

Use of Negative Pressure Wound Therapy With Instillation and Dwell Time in Non-Healing Lower Extremity Wounds

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Background

- The presence of non-healing lower extremity wounds carries a risk for amputation.
- However, advanced wound therapies can offer options for managing these complex wounds, and potentially help avoid limb amputation.
- The addition of negative pressure wound therapy with instillation and dwell time (NPWTi-d*) using reticulated open cell foam dressings with through holes (ROCF-CC¹) to wound care plans may help remove barriers to healing by helping to remove thick exudate and infectious materials and promoting development of granulation tissue.

Purpose

- The use of NPWTi-d with ROCF-CC dressings was assessed in 3 patients with non-healing, lower extremity wounds.

Methods

- Patients presented for care after failing previous treatment plans with other health care providers.
- Wounds were assessed for osteomyelitis and malignancy.
- Antibiotics were initiated for all patients.
- Surgical debridement was performed followed by application of NPWTi-d with ROCF-CC dressings.
- Normal saline was instilled with a 1-minute dwell time, followed by continuous negative pressure at -125 mmHg for 2.5 hours.
- Dressings were changed every 2-3 days.
- Once the wound bed was covered with healthy granulation tissue, NPWTi-d was discontinued.
- Patients then received either split-thickness skin grafts (STSGs) or continued wound care using advanced wound dressings alone or with hyperbaric oxygen therapy (HBOT).

Results

- Three patients (age range: 66-73 years) presented for care.
- Wound types included neuropathic ulcer, Wagner Grade 3 diabetic foot ulcer (DFU), and Stage 4 pressure injury (Table 1).
- Previous medical history included diabetes, obesity, neuropathy, and congestive heart failure (Table 1).
- Wounds had been present for 7 days to 8 years.
- Previous wound care included surgical debridement and use of advanced wound dressings.

Table 1. Patient demographics

| Case | Age | Sex | Previous Medical History | Wound Type |
|------|-----|--------|--|-------------------------|
| 1 | 72 | Female | Obesity; HTN; Hyperlipidemia; Autoimmune Hepatitis; Degenerative Disk Disease; Neuropathy | Neuropathic Ulcer |
| 2 | 66 | Female | Diabetes; CHD; Cancer; Chemotherapy; Obesity; HTN; CKD; Charcot Foot; Peripheral Neuropathy | Wager Stage 3 DFU |
| 3 | 73 | Female | Diabetes; Obesity; Hypertension; CHF; CVA; Charcot Foot; Gout; Hyperlipidemia; Hypertrophic Cardiomyopathy; Neuropathy; Incontinence | Stage 4 Pressure Injury |

CHD= Coronary Heart Disease; CHF= Congestive Heart Failure; CKD= Chronic Kidney Disease; CVA= Cerebral Vascular Accident; DFU= Diabetic Foot Ulcer; HTN= Hypertension

- NPWTi-d with ROCF-CC dressing use resulted in removal of debris and infectious material from the wound bed.
- All wounds developed healthy granulation tissue.
- Wound closure was achieved with a STSG in 1 patient.
- One patient received further care with HBOT, native Type 1 collagen matrix with polyhexamethylene biguanide dressings, and placental wound allograft coverings.
- The remaining patient is receiving wound care with advanced wound dressings.
- Two wounds were fully closed 51 and 140 days after presentation (Figures 1-2).
- The remaining wound is undergoing continued wound care management under home health care (Figure 3).

Cases

- A 72-year-old female presented with a neuropathic ulcer present for >8 years. The wound was negative for malignancy and osteomyelitis. Surgical debridement was performed followed by application of NPWTi-d. After 14 days, healthy granulation tissue covered the wound bed and an STSG procedure was performed. The wound was fully closed 51 days after presentation.



Figure 1A. Wound at presentation



Figure 1B. Wound after 10 days of NPWTi-d



Figure 1C. Wound 8 days after STSG



Figure 1D. Wound remains closed 38 days after STSG

- A 66-year-old female presented with a Wagner Stage 3 DFU present for >1 year. Surgical debridement and excision for osteomyelitis with infected bursa were performed, followed by application of NPWTi-d. After 48 days, NPWTi-d was discontinued, and HBOT, antimicrobial wound matrix, and placental allograft applications initiated. The patient underwent 40 treatments of HBOT, 5 placements of antimicrobial wound matrix, and 3 placements of placental allograft. The wound was fully healed 140 days after presentation.



Figure 1A. Wound at presentation



Figure 1B. Wound after surgical debridement and excision



Figure 1C. Wound after 26 days of NPWTi-d



Figure 1D. Wound fully closed 140 days after presentation

Cases (Cont'd)

- A 73-year-old female presented with a Stage 4 pressure injury present for 7 days. Sharp debridement was performed followed by application of wound dressings and offloading at home. Due to limited wound improvement, the patient was admitted to a long-term acute care facility and NPWTi-d was initiated. After 26 days of NPWTi-d, the healthy granulation tissue covered the wound bed. Continued wound management is ongoing in the home health care environment.



Figure 3A. Wound 99% closed before loss of wound care



Figure 3B. Severe wound deterioration after 7 days



Figure 3C. Wound after 80 days of sharp debridement, wound dressings, and offloading



Figure 3D. Wound after 12 days of NPWTi-d



Figure 3E. Wound after 26 days of NPWTi-d

Conclusions

- NPWTi-d with ROCF-CC dressing use helped remove debris and infectious materials and promoted granulation tissue development in these 3 patients.
- The comprehensive wound care plan that included NPWTi-d with ROCF-CC dressings, HBOT, and advanced wound dressings helped with limb preservation.

*3M™ Veraflo™ Therapy; 3M™ V.A.C. Veraflo Cleanse Choice™ Dressing (3M, St. Paul, MN)

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