AN ANTERIOR-LATERAL THIGH PERFORATOR FLAP ON A RECIPIENT BRACHIAL-RADIAL VEIN GRAFT FOR COMPLEX WOUND RECONSTRUCTION: A CASE REPORT

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A case of challenging microsurgical reconstruction of a difficult defect in a radiated upper limb is reported. A difficult wound, with tendon and bone exposition, developed on the dorsum of the forearm in a 76-year-old patient; she had been radiated since almost 50 years and her left hand had also been revascularized twice with venous grafts between the humeral artery and the superficial palmar arch. After failure of a local flap, an anterior-lateral thigh perforator flap was successfully transferred with end-to-side anastomoses on the arterialized venous graft. Up to date follow-up shows a good outcome. The Authors discuss the case and review the indications for microsurgical reconstruction in difficult wounds after radiation and ischemic limb conditions. © 2009 Wiley-Liss, Inc. Microsurgery 29:495–498, 2009.

Microsurgery plays an important role in difficult reconstructions, demanding for restoration of both a good blood supply and soft tissue cover. This is even the case of chronic wounds after radiation treatment, always involving surrounding tissues through a progressive ischemia-fibrosis mechanism and demanding for pedicled reconstructions. Local flaps often fail because of poor blood supply and distant flaps must be performed. We present a case of complex forearm reconstruction in an old woman, which was achieved by a microsurgical flap (a free anterolateral thigh flap) on an arterialized vein graft as a recipient vessel. The purpose of this report is to demonstrate that microsurgical reconstructions can also be considered as first choice solutions.1–3

CASE REPORT

A 76-year-old woman had been irradiated since almost 50 years on her left forearm. She did not know the reason for the radiation and the information concerning the dosage was not available. Progressive ischemia had lead to acute radial artery obstruction with apical necrosis and eventual amputation of the distal phalanges of the first and second fingers. Hand ischemia had been treated with two saphenous vein grafts connecting the brachial artery above the level of radiation to the superficial palmar arch. A third vein graft had been done two years later due to poor perfusion to the hand. In March 2006 the patient presented with a 6 × 4 cm ulceration of the distal third of the dorsal forearm. Bone and tendon were exposed (Fig. 1). A contrast angiographic study revealed a patent vein graft with occlusion of the radial and ulnar arteries. There were a proximal ulnar artery stump and a proximal posterior interosseous branch (Fig. 2). A local rotation-transposition adipofascial flap failed.

Therefore, an ATL free flap was planned. The wound was redebrided. The perforators were marked out on the contra-lateral thigh with a Doppler probe (Fig. 3). The flap was elevated with a long pedicle and a minimum of adipose tissue. The arterialized vein graft and basilic vein were exposed through a median longitudinal volar incision on the distal forearm (Fig. 4), and a subcutaneous tunnel to the wound was created for the flap pedicle. End to side anastomoses were performed between the anterior-lateral thigh (ALT) perforator artery and the saphenous vein graft and two ALT vein perforators to the basilic vein (Fig. 5). Figure 6 shows the well perfused flap covering the open wound at the end of the operation. An angiogram performed 60 days later shows a patent arterial anastomosis (Fig. 7). The flap remained viable two years later, although the surrounding tissues exhibited ischemic damage from the previous radiation (Fig. 8).

Both instrumental and clinical follow-up were uneventful, and the patient was highly satisfied.

DISCUSSION

Radiation-induced arterial obstruction in the upper limb is a rare but fearful event, leading to important ischemic complications.

Moreover, soft tissue damage induced by progressive ischemia often produces difficult sores, and muscle, tendon and bone exposure and infection are to be considered. Our patient had undergone two revascularizations with saphenous grafts (the latter was a redo), and when she presented to our Unit, she had developed a large, painful nonhealing wound with tendon exposure on the dorsal aspect of her left forearm; a preoperative angiogra-
phy showed only collateral supplies to the region. A pedicled reconstruction was needed to achieve a better blood supply and a stable cover. A local adipofascial flap failed, as often reported in cases of severe radiation damage involving the surrounding tissues, the reconstructive ladder1 claiming for distant flaps.

Leaving the groin pocket as our last choice, we decided to perform a microsurgical reconstruction, using an end-to-side anastomose on the arterialized saphenous tract. We understood it represented a risk for the main hand arterial vascular supply, but the patient claimed for a one stage reconstruction and accepted the eventuality of a new hand revascularization in case of damage to the saphenous bridge. The indication to branching more proxi-

Figure 1. Ulceration of the distal third of the dorsal forearm.

Figure 2. Angiographic study (preoperative).
Figure 3. ALT flap planned.

Figure 4. Arterialized vein bridge and the basilic vein exposed.

Figure 5. End-to-side anastomoses.

Figure 6. Flap positioned.

Figure 7. Angiographic follow-up 60 days postop.

Figure 8. Two-year clinical follow-up.
mally on nonradiated vessels to reduce the risk for thrombosis, was also refused.

We ruled out classical free flaps, such as radial forearm or latissimus dorsi, because of their important blood flow demand and donor site sacrifice, and preferred an ALT flap to achieve good tissue and flow-sparing reconstruction.2,3

The ALT flap has a number of advantages4; the most important in our case, its long vascular pedicle, which was further extended by dissecting the perforators (artery and veins) at one end of the flap.5 We designed a Kimura6 type three flap and performed its thinning following the recommendations of Kimura and Nojima.7

On the recipient site, microscopic procedures were performed with success, and both arterial and venous flow revealed excellent immediately after clamp removal and kept on stable until flap positioning and suture. The ALT flap, even in this difficult case despite previous experiences, was a very good solution.

Two years later, the flap is in perfect condition with excellent vascular supply, confirming that the ALT has also an important internal vascular network, as shown by previous reports.8 This may be the reason for its versatility, to be used in different sizes and forms and including different components.

In conclusion, with this report another example can be added to Lineaweaver’s statement that “a confidently performed microsurgical flap” acts as the simplest solution “as the most direct route to satisfactory healing”, that is how the reconstructive ladder can be inverted,2 and even in critical radiation damage leading to troublesome vascular limb condition and complex chronic wound formation, microsurgery can represent a good solution in expert hands.

In particular the ALT flap, because of its hemodynamics (low flow, well-distributed internal blood supply) could be proposed as a safe choice even in cases as this, where a severe vascular impairment of a limb or a segment has occurred.

REFERENCES