Real-World Experience With Use Of Traditional Negative Pressure Wound Therapy Versus Single Use Systems – Retrospective Case Review In An Acute Wound Care Setting

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Introduction

- Despite widespread adoption of traditional negative wound pressure therapy (tNPWT) and the increasing availability of single use negative pressure wound therapy (sNPWT) systems, there is limited experience published about how the two systems can be used to optimize treatment pathways.
- In 2020, a call to action was published highlighting a need for evidence-based recommendations to guide clinical decisions on use of NPWT systems.[1]
- In 2021, an International Consensus Panel published recommendations on how to optimize use of tNPWT and sNPWT systems in the management of acute and chronic wounds.[2]
- Insights into the impact of implementing such guidance on which system to use and when in clinical practice would be valuable to validate its utility.

Objectives

- The aim of this retrospective case review is to evaluate which wounds were transitioned from tNPWT to sNPWT in a real-world acute care setting and to review clinical outcomes, thereby informing future practice approaches.

Methods

- A retrospective review and analysis of electronic medical records (EMR) for all patients with wounds eligible for treatment with tNPWT or sNPWT* at a single post-acute wound care center in the USA (Feb 2023 to Sep 2024).
- Standard wound photography was used to record wound healing progression (patient consent was available for images from the EMR).
- Eligible wound types could be chronic or acute, traumatic origin, sub-acute and dehisced wounds, ulcers, partial-thickness burns, skin flaps and grafts.
- Cases where wounds could be transitioned to sNPWT as determined by a specialist considering overall treatment plan and patient preferences.
- Products were administered in accordance with the manufacturer's Instructions For Use.
- Data analysis was performed using R version 4.5.0 (R Foundation for Statistical Computing, Austria) and summarized using descriptive statistics.
  - Wound area was estimated using elliptical approximation.

Ethics/Institution Review Board (IRB) Review

- Informed patient and institutional consents were obtained in writing; the protocol was reviewed and approved by the University of Pennsylvania IRB in May 2024 (IRB protocol number 855837).

*All products by a single provider (Smith+Nephew, Hull, UK): tNPWT (RENASYS° TOUCH Negative Pressure Wound Therapy System, RENASYS°-F Foam Dressing Kit with Soft Port, RENASYS° White Foam or RENASYS° AB Abdominal Dressing Kit with Soft Port), or sNPWT (PICO° 7 or PICO° 14 Single Use Negative Pressure Wound Therapy System). °Trademark of Smith+Nephew.

Results

Patients and Wounds

- 27 patients with wounds were included (12 females; 15 males).
- Patient age was grouped into ranges and started from 18–35 years up to >85 years; most patients were aged 36 to 75 years (n=19).
- At baseline, 69 concomitant conditions were reported for all patients, the most frequently occurring were diabetes (70%; n=19) and obesity/body mass index >30kg/m^2 (33%; n=9).
- The most common wound types were stage 4 pressure injuries (n=7; 26%) and open surgical wounds (n=5; 19%).
- Mean duration of treatment with NPWT was 9.8 ± 11.1 days (median 7 days; range: 3–60 days).
- At baseline, 16 and 11 wounds had low and moderate exudate levels, respectively; at discontinuation of NPWT, 24 had low exudate levels, and 3 had moderate levels.

Table 1. Wound Dimensions and Characteristics at Baseline and End of NPWT

Wound Characteristic/Variable	Baseline (N=27)	End of NPWT (N=27)
Dimensions		
Mean (±SD) length (cm)	11.0 ± 11.0	9.1 ± 7.7
Mean (±SD) width (cm)	5.7 ± 5.0	6.2 ± 9.8
Mean (±SD) depth (cm)	2.65 ± 2.73	2.15 ± 2.6
Mean (±SD) area* (cm^2)	69 ± 156	62 ± 157
Mean (±SD) volume (cm^3)	467 ± 1837	454 ± 1811
Median (Q1, Q3) length (cm)	7.0 (5.0, 12.0)	7.0 (4.0, 11.5)
Median (Q1, Q3) width (cm)	5.0 (3.0, 6.0)	4.0 (2.0, 5.0)
Median (Q1, Q3) depth (cm)	2.0 (0.5, 3.5)	1.0 (0.4, 3.2)
Median (Q1, Q3) area* (cm^2)	25 (16.0, 47.0)	14 (9, 36)
Median (Q1, Q3) volume (cm^3)	47 (11, 124)	14 (3, 90)
Tunnelling		
Yes (n, %)	6 (22%)	7 (26%)
Periwound		
Healthy/intact (n, %)	24 (88.9%)	27 (100%)
Wound bed assessment		
Primary status	Granulating: 21 (78%) Red: 11 (41%) Slough: 9 (33%)	Granulating: 25 (93%) Red: 12 (24%) Slough: 4 (15%)

Based on elliptical approximation; SD: standard deviation

- For all 27 wounds, median wound area decreased from 25cm^2 at baseline to 14cm^2 at end of NPWT (Table 1); estimated daily median wound area reduction was 3.2% (mean value 5.8%); median wound volume improved (from 47cm^3 at baseline to 14cm^3 at end of NPWT).
- For individual patients, wound area reduced for 20 of 27 wounds, was unchanged for 5 wounds and increased slightly for 2 wounds.
- At discontinuation of NPWT, all 27 wounds had an advancing wound edge.

Suitability for Transition from tNPWT to sNPWT

- All wounds were initially treated with tNPWT at -80mmHg (n=3) or -120mmHg (n=24) continuous.
- Eight wounds were transitioned to a 7-day (n=3) or 14-day (n=5) sNPWT system dependent on the expected duration of use (i.e., either short- or long-term)
- Figure 1 shows wound progression with transition from tNPWT to sNPWT; Figure 2 shows a wound that required in-hospital management with tNPWT.
- No consistent pattern in patient profiles or wound characteristics at baseline that identified a wound as a potential candidate for transition from tNPWT to sNPWT.


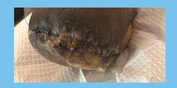


Figure 1. Use of tNPWT to Manage an Open Transmetatarsal Amputation Site Followed by Successful Transition to Single Use NPWT. Wound dimensions at baseline: length 4.0cm, width 8.0cm, depth 0.3cm. Dimensions at end of NPWT: length 2.5cm, width 7.0cm, depth 0.2cm.

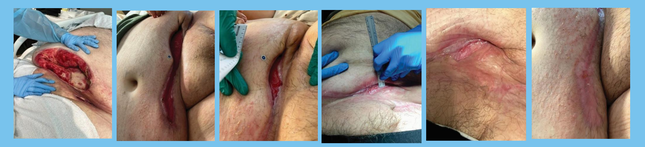

Figure 2. Management of an Open Surgical Abdominal Wound (Confirmed Necrotizing Fasciitis) using tNPWT. Wound dimensions at baseline: length >50cm, width >20cm, depth >12cm (undermining >12cm). At end of NPWT: length >50cm, width 20cm, depth >12cm.

Conclusion

- Approximately 30% of wounds treated with tNPWT were successfully transitioned to sNPWT; no wounds were initiated on sNPWT.
- These findings may highlight underutilization of sNPWT for some wounds based on their area, depth and exudate volume, as well as on available sNPWT dressing sizes using published proposed criteria/decision making tools.[2–4]
- Due to the complexities of tNPWT services in hospitals, earlier transition to sNPWT as wounds become eligible, or increased use of sNPWT as the primary NPWT modality where appropriate, may help to alleviate administrative burden and facilitate earlier patient discharge without compromising clinical outcomes.

References

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