Use of a Polymeric Skin Protectant on Periwound Skin Under NPWT Drape

Iwen Grigsby, PhD; Bryan A. Baker, PhD; Amy K. McNulty, PhD

3M, St. Paul, MN

Background

- Ensuring a sufficient seal is critical to successful Negative Pressure Wound Therapy (NPWT).
- Maintaining adherence of NPWT drapes over fragile or otherwise wet or denuded skin can be problematic.
- Application of a cyanoacrylate based polymeric barrier film (CASP*) underneath the acrylate NPWT drape† has been advocated in the presence of wet, weepy, damaged skin.[1]

Purpose

This preclinical study was undertaken to assess the benefits of applying a cyanoacrylate-based polymeric barrier film on healthy intact skin versus damaged skin in conjunction with an acrylate adhesive-based NPWT drape.

Methods

- This study was reviewed and approved by 3M's Institutional Animal Care and Use Committee. 3M's animal research program complies with the Animal Welfare Act and follows recommendations in the Guide for the Care and Use of Laboratory Animals.
- Partial thickness wounds (3 cm by 18 cm by 500 um deep) were created on the backs of 6 swine to simulate damaged periwound skin. Sites with no damage were also evaluated.
- On each pig, CASP* was applied over an area of healthy intact skin and an area of damaged skin.
- Dressings consisting of a non-adherent contact layer‡ and polyurethane reticulated open-cell foam layer§ were placed over CASP on the healthy intact skin and the damaged skin.
- A 14 cm x 14 cm NPWT drape† was placed over each foam dressing (**Figure 1**) and attached via tubing to an NPWT unit, which delivered either -50 mmHg or -200 mmHg continuous negative pressure for 72 hours.
- The same surrogate wound assembly without the use of CASP served as the control.
- At 72 hours, drapes were removed and the percentage of drape lift for each surrogate wound was recorded; an adhesive remover was used for sites treated with CASP.
- Drapes removed from intact skin were stained with Phloxine B to assess corneocyte coverage.
- Tissue samples from damaged skin sites were sent for histology to assess epithelialization, bacterial and necrotic tissue presence, and inflammation.

Results

- For sites with damaged skin, NPWT drape had a higher percent lift when CASP was not used (**Figures 1 & 2**).
- NPWT drapes removed less skin cells when CASP was used (**Figure 3**).
- NPWT + CASP damaged skin was cleaner than NO CASP-treated damaged skin as evidenced by the presence of less cellular and necrotic debris and bacteria (**Table 1**).
- Histologically, there was no significant difference in length of epithelium with or without CASP, indicating that CASP did not interfere with healing.

Results (Cont'd)

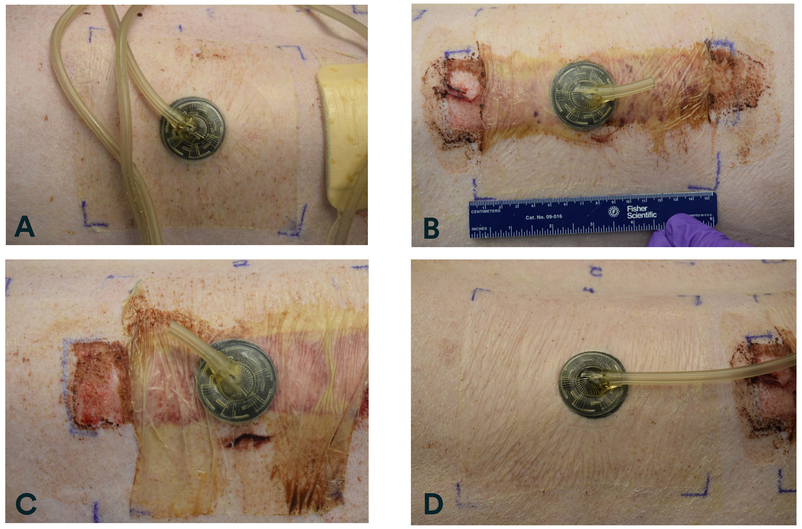

Figure 1. Sample of 4 wounds on one pig after 72 hours of NPWT. The acrylate drape is well adhered over the intact skin sites (A & D) and the damaged skin with CASP (B) but is less adhered to the NO CASP-treated damaged skin (C).

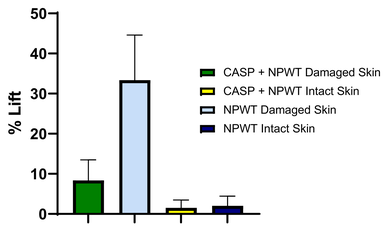

Figure 2. Drape lift at 72 hours

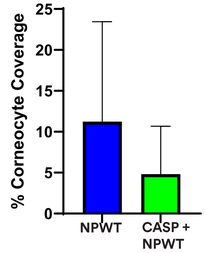

Figure 3. Percent corneocyte coverage on drape after removal

Results (Cont'd)

Table 1. Presence of bacteria with and without application of CASP at -50 and -200 mmHg of negative pressure

Damaged skin with NO CASP applied			Damaged skin with CASP applied		
Slide #	**Bacteria over intact skin at edge of damaged skin**	**Bacteria over damaged skin**	**Slide #**	**Bacteria over intact skin at edge of damaged skin**	**Bacteria over damaged skin**
NPWT = -50 mmHg					
1	Present	None	7	None	None
2	Present	*Present	8	None	None
3	Present	*Present	9	Present	*Present
NPWT = -200 mmHg					
4	Present	Few planktonic colonies	10	None	None
5	Present	*Present	11	Present	None
6	Present	*Present	12	None	None

*Present in eosinophilic smudged material on superficial surface of wound

Conclusions

CASP may serve as a good alternative to crusting and other methods used to obtain a secure seal when using acrylate NPWT drapes over damaged tissue.

References

1. Brennan MR, Milne CT, Grell-Kann M, et al. *J Wound Ostomy Continence Nurs*. 2017; 44(2): 172-180.

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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 labeling prior to application. Rx only.

*3M™ Cavilon™ Advanced Skin Protectant, †V.A.C.® Advanced Drape, ‡3M™ Adaptic™ Non-Adhering Dressing, §3M™ V.A.C.® Granufoam™ Dressing (3M, St. Paul, MN)

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