CASE REPORT

Lower eyelid reconstruction following a traumatic full thickness loss

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SUMMARY

Eyelid reconstruction is complex and challenging since it is not only for structural and functional restoration, but also for an acceptable aesthetic result. In full thickness eyelid injuries, it will involve both anterior and posterior lamella. Therefore, when reconstructing the defect, it requires at least two layers; one will be a flap with blood supply, and the other can be a free graft. In this case, a rotational advancement cheek flap and composite graft were used to reconstruct the lower eyelid.

KEY WORDS:
Lower eyelid, chondromucosal graft, cheek rotational advancement flap

INTRODUCTION

The face, being the most exposed part of the body, is vulnerable to traumatic injuries in roughly 50-70% of individuals who have sustained road casualties. Eyelid lacerations may include the lid margin, extramarginal or tissue loss. It may be accompanied with orbital rim or wall fractures. The verification of visual functions is crucial so as to prevent visual loss.[1]

CASE REPORT

A 24-year-old gentleman was involved in a motorbike accident. He sustained an extensive wound over the right cheek, with full thickness lower right eyelid loss, exposing the orbicularis oculi muscle. The medial and lateral canthus with the lacrimal punctum were intact. Clinically, there were no facial bone fractures. There were neither eye ball injuries nor diplopia.

OPERATIVE TECHNIQUE

A rotational advancement cheek flap was used as a wound coverage (anterior lamella), along with a nasal chondromucosal graft to replace the posterior lamella (tarsal plate and conjunctiva).

The nasal septal chondromucosal graft was harvested from the left nasal septum. The incision was made at the base of the left nasal alar. A caudal and dorsal strut of 1 cm was preserved. The cartilage was trimmed with the height of 5mm to replace the lost tarsal plate, and the mucosal layer was left to be larger than the cartilage so that it could form the eyelid margin and conjunctiva (Fig. 1D). The nasal chondromucosal graft was medially anchored to the remnant of the tarsal plate, and the periosteal of the lateral orbital wall was laterally placed with prolene 5/0. The mucosal graft was anchored distally to the remnant of the conjunctiva with vicryl 7/0, and was proximally folded over to be sutured with the skin flap (Fig. 1 E, F).

The rotational advancement cheek flap was raised at the superficial muscular aponeurotic system (SMAS) plane, with the incision made laterally to the defect; extending to the lateral canthal with an upward curve (Fig. 1C). It continued along the preauricular incision line with a back cut at the lateral extension of the flap behind the ear lobe. It was superiorly advanced and then rotated to cover the defect. The dermal layers were sutured with vicryl 5/0, while the skin was sutured with dafilon 6/0. A penrose drain was inserted below the flap to ensure that no collection or hematoma formation occurs, which will reduce the take of the composite graft.

Postoperatively, the patient was able to close his eyes completely and has mild ectropion after 6 months. There was no worsening of ectropion after a year of follow up.

DISCUSSION

Eyelids protect the globe from local injury, regulate light that reaches the eye, maintain the tear film over the cornea during blinking and allows tears to flow by their pumping action on the conjunctival and lacrimal sacs. The upper eyelid plays a role in mobility and, therefore, required reconstruction with lightweight and pliable tissue; while the lower eyelid is for stability.[1]

Options for the reconstruction of full thickness eyelid injuries depend on whether the upper or lower eyelids are involved, the depth and the size of the defect. In full thickness lower eyelid injuries, it will involve both anterior and posterior lamella. Reconstruction for large defect of the anterior lamella of the lower eyelid can be done in one or two-stage procedure. In a one-stage procedure, choices of flap are semicircular rotation (Tenzel) flap or rotation-advancement (Mustarde) flap, while in a two-stage procedure, musculocutaneous of the upper eyelid (Tripier) flap or temporal transpositional (Fricke) flap can be used.[1, 2]

Complications such as ectropion, entropion and poor permanent lid support may arise if the reconstructed area of

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Fig. 1: Operative techniques: (A, B): Extensive wound over the right cheek with full thickness lower right eyelid loss. (C): Outline of the cheek rotational and advancement flap. (D): Nasal septal chondromucosal graft. Cartilage layer (above) and mucosa layer (below). (E, F): Harvested chondromucosal graft (marked by) inset at defect.

Fig. 2: Lower eyelid reconstruction: (A, B): pre-operative and (C, D, E): 6 months post-operative.

large defects do not have adequate support.(2) Therefore, posterior lamella plays an important role in the lower eyelid reconstruction as it will provide a firm support for the newly constructed anterior lamella and restore a soft lining to reduce friction with the globe. It may be a transposition flap with blood supply for example sliding tarsoconjunctival flap from the upper eyelid or free grafts such as ear cartilage graft from the scaphoid area, septal chondromucosal graft from the nasal septum or hard palate mucosal graft.[1] Nonvascularized grafts should be used with a vascularized flap to enhance their survival.

Anterior lamella reconstruction, in this case, was a combination of cheek rotational skin flap and advancement skin flap due to extensive loss of the lower eyelid and the upper part of the cheek. Advantages of this flap are: 1) It can provide sufficient soft tissue to cover the entire defect while sparing the upper eyelid as a donor site 2) The incision scar can be hidden following the borders of the cheek topographic unit 3) It has similar skin colour and texture as it is from the adjacent skin. Elevation of the cheek flap deep into the orbicularis oculi and superficial musculoaponeurotic systems (SMAS) will improve the random blood supply to the flap and provide a good vascularized bed for the posterior lamella graft. The incision made extending to the lateral canthal with an upward curve was to prevent ectropion which may be caused by scar contraction and the weight of the flap. Lateral canthoplasty is recommended in cheek rotational and advancement flaps to reduce the risk of lower lid malposition, and to avoid postoperative lid retraction.[1]

If the defect is very large, the flap can be extended to the deep plane cervicofascial flap (DPCFF). The DPCFF is a musculo-fascio-cutaneous flap which includes the SMAS, as well as, an axial blood supply.[3] DPCFF possesses enhanced advantages over the conventional cheek advancement-rotation flap as the latter has a random blood supply and, therefore, may require a wider pedicle to maintain its vascularity.

Posterior lamellar reconstruction is necessary in order to restore the inner lining so as to reduce friction with the globe, as well as, to support the eyelids. Septal chondromucosal graft from the nasal septum is a composite graft consisting of the nasal cartilage and mucosa.[2] It replaces both the tarsal plate and conjunctiva. The height of the graft forms the lower fornix and the width should be adequate to maintain the actual length of the eyelid. A caudal and dorsal strut of 1 cm is preserved for adequate nasal support. Some minor modifications were done where the cartilage was trimmed to replace the lost tarsal plate, and the mucosal layer was left to

be larger than the cartilage so that it may form the eyelid margin and conjunctiva.1 This composite flap provides both firm support and softer lining with less corneal irritation in the absence of a keratinised surface while its donor site is hidden.

CONCLUSION

Eyelid reconstruction is challenging as it must restore the complex eyelid anatomy; recreating a natural aesthetic appearance. The best treatment options in eyelid reconstruction depend on the location, size and anatomy of the eyelid involved, as well as, the shape of the defect.

COMPLIANCE WITH ETHICAL STANDARDS

Conflict of Interest: Weng Jun, Tang and Arman Zaharil Mat Saad declared that they have no conflict of interest.

Ethical approval: This article does not contain any studies with human participants performed by any of the authors. It is a case report reported retrospectively.

Informed consent was obtained from this individual participant included in the study.

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