New technologies in V.A.C.® GranuFoam Bridge™ dressing

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Foot ulceration is a serious complication of diabetes, with a reported incidence of 1–3.6% and a prevalence of up to 25% (Singh et al, 2005). The impact can be devastating and results in more hospital admissions than any other diabetes-related complication. It is the major contributing factor to lower extremity amputations (Pecoraro et al, 1990). Infection of diabetic foot wounds is a common and serious complication, which, if not managed effectively and quickly, can lead to extensive tissue destruction. Deep tissue samples are preferred, as they not only isolate surface bacteria but also bacteria in the deeper tissues, and repeated sampling is important to verify isolates and target antimicrobial therapy. However, to avoid overuse of antimicrobial agents it is important to clinically differentiate between soft tissue infection and colonisation, although in patients with diabetes this can be extremely difficult due to dampened inflammatory responses.

The standard approach to diabetic foot ulcer management includes patient examination, wound debridement, infection control, off-loading and regular reviews (Bowling et al, 2009).

There are several advanced technologies now being used to assist wound healing. One of the most recent of these is Vacuum Assisted Closure (V.A.C.®, KCI Medical) Therapy that produces negative pressure at the wound surface, thereby lowering oxygen tension and stimulating angiogenesis. However, it should be remembered that topical negative pressure (TNP) reduces tissue oedema and thus improves blood flow, and so the association of low Pc02 could be the result of the wounding process itself, not the TNP therapy.

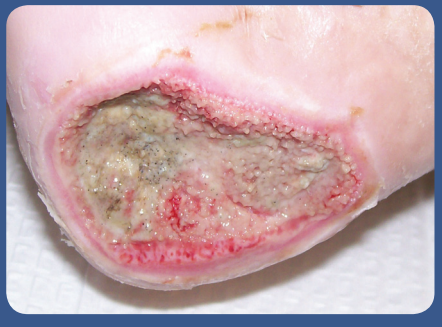

Figure 1. Heel ulcer following three applications of larval therapy. Some remaining slough evident.

Figure 2. V.A.C. Therapy started. GranuFoam silver applied to wound bed.

Background

The V.A.C. Therapy system is a non-invasive, dynamic system that promotes wound healing. The V.A.C. Therapy unit delivers sub-atmospheric (negative) pressure to the wound site through the open-cell foam dressings. The foam dressing is cut to size, placed in the wound, and secured with an adhesive drape that maintains an airtight seal when the system is operating. A pressure sensing T.R.A.C.® Pad (KCI Medical) is placed over a hole created in the drape, allowing the therapy unit to monitor and adjust the negative pressure. Tubing connects the pad and foam to a canister housed in the computerised therapy unit that intermittently or continuously generates negative pressure. Therapeutic pressures can range, but -125mmHg is the standard pressure that may be applied. Clinical benefits reported include (Armstrong et al, 2009):

- Maintenance of a closed moist wound healing environment, which acts as a barrier to infection,
- Removal of exudate and reduction of periwound oedema
- Promotion of the formation of granulation tissue
- Optimisation of blood flow through capillary proliferation.

Case report

A 78-year-old male patient (Mr X) with type 2 diabetes was admitted to a surgical ward with sepsis secondary to an infected right foot. He presented with cellulitis to his right foot with areas of necrosis to his second and third digits. He had previously had his hallux amputated due to poor arterial inflow. He was initially treated with antibiotics and had a right popliteal angioplasty. However, deterioration of his foot led to a right transtibial amputation being carried out.

Mr X was unwell in the postoperative period and suffered several episodes of rectal bleeding and was nursed extensively from his bed. During this time a necrotic ulcer was noted to his left heel. A left popliteal angioplasty was performed and he was issued with a pressure-relieving ankle and foot orthosis (PRAFO).

On examination he had evidence of peripheral neuropathy, which was determined by his inability to feel light pressure using a 10g monofilament, sharp sensation and vibration perception thresholds of >25 volts. There was also significant evidence of peripheral arterial disease with all pedal pulses, posterior and anterior tibial, being non-palpable.

Following treatment of his rectal bleeding, improvement in his general condition took place over a period of 3–4 weeks. Mr X was keen to walk again and was transferred to a rehabilitation ward for assessment for prosthetic rehabilitation.

Biosurgical debridement of his heel ulcer took place using three applications of larval therapy. This resulted in a wound measuring 5.0x4.5cm. There was slight erythema to the periwound skin and some remaining slough to the wound bed (*Figure 1*).

Figure 3. GranuFoam Bridge dressing was applied to the lateral aspect of the leg.

Figure 4. Portable V.A.C. unit attached. Mr X was able to wear his pressure-relieving ankle and foot orthosis and continue rehabilitation.

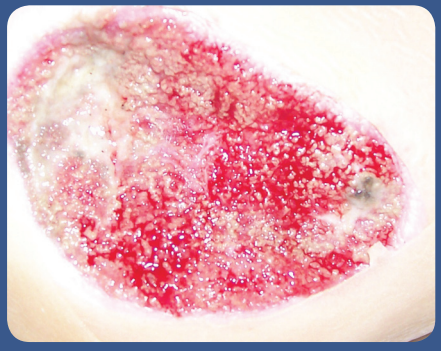

Figure 5. Two weeks after starting V.A.C. Therapy, granulation tissue was evident across the wound bed.

V.A.C Therapy was subseqently started. GranuFoam Silver® (KCI Medical) was applied to the wound bed (*Figure 2*), secured with a drape and a V.A.C. GranuFoam Bridge™ dressing was applied up the lateral aspect of his leg. This was attached to a V.A.C. Freedom® unit (KCI Medical) and negative pressure was set at -125mmHg on a continuous pressure setting (*Figures 3* and *4*).

Mr X had the V.A.C. Therapy system applied for a period of four weeks. Dressings were renewed three times a week. By week two the wound had reduced in size to 4.5x4.0cm and granulation tissue was evident across the wound bed (*Figure 5*).

By week four the wound had improved further and measured 4.0x3.2cm. A combination of negative pressure and larval therapy may have contributed to both a decrease in the wound size and an increase in granulation tissue.

Conclusion

Use of the V.A.C.® Freedom ® unit and the V.A.C.® GranuFoam Bridge™ dressing allowed Mr X to continue to wear his protective footwear and to mobilise. He was able to attend daily sessions in the gym and participate in prosthetic rehabilitation. He was cast for and fitted with a primary prosthesis to his right leg. Current evidence supports earlier mobilisation, which increases tissue oxygenation, thus promoting the healing process (Van Ross et al, 2009). In the authors' opinion, the use of the bridge dressing adds valuable clinical time, reduces cost, thereby expediting patient treatment and optimising functional outcomes. WUK

References

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