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The application of axial superficial temporal artery island flap for repairing the defect secondary to the removal of the lower eyelid basal cell carcinoma

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Abstract

Our aim was to investigate the repair of the defect that follows excision of a basal cell carcinoma (BCC) of the lower eyelid. Skin projections of the superficial temporal artery and its frontal branches were marked using Doppler ultrasonography. The lesion was excised with 0.5–1.5 cm margins. Frozen sections were taken to clarify the diagnosis. The frontal flap was designed according to the preoperative labelling, and was 0.5 cm larger than the defect. The pedicle was 1.0–1.5 cm longer than the distance between the pedicle and the defect, and the width of the pedicle was 3 cm. If the lesion affected the full thickness of the lower eyelid, a conjunctival flap was sutured with the flap. A skin graft was applied when the defect was large. Such defects have been repaired successfully in 10 patients. There was no secondary defect or ectropion postoperatively. The superficial temporal artery frontal branch island flap is a satisfactory method for the repair of a defect secondary to a BCC of the lower eyelid.

Keywords: Superficial temporal artery; Frontal branch; Low eyelid reconstruction; Basal cell carcinoma

Introduction

Repair of defects on the eyelids, face, nose, and upper lip with the superficial temporal artery (STA) frontal island flap gives excellent colour and texture and a satisfactory result, which is readily accepted by both patients and surgeons.[1–4] From May 2006 to March 2010 we successfully repaired defects secondary to removal of basal carcinomas (BCCs) of the lower eyelid in 10 patients.

Patients and methods

Clinical anatomy

The frontal branch of the STA is used as the pedicle of the island flap. According to the donor sites, frontal branch flaps can be divided into unilateral, complete, and midfrontal flaps.[4,5] The frontal branch flaps are always in the same position, and are characterised by superficial extension of blood vessels, rich circulation, closeness to the face, and a long and flexible pedicle of tissue. They are therefore ideal flaps for the repair of facial defects. The forehead takes its blood supply from the STA branch of the external carotid

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artery, and the supratrochlear and supraorbital branches of the internal carotid artery also provide some of the blood supply. The frontal branch can be divided into the parallel and ascending branches according to its extending direction; the former extends along the superficial surface of the frontal muscle while the latter extends obliquely forward to the skull cap and is accompanied by the auriculotemporal nerve.

Patients

We studied 4 men and 6 women, mean age 55 (range 52–72) years. All the cases were diagnosed as BCC by frozen section examination, which was confirmed postoperatively. The malignant cells involved the full thickness of the lower eyelid. Nine had tumours on the palpebral margin, and in one the cancer cells had invaded the external canthus. The shapes of the flaps were designed according to the lesions, the sizes being 5.0 cm to 8.0 cm × 5.0 cm.

Operative technique

Before the operation, skin projections of the STA and its frontal branch were marked using Doppler ultrasonography. During the operation, the BCC were excised with margins of 0.5–1.5 cm. If the lesions involved the full thickness of the lower eyelid, all the tissues involved were excised and frozen sections were taken to clarify the features of the diseased tissues and to see whether the diseased tissues and the margins and bases had been clearly excised.

The frontal flap is designed according to the preoperative labelling. It is 0.5 cm larger than the defect, and the pedicle is 1.0–1.5 cm longer than the distance between it and the defect.

In the S-shaped extending direction of the frontal branch of the STA, a cut is made from the skin to the subcutaneous part, where both lateral parts are stripped to 1.5 cm. The frontal flap is cut and lifted along with the pedicle of fascia and blood vessels, and then transferred to the receptor site. If the pedicle is under tension or subject to pressure, the STA should be stripped even further to cut the trunk of the STA and free the pedicle into a relaxed position.

A subcutaneous tunnel from the root of the pedicle to the lesion is formed. As the width of the pedicle is about 3.0 cm, the tunnel should be 3.0–4.0 cm wide so that the pedicle is not under pressure. After thorough haemostasis, the flap is brought through the tunnel. If the lesion affects the full thickness of the lower eyelid, the conjunctival flap is sutured with the flap. If the conjunctival flap is not long enough, the frontal flap should be designed to be large enough with its margin trimmed to full thickness and turned over to be sutured to the conjunctival flap. As the frontal flap is thick, there is no need to repair the tarsus of the lower eyelid. If the surface of the donor area is too large to be sutured, a skin graft should be applied.

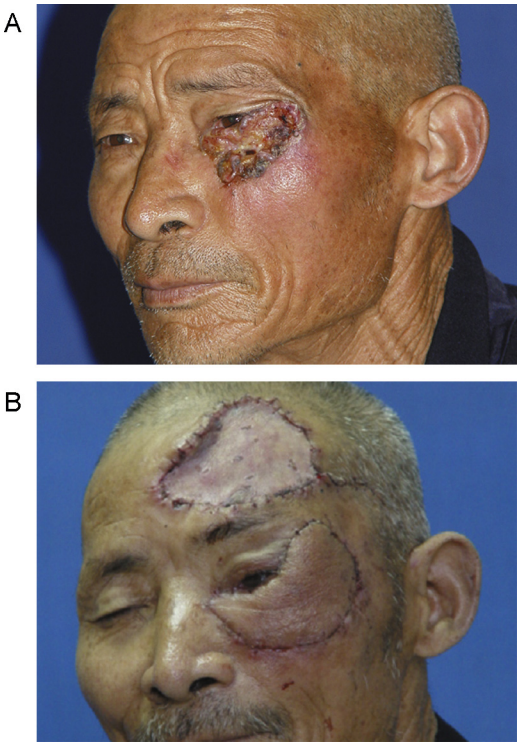

Fig. 1. Case 1: (a) the preoperative lateral view of the basal cell carcinoma on the left lower eyelid, and (b) the postoperative lateral view (published with the permission of the patient).

Results

Shortly after the operation, blood stagnated in all the flaps. After the application of compression bandages, 9 flaps survived. In one case an area 1.0 cm^2 of the apical segment became abraded but it healed after the dressing had been changed. None of the patients developed eversion of the eyelid and they could all open and shut their eyes freely. Three patients were seen again within 6–12 months with no recurrence of malignant tissue.

Case reports

Case 1

A man aged 72, had a lump on his left lower eyelid for 6 years, and was admitted to hospital a year after the lump ulcerated (Fig. 1a). Six years previously a bean-sized node had appeared on the man's left lower eyelid but he felt nothing abnormal. A year ago the node started to enlarge progressively and ulcerated, which affected the sight of his left eye. Histological examination of a biopsy specimen confirmed a BCC on the left lower eyelid. Physical examination showed an irregular mass 5.0 cm × 4.0 cm that extruded 5 mm from the normal skin.

The mass had a clear margin and was ulcerated with secretion on the surface. The left lower eyelid and the exterior