Impact of Negative Pressure Wound Therapy All-in-One Dressings on Pain and Care Setting Transition: Case Series

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Introduction

- Accelerated wound healing has been reported with adjunctive use of negative pressure wound therapy (NPWT) and a reticulated open-cell foam (ROCF) dressing interface across various wound types.[1,2]
- Wound care and dressing changes with ROCF-interface dressings can be painful.[3,4]
- An all-in-one dressing[5] composed of encapsulated ROCF, a perforated nonadherent layer, and hybrid acrylic-silicone drape is available with an extended wear time, expanded wound type utilization, and potential to reduce pain during therapy and dressing changes.

Purpose

- We report our experience with NPWT and all-in-one dressings to adjunctively manage 4 complex wounds in patients with multiple comorbidities

Methods

- Wounds were appropriately debrided, and antibiotics prescribed as needed.
- Patients initially received adjunctive treatment with NPWT using traditional ROCF-interface dressings or NPWT with instillation and dwelling of a topical wound solution (NPWTi-d).
- Once the wounds reached appropriate size, therapy was switched to NPWT with an all-in-one dressing*.
- An all-in-one wound dressing with drape was applied over the wound, extending at least 5 cm beyond the wound edge, and connected via tubing to an NPWT unit†.
- Negative pressure was applied between -75 mmHg and -125 mmHg.
- Dressings were changed at least once per 7 days.

Table 1. Overview of Cases

Case #	Sex	Age (years)	Comorbidities/history	Wound type	Duration of all-in-one dressings (days)
1	F	65	Type 2 DM, HTN, COPD, HPL, GERD, gout, hypothyroidism, obesity; Hx of DFU, CAD s/p previous MI, CABG X 2, stage 4 oropharyngeal cancer	Surgical abdominal wound	27
2	M	72	HTN, HPL, RA, chronic venous insufficiency	Trauma wound post hematoma	37
3	F	41	Type 2 DM, PTSD, episodic mood disorder, generalized anxiety disorder, POTS, obesity	Surgical wound post fasciotomy; acute limb ischemia	32
4	F	68	HTN; Hx of gastric bypass, prior cholecystectomy	Atypical vasculitis on left LE	40

DM: diabetes mellitus; HTN: hypertension; Hx: history; DFU: diabetic foot ulcer; CAD: coronary artery disease; MI: myocardial infarction; CABG: coronary artery bypass surgery; PTSD: post-traumatic stress disorder; POTS: postural orthostatic tachycardia syndrome; LE: lower extremity; HPL: hyperlipidemia; RA: rheumatoid arthritis

Results

- Four patients (3 female and 1 male; age range: 41-72 years) with 5 wounds (surgical [n=4] and atypical vasculitis [n=1]) were treated (**Table 1**).
- Patients' prior treatments included alginate dressings, NPWT using reticulated open cell foam (ROCF)‡, NPWTi-d, collagenase, and non-adherent dressings.
- Duration of NPWT using all-in-one dressings ranged from 27-40 days.
- All wounds exhibited a positive wound healing progression during NPWT with all-in-one dressings, as evidenced by tapered, advancing wound edges.
- Both patients who reported intense wound and periwound pain during traditional NPWT with ROCF dressings reported significantly reduced pain during therapy when switched to all-in-one dressings.
- Simplicity of dressing application and extended wear time eased patient transition between care settings.

Conclusions

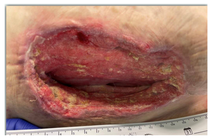
- **All complex wounds in this series progressed in a positive wound healing trajectory during use of NPWT and all-in-one dressings.**
- **A limitation was the lack of all-in-one dressing availability in the extended care facility.**
- **Minimal to no pain was noted during therapy as well as dressing application and removal.**
- **Use of all-in-one dressings eased patient transitions between care settings.**

References

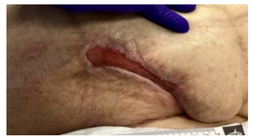
1. Isoherranen K, Kluger N, Hannula-Jouppi K, Väkevä L. *Int J Low Extrem Wounds.* 2021;23(3):445–449.
2. Horn C, Fierro A, Lantis JC II. *Wounds.* 2023;35(6):117-125.
3. Vuolo JC. *Br J Nurs.* 2009;18:S20, S22-5.
4. Upton D, Andrews A. *Int Wound J.* 2015 Feb;12(1):100-5.
5. Allen D, Mann S, Robinson T, Schmidt M, Kieswetter K. *Adv Wound Care (New Rochelle).* 2024;13(6):291-307.

Cases

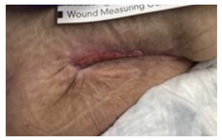
Case 1. Surgical abdominal wound post renal transplant. Large dehisced abdominal wound resulted from a renal transplant 2 weeks prior. Following washout and wound management with NPWTi-d and NPWT with ROCF dressings, patient continued to report pain at the wound edges. All-in-one dressings were initiated with NPWT at home with goals of alleviating pain and reducing wound size.



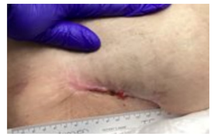
A. **Week 6.** After 6 weeks of NPWT and NPWT management. Patient discharged home with NPWT, continuing to report pain at wound edges.



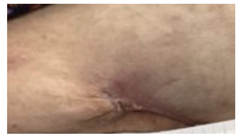
B. **Week 14.** NPWT initiated with all-in-one dressings at home



C. **Week 16.5**. After 17 days with all-in-one dressings, wound size was reduced, and patient was no longer experiencing pain. Therapy changed to collagen dressings.

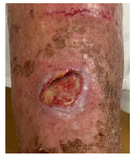


D. **Week 21.** At 30-day followup after discontinuation of NPWT

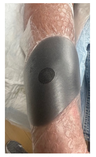


E. **Week 30**. Wound closed. Patient returned to swimming and other daily activities.

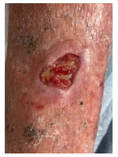
Case 2. Traumatic post-hematoma wound with venous component. Patient presented with a large hematoma secondary to minor trauma. Patient was ambulatory and diagnosed with chronic venous insufficiency, based on hemosiderosis and obtained reflux studies. The hematoma was evacuated in the operating room and the resulting wound was treated with alginate dressings. After 4 weeks, therapy was switched to NPWT with all-in-one dressing.



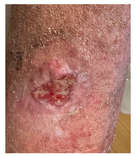
A. **Day 0.** After 4 weeks of alginate dressing treatment, NPWT initiated with all-in-one dressing



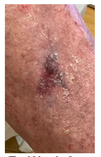
B. Application of all-in-one dressing



C. **Week 2.** Flattened and advancing wound edges

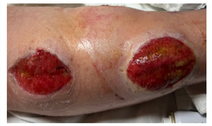


D. **Week 4.** Reepithelizing wound



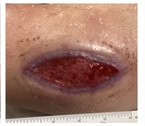
E. **Week 6.** Closed

Case 3. Fasciotomy wounds. Patient presented with acute limb ischemia following an open thrombectomy of the right femoral artery. The initial injury stemmed from a groin central venous line placement at an ambulatory surgical center, resulting in an iatrogenic femoral artery injury, which was subsequently repaired and primarily closed with negative pressure dressing over the closed incision. The patient was re-admitted for further surgical exploration, lysis, angioplasty, and stenting, with management including drug-coated balloons to the femoral artery and targeted treatment of the anterior/posterior tibial arteries and fasciotomy. Following 1 week of NPWT management with a nonadherent layer and ROCF dressings, the dressing was switched to the all-in-one dressing.

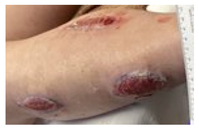


A. **Day 9.** Fasciotomy wounds after 9 days of NPWT with all-in one dressings

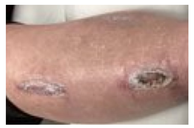
B. All-in-one dressings applied to 2 fasciotomy wounds using a Y-connector. Patient discharged home 6 days later with NPWT and all-in-one dressings.



C. **Week 4.** Tapered, advancing wound edges. Therapy changed to compression with HOCl cleansing solution, collagen, and non-adherent dressings.

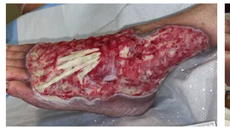


D. **Week 6.** Continued wound size reduction

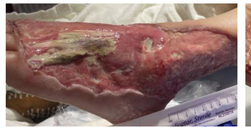


E. **Week 10**. Wounds closed

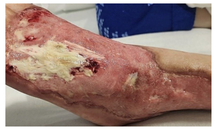
Case 4. Atypical vasculitis. Patient presented with diffuse body bruises, left lower extremity swelling, blistering, and anorexia. A CT scan showed atrophic pancreatic parenchyma, hepatic steatosis, patulous jejunojejunostomy, nonspecific colitis edema, left pleural effusion, and soft tissue anasarca. Left lower extremity biopsy showed gangrenous necrosis, non-specific. High dose steroids were initiated. Following adjunctive management with NPWTi-d and NPWT with ROCF dressings, patient received NPWT with all-in-one dressings. Patient was transferred from ECF to hospital twice during which time she received NPWT and all-in-one dressings. Wound was managed with NPWT and ROCF dressings in ECF since ECF did not stock all-in-one dressings.



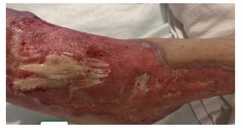
A. **Day 0**. 6 weeks after initial presentation, NPWTi-d was initiated over atypical vasculitis wound with exposed tendon



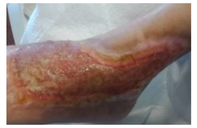
B. **Week 2**. After 2 weeks of NPWTi-d, patient discharged to ECF with NPWT and ROCF dressings



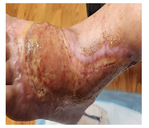
C. **Week 5**. Patient re-admitted to hospital, and NPWT initiated with all-in-one dressings



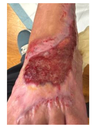
D. **Week 5.5.** Patient transferred back to ECF which did not stock all-in-one dressings. Skin substitute applied in ECF.



E. **Week 15.** Patient readmitted to hospital and received all-in-one dressings



F. **Week 16.** Patient transferred back to ECF



G. **Week 26**. Therapy changed to collagen dressings

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