

Microvascular free flap coverage for a chronic, therapy-resistant Achilles tendon ulcer

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Abstract

Wound healing of chronic ulcers remains challenging, especially in regions of impaired perfusion, or in defects with bradytrophic tissue such as tendon exposure. This case impressively demonstrates a microvascular free flap coverage approach for complex Achilles tendon ulcers, outlining the limitations of conservative treatment attempts and the potentials of a surgical approach.

Introduction

In an aging society, chronic leg ulcers are a dramatically increasing medical and health-economic problem. They account for significant patient morbidity, loss in quality of life and increasing healthcare expenditure [1]. Even with modern diagnostic tools and consequent therapy of the underlying disease in specialized centers, wound healing of chronic ulcers remains challenging. There is a great need for effective strategies, especially in order to accelerate the stages of granulation and epithelialization. In regions of impaired perfusion, or in defects with exposed bradytrophic tissue, conservative wound healing strategies often fail. These wounds usually require aggressive surgical debridement followed by microvascular free tissue transfer to achieve adequate defect coverage. The benefits of this approach include an enhanced blood supply at the recipient site and an immediate defect reconstruction [2].

Case Report

A 53-year-old male patient with combined complex soft-tissue and Achilles tendon defect following surgical repair of a traumatic Achilles tendon rupture consulted our outpatient clinic for wound management. Written informed consent was provided by the patient to publish the following case details and associated images. He presented with an ulcer of 1.5 cm diameter with bacterial overgrowth within an externally grafted split skin. The wound had been resistant to conservative treatment for three months using antiseptic topicals and specialized wound dressings. The patient had a clinical history of type II diabetes. Venous insufficiency and peripheral arterial occlusive disease had been ruled out prior to our consultation. A punch biopsy taken from the center and margin of the ulcer showed capillary occlusion in the deeper dermis, compatible with livedoid vasculopathy. In order to promote angiogenesis and to optimize wound conditioning, cold atmospheric plasma (CAP) therapy three times a week for a duration of 90 seconds (PlasmaDerm® (Cinogy®)) was performed. Several in vitro and in vivo studies have demonstrated that CAP activates angiogenesis-promoting pathways and reduces the bacterial load in chronic wounds [3,4].

After four weeks of treatment, the defect reduced to 1.2 cm diameter, showing no further sign of infection (Figure 1). After achieving vital granulation tissue, defect coverage was attempted using another split skin graft. However, complete graft failure was observed.

Thereafter, complete surgical debridement was undertaken, followed by initiation of negative pressure therapy. Five days later, defect coverage was achieved using a free composite fasciocutaneous anterolateral thigh flap including fascia lata for Achilles tendon reconstruction [5,6] (Figures 2,3). The postoperative course was uneventful and led to an excellent clinical result in this complex anatomic localization. The patient was discharged from the hospital ten days after free flap reconstruction and returned to work eight weeks postoperatively (Figure 4).

Conclusion

To conclude, wound healing of chronic ulcers remains challenging, especially in regions of impaired perfusion, or in defects with bradytrophic tissue such as tendon exposure. This case impressively demonstrates the need for localization-adapted special intervention strategies for defect coverage of complex wounds, outlining the limitations of conservative treatment attempts and the potentials of an interdisciplinary approach. Especially in demanding locations with tendon exposure, microvascular free flap coverage seems to be superior to free skin grafting.

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Figure 1. Therapy-resistant Achilles tendon ulcer in the center of a split skin graft after four weeks of CAP treatment three times a week for 90 seconds



Figure 2. Tissue defect of the Achilles tendon side after surgical debridement

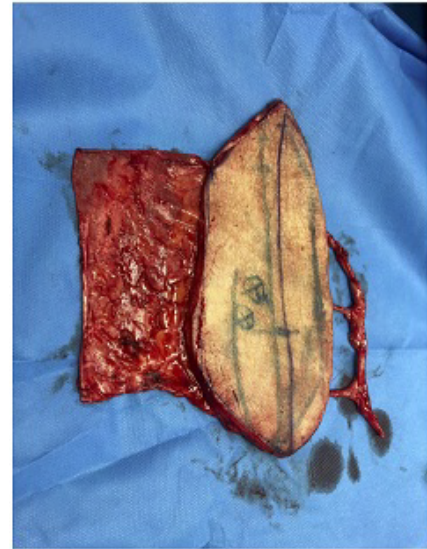


Figure 3. Free composite fasciocutaneous anterolateral thigh flap including fascia lata of the lateral vastus muscle



Figure 4. Postoperative result with a complete healing of the thigh flap

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