Lateral orbital propeller flap technique for reconstruction of the lower eyelid defect

J-P Ding¹, B Chen², J Yao³

¹Department of Plastic Surgery, Beijing Hospital, National Center of Gerontology, Beijing, China

²Department of Plastic and Reconstructive Surgery, Plastic Surgery Hospital, Chinese Academy of Medical Sciences and Peking Union Medical College, Beijing, China

³Department of Plastic Surgery, Hangzhou Plastic Surgery Hospital, Hangzhou, China

ABSTRACT

The lower eyelid, which has a unique anatomy and esthetic importance, is a common site of basal cell carcinoma. The reconstruction of the defect after the wide excision of the tumour is a special concern of many plastic surgeons. How to achieve the most satisfying effect through minimal invasive is important for patients. We successfully applied the lateral orbital propeller flap for one-stage reconstruction of a large lower eyelid defect after tumour resection. We consider that this flap can achieve better tissue mobilisation as it provides effective coverage of soft tissue defects and thus is especially useful for repairing facial defects.

KEYWORDS

Basal cell carcinoma – Lower eyelid defect – Propeller flap – Lateral orbital area

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CORRESPONDENCE TO

Jian-min Yao, E: yjumpy@163.com

Case history

A 64-year-old woman presented a 10 × 8-mm lesion with ulceration on her left lower eyelid and eyelash root. She visited our clinic, having been diagnosed with basal cell carcinoma that only involved skin and subcutaneous tissue via a biopsy (Fig 1). We planned to excise the tumour with a wide-margin resection, but it was bound to produce a large defect that would demand reconstruction. Historically, skin flaps from the forehead, cheek or paranasal area were applied in the reconstruction but this left a patch-like appearance because the eyelids have a unique structure with thinner skin and fine wrinkles. Clinically, therefore, it is ideal to use the adjacent periorbital skin. In this case, we attempted to apply the lateral orbital propeller flap to the lower eyelid, as the defect could not be stitched directly.

Surgical technique

This operation was performed under local infiltrating anaesthesia (2% lidocaine with epinephrine at 1 : 200,000). First, we designed the markings of the lower eyelid malignant tissue for wide excision with sufficient 3-mm lesion-free margin. For the 14 × 10-mm defect, we designed the flap about 30 × 11 mm on the left lateral orbital area with its pivot point adjacent to the lateral canthus (Fig 2, left). Second, we removed the lesion along the marking. After verifying that there were no tumour cells on the peripheral

and deep margins, immediate reconstruction was undertaken. We raised the flap with careful dissection and hemostasis. The elevated flap was then rotated 180 degrees to the defect with its subcutaneous pedicle, which was at least 0.5 cm (Fig 2, right). Third, after further meticulous haemostasis, we covered the defect with the flap by using 6-0 nylon sutures. The donor site was closed with the same sutures (Fig 3).

Results

After 24 months, the patient was satisfied with the good aesthetic result, even though some of the lower eyelid lashes had been removed. Neither lower eyelid ectropion nor drooping occurred (Fig 4).

Discussion

The eyelid and periocular area are the most common regions for basal cell carcinoma. About half of the malignant tumours are found on the lower eyelid. Numerous techniques have been described for the repair of lower eyelid defects after extended resection, including cervicofacial flaps and V-Y advancement flap.^{1–5} Our case demonstrates successful use of the lateral orbital propeller flap for one-stage reconstruction of a large lower eyelid defect after tumour resection. The advantages of this flap are:

Figure 1 A 64-year-old woman with basal cell carcinoma of the lateral half of the left lower eyelid

Figure 3 The reconstructed lower eyelid during surgery

Figure 2 Intraoperative photographs showing (left) markings of the lower eyelid malignant lesion for wide excision with sufficient 3-mm free margin and the design of acentric axis type propeller flap from lateral orbital area according to the defect; (right) after the lesion is removed, the flap is elevated with its subcutaneous pedicle and rotated 180 degrees to the defect

Figure 4 Results at 24 months after the operation. Symmetry of the eyelids was obtained with no complications

- > It is easy to manipulate and can be harvested from minimal invasive and invisible donor sites on the relaxed skin tension lines.
- > This flap exploits the lateral orbital skin's texture and colour which most closely resemble the eyelid skin. Linear scarring on the donor site can easily fade along the relaxed wrinkled lines.
- > Generous skin laxity on the outer canthal donor site allows for direct closure without much effort.
- > With age, tissue laxity augments make the tension-free eyelid reconstructions easier. All of these allow for a good fit to orbit and good aesthetic results.
- > Most importantly, this flap can achieve better tissue mobilization, as it provides effective coverage of soft tissue defects.

Owing to the abundant facial blood supply, the propeller flap is not subjected to the length–width ratio limit, making rotation more flexible. The propeller flap is classified into central axis type and acentric axis type, depending on the

location of the pedicle.³ Generally, an acentric axis type flap is conducive to covering a defect because this type of flap can be rotate 180 degrees.⁴ We design acentric axis type flaps as the asymmetric bilobed propeller flap, the tail of which is larger for covering the defect and the head of which is smaller for closing the donor site. This asymmetric design is beneficial for minimising donor-site sacrifice. Although rotation flaps based on the orbicularis oculi muscle⁵ and our propeller flap are thought to be similar designs, the concept behind them is different. Even so, these two flaps can both achieve a good and aesthetic outcome, whereas we expect to keep as much of the orbicularis oculi muscular fibres as possible and do not aim to separate any deep pedicle.

To conclude, this method is easy to perform and can achieve to reproduce similar texture and colour of the eyelid following the aesthetic subunit with minimal sacrifice. It is especially useful for repairing facial defects. There are, however, some limitations. One is that the size of the elevated propeller flap is limited because of the special anatomical position. The other is that it cannot cover the

full thickness defect and another patching graft maybe required behind the flap.

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