Successful staged limb salvage in a poorly controlled diabetic with undiagnosed chronic lymphocytic leukemia and multiple exposed extensor tendons utilizing fish skin xenografts

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PURPOSE

Dorsal foot extensor tendon exposure is related to an unreliable vascular supply coupled with a paucity of subcutaneous tissue. Uncontrolled diabetes and untreated malignancy independently contribute to poor wound healing. This case report highlights the clinical efficacy of fish skin xenografts in this unique subset of challenging patients. (Level 4)

METHODS

The patient is a 77 year old male with absence of medical care who presented with a necrotizing fasciitis of his right foot and leg. Workup revealed uncontrolled diabetes (HgbA1c of 6.6) and Chronic lymphocytic leukemia (CLL) manifested with a lymphocytosis of 67,000. He emergently underwent excisional debridement and 4 compartment fasciotomy. Two further operative debridements were required to definitively control his Methicillin sensitive staph aureus infection. Despite being treated with culture specific antibiotics, tight glycemic control and negative pressure wound therapy, his foot wound progressed to exposure of multiple extensor tendons devoid of peritenon.

CASE: Successful Staged Limb Salvage Using Fish Skin Xenografts in a Diabetic Patient with Undiagnosed Chronic Lymphocytic Leukemia and Multiple Exposed Extensor Tendons

Patient History: A 77-year-old man with no prior medical care presented with necrotizing fasciitis of the right foot and leg and was newly diagnosed with uncontrolled diabetes and chronic lymphocytic leukemia.

Wound History: Following multiple debridements and negative pressure therapy, the patient developed dorsal foot wounds with exposed extensor tendons lacking peritenon despite infection control and glycemic optimization.

Patient Outcomes: After three staged fish skin xenograft applications and subsequent split-thickness skin grafting, the patient achieved full tendon coverage, stable soft tissue healing, and returned to full ambulation while beginning targeted oncologic therapy.

4/1/2025: Pre-Op

4/1/2025: Application of Micronized FSG and FSG Sheets

5/17/2025: Follow-up after 1 FSG application

5/24/2025: Follow-up after 2 FSG applications

5/31/2025: Follow- up after 3 FSG applications

7/26/2025: Follow-up post-graft application

9/20/2025: Healed Wound

RESULTS

Trans-metatarsal amputation was recommended by his primary surgeon. The patient declined and wanted to pursue limb salvage despite knowing his oncologic management would be deferred until the wound healed. Three fish skin grafts were placed at biweekly intervals. The tendons fully granulated and he underwent successful staged split thickness skin grafting. He is fully ambulatory with stable and pliable soft tissue coverage with full excursion of the tendons. He is currently undergoing targeted oncologic therapy. Tendons are relatively avascular and not prone to secondary intention healing or primary skin grafts. The mainstay of treatment has therefore been with flap reconstruction. Not all patients however are candidates secondary to underlying co-morbidities. In these high-risk patients, advanced biologics are warranted to avoid complications including amputation.

CONCLUSIONS

Fish skin xenografts are FDA approved for treating most chronic and acute wounds. The product is an acellular dermal matrix sustainably harvested from Icelandic cod with a porous microstructure similar to human skin. Characteristics of the xenograft include bacterial resistance, cellular migration/ proliferation, angiogenesis and inflammatory cytokine mitigation.