The Use of a Superabsorbent Three Layer Wicking Wound Dressing to Manage Diabetic Wounds in a Long-Term Care Facility

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INTRODUCTION

Optimal wound healing requires a moist wound environment. Therefore, moisture balance is essential because prolonged exudate exposure delays the wound healing process. Caustic elements present in wound fluid can significantly slow the proliferation of cells.[1] Additionally, if fibroblast proliferation is inhibited, extracellular matrix (ECM) and collagen synthesis will be inhibited.[2] Thus, prolonged exposure to exudate negatively impacts the wound healing process, leading to the breakdown of the ECM proteins and growth factors.[3] A new, superabsorbent three-layer wicking dressing* has been designed such that the layer in contact with the wound bed will vertically wick exudate into the second superabsorbent fiber layer. The top layer is colored blue to indicate how the dressing is meant to be applied, and if the superabsorbent layer is saturated, it allows the fluid to flow through. In this case series, the dressing's ability to wick and absorb wound fluid was assessed in patients with diabetic foot ulcers.

METHODS

A convenience sample of 10 patients with stalled diabetic wounds was selected, at clinician discretion. The wound bed was prepared per the standard of care. Then the three layer wicking dressing was applied with an appropriate secondary dressing. The wound and periwound were assessed at every dressing change. Wound size and exudate levels were recorded over time. An initial assessment, dressing change 0, was done, followed by assessments at each dressing change.

RESULTS

A total of 10 patients with 13 chronic diabetic wounds with and average duration of 14.8 months (6.1 months excluding the 10 year old wound) were managed with a superabsorbent three-layer wicking dressing. As shown in Figure 1, most wounds decreased in size even after the first dressing change, and by the fourth dressing change, a trend towards wound size reduction was demonstrated for all the wounds. Correspondingly, Figure 3 shows that all monitored wounds achieved a decrease to at most 50% necrotic tissue, and therefore, at least 50% granulation tissue by the third dressing change. Patient 3's second wound (3.2) and patient 5's wounds healed by the third dressing change, and patient 2's wound healed by the fourth dressing change. The levels of exudate present in the wound bed at each dressing change, and even with high levels of exudate, there were no incidences of maceration during the study. Patient 10 presented with a macerated wound, which resolved by the first dressing removal.

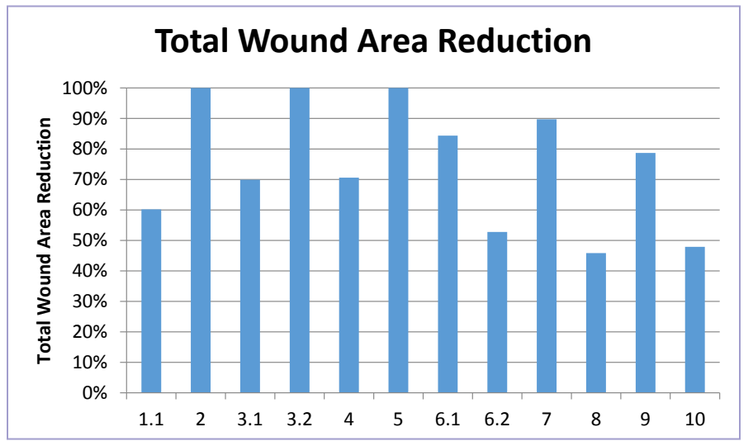

Figure 1: Total Wound Area Reduction

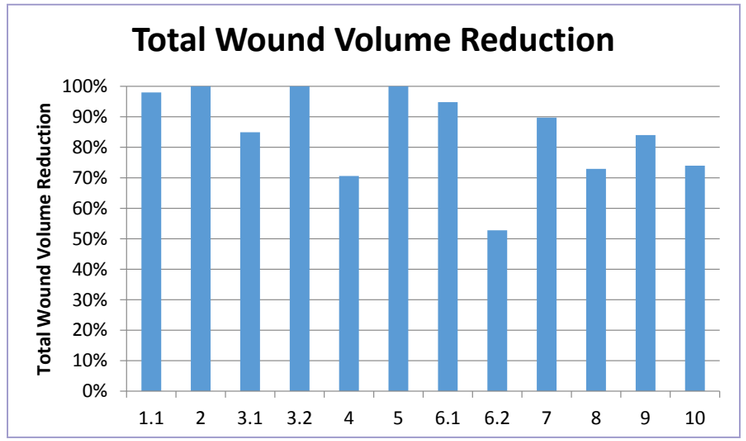

Figure 2: Total Wound Volume Reduction

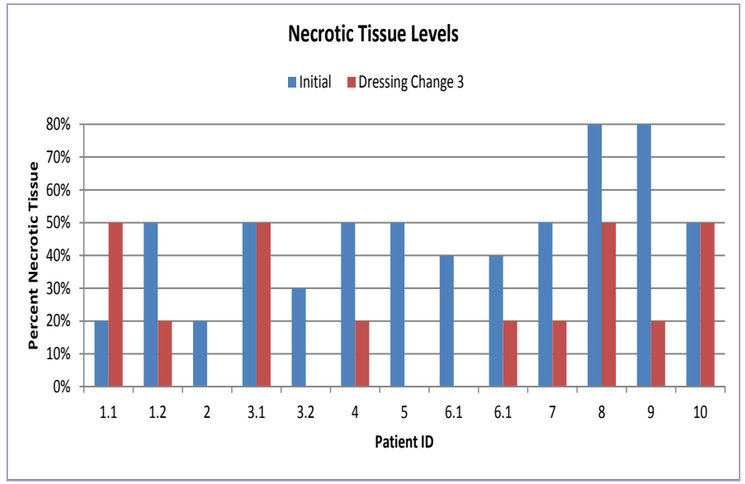

Figure 3: Necrotic Tissue Progression

DISCUSSION

Effective absorptive wound dressings need to absorb large quantities of wound fluid, and they also need to lock away excess fluid to prevent leakage and fluid pooling to prevent maceration and further skin breakdown. The use of a new, superabsorbent three-layer wicking dressing was studied in 10 patients with 13 wounds due to its innovative design. The contact layer is comprised of a blend of hydrophobic and hydrophilic fibers. The hydrophilic fibers attract wound fluid that is then directed and channeled vertically away from the wound bed by the hydrophobic fibers into the storage layer of the dressing. It is a quick wicking layer that is dry to the touch moments after fluid absorption. The storage layer consists of super absorbent polyacrylate fibers that absorb and retain large amounts of exudate. The combined actions of these two layers help create an optimal moist wound healing environment because excess exudate can damage the periwound. Most wounds decreased in size by the first dressing change, and by the fourth, three wounds had healed and the rest showed signs of healing. Wound 1.2 increased in are and volume by 665%, so it was not included in Figures 1 and 2 because it skewed the data. However, the amount of necrotic tissue in wound 1.2 did decrease from 50% to 20%. Overall, for all wounds (excluding 1.2) there was an average wound area decrease of 75% and an average wound volume decrease of 85%. Additionally, there was an average 46% decrease in necrotic tissue between the initial and final dressing change 3. There were no incidences of maceration, which may speak to a dry contact layer that wicked fluid into the fluid locking secondary layer.

CONCLUSION

The new superabsorbent, three-layer dressing managed these exudating diabetic foot ulcers with no reported adverse events. All monitored wounds improved and achieved at least 50% granulation tissue by the third dressing change, with a corresponding decrease in wound size. Three wounds healed completely, and there were no incidences of maceration. This superabsorbent, three-layer dressing promoted effective exudate management.

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