

Prophylactic Negative Pressure Wound Therapy Dressings for Neuromodulation: A Single Center Study

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INTRO

- Surgical site infection (SSI) is an important consideration for neuromodulation implants with an incidence of SSI as high as 10%.^{1,2}
- The Neurostimulation Appropriateness Consensus Committee (NACC) reports infection rates associated with spinal cord stimulators (SCS) are often higher than those reported with other implantable devices indicating a need for improved practices.²
- Other surgical fields have utilized innovative wound dressing techniques such as negative pressure wound therapy (NPWT) to decrease SSI.³ NPWT consists of a closed, sealed system that applies negative pressure to the wound surface.³
- Despite high levels of evidence supporting NPWT, including multiple randomized controlled trials and systematic reviews such as a Cochrane review, such dressings have not been used in neuromodulation.³

METHODS

- A single-use NPWT (sNPWT) system, PICO 7 (Smith+Nephew, Watford, UK), was used for neuromodulation implantation.
- The PICO 7 is a sealed wound dressing attached to a portable vacuum pump that extracts fluid from the wound. The sNPWT dressing was applied for 7 days over both the lead insertion sites and pulse generator incision in a dual or single dressing technique (Figure 1A and 1B).
- A retrospective review of all patients who had the system applied was conducted, and clinical outcomes including SSI were assessed.
- The SSI rate was compared to the pre-sNPWT baseline from the prior twenty consecutive neuromodulation patients, which was 15% at our institution.
- The Fisher's Exact test was used to assess for statistical significance, and a significance level of 0.05 ($\alpha=0.05$) was used.

RESULTS

- Twenty-six patients underwent use of the sNPWT system between July 2021 and July 2024.
- Of these 26 patients, the sNPWT was used in nineteen SCS implants, one SCS explant, three dorsal root ganglion stimulator (DRG-S) implants, two lumbar multifidus stimulation system, and one basivertebral nerve ablation.
- The median age, weight, height, and body mass index (BMI) were 69.3 years old, 84.1 kg, 169 cm, and 29.3, respectively, with 46.2% females.
- There were no major adverse events and the rate of SSI (0%) was less than that of the prior twenty non-sNPWT patients. This, however, did not reach statistical significance ($p=0.0751$) in the setting of small sample sizes.

Conclusion:

NPWT dressings are a feasible method that may help reduce SSI, though further study is needed. SCS is an expensive procedure (with procedure-related costs averaging \$67,191).⁴ Provenzano *et al* reported that the estimated incremental annual healthcare expenditures of SCS systems complicated by SSI is \$59,716 for initial implanted patients and \$64,833 for replacement SCS implants.⁴ Strugala *et al* published a meta-analysis of 1863 patients showing a significant reduction in SSI rate by 58%, reduction in wound dehiscence rate by 26%, and decreased hospital length of stay (LOS) with sNPWT.⁵

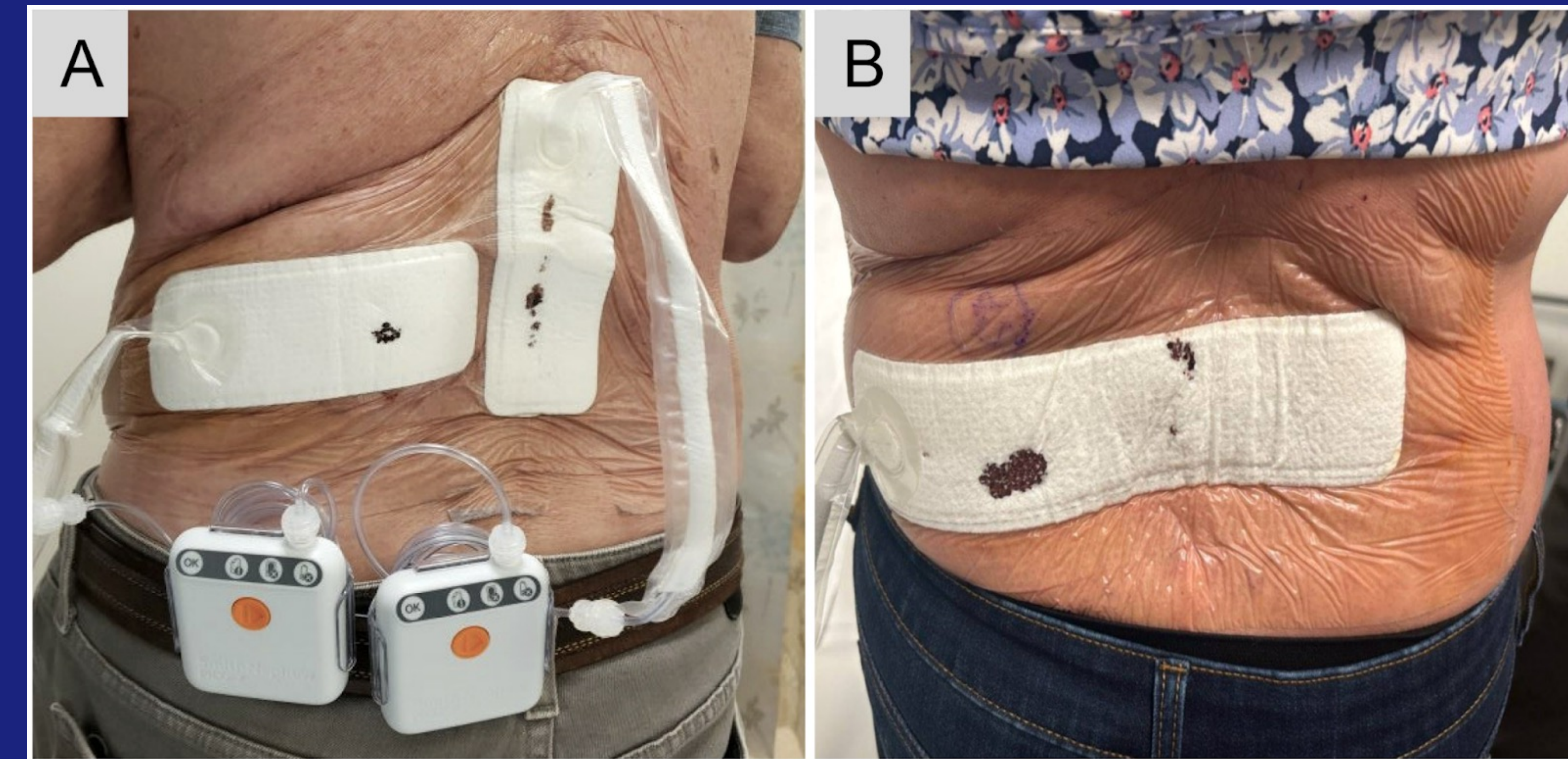


Figure 1 Single-use negative wound pressure therapy (sNPWT) system following spinal cord stimulator (SCS) implantation in a dual dressing (Figure 1A) and single dressing (Figure 1B) technique.

References

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