

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.
- Negative pressure wound therapy with instillation and dwell time (NPWTi-d*) using reticulated open cell foam dressings with through holes (ROCF-CC[†]) 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 7 patients with non-healing, lower extremity wounds.

Methods

- Patients presented for care after previous treatment plans with other health care providers failed to promote wound healing.
- 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.
- NPWTi-d was discontinued when the wound bed was covered with healthy granulation tissue.
- Hyperbaric oxygen therapy (HBOT) was utilized in 3 patients.
- The NPWTi-d device was disconnected prior to each HBOT session. The device tubing and ROCF-CC dressings remained in place and were covered with a moist towel throughout HBOT treatment.
- Wound closure was achieved with split-thickness skin grafts (STSGs) or by secondary intention with use of advanced wound dressings.

Results

- Seven patients (average age 69.4 ± 8.1 years) presented for care.
- Wound types included Wagner Grade 3 diabetic foot ulcer (DFU, n=3), ulcer (n=2), Stage 4 pressure injury (n=1), and DFU infection (n=1), (Figure 1).

Representative Cases

Case 1. Neuropathic ulcer present for >8 years. 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 2A. Wound at presentation



Figure 2B. Wound after 10 days of NPWTi-d

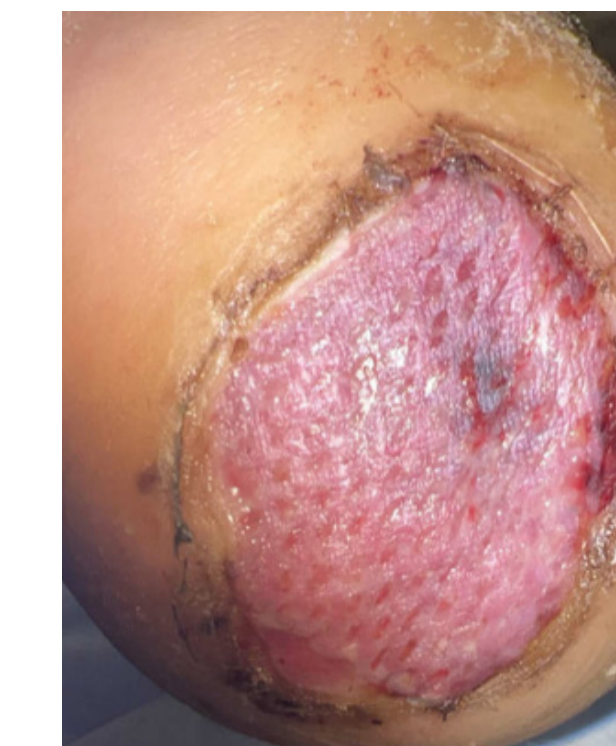


Figure 2C. Wound 8 days after STSG



Figure 2D. Wound remained closed 38 days after STSG

Case 2. Stage 4 pressure injury present for 7 days. After 26 days of NPWTi-d, healthy granulation tissue covered the wound bed. NPWTi-d was discontinued and an STSG procedure was planned. After discharge from the hospital, the patient was lost to follow up and the window of opportunity to place an STSG was lost.



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 wound dressings, offloading, and sharp debridement



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



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

Case 3. Wagner Stage 3 DFU present for >1 year. After 48 days, NPWTi-d was discontinued. HBOT, antimicrobial wound matrix, and placental allograft applications were initiated. The wound was fully healed 140 days after presentation.



Figure 4A. Wound at presentation



Figure 4B. Wound after surgical debridement and excision



Figure 4C. Wound after 26 days of NPWTi-d



Figure 4D. Wound fully closed 140 days after presentation

Case 4. Wagner Stage 3 DFU present for 42 days. After 25 days, NPWTi-d was discontinued. HBOT and advanced wound dressings were initiated. The patient was discharged to a long-term acute care facility.



Figure 5A. Wound after sharp debridement



Figure 5B. Wound after 25 days of NPWTi-d



Figure 5C. Wound 90% closed 4 months after presentation

Results (Cont'd)

- The most common patient comorbidities included hypertension, diabetes, and obesity (Table 1).
- Wounds had been present for 7 days to 8 years.
- NPWTi-d with ROCF-CC dressing use resulted in removal of debris and infectious material from the wound bed.
- Five wounds were fully closed 51-140 days after presentation (Figures 2-5).
 - Four patients received an STSG.
 - One patient received wound care with advanced wound dressings until wound closure.
 - One patient received further care with HBOT, native Type 1 collagen matrix with polyhexamethylene biguanide dressings, and placental wound allograft coverings; wound care is ongoing.
 - The remaining patient was lost to follow up prior to wound closure.

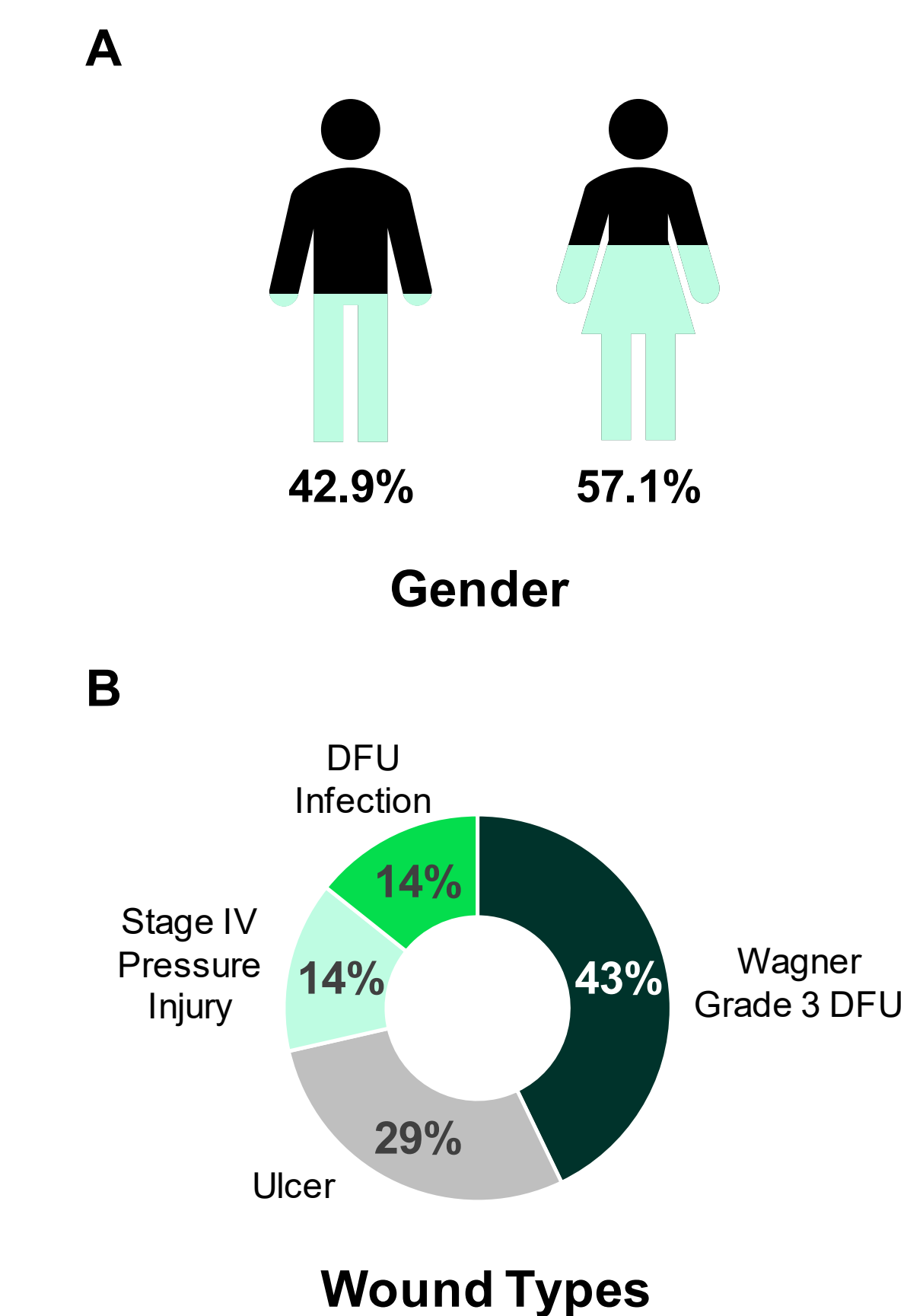


Table 1. Common patient comorbidities

Comorbidity	n=7
Hypertension	6 (85.7%)
Diabetes	5 (71.4%)
Obesity	5 (71.4%)
Neuropathy	4 (57.1%)
Congestive Heart Failure	3 (42.9%)
Coronary Heart Disease	3 (42.9%)
Hyperlipidemia	3 (42.9%)
Cancer	2 (28.6%)
Chronic Kidney Disease	2 (28.6%)

Figure 1. Patient demographics and wound types. A. Patient demographics; B. Wound Types

Conclusions

- NPWTi-d with ROCF-CC dressing use helped remove debris and infectious materials and promoted granulation tissue development in these 7 patients.
- The comprehensive wound care plan used to manage these complex wounds, which included NPWTi-d with ROCF-CC dressings, HBOT, and advanced wound dressings helped with limb preservation in 3 patients.

*3M™ Veraflo™ Therapy; †3M™ V.A.C. Veraflo Cleanse Choice™ Dressing (Solventum Corporation, Maplewood, MN)

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