A Marine Polysaccharide Based Gel-Forming Dressing Manages Leg Wounds without Shrinkage of Dressing and Dressing Disintegration

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Study # LIT1036R

This study was sponsored by:

Educare

The clinical education division of Medline
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PURPOSE
To comparatively evaluate a marine polysaccharide dressing\* to a carboxymethylcellulose dressing\** to determine retention of dressing properties, absorption of exudate, and effect on periwound maceration.

BACKGROUND
Optimal moist wound management of lower leg wounds, in our busy wound center, includes the use of soft dressings that efficiently absorb wound exudates. Retention of original dressing size upon moistening (i.e., lack of “shrinkage”), and the property to remain integral (i.e., “in one piece”), during the removal process is also important. We evaluated a dressing derived from a marine polysaccharide (MPS) in a comparative manner to another dressing based on carboxymethylcellulose (CMC). Both dressings contain silver to help manage biofilm burden. The MPS dressing, when moistened, was observed to retain its shape and avoid denaturation. The test design evaluated whether it would retain wound fluid more efficiently than other more disintegrative dressings thus reducing maceration, as measured using the Peri-ulcer skin assessment scale (the PUSAS) 4.

METHODS
We chose a convenience sample of 10 patients with bilateral lower extremity venous ulcers. Each patient received two dressings, one of each type, one per each limb. The dressings were covered with appropriate secondary dressings, and compression wrapped. The dressings were changed weekly during wound center visits. Wound size, periwound skin quality, and dressing integrity during removal were evaluated. A visual assessment of dressing shrinkage was performed.

RESULTS
The average and median length of treatment across the sample was six and a half weeks, with one patient receiving only three weeks of treatment, and another receiving ten treatments. One patient requested to switch from the carboxymethylcellulose dressing to the marine polysaccharide dressing after seven weeks of treatment due to better experience on the limb with the marine polysaccharide dressing.

Wound Size: The marine polysaccharide product demonstrated a trend towards greater wound size reduction than the carboxymethylcellulose dressing. Seven of ten patients using the marine polysaccharide product experienced a greater average weekly reduction in wound size than the carboxymethylcellulose dressing\*, and one patient’s weekly size reductions were equal (p = 0.07 for the group) between the two dressings. See Figure 1. Wound size was reduced by an average of 23 square centimeters with the marine polysaccharide product compared to an average reduction of 16 square centimeters with the carboxymethylcellulose dressing (p = 0.06). Statistical significance was not achieved, due to the small sample size of ten patients. See Figure 2.

Periwound Tissue Quality: The marine polysaccharide product demonstrated greater per-ulcer skin quality score reduction (a high score denotes poor periwound skin quality) than the carboxymethylcellulose dressing. Among all ten patients, the weekly average Peri-ulcer skin quality score was reduced most when using the marine polysaccharide product (33% average reduction from week before versus 23%, p = 0.048). See Figure 3. Periwound skin quality global scores of patients using the marine polysaccharide product showed an average total reduction of 52 points, while periwound scores of patients receiving the carboxymethylcellulose dressing averaged a 43-point reduction (p=0.03). See Figure 4. Interestingly, the single patient who switched products experienced a 36-point reduction in Peri-ulcer skin quality score when using the carboxymethylcellulose dressing for seven weeks, then switched to the marine polysaccharide dressing for 2 weeks and experienced another 24-point reduction.

Dressing Shrinkage: The marine polysaccharide dressing was not observed to shrink from the original dimension when saturated with wound exudate or saline prior to application, as opposed to the carboxymethylcellulose dressing, which shrunk in size.

Dressing Integrity: The marine polysaccharide was noted to leave lower amounts of residue behind in the wound and therefore assessed as maintaining dressing integrity during the removal process.

Overall Observations: The marine polysaccharide dressing was deemed superior to the carboxymethylcellulose dressing in all four evaluated categories. In particular, the marine polysaccharide dressing performed well in reducing wound size and skin quality of the periwound tissue. See Figures 5 and 6. Figures 7–16 show graphically the periwound skin score reduction with dressing use between individual patients (n=10).

REFERENCES

\*Opticell Ag is a trademark of Medline Industries, Inc.
\**Aquacel Ag is a registered trademark of Convatec, Inc.
\*** Calculated by averaging the weekly % reductions in wound size, or PUSAS.