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Venous bridge used in free flap transfer for the lower leg in the presence of venous hypertension: a case report

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Summary—Reconstruction with free flaps for the lower leg in the presence of venous thrombosis or venous hypertension has a high risk of failure. We describe the use of the contralateral leg for venous drainage through a pedicled skin bridge containing a tributary of the long saphenous vein. The recipient artery was a main artery of the ipsilateral leg. Two weeks later, once there was a well-established venous communication between flap and recipient site, the venous bridge was divided. Because the arterial inflow to the flap was not interrupted by the division of the skin bridge, the flap has good viability and good resistance to infection or ulceration 3 years later.

Case report

A 28-year-old man suffered from a chronic ulcer on the dorsum of his right foot for 3 years (Fig. 1) due to impaired circulation from an arterio-venous fistula. The ulcer had been treated elsewhere with split thickness skin grafts on eight occasions but all had failed.

On physical examination, there was a chronic ulcer 8 cm in diameter on the dorsal aspect of the right foot. The long saphenous vein near the medial malleolus had a palpable pulse. The patient insisted on preservation of the foot.

During surgery the ulcer was debrided and the arterio-venous fistula in the interosseous muscles was excised and ligated as far as possible. This resulted in exposure of metatarsal bones. Reconstruction with a flap of good blood supply was necessary. However, a difficult problem was encountered. There were still minor arterio-venous communications deep in the foot, which could not be eradicated completely if the foot was to be preserved. The veins in the right leg had a high venous pressure due to the residual fistula, as confirmed by a pulsatile flow of well oxygenated blood from their cut ends. An ipsilateral leg vein was therefore not suitable for drainage of the venous blood from the flap. To solve this problem, a contralateral leg vein was used as a route for venous drainage of the flap. A latissimus dorsi flap was used for reconstruction and the recipient artery was the anterior tibial artery of the right (ipsilateral) leg. The recipient vein was a tributary of the long saphenous vein of the left (contralateral) leg contained in a pedicled skin bridge at the medial side of the left leg which was joined to the right leg with an external skeletal fixator before the vascular anastomosis was performed. The inner surface of the skin bridge was covered with a split thickness skin graft. Two weeks later, preliminary clamping with a soft clamp applied to the vein in the skin bridge caused no change in the circulatory status of the flap after one hour of observation, so the venous bridge was divided. The flap survived well without complication and the patient was discharged 3 weeks after surgery. There has been no recurrence of the ulcer during 3 years of follow-up (Fig. 2).

Discussion

A combination of the principles used in free flap surgery with those of a conventional cross-leg flap (Stark, 1952) is used here. A standard free flap would have failed in this case because of inadequate venous drainage. A conventional cross-leg flap has the disadvantage of poor blood supply when the pedicle is divided. By combining the use of an ipsilateral leg artery to supply the free flap and a contralateral leg vein for temporary venous drainage, both problems were overcome.

We believe that the foot has been successfully preserved because the residual lesion is buried deeply under the muscle flap, which prevents further trauma and recurrence of the ulcer.

This method is different from the vascularised tube pedicle (Morrison and Pribaz, 1980) in which division of the pedicle also interrupts the main artery supplying the flap.

Fig. 1

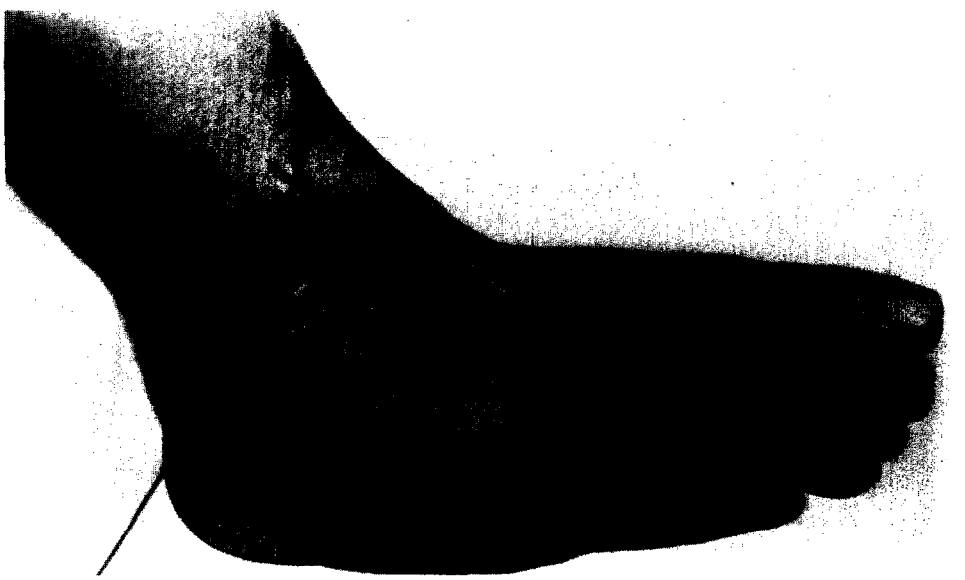

Fig. 2

Figure 1—Ulcer on the dorsum of the right foot which had venous hypertension due to residual arterior-venous fistula.
Figure 2—The healthy flap 3 years postoperatively.

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