

Statement of Purpose

Diabetes Mellitus can lead to limb threatening infections of the lower extremity, often times associated with limb deformations secondary to Charcot neuroarthropathy. It is known that lower extremity amputation increases both the morbidity and mortality rate of patients, so proper care must be taken in management of these patients to prevent loss of limb and subsequent deterioration. In this study, we present a case where the patient presents with a complex infected wound secondary to Charcot deformity, where limb salvage was obtained through the use of aggressive infection control and orthoplastic reconstruction.

Case Study

A 60 year old diabetic male who initially presented to clinic with a large infected wound to the medial aspect of his right ankle (Figure 1) secondary to Charcot deformity with laterally displaced forefoot and midfoot (Figure 2). Aggressive surgical debridement was performed, removing all non-viable bone and soft tissue with insertion and an antibiotic spacer, leaving the patient with a 27.0 cm x 5.5 cm soft tissue defect. At this time the patient was also placed in a pin to bar style external fixator to maintain proper osseous alignment and aide in soft tissue stabilization (Figures 3 and 4). Targeted antibiotic therapy was administered per Infectious Disease and multiple debridements were performed over the course of 2 ½ months. Once the wound was infection free, we proceeded with a soft tissue transfer to obliterate the soft tissue defect and provide healthy vascular tissue to the wound site. A gastrocnemius adipose fasciocutaneous flap was mobilized from the medial calf (Figure 5) and transferred distally (Figure 6) completely covering the wound site. After several weeks of local wound care, split thickness skin grafts were harvested from the thigh and grafted to the flap site. The vast majority of the wound healed, however, due to the non biologic effect of the antibiotic spacer. The antibiotic spacer was removed, and an abductor hallucis muscle flap transfer was also performed, transferring the distal soft tissue more proximal to add further bulk and vascularity to our previous wound site (Figures 7 and 8). Once adequate soft tissue coverage had been appreciated, and additional split thickness skin graft was performed to complete the healing of the midfoot wound. The next step was to address the osseous deformity. The external fixator was subsequently removed, and a Tibial Calcaneal fusion was performed using an intramedullary rod (Figure 9). The patient currently presents with a well aligned deformity and well healed soft tissue defect (Figures 10 and 11).

Contacts

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Methods and Materials

1 Patient undergoing Charcot reconstruction in the setting of osteomyelitis with the use of orthoplastic techniques for adequate soft tissue coverage. Consisted of a Gastrocnemius Adiposfasciocutaneous Transfer, Abductor Hallucis Transfer, split thickness skin grafting and Tibiocalcaneal arthrodesis



Figures 1 and 2: The patient's initial wound and the associated Charcot deformity with a medially dislocated talus.



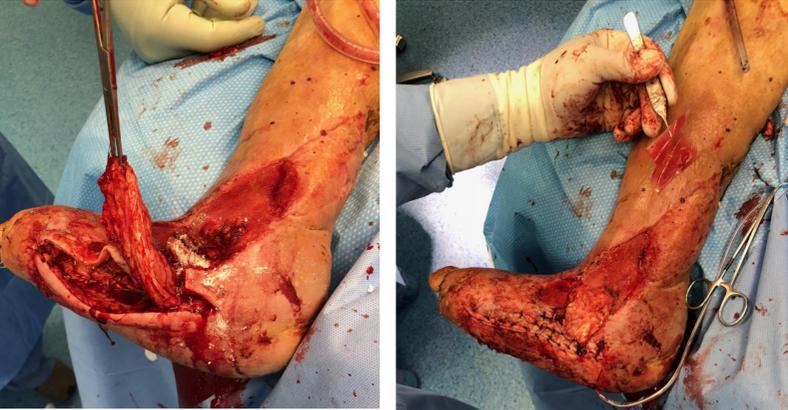
Figures 3 and 4: Patient's wound after debridement and application of external fixator. Figure 4 on the right shows a later presentation wound with intact retention sutures and contraction of wound edges.

Results

All flaps survived with resolution of all wounds. Patient ambulating with stable osseous fusion with no plans for further surgical intervention.



Figures 5 and 6: The adipose fasciomyocutaneous flap is mobilized (left) and transferred distally (right) to cover the soft tissue defect.



Figures 7 and 8: Transfer of the abductor hallucis graft from distal to proximal, providing further bulk and vascularity to wound site.

Literature Review

Much of the current literature regarding limb salvage is showing a trend towards the use of distal soft tissue flap transfers. Li et al found great success in a series of 10 patients using a similar flap construct as the case we presented for lunular soft tissue defect of the foot an ankle, reporting one of the strengths of the procedure is a dual blood supply from both the sural and peroneal systems (1). Schmidt et al compared the quality of life between patients given distal flap transfers and those with free flap transfers and found that while the free flaps had higher quality of life initially, in the long term they were equivocal (2). Assi et al found that there was no significant difference between outcomes in flap transfers between patients with diabetic wounds vs. traumatic wounds, supporting the power of the procedure in limb salvage, despite the risks associated with diabetes (3).



Figures 9, 10 and 11: Radiographs of TC fusion and patient's clinical result, with resolution of all wounds and osseous stability.

Analysis and Discussion

Distal flap transfers in combination with osseous stabilization procedures are powerful and effective tools in the management of complex diabetic limb salvage.

Resources

1. Clinical effect of double blood supply composite tissue flap with peroneal artery perforator and sural nerve nutrient vessel carrying gastrocnemius muscle in repairing lacunar defect of ankle, Li PD and Shen GL, *Chinese Journal of Burns*, May 2019
2. Quality of Life after Flap Reconstruction of the Distal Lower Extremity: Is There a Difference Between a Pedicled Suralis Flap and a Free Anterior Lateral Thigh Flap?, Schmidt et al, *Plast Reconstr Glob Open*, April 2019
3. A Comparative Study of the Reverse Sural Fascio-Cutaneous Flap Outcomes in the Management of Foot and Ankle Soft Tissue Defects in Diabetic and Trauma Patients. Assi et al, *Foot Ankle Spec*, Oct 2019

Disclosures

None