Utilizing Disposable, Mechanical NPWT Devices to Aid Wound Management at Home: Cost Savings Considerations

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Background

- In 2018, Medicare spending on wound care was conservatively estimated to total $28 billion, highlighting the economic burden of wounds on the healthcare system.[1]
- Negative pressure wound therapy (NPWT) has emerged as an effective wound management technology, although these devices can have higher upfront costs than traditional therapies.
- A disposable, mechanically powered NPWT (dNPWT) unit is an affordable option for managing small wounds.[2]

Purpose

- We present 3 complex cases of lower extremity wounds managed with dNPWT and discuss the implications of dNPWT on cost savings.

Methods

- Debridement and antibiotics were utilized as necessary.
- dNPWT* was applied at -125 mmHg and dressings were changed 3 times per week.
- After dNPWT, wound closure was assisted by applications of an antimicrobial wound matrix§ or autologous skin grafting.

Results

- Case 1 (**Figure 1**) was an 85-year-old male with a history of smoking and peripheral arterial disease who presented with an open wound following excision of a hematoma. dNPWT was started, but was interrupted when the patient suffered a femur fracture. After an additional 6 weeks of dNPWT, the wound volume had reduced by 90.8%, and treatment transitioned to applications of antimicrobial wound matrix. The total duration of wound care was 10 weeks.
- Case 2 (**Figure 2**) was a 59-year-old male with a history of coronary artery disease, hypertension, and smoking who underwent ankle fusion surgery and presented with a surgical wound with osteomyelitis. After initiation of antibiotic therapy and dNPWT, the patient removed the external fixator and was later hospitalized with cellulitis, requiring revision. After return to dNPWT, the wound was then closed via autologous skin grafting. The total duration of wound care was 19 weeks.

Figures

Case 1. An 85-year-old male presenting with an open wound after excision of a hematoma.

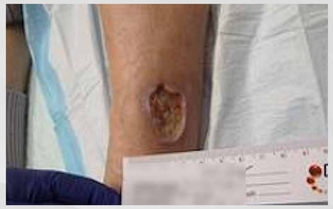

Figure 1A. Initial presentation with an open wound after excision of a hematoma.

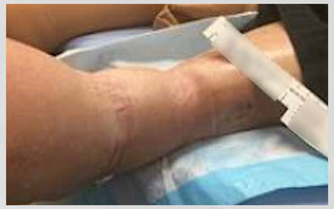

Figure 1B. Significant reduction of wound size after application of dNPWT.

Figure 1C. Wound appearance upon discharge to assisted living facility.

Case 2. A 59-year-old male presenting with an open wound after ankle fusion surgery.

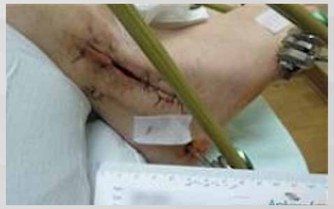

Figure 2A. Initial presentation of a surgical wound after ankle revision surgery.

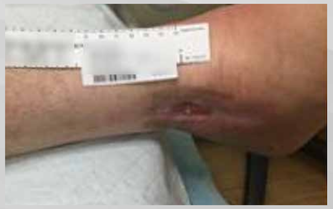

Figure 2B. Wound appearance after 7 weeks of therapy.

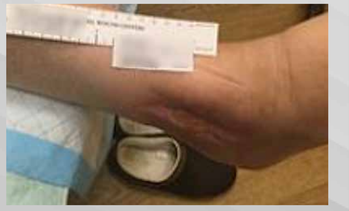

Figure 2C. Wound appearance after 11 weeks of therapy.

Case 3. A 73-year-old male with Charcot foot deformity presenting with a diabetic foot ulcer.

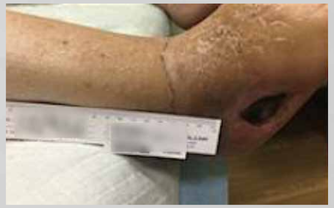

Figure 3A. Initial presentation of a diabetic foot ulcer.

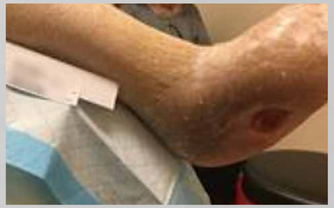

Figure 3B. Wound appearance after 2 weeks of dNPWT.

Figure 3C. Wound appearance after dNPWT and 1 month of hyperbaric oxygen therapy.

Results (Cont'd)

- Case 3 was a 73-year-old male with diabetes, hypertension, Charcot foot, and neuropathy who presented with a diabetic foot ulcer with osteomyelitis. After the use of antibiotics and dNPWT, the wound volume decrased by 40%. The patient was transitioned to hyperbaric oxygen therapy, although treatment was complicated by the formation of additional diabetic foot ulcers and infection with methicillin-resistant *S. aureus*. Closure was achieved after 58 weeks of therapy.

Cost Considerations

- The use of traditional NPWT has been shown to be effective in managing complex open wounds; however, NPWT dressings are typically more expensive than standard of care dressings.
- In some wound care settings, single-use dNPWT dressings can offer a greater cost benefit than traditional NPWT.[3]
- Outpatient application of dNPWT costs an estimated $726 per week.[4] Each day that inpatient stay is shortened represents $2,969 in potential cost savings.[5]
- For difficult-to-treat wounds, dNPWT may provide an ideal balance between providing advanced wound management and reducing the costs of care.

Conclusions

- These cases represent difficult-to-treat scenarios in which dNPWT contributed to a positive healing outcome.
- Despite significant interruptions unrelated to dNPWT, closure was achieved in all cases.
- With lower upfront costs than powered NPWT and applicability outside acute care settings, dNPWT can be cost-effective for small lower extremity wounds.

Acknowledgements

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References: 1. Nussbaum SR, Carter MJ, Fife CE, et al. *Value in Health*. 2018;21(1):27-32. 2. Hutton DW, Sheehan P. *Int Wound J*. 2011;8(2):196-205. 3. Kirsner RS, Delhougne G, Searle RJ. *Wound Manag Prev*. 2020 Mar;66(3):30-36. 4. Calculated based on weekly clinic visits (99211) and twice weekly applications of dNPWT (97607). Search the Physician Fee Schedule. Centers for Medicare & Medicaid Services. https://www.cms.gov/medicare/physician-fee-schedule/search. Updated Jan 20, 2021. 5. 1999-2019 AHA Annual Survey: Hospital Adjusted Expenses per Inpatient Day. Kaiser Family Foundation. https://www.kff.org/health-costs/state-indicator/expenses-per-inpatient-day/?currentTimeframe=0. Updated Jan 31, 2020.

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NOTE: Specific indications, contraindications, warnings, precautions and safety information exist for these products and therapies. Please consult a clinician and product instructions for use prior to application. Rx only.
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*3M™ Snap™ Therapy System (3M Company, San Antonio, TX)
§PuraPly® Antimicrobial Wound Matrix (Organogenesis Inc., Canton, MA)