



Use of Collagen Extracellular Matrix Dressing for the Treatment of a Recurrent Venous Ulcer in a 52-Year-Old Patient

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ABSTRACT

CASE: This case study describes treatment for a 52-year-old man with a recurrent venous leg ulcer using a collagen dressing with extracellular matrix.

BACKGROUND: The patient was admitted to the wound care service for a 3-week-old recurrent venous ulcer. Treatment included application of a collagen dressing with extracellular matrix twice weekly or as needed by the patient; application of a secondary dressing (4 × 4 gauze); and coverage with an expandable netting or gauze using a conforming stretch gauze bandage and latex-free dressing retention tape.

CONCLUSION: The initial venous leg ulcer in this patient required 10 weeks to achieve closure. Ninety-eight percent resolution of the recurrent ulcer had occurred within 4 weeks of treatment, with complete closure at 7 weeks. The average healing time for recurrent venous ulcers is reported in the literature to be longer than initial venous ulcers. In the case provided, collagen ECM dressings promoted complete wound healing in 49 days.

KEY WORDS: Chronic wound healing, ECM dressings, Extracellular matrix (ECM), Venous leg ulcers, wound reoccurrence

INTRODUCTION

Venous leg ulcers occur in patients who experience chronic venous insufficiency; they are one of the most common chronic wounds seen in clinical practice. It is estimated that approximately 1 million patients in the United States currently have this condition.¹ While the treatment of venous leg ulcers requires intervention to address the underlying cause of the disease, direct care of the ulcer must also be considered.² Venous leg ulcers have a high rate of recurrence that negatively influences health-related quality of life and the provider's ability to enhance patient outcomes.² Efforts to reduce recurrence have typically focused on patient education to facilitate changes in lifestyle.³ The use of compression hosiery, increased physical activity, and leg elevation are recommended for preventing recurrence.³ Even when patients engage in these self-care activities, recurrence of the venous ulcer may still result.³

Compression is essential for wound in patients with venous leg ulcers.^{1,2} Various proprietary, adjustable compression boots and bandage systems have been developed to facilitate wound healing and prevent recurrence.⁴ However, a systematic review comparing boot and bandage systems found no difference in wound-healing rates.⁴ Recurrent venous ulcers are especially difficult to treat because most recurrent wounds represent significant changes in skin tissue that may not respond to conven-

tional treatment.⁵ Significant degradation of the extracellular matrix (ECM), which is vital to the healing process, may occur when a venous leg ulcer occurs.⁵ Therefore, effective treatment of a recurrent venous ulcer may require additional interventions to help address these issues and restore skin integrity. Mostow and colleagues⁶ completed a randomized controlled trial that compared compression therapy alone with compression therapy plus a collagen dressing with porcine-based ECM in 120 patients with at least 1 venous leg ulcer. They reported that patients treated with compression plus the extracellular graft matrix were more likely to heal within a 6-month treatment period than were subjects managed with compression therapy alone. They further reported outcomes at 6 months following the original protocol-driven treatment. Fifty-four subjects (45% of the original study sample) were evaluated; none of the patients treated with combination therapy experienced a recurrent ulcer as compared to a 30% recurrence rate in patients treated with compression therapy alone.

Current efforts to improve chronic wound healing and prevent the recurrence of venous ulcers have concentrated on the delivery of ECM components directly to the wound site via various bandage systems.⁵ Research regarding the use of ECM components in various bandage systems has demonstrated that this approach can be effective in healing chronic and recurrent wounds.^{7,8} Although the specific mechanism by which this process occurs is not fully understood, it is believed that ECM components, when delivered to the wound site, can provide a temporary scaffold enabling the body's natural healing systems to work more effectively.⁵ Once the healing is initiated, the patient's body is able to sustain the process, allowing for more rapid wound healing. Enhanced healing may reduce the likelihood of recurrence by creating a stronger tissue barrier to protect against the redevelopment of the wound over time.⁶

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Based on this knowledge, I elected to treat a patient with a recurrent venous leg ulcer and chronic venous insufficiency with a collagen-based dressing with ECM in an effort to enhance wound healing and prevent additional recurrences.

Case History

Mr H., a 52-year-old man, was first evaluated by our wound care team for treatment of a venous leg ulcer located on the left, medial ankle. Treatment of the initial wound occurred between November 6, 2003, and February 9, 2004. Management included cleansing with a saline-based wound cleanser and silver-releasing foam dressing (Restore wound cleanser, Hollister, Libertyville, Illinois; Contreet/Biatain Ag Foam Antimicrobial Barrier Dressing with Silver, Coloplast, Minneapolis, Minnesota). The use of adhesives was minimized, and we recommended the use of an expandable netting or gauze Unna Boot for compression. The patient was discharged from care in February with complete ulcer healing. Recommendations for lifestyle changes were made to help reduce recurrence, such as compression therapy, exercise, and leg elevation.

Mr H. remained ulcer free for 9 years when he was referred for treatment of a recurrent venous ulcer on the left, medial ankle. At that time, the patient indicated he had been compliant with compression therapy until 6 months prior to the development of the current wound. At this time, he stopped the use of compression therapy when a change in insurance coverage resulted in elimination of coverage for compression stockings. As a result, he was unable to continue compression therapy.

Current Treatment

At the time of admission to our home care wound service, his wound was 3 weeks old. The patient lived at home with his wife and was alert, oriented, and independent in ambulation and activities of daily living. His medical history included hyperlipidemia, hypertension, and type 2 diabetes mellitus. He did not perform home blood glucose monitoring; however, a recent hemoglobin A_{1c} level was 7.5%. Medications at



Figure 2. Wound at the middle of treatment: August 19, 2013: length, 3.4 cm; width, 3.3 cm; and depth, 0.1 cm.

that time were metformin, furosemide, simvastatin, losartan, and amlodipine. His past surgical history included shoulder replacement and wrist reconstruction secondary to a fall.

Initial evaluation revealed a venous leg ulcer that was 4.0 cm in length by 4.5 cm in width; the ulcer was 0.1 cm in depth (Figure 1). Topical treatment of the venous leg ulcer included a collagen dressing with ECM (Endoform, Hollister Wound Care Libertyville, Illinois). The dressing was applied twice weekly or as needed by the patient; application of a secondary dressing (4 × 4 gauze); and expandable netting or gauze using conforming stretch gauze bandage (McKesson Tubular Elastic dressing retainer size 6). This did not produce the therapeutic level of compression, therefore we added a cohesive bandage 4 in × 5 yards and latex-free dressing retention tape (Coban, 3M, St Paul, Minnesota). Collagen ECM dressings are formulated with a 90% collagen base and 10% ECM component



Figure 1. Wound at the initiation of treatment: August 5, 2013: length, 4.0 cm; width, 4.5 cm; and depth, 0.1 cm.



Figure 3. Wound at the completion of treatment: September 23, 2013 (resolved): length, 0 cm; width, 0 cm; and depth, 0 cm.

designed to repair missing or degraded ECM at the wound site.⁹ The patient's wound was assessed 2 weeks later; the wound was 3.4 cm in length, 3.3 cm wide, and its depth was 0.1 (Figure 2). Ten days later, the wound size had shrunk approximately 98%.

The patient was reevaluated after 7 weeks of therapy. This lapse in visits occurred because of a change in primary care physician, resulting in the absence of authorization for additional wound care visits. Nevertheless, when the patient was examined after 7 weeks, we found that the wound had closed and complete epithelialization had occurred (Figure 3). Mr H. reported that he had continued the topical therapy we proscribed and adhered to compression therapy during this period of time. He was discharged from care with recommendations for continued use of compression stockings to prevent the recurrence of the ulcer. The time for wound healing for this recurrent venous leg ulcer was 7 weeks as compared to 10 weeks for the initial venous ulcer.

DISCUSSION

Venous leg ulcers are a common and debilitating condition associated with a chronic underlying disease, chronic venous insufficiency.¹⁰ The condition is often conceptualized as occurring in a "forever healing" cycle; venous leg ulcers require weeks to months to heal, and recurrence rates are as high as 70%.¹⁰ Even patients who regularly adhere to preventive interventions such as the regular and consistent use of compression hosiery experience recurrence rates as high as 60%.¹⁰ Research suggests that the average time to heal a first-time venous leg ulcer is 80 days, while a recurrent venous ulcer requires a mean time of 117 days to heal.¹¹ Therefore, treatment must be based on healing the current ulcer, preventing its recurrence whenever possible, and providing treatments that may facilitate healing if a recurrent wound develops. Materials designed to replace the ECM of the skin have been shown to promote wound healing in patients with nonhealing wounds, along with the use of compression.^{12,13}

In this case, treatment of a recurrent venous leg ulcer resulted in faster healing time (7 weeks) than did treatment of the initial wound (10 weeks), and he achieved 98% wound closure within the first month of treatment. While it is not possible to generalize these findings, the success of the collagen ECM dressing in treating this patient indicates the need for further investigation of the role of ECM in management of recurrent venous leg ulcers.

CONCLUSION

Venous leg ulcers tend to heal slowly and, even with the consistent use of compression hosiery and lifestyle changes, likely to recur. Recurrent venous ulcers tend to heal even more slowly than the original ulcer. I described the case of a 52-year-old

male patient with a recurrent venous leg ulcer treatment with compression and a collagen dressing with ECM. Healing time for the patient's recurrent venous ulcer was shorter than the time required to heal his initial venous ulcer. It was also shorter than the average healing time reported in the literature.¹¹ Additional research is needed to more fully evaluate the role of collagen dressings with ECM in the management of initial and recurrent venous leg ulcers in patients with chronic venous insufficiency.

KEY POINTS

- Venous leg ulcers in patients with chronic venous insufficiency recur in up to 70% of patients who experience an initial ulcer and as many as 60% who adhere to regimen of preventive interventions including compression.
- Recurrent venous ulcers tend to require more time to heal than does an initial ulcer.
- Use of a collagen-based dressing with ECM led to more rapid closure of a recurrent venous leg ulcer in a 52-year-old man than did healing of the initial ulcer.

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