CASE REPORT

Ear helix flap for reconstruction of total loss of the upper eyelid

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SUMMARY. We present a patient with a recurrent carcinoma of the right upper eyelid who underwent resection of the subtotal upper eyelid resulting in a full-thickness defect. The eyelid was reconstructed with advanced conjunctival lining and an ascending helix chondrocutaneous flap from the right auricle. This flap was nourished with a reverse flow of the frontal branch of the superficial temporal vessels. A superficial temporal vein of the flap was anastomosed to the zygomaticofacial branch of the superficial temporal vein at the lateral canthal region to ensure adequate drainage. The flap survived without any congestion. An ascending helix flap is the best candidate for total loss of the upper eyelid.

Keywords: eyelid, reconstruction, chondrocutaneous flap, ear, reverse-flow flap, super-drained flap.

The upper eyelid comprises uniquely thin and mobile skin, together with tarsus levator muscle and conjunctiva. Upper lid reconstruction is challenging, because it requires repair of as many of the missing elements as possible. For large defects, local flaps are insufficient in dimension and thickness, and distant tissues must be employed. It is essential that the structure, colour match, contour, thickness and mobility of the skin flap be similar to the normal upper eyelid.

The ascending helix of the ear seems to be a very suitable candidate, because it has a laminated structure composed of cartilage attached to a thin layer of skin. A case of upper eyelid reconstruction is presented, using a super-drained ear helix chondrocutaneous flap based on reverse flow in the superficial temporal system.

Case report

A 66-year-old man presented with a recurrent carcinoma affecting the right upper eyelid and it was widely resected. As the upper lid fornix provided sufficient conjunctival lining, the posterior aspect of the flap (cartilage) was covered with an inferiorly advanced conjunctival flap. The resulting total skin loss of the upper eyelid required a sufficiently thin skin flap. After designing an ascending helix flap from the right ear, the proximal side of the superficial temporal artery and vein was transected and a reverse flow island flap was transferred to the prepared eyelid defect. To ensure adequate drainage, the transected proximal end of the superficial temporal vein was anastomosed to the cutaneous vein (the zygomaticofacial branch of the superficial temporal vein) at the lateral canthal region of the eyelid. This established a super-drained system for this reverse flow flap. Then, the transected edge of the remaining levator palpebrae muscle was fixed to the flap cartilage to restore movement of the upper lid. The donor defect in the auricle was closed directly.

The postoperative course was uneventful, without congestion, ischaemia or necrosis. Four years after surgery, there has been no corneal erosion or ulcer, or tumour recurrence on the eyelid. The patient can open and close his eyelids completely. There was minimal deformity of the donor ear.

Discussion

The anatomy of the vascular supply to the auricle and nasal reconstruction with an ascending helix flap have been previously described by several authors.1-5 The definitive description of an ascending helical flap based on the temporal vessels was made by Parkhouse and Evans.1 They reported that the upper anterior extremity of the helix affords an ideal reconstruction of the alar margin. From their 40 cadaver dissections, they assessed the variations in vascular anatomy of the preauricular branch of the superficial temporal artery and concluded that the helix received direct preauricular branches from the temporal artery in about 90% of specimens. Park et al1 also demonstrated that the pinna has a rich collateral blood supply from both the superficial temporal and postauricular arteries, and that the upper auricular (or preauricular) branches of the superficial temporal artery supply the anteroauricular triangular fossa (scapha) surface.

We chose to use an ascending helix flap to reconstruct the upper eyelid in our patient because the thin helical edge closely resembles the thin eyelid edge as well as the nasal rim. Also, part of the helix best approximates the contour of the eyelid, minimising the need for secondary correction after transfer. We used it as an island flap with a reverse flow. The difference between our method and previous descriptions1-5

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is the re-establishment of blood flow in the flaps, i.e. reverse flow or normograde flow. Orticochea first described reverse flow island posterior auricular flaps from both ears for nasal reconstruction. This retrograde flow comes from the temporal branch of the superficial temporal vessel. Song et al. also used retroauricular flaps based on a reverse flow from the posterior auricular artery via the superior auricular arteries to the superficial temporal artery. They used this flap successfully for reconstruction of a total nose defect and a severely constricted anophthalmic socket. However, there is a problem of insufficient venous drainage with a reverse flow helix flap. Pribaz and Falco noted that in cases with a free helix flap, no attempt is made to skeletonise preauricular and/or superficial temporal vessels. The subcutaneous tissue in the preauricular area is harvested en masse with the superficial temporal vessels. They recommended that the subcutaneous tissue should be included around the pedicle vessels and sometimes a delay procedure is required (personal communication, 1996). Tanaka et al. used this free flap for nasal reconstruction. The flap had to be based on the superficial temporal vessels with reverse flow to obtain a vascular pedicle of sufficient length for microvascular anastomosis. However, normograde venous drainage was established with a long vein graft because there was little venous outflow from the reverse pedicle. Our vascular reconstruction involved a modification of Tanaka’s method, i.e. a reverse flow island flap with super-drainage without vein grafting.

This flap offers superior reconstructive results over local flaps for total eyelid loss because of its similarities in structure, contour, thickness and colour with...
the upper eyelid. Use of this flap minimises the need for later revision. The donor defect is acceptable with simple repair and the donor scar can be easily concealed with hair in female patients. The disadvantage is the technical difficulty in vascular anastomosis to ensure venous drainage.

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References


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