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Original research

A novel technique for full thickness medial canthal reconstruction; playing with broken lines

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Abstract

Purpose: To introduce a new modification of transposition flap technique for reconstruction of the medial canthal region.
Methods: This prospective study included 58 patients with the full thickness involvement of both upper and lower lid in the medial canthal area. Reconstruction of posterior lamella was performed by utilizing periosteal flaps and tarsoconjunctival grafts, and anterior lamellar reconstruction was performed using transposition of multiple full-thickness skin flaps, a modified form of rhomboid flap technique. Post-surgical outcomes, advantages, and drawbacks of this technique are discussed.
Results: Between 2010 and 2014, 58 patients with basal cell carcinoma, proven by histopathologic study, underwent medial canthal reconstruction. The mean age was 72.8 ± 8.3 years. In 30 patients, the lacrimal apparatus was excised, and periosteal flaps or tarsoconjunctival grafts were prepared to reconstruct the posterior lamella. Anterior lamellar reconstruction was performed in all patients, and the mean number of transposition flaps was 3.63 in addition to the blepharoplasty flap. Patients were followed for 24 months. None of the patients developed flap necrosis or other intraoperative and postoperative complications, with acceptable aesthetic and functional outcomes.
Conclusion: Full-thickness reconstruction of the medial canthal area by utilizing periosteal flaps and modified transposition flap technique all in one session can be considered an alternative method in medial canthal reconstruction, with acceptable functional and aesthetic outcomes.

Keywords: Medial canthal reconstruction; Rhomboid; Modified transposition flap technique; Periosteal flap

Introduction

Complex anatomy and function of the medial canthus and its deeply situated position make it one of the most challenging structures in reconstructive surgery.[1,2] On the other hand, most of the malignancies that involve this region have a worse prognosis and more aggressive nature in comparison to other sites in the periorbital area. The high risk nature of malignant lesions here makes it mandatory to have extensive tissue excision to reach safe margins. Considering the growing rate of malignancies and higher efficacy of chemotherapeutic adjuvant therapies, more patients need an acceptable cosmetic reconstruction in addition to a well-functioning structure in the site of the excised tumor. Reconstructive surgery aims to provide safe free margins, minimally manipulate the adjacent normal tissue, and seal the tissue defect with an appropriate aesthetic and functional feature. Reconstruction of the posterior lamella can be performed by harvesting the buccal mucosa and hard palate graft; however, it is not a good choice in cases with a small and deeply-sited medial canthal area, especially when the medial canthal tendon reconstruction is also

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mandatory. For reconstruction of anterior lamella, various types of skin flaps have been introduced previously, and rhomboid flap technique is one of the mostly used techniques.[1–5] The defects smaller than 1 cm^2 can be filled with a single rhomboid flap, but in larger defects, more flaps should be prepared. In this study, we present a modified form of rhomboid flaps for the cases with larger defects not possibly filled with a single flap. We also introduce utilizing preseptal excessive skin as one of the flaps, named blepharoplasty flap. This flap is utilized to reconstruct the upper part of the defect where the texture of the lost skin is thin, similar to the specific context of eyelid skin.

Methods

In this study, 58 patients with medial canthal lesions who underwent medial canthal reconstruction were included. Histological investigation confirmed the diagnosis of basal cell carcinoma (BCC) in all of these patients. The study was implemented in accordance with the tenets of the Declaration of Helsinki. The study protocol was approved by the local Ethics Review Committee of Tehran University of Medical Sciences, and all participants provided us with written informed consents prior to being included.

Simultaneous excision of the primary lesion and reconstruction was performed under local anesthesia in all of the patients. Reconstruction was performed utilizing crossed periosteal flaps for posterior lamella and modified transposition flaps and blepharoplasty flap technique for anterior lamella. Patients were visited on the first day, 2 weeks, one month, six months, and 2 years after reconstruction surgery. Despite free margins reported in all of our cases, the site of surgery was investigated carefully for any evidence of recurrent disease. The surgeon evaluated cosmetic feature, efficiency of defect closure, complications, and patient satisfaction in all postoperative visits.

Surgical technique

This method was used to reconstruct the large medial canthal defects involving full thickness of both upper and lower lids. In 30 of the patients, parts of lacrimal drainage system including punctums, canaliculi, and medial canthal tendon were resected. Posterior lamellar reconstruction was performed by preparing the periosteum of the lateral nasal bones in the area of medial canthus in a scissor crossed pattern. A square-shaped periosteal flap with the size of 1 cm^2 with anterior base was prepared. It was horizontally cut into two parallel stripes, and it was crossed; the lower half was sutured to the remnant of the upper tarsus, and the upper half was sutured to the remnant of the lower tarsus using Vicryl 5-0 sutures. Then the large skin defect was reconstructed by means of its surrounding skin, considering the excessive chalatic upper lid preseptal skin as one of the flaps. After reconstruction of deep structures, the two largest perpendicular diameters of the anterior lamellar defect were measured by caliper. Hemostasis was established by bipolar cautery. Only defects with a surface area larger than 2 cm^2 involving both medial canthal skin overlying nasal wall and medial portion of lower and upper lid were included for this technique.

Drawing a sketch of incisions in the configuration of broken lines in the tissue surrounding the defect was the first step in reconstruction. Then 3 modified transposition flaps were prepared on the medial canthal skin covering the nasal wall as follows: Considering the defect as a round area with the radius of "a" in Fig. 1, the line of incision was drawn in continuity with the radius of the circular defect area, making a 90° angle with the tangential line passing through that point, to the extent equal to the size of the radius. The outline was then broken by the angle of 60–80°. It was then continued to the size equal to the radius in the new orientation (Fig. 1).

Outline and orientation of the lines were not strict. Dynamic adjustment of the design and array of tissue puzzle was possible and depended upon the judgement of the surgeon by taking the skin tension lines into account to have the least amount of scar or webbing.

Then upper lid blepharoplasty drawing, with some modification, was prepared as one of the flap fractions and was rotated medially to fill the lateral region of the defect area (Fig. 1). This flap was utilized to reconstruct the upper part of the defect. Term modification referred to unilateral partial removal of the excessive skin of the upper lid, whereas the

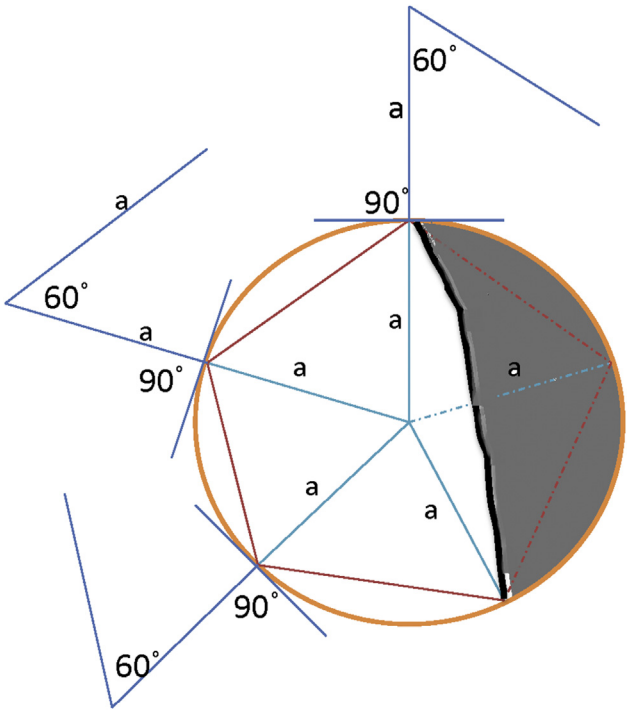

Fig. 1. Illustration of the geometric configuration of the modified transposition flap technique. The line of incision is drawn in continuity with the radius (a) of the circular defect area to the extent equal to the size of the radius; then it is broken by the angle 60°, and it is continued then to the amount equal to the radius of the defect. Utilizing modified blepharoplasty skin flap (gray part) for covering of the medial portion of upper and lower eyelid and sealing the remainder of the defect by means of 3 modified transposition flap technique for coverage of skin defect covering the nasal bone in the right side. Four flaps are rotated counterclockwise.

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