Pyoderma gangrenosum wounds treated with a synthetic hybrid-scale fiber matrix*

Dr. Jill Eysaman-Walker, D.O.
Advanced Wound Healing Center, Catholic Health, New York

Catholic Health

Introduction

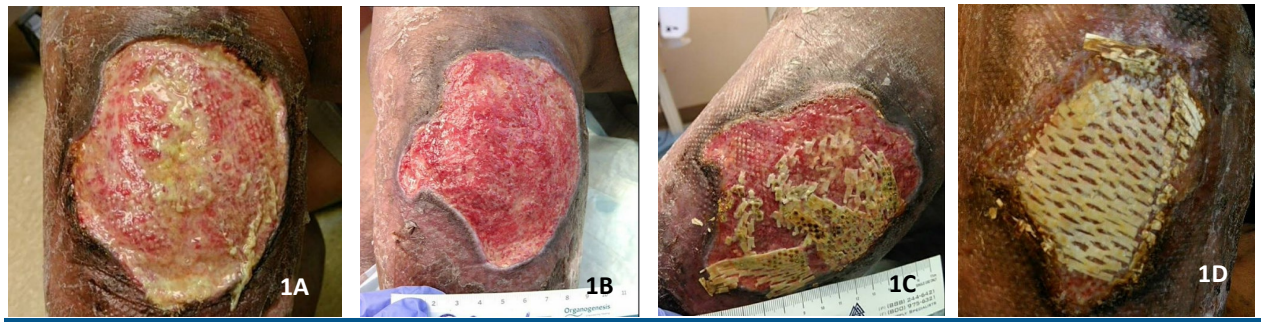
Pyoderma gangrenosum (PG) is a rare inflammatory skin disease which presents with painful skin ulcers.[1] These ulcers often occur on the lower extremity, and present with peripheral erythema and undermined borders.[1] Systemic treatment with immunosuppressant medication is the typical first line treatment, however there is currently no gold standard in wound management.[1] A synthetic hybrid-scale fiber matrix (SHSFM), with a size and structure similar to human extracellular matrix, has shown promise in healing difficult PG wounds in prior case studies.[2-3] By encouraging cellular infiltration and neovascularization through its engineering design, as well as minimizing inflammatory response, the synthetic matrix could offer a novel approach in PG wound treatment.[2-4]

Methods

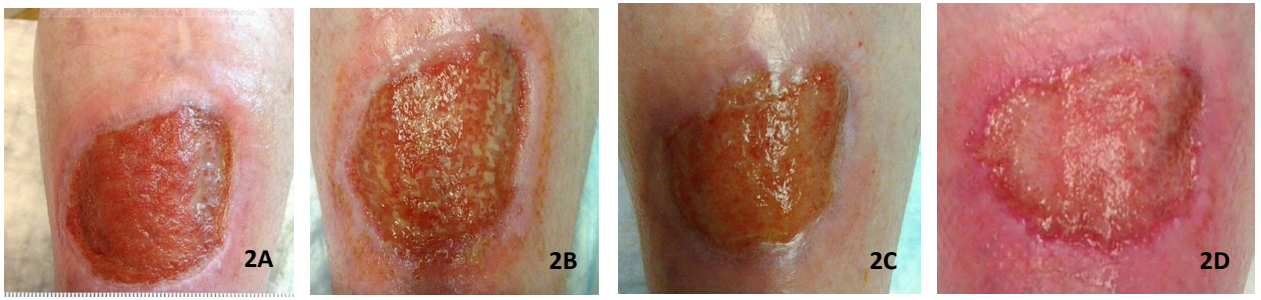
A retrospective review of 2 patients treated with the SHSFM for pathologically confirmed PG wounds was conducted at a single site. Both patients had previously failed aggressive wound care treatment. Each patient received at least one application of the SHSFM to their PG wounds in conjunction with antimicrobial wound gel. Patients were followed clinically for wound healing progress and dressing changes.

Results

The patient ages at the start of treatment were 60 and 66 years old. Both patients had a history of prior difficult-to-heal PG wounds. Comorbidities included venous insufficiency, hypertension, prior renal transplant, hyperparathyroidism, and rheumatoid arthritis. The starting wounds sizes were 11.5cm x 11cm and 5.9cm x 6 cm. After an average of 18 weeks of treatment, patients achieved wound area decreases of 90% and 40% respectively. Additionally, both patients experienced significant clinical improvements not achieved with prior treatments, such as decrease in pain at the wound site and ability to return to work. Patient 1 is able to proceed with a kidney transplant due to his now controlled pain and significant decrease in wound size.



Patient 1: 1A: The PG wound 9 weeks after initial debridement and a 25% increase in wound size following failure of antimicrobial dressings. 1B: First application of the SHSFM, measuring 11.5 x 11cm. 1C: The PG wound at week 3 .The 2nd application can be observed resorbing into the wound bed. 1D: PG wound at week 14 measuring 7.5cm x 4.5cm, with the 4th application of the fenestrated SHSFM incorporating into the wound bed. At week 19, the wound size was 5cm x 2.5cm with significant improvement with pain and quality of life.



Patient 2: 2A: Persistent PG wound at the first application of SHSFM, measuring 5.9 x 6cm after lack of clinical improvement with hydrogel alone due to patient intolerance of other advanced treatments. 2B: The PG wound 4 weeks after initial application, measuring 4.7x4.7cm. 2C: The PG wound 15 weeks after initial application measuring 3.5 x 4.5cm. 2D: PG wound at week 17 measuring 4 x 3.5 x .1cm, a 40% reduction from initial wound size. The patient reported reduced pain, improved quality of life, and has been able to return to work following SHSFM treatment.

Discussion

PG wounds can be difficult to manage give that standard treatment with repeat debridement and wound dressings can worsen the inflammatory response associated with these wounds.[2] A SHSFM may encourage wound healing by providing a synthetic scaffold to support cellular infiltration and differentiation within the wound bed.[4] The synthetic nature also minimizes inflammatory response, which is vital to healing these often chronically inflamed wounds.[2,4] The PG patients presented here not only achieved reduction in wound size, but also overall clinical improvement and reduced pain.

References: 1. Maverakis E, Marzano AV, Le ST, et al. Pyoderma gangrenosum. Nat Rev Dis Primers. 2020;6(1):81 2. Schultz A, Pynter T, Wireman G, et al. Utility of a synthetic hybrid-scale fiber matrix in the treatment of pyoderma gangrenosum: A case report. Proceedings of American College of Foot and Ankle Surgeons. Los Angeles, CA. February 9 – 12, 2023. 3. Figueroa S. Treatment of pyoderma gangrenosum with a synthetic hybrid-scale fiber matrix. Proceedings of Symposium on Advanced Wound Care. Las Vegas, NV. October 14-16, 2022. 4. MacEwan MR, Jeng L, Kovacs T, et al. Clinical application of bioresorbable, synthetic electrospun matrix in wound healing. Bioengineering. 2023;10(9):9.

*Restrata®, Acera Surgical, Inc., St. Louis, Mo