



Case Report

Challenging eyelid reconstruction in malignancies: Case reports

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ARTICLE INFO

Keywords:

Eyelid malignancies
 Full-thickness defect
 Eyelid reconstruction
 Skin flaps
 Skin graft

ABSTRACT

Eye is one of the most crucial organs in need of protection. The most important function of eyelids is designed to protect the eyeball. Despite their small and thin surface area, they are among the most sunlight-exposed area of skins, hence, it is prone to develop eyelid tumors. As the malignant tumors have the tendency of growing aggressively and have a high mortality, we have to meticulously remove the lesion along with its surrounding tissue, if needed, to ensure the clearance of tumor margin. To strike a suitable outcome between the cosmetic and function after tumor removal is a quite challenging task. Compromise on aesthetics and eyelids' indispensable function of protecting the eyes during management, may lead to unfavorable cosmetic deformity and loss of vision. Therefore, it is imperative that wise selection of appropriate techniques be discussed and managed accordingly. In this article, the authors reported two case scenarios of eyelid reconstruction which was performed to show the management of full-thickness defect after removal of the malignant neoplasms. Skin flaps and graft technique used to reconstruct the eyelid in each patient was different to emphasize that eyelid malignancies require an individualized management.

1. Introduction

The eyelids are accessory visual structures with vital function of protecting the eyes, composed of anterior, medial, and posterior lamella [1]. The thin skin of the eyelids is particularly sensitive to various irritants and ultraviolet, making it vulnerable to develop tumors. Although eyelid tumors are relatively rare and varied in their presentations, these tumors require individually tailored distinct diagnostic and treatment [2]. As the malignant tumors tend to have very aggressive histopathologic types, complete surgical excision is the essential in the treatment of primary malignant eyelid tumors [3]. To obtain a maximum preservation of cosmetic and functional outcome is a challenging task even for an experienced surgeon. In these case reports, the authors shared experience of one-step reconstruction techniques after removal of eyelid malignancies. Written consent were obtained from both patients. These case reports have been reported in line with the SCARE Guideline [4].

2. Case presentation

2.1. Case 1

A 60-year-old female presented with a red mass on the right lower eyelid for 5 months. A solid mass measuring 5.0 × 3.0 × 6.0 mm and ectropion of the right lower eyelid were seen. Palpation of lymph nodes was unremarkable. The mass was excised with 5-mm free margin from the tumor border confirmed with negative frozen section; hence, left a wide defect on the lower eyelid. Histopathology confirmed it to be a keratinocytic squamous cell carcinoma (SCC). Reconstruction of the eyelid defect using lip mucosal graft was addressed for the posterior lamellar, whereas rhomboid flap was designed to repair the anterior lamellar.

2.2. Case 2

A 55-year-old female came with a right upper lid mass which hindered her to open her eyes for the last seven years. A solid nodular mass that was originated from tarsal plate covering all the right upper lid

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<https://doi.org/10.1016/j.amsu.2021.102987>

Received 14 September 2021; Received in revised form 18 October 2021; Accepted 28 October 2021

Available online 30 October 2021

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sized 40 × 30 × 15 mm, accompanied with telangiectasia, red skin, madarosis, and crusts without lymph node involvement. Histopathology confirmed the mass to be a moderately-to poorly-differentiated keratinocytic SCC. The tumor was excised 5-mm from the tumor border, followed by negative frozen section. The large defect was consequently repaired by posterior lamellar graft using mucous membrane graft sized 30 × 15 mm. Combination of suprabrow island flap and v-flap from the cheek were also secured to provide the large defect coverage.

3. Discussion

These case reports highlight the reconstruction techniques to repair a large wide defect of the eyelid. The four most common malignancies involving the eyelids are basal cell carcinoma (BCC), squamous cell carcinoma (SCC), sebaceous gland carcinoma and malignant melanoma [5]. However, their relative frequencies differ. In western countries, BCC is usually the most common, comprised >80% of eyelid malignancies [6, 7]. On the contrary, the frequency of SCC and SGC is higher in Asia, accounted for 7–40% and 3.4–29%, respectively [6,8–10].

The principle to repair a full-thickness defect is covering the anterior and posterior lamellar. If the horizontal extent of defect is <30%, direct closure with or without cantholysis is needed. Defect between 30 and 50% width is repaired with a semicircular flap. For >50% horizontal defect, note also the vertical extent of the defect. If it is large (>15 mm), reconstruction can be performed with flap and graft, which can be done in a single-step surgery; or with combination of both flaps, which is usually performed in a multiple-step surgery [11]. However, performing both graft is not suggested because a good blood supply that can be obtained from flap is needed for the large defect coverage.

Our first case (Fig. 1A and B) presents a further challenge to repair because of its location and border. The posterior and anterior lamellar were repaired by graft and rhomboid flap. Each edge of the defect was pulled without tension to measure the graft size (Fig. 1C). A 20 × 15 mm lip mucosal graft was taken and stitched to connect the remaining tarsal conjunctiva and replace the posterior lamellar (Fig. 1D). The donor site of the lip was closed with 6/0 vicryl. Tightening of the eyelid lateral

canthus onto the periosteum is necessary to prevent ectropion and entropion.

The rhomboid flap to repair the anterior lamellar pivots over an incomplete bridge of skin, can combine well with other flaps or full-thickness skin graft and used for the reconstruction of medial canthal defects involving the nasal sidewall [12–14]. As the defect in the first case was circular, rhomboid flap was used with internal angles of 60° and 120°. An equal length on each side is required to form an equilateral parallel. However, the disadvantages of flap over a graft is the higher incidence of subcutaneous hypertrophy that could mask the recurrence of a malignant tumor and the required amount of normal tissue that needs to be discarded [13,15].

Vertical marker in the mid of the defect marked the incision design of rhomboid (Fig. 2A). The rhomboid skin flap was pulled allowing closure of the defect (Fig. 2B). Grey area on Fig. 2C represents the defect on Fig. 2A which would be closed by rhomboid design. This flap includes two different inner angles such as 60° and 120°. First incision (A-B line) is an extension line. Second incision (B-C line) is an extended line that is continued from the end point of first incision with angle of 60°. Make the incision in depth of subcutaneous fat level. The direction of the flap depends on the skin that relocated to the defect. Black dot (Fig. 2D) is the

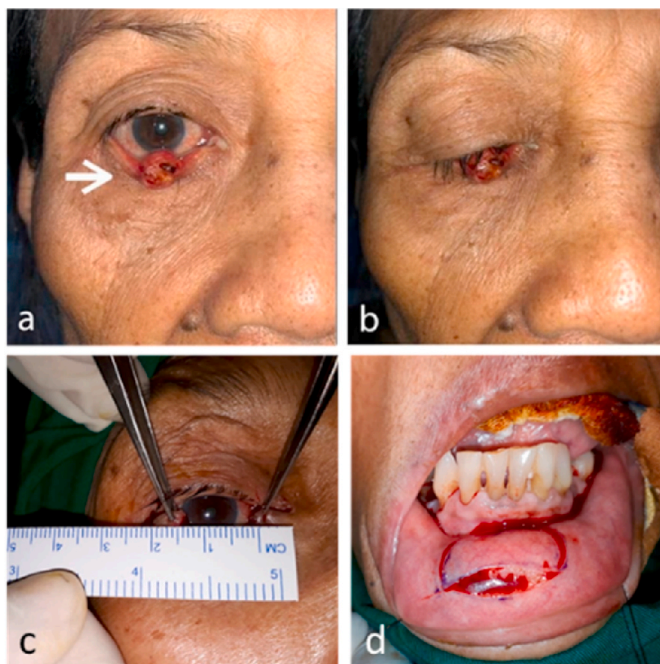


Fig. 1. (A) White arrow points the right lower eyelid squamous cell carcinoma; (B) Preoperative photograph when the eye was closed; (C) Measurement of the graft size; (D) Lip mucosal graft was harvested to cover the posterior lamellar defect.

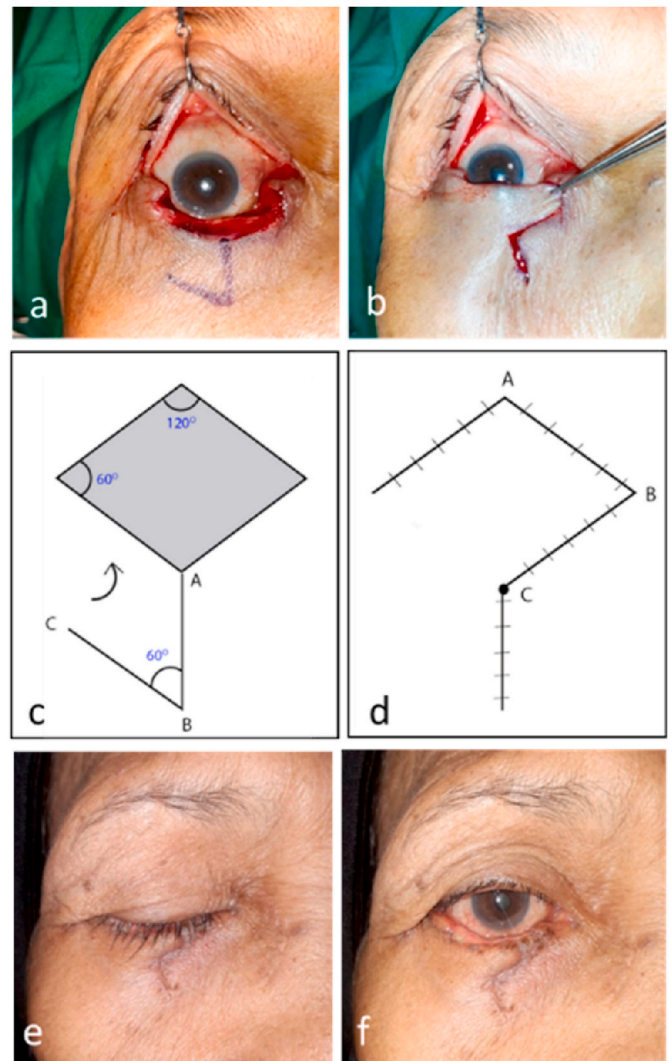


Fig. 2. (A) Planned incisions were marked in the mid of defect; (B) Pulling each edge of the wound allowing the defect closure; (C) Schematic illustrations of the rhomboid flap design; (D) Closure of the defect with the rhomboid flap; (E and F) One-month post-operative pictures showing good aesthetic and functional outcomes.

point of maximal tension. Note that this point should be approximated first followed by the closure of the donor area since it is the site where most of the tension is located following rotation of the flap [15]. All the flap was closed by 6/0 prolene.

Follow-up was performed to examine postoperative complications including flap necrosis, entropion, ectropion, and tumor recurrence [14]. One month follow-up (Fig. 2E and F) demonstrated a good aesthetic and functional outcomes, which was defined as normal because the opening and closure function of the reconstructed lid was preserved and lid malposition, lagophthalmos, epiphora, and punctate epithelial erosions were not observed. However, due to current pandemic situation, the patient could not come to our outpatient clinic to have her eyes checked. It is imperative to do a follow-up until five years due to the recurrence rate of eyelid SCC which appeared to be 57.1% while the reported incidence of lymph node metastasis has ranged from 0.1% to 21.4% [16,17]. The 5-year disease-specific and overall survival rates for all patients with eyelid SCC were found 86% and 71%, respectively [18].

Our second patient (Fig. 3A and B) had undergone wide excision and negative frozen section for the malignant neoplasm resulting in a full-thickness upper lid defect extending until fornix conjunctiva, medial and lateral canthal area. Medial canthal reconstruction is associated with many challenges, including donor-site morbidity, scar formation, flap color, and texture mismatch. Moreover, normal concavity of the medial canthal region should be preserved and distortion of the surrounding structures should be avoided [14].

We used mucous membrane graft sized 30×15 mm that was attached onto the periosteum with a proper tension to reconstruct the

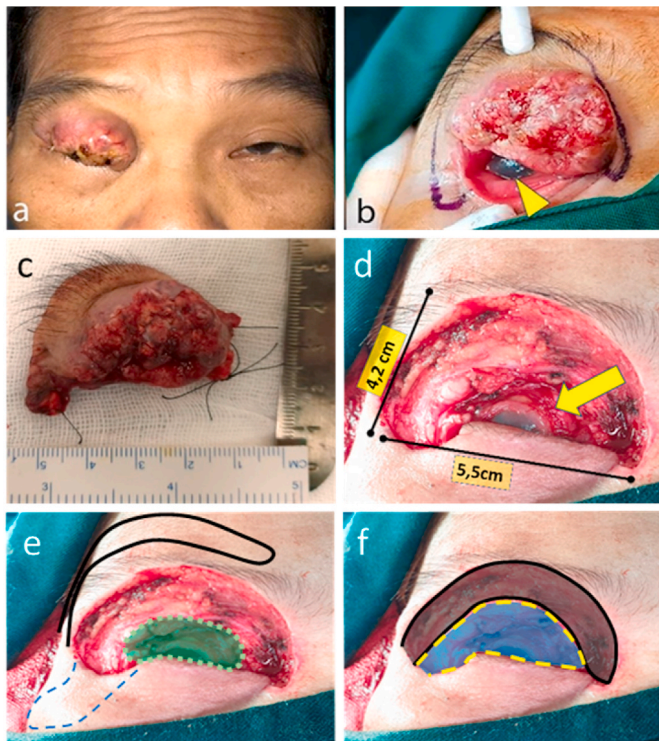


Fig. 3. (A). Clinical appearance of the mass; (B) Intraoperative marking with 5 mm around the tumor border. Yellow arrow points the hazy cornea; (C) Gross section of the mass after wide excision; (D) A large defect involves the posterior lamella until superior bulbar conjunctiva (yellow arrow); (E) Green area represents the posterior lamellar graft, black line demonstrates the origin of suprabrow flap, and blue dashes represents the origin of temporal advancement flap; (F) Illustration of the postoperative result. Black area depicts the suprabrow flap, while blue area depicts the temporal flap. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

posterior lamellar. This technique has successfully led us to obtain a stable graft without using a cartilage. Reconstructive surgery of the posterior lamellar upper lid tends to be more complicated than that of the lower lid because full-thickness defect may damage the levator palpebrae; moreover, excessive horizontal and vertical tension may also cause ptosis and lagophthalmos [14]. Posterior lamella graft which reforms the lid margin needs to be stiff for support. It can be harvested from the contralateral upper lid, nasal septal, auricular cartilage with its attached mucoperichondrium, and hard palate mucosa [11].

For the anterior lamellar, a combination of suprabrow island flap and v-flap from the cheek were used to cover the extending wide defect from the upper eyelid until the brow. Suprabrow rotational flap was used to close the defect below the eye brow, wherein a temporal rotational flap was used to reconstruct the upper lid (Fig. 3C–F). These flaps are good options since they provide adequate tissue movement without compromising the contour. Continuous suture with 6/0 vicryl was made to create upper lid margin. The skin was closed using 6/0 prolene. Our second patient was also closely monitored. During her one-year follow-up, we found no ptosis, 5-mm vertical eyelid fissure, 2-mm margin reflex distance, and 1-mm lagophthalmos without corneal exposure (Fig. 4).

4. Conclusion

The recognition and treatment of malignant eyelid tumors pose a challenge to even experienced ophthalmologists. Adequate initial tumor excision confirmed with negative frozen section and the use of individualized reconstructive procedures are important. For one-step reconstructive surgery in a large full-thickness eyelid defect, anterior lamellar should be repaired with flap and posterior lamella is suggested to be reconstructed by graft. Lateral tightening of the eyelid onto the periosteum is imperative to make a stable fixation, hence, the complications can be prevented. Patients' follow-up within five years is required to acknowledge the prognosis, enabling satisfactory outcomes for both the patient and the surgeon.

Ethical approval

This is a case report and there is no need for ethical committee approval. Nevertheless, informed consent is taken from patient.

Sources of funding

The authors declared that this study has received no financial support.

Author contributions

Yunia Irawati: study concept, data collection, data analysis, writing paper, final approval. Carennia Paramita: data collection, data analysis, writing paper, final approval. Hisar Daniel: data collection, data analysis, writing paper, final approval.



Fig. 4. Healed results one year postoperatively. Patient was advised to apply lubrication, eye ointment and lid tapping during sleep regularly.

Registration of research studies

N/A.

Guarantor

The Guarantor of this study is Yunia Irawati.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Declaration of competing interest

Authors of this article have no conflict or competing interests. All of the authors approved the final version of the manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.amsu.2021.102987>.

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