabetic gentleman (Mr E) referred to his local hospital following partial forefoot amputation and the challenges faced. Mr E was a 64-year-old insulin-dependent diabetic of fifteen years' duration, with a history of myocardial infarction and coronary artery bypass grafting.

In February 2007, he was admitted onto a vascular surgical ward following the development of digital necrosis, severe foot infection, rising blood glucose levels and extreme ischaemic pain. His initial surgical interventions included a common femoral endarterectomy to restore blood flow to the limb and amputation of the hallux, partial first metatarsal and the second digit. However, during the initial post-surgical period, further necrosis within the wound delayed healing and an episode of biosurgery was undertaken to remove non-viable tissue. At this stage the wound progressed and Mr E was transferred to his community team for ongoing care.

Four weeks later Mr E was readmitted with systemic signs of infection and a red, hot, swollen foot with purulent discharge. On examination the remainder of the first metatarsal bone was necrotic and an abscess had developed within the plantar subaponeurotic space. Blood tests recorded a C-Reactive protein of 211.7mg/L (normal <5mg/L). Mr E was readmitted with spreading infection and abscess formation within the plantar subaponeurotic space. A second visit to theatre was required for plantar dissection of the abscess, transmetatarsal amputation of the first and second metatarsals and amputation of the third toe. Post-surgical management of the foot wound included ribbon alginate, dressing pads



Figure 1. Patient's wound post-operatively, after two days of VAC therapy.

and offloading with a post-operative shoe. Eleven days after the operation Mr E was referred to the diabetic foot team and vacuum assisted closure (VAC[®], KCI) therapy was initiated on the ward.

Initial assessment

The patient had undergone two forefoot surgeries within a five-week period. It was generally agreed that the foot was at the limit of structural loss and any further surgery would result in a non-functioning foot and, therefore, higher amputation would be considered to be the only viable option.

Neuropathic in nature, the goal of treatment was to salvage the foot by optimising wound healing and offloading the medial forefoot, thereby avoiding unnoticed pressure on the wound area. Semi-retired with an active social life, the

patient challenge was to allow Mr E the freedom to maintain his usual lifestyle. The closed wound environment provided by VAC therapy was considered essential for wound edge approximation, promotion of granulation tissue formation, stimulation of angiogenesis and the removal of excess fluid. This was used in combination with a Wound Care System Shoe (Darco International, Germany), the insole of which was adapted to allow dynamic pressures acting through the foot to be borne through the heel and lateral border.

After two days of VAC therapy, the wound measured 7.3cm (maximum width) × 10.6cm (length) × 1.0cm (depth), with 90% granulation tissue and 10% slough/connective tissue (Figure 1). The wound site was bordered with VAC drape and lined with Mepitel[®] (Mölnlycke Health Care) for the first dressing change.



Figure 2. Patient's wound after ten days of VAC therapy. To maximise cellular deformation the liner was omitted after the first dressing change.



Figure 3. After 34 days of VAC therapy, showing wound edge approximation and a significant reduction in the wound dimension.



Figure 4. At day 59 when VAC therapy was discontinued.

Continuous therapy was used for the first 48 hours, changed to -125 mmHg intermittent therapy thereafter; five minutes on and two minutes off. Mr E attended the diabetic foot clinic three times a week for dressing change, wound assessment and sharp debridement as needed.

VAC therapy review

After 10 days of VAC therapy the medial and lateral wound edges were seen to be advancing, measuring 10.4 cm (length) \times 6.9 cm (width) \times 0.8 cm (depth) (Figure 2).

After 34 days of VAC therapy the change in wound dimension was significant, reducing to 10.0 cm (length) \times 5.8 cm (width) and 0.2 cm (depth) (Figure 3). At 59 days, VAC therapy was discontinued with the wound measuring 2.7 cm (length) \times 2.7 cm (width) \times 0.2 cm (depth) (Figure 4).

Post VAC therapy

Following VAC therapy, the remaining superficial wound was managed using a foam dressing and retention bandaging. At two weeks post VAC, the wound continued to reduce in size measuring 1.7 cm (length) \times 2.3 cm (width) \times 0.1 cm (depth) (Figure 5). At four months post surgery the wound was healed and Mr E

was referred for bespoke footwear and orthosis to maintain the integrity of the foot (Figure 6).

Discussion

The surgeons involved in Mr E's care had made him fully aware of the seriousness of the situation, where lower limb amputation would be the only surgical option available should healing not take place. Fully informed, Mr E was understandably fearful for the future and anxious at each dressing change for positive feedback. The closed environment of VAC therapy and exudate management took away anxiety related to dressing strikethrough and odour when socialising. Digital photographs were taken on a regular basis to reinforce the progress made by the wound to the patient. Diabetic post-operative foot wounds are complex, posing a challenge to providers of wound care. The clinical challenge of this case report was to salvage a neuroischaemic foot where, due to the extent of structural loss, no further foot surgery was considered possible. The combined use of VAC therapy, offloading techniques and sharp debridement within a dedicated foot clinic delivered a positive outcome. The long-term goal of limb salvage was achieved; the resultant foot is functional and can be accommodated within bespoke footwear. **WUK**



Figure 5. With a conventional dressing regimen and use of a wound care shoe system to offload the medial forefoot, the wound continued to reduce in size.



Figure 6. Four months postoperatively the wound had healed and the foot was functional.