Long Term Cosmetic and Functional Results of One Stage Reconstruction for Lower Eyelid Malignant Melanoma: A Single Centre Experience of Eleven Patients

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Received: 24 October 2015 / Accepted: 17 June 2016 / Published online: 30 June 2016
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Abstract

Introduction Eyelid malignant melanoma represents less than 1 % of all skin melanomas and approximately 1 % of all malignant neoplasms of the eyelid skin. Because of its relative rarity, there is a paucity of descriptive papers reporting only small series of reconstructed patients. The repair of eyelid defects represents a reconstructive challenge. Ideally, the reconstruction of the defect must guarantee function with tissue of the same color, texture, and thickness of that of the removed skin and at the same time avoid complications such as ectropion and lagophthalmos.

Materials and Methods We describe a consecutive series of 11 patients affected by cutaneous melanoma of the lower lid who underwent full-thickness excision of the neoplasm and subsequent wide excision. All the patients were treated in one-stage reconstruction modality with a modified monopedicle myocutaneous flap, harvested from omolateral upper eyelid, tunneled under the lateral canthus skin and armed with a conchal auricular cartilage framework. Four patients underwent the sentinel lymph node biopsy during reconstructive procedure. No major complications were reported. In our experience, the proposed myocuta-

neous flap allows to obtain excellent results, both aesthetically and functionally.

Conclusions This technique has the advantage of avoiding multi-staged procedures, with respect for the oncological excision indication for head and neck melanoma, decreasing the incidence of associated major complications.

Keywords Lower eyelid melanoma · Facial local flaps · Myocutaneous flaps · Reconstruction

Introduction

Eyelid malignant melanoma represents less than 1 % of all skin melanomas and approximately 1 % of all malignant neoplasms of the eyelid skin [1].

This type of tumor can originate either on the skin or conjunctival surface and can extend in either direction during its neoplastic growth [2].

The surgical repair of the lower eyelid represents, nowadays, one of the most challenging procedures in head and neck reconstructive surgery, both aesthetically and functionally. Supposedly because of the difficulty and the poorness of tissue in this particular anatomical area, some authors prefer multiple surgical procedures to obtain a satisfactory lower lid reconstruction, mainly in younger patients.

Because of the relative rarity of eyelid skin melanoma, there is a paucity of descriptive papers in literature reporting only small series of reconstructed patients.

The purpose of this paper is to describe cosmetic and functional advantages of a modified monopedicle myocutaneous flap harvested from upper lid, in the surgical reconstruction of the lower eyelid after wide local excision in patients affected by melanoma.

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Materials and Methods

Ethical Considerations

The study was approved by our Institutional Review Board. An informed consent was obtained from each patient.

Between December 2001 and May 2014, eleven patients affected by cutaneous melanoma of the lower eyelid underwent full-thickness excision of the neoplasm and subsequent wide local excision.

The microscopic and histopathologic features were evaluated in all patients.

All the patients were treated in one-stage reconstruction modality with an island myocutaneous flap, harvested from omolateral upper eyelid.

From 2010, in stage Ib or stage II patients who demonstrate no signs of metastatic disease (according to the International Guidelines) [3], we performed SLNB (sentinel lymph node biopsy) along with the reconstructive procedure. No patient presented clinical lymph nodes involvement at the time of surgery.

Surgical Technique

The surgical procedure was usually performed under local anesthesia, with monitored sedation; when simultaneous SLNB was performed, we preferred general anesthesia in combination with local infiltration.

A 27 or 30 gauge needle was used for local infiltration (Lidocaine 1 % with Adrenaline 1:100.000); injection technique should steer clear of subcutaneous vessels and orbicularis muscle to reduce ecchymosis.

The local injection was given into both upper and lower lids after appropriate measurement and marking of the surgical excision and reconstructive planning.

After the full-thickness wide excision of the lower lid melanoma, according to International Guidelines for excision margin, we outlined a flap of corresponding size on the upper eyelid. Using forceps and caliper, the excess tissue in the upper eyelid was then pinched at the skin crease to determine the extent of the myocutaneous tissue which had to be removed in the form of a flap, while preserving upper eyelid function (Fig. 1).

If two thirds of the length of the upper lid is required to perform the reconstruction, a single pedicle is sufficient. The inclusion of the muscle into the flap ensures adequate blood supply from musculocutaneous perforators. The flap was then lifted with the underlying orbicularis muscle and was easily transposed down into the lower eyelid defect with a pivot point on the lateral canthus. We modified the traditional Tripier flap, creating a subcutaneous tunnel at the lateral canthus to allow the underlying passage of the

Fig. 1 Preoperative planning of the surgical excision and of the upper eyelid myocutaneous flap

flap, properly disepithelized, thus avoiding the usual lateral bulging at the pivot point of the flap (Fig. 2).

At this time the inner part of the flap was sutured with eyelid conjunctiva using absorbable stitches and the tarsal structure was reestablished by using a cartilaginous framework previously harvested from auricular concha. The cartilage was accurately tailored on the basis of the size and shape of the surgical defect and anchored with non absorbable sutures to the tarsal plate (Fig. 3).

The final step provides to cover the cartilaginous support by rolling the same myocutaneous flap around the framework in a “sandwich way”, to reestablish the cutaneous and conjunctival continuity of the lower eyelid (Fig. 4).

The donor site of the myocutaneous flap and the retroauricular incision were repaired by primary closure.

Four patients underwent, on the same-day, preoperative technetium Tc 99 m lymphoscintigraphy followed by SLNB using gamma probe and blue dye.

Results

There were 4 females (36.4 %) and 7 males (63.6 %), with a mean age of 52.4 years (range 19–78 years).

Clear margins were obtained in all patients and almost one sentinel lymph node was identified in all 4 patients eligible. One patient with positive SLNB underwent total parotidectomy, sparing the facial nerve, and supraomohyoid CLND.

The mean length of the defect was 13.7 mm (range 8–20 mm), while the mean height was 11 mm (range 4–17 mm). The defect involved the medial one third and the lateral one third of the lower eyelid.

The mean Breslow thickness of melanomas was 1.16 mm (range 0.85–1.9 mm). One of the patients presented in situ melanoma. In another patient, the large

Fig. 2 The upper lid myocutaneous flap harvested disepithelized in the *right* sized and tunneled under lateral canthal skin

Fig. 3 Tailoring and arming of the upper lid myocutaneous flap with auricular concha cartilage

Fig. 4 Appearance of the periocular area two days after surgery

pigmented lesion on the eyelid margin was compatible with metastatic nodule by previous cutaneous melanoma.

Also youngest patient of the series had upper eyelid dermatochalasis, sufficient to allow for an adequate myocutaneous donor flap. Post-operative follow-up ranged from 13 months to 168 months, with a mean of 81.6 months (6.8 years).

The modified myocutaneous flap, in comparison to other local flaps, allowed to obtain easily excellent functional and cosmetic results in all the patients. Regarding aesthetic aspect, this local flap led to a complete reconstruction of the aesthetic sub-unit of the lower lid, using skin type with the same texture, color match and thickness of the defect area.

The donor site was repaired by primary closure, as an upper cosmetic blepharoplasty.

As far as functional results are concerned, the cartilaginous framework permits to obtain an excellent lid competence, decreasing the risk of lagophthalmos and ectropion, thus avoiding ophthalmic complications related to scleral exposure (Fig. 5).

The procedure was relatively easy to perform, with a mean surgical time of 91 min (range 78–113).

No cases of graft failure or flap necrosis were revealed. All the patients showed oedema and ecchymosis which spontaneously resolved in 10–15 days. Mild residual oedema was observed in 2 patients one month after surgery.

However 3 months postoperatively, all patients showed satisfactory aesthetic results, good lid globe apposition and eyelid position without relapse, ectropion, lagophthalmos or epiphora. Optimal functional and aesthetic results were confirmed at long term follow up.

Local recurrence of lower lid melanoma occurred in one patient 14 months after primary surgery. The lower lid reconstruction following excision of the local recurrence was performed by a propeller flap based on the frontal

Fig. 5 Result 12 months after surgery

branch of superficial temporal artery, armed with a cartilage graft. All patients are now disease free.

Discussion

To our knowledge this series is one of the largest single-centre study of eyelid melanomas that looks at the issue of surgical repair.

The primary objective of eyelid reconstruction is to repair the surgical wound and to reconstruct the missing anatomic structures, to reestablish functional eyelid that protect the eye and permits normal vision, decreasing the risk of ocular complications.

The main aesthetic goal is a natural appearance of the periocular region, that constitutes a critical area in interpersonal relationships.

In the past, many techniques have been proposed to reconstruct the lower eyelid with poor aesthetic and functional results, and hence many authors prefer multiple consecutive surgical procedures to obtain a satisfying lower lid reconstruction, mainly in younger patients.

The most common reconstructive techniques use full thickness skin graft, cheek rotation Mustardé flap [4] or monopedicle/bipedicle Tripiér flap [5], combined with autologous graft (auricular cartilage, nasal septal cartilage and buccal mucosa), glabellar flap, Tenzel's semicircle flap [6], Fricke flap.

The appropriate type of reconstruction is selected according to the defect location, excised tissue size, elasticity and availability of the adjacent tissues.

Because of the high rate of local recurrence some authors recommend that the repair of the defect should be delayed until margin status is confirmed [7]. However, in our opinion there may be some disadvantages to this approach, because the management of an open wound for up to more than 10 days after the initial surgery may be psychologically and logistically unacceptable to patients. We observed local recurrence in only one of our patients and this confirms that a one step procedure permits a good local control rate. Furthermore our technique obviated the need for a second-stage procedure, and undoing and redoing a flap in this anatomical area may not be advisable because it can lead to significant ocular morbidity.

The Strength of the Technique

In our opinion this technique shows some advantages compared with other approaches used in repairing full-thickness lower eyelid defects. It is technically easy and can obtain better aesthetic results. In comparison with

Mustardé cheek advancement flaps, this modified monopedicle myocutaneous flap involves the harvesting of a small undermined area resulting in minimal invasiveness. Besides, in our technique the auricular cartilaginous graft covered by the flap results in a smooth surface in contact with the eyeball that guarantees a firm and soft posterior lamella, decreasing some complications of the Tenzel procedure such as palpebral retraction, ectropion, or symblepharon.

For an ideal reconstruction, surgical incisions must follow Langer lines. Conversely, vertical lid incisions may contract and deform the lid edge.

The upper lid is an excellent donor site; it is a good source of flaps, mainly in older patients, is conveniently placed and offers good texture and color match for lower lid reconstruction. In the described flap, surgical incisions are made along the lid line transversely and in the crow's feet lines laterally.

Furthermore, upper eyelid myocutaneous flap is an attractive reconstructive choice. Because of its proximity, its vascular security and its blood supply, the flap can be raised on its lateral or medial pedicle. Considering these features, we propose a one-stage lower lid reconstruction, by using a modified monopedicle myocutaneous flap from the upper eyelid. The suggested modification consists in tunneling a part of the upper lid myocutaneous flap, previously disepithelized in the right size, under lateral canthal skin to avoid the usual lateral bulging thus obtaining more satisfying functional and cosmetic outcomes. This technique does not preclude the ability to detect any local recurrence and the use of other local flaps.

Flap failure resulting from ischemia is a rare occurrence and may occur only when the orbicularis oculi muscle has not been included in the flap.

The limitation of this study is the relatively small sample size, but this is related to the rarity of the eyelid melanoma.

Conclusions

We conclude that this modified monopedicle myocutaneous flap harvested from omolateral upper eyelid, combined with a cartilaginous framework provides excellent long term functional and cosmetic results in younger patients also.

This technique has the advantage of avoiding multi-staged procedures, with respect for the international oncological excision indication for head and neck melanoma decreasing the incidence of associated major complications and allowing for a good control for local recurrence.

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