

Outcome of Loco-regional flap technique for reconstruction of periocular defects in lid malignancy and trauma

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Introduction

Reconstruction of eyelid is always a challenging issue. Particularly when the defect size is large (more than 50%) and associated with periocular tissue loss. There are several requirements for an eyelid reconstruction to be considered "aesthetic." Both lids have to be in proper position, with normal palpebral fissure width and height. The eyelid margin should be distinct from the preseptal segment. Tissues must be thin to blend seamlessly with local skin. Finally, the canthal angles must be sharp and crisp¹. Sometimes upper and lower both lids need to be reconstructed. That is the most critical issue. Surgeon should be aware of ocular healthy environment, that should not be compromised. Corneal transparency and tear distribution should not be hampered. Lagophthalmos is a big problem. If bells phenomenon is good to cover night time, a little amount of lagophthalmos may be allowed with ocular lubricants. Age, location and amount of defect are the main factors before definite procedure. Conjunctival surface and corneal epithelium should be moist by undisturbed tear film. Sometimes conjunctival reflection may used to cover little portion of newly formed reconstructed surface. If it is inadequate then mucous membrane graft or amniotic membrane may be considered. Usually full thickness skin graft is insufficient to cover function of both

lamella when it is removed or lost after trauma. In this situation flap technique is very effective. In ophthalmic plastic and reconstructive procedure local and regional flap is used. Proper cosmesis is always a vital issue. Donor site morbidity should be minimal.

Materials and Methods

The prospective interventional study was conducted in the Orbit & Oculoplasty department of Lions Eye Institute and Hospital, Agargoan, Dhaka, during the period from 01.07.2022 to 30.06.2023. Total 16 patients with variable degree of large periocular defect (post surgical and post traumatic) was taken for this study. All patients underwent reconstructive surgery under general anaesthesia. Lid and peri-ocular defect repaired with skin graft was not taken for this study. Small defect closure, surface repair with direct closure were not enrolled. Two and more flaps and composite graft with several flaps are included. Inclusion criteria were large(>50%) lid and periocular defect which was not recoverable with one surgical technique. Exclusion criteria were small defect, one lamellar defect, only surface repair, direct closure. All the study subjects were informed about the study, were confirmed about the privacy and taken consent about the study and digital photography.

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Results

The patients of this study were between 10 to 75 years and the mean age was 51.63(SD±22.65). Male female ratio was 2 : 3. Total 16 patients underwent lid reconstructive surgery, among those 12 patients came with extensive lid neoplasm and 4 patients came with lid trauma with tissue loss. All patients were operated by multiple loco regional flap techniques without any free skin graft. Among these - Rhomboid flap, Advancement flap, Tail flap, Tenzel and Reverse Tenzel flap, Cutler beard, Composite flap techniques were performed. 1 year close follow-up was taken with digital photograph.

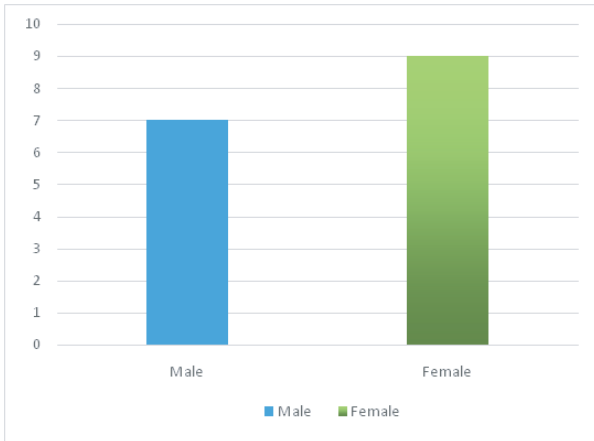


Chart 1 - Gender distribution

Table - 1 : Aetiology for lid reconstruction .

Aetiology	Number	Percentage
MGC	5	31%
BCC	3	20%
SCC	2	12%
Vascular Malformation	2	12%
Trauma	4	25%

Table - 2 : Description of Flaps .

Flap	Number of cases
Advancement Flap	4
Tail Flap	2
Tenzel Flap	3
Cutler Beard	4
Mustarde Cheek Rotation Flap	2
Forehead Flap	1
O - T Advancement Flap	1
Glabellar Flap	2

(* Multiple flaps are used in same patients , so total number of application is not identical of total number of patients)



Figure - 1-a Figure - 1-b Figure - 1-c

Figure 1 showing an elderly patient with extensive BCC involving total upper eyelid, more than half of the brow with part of the forehead (1-a), was reconstructed by O- T flap with forehead & composite flap (1-b). Outcome after few months (1 -c).



Figure - 2-a Figure - 2-b Figure - 2-c

An Extensive Ulcerated BCC involving upper part of cheek with lower lid and medial site of medial canthus (2-a) which was reconstructed by Mustarde cheek rotational flap, glabellar flap and modified Mc Gregor flap (2-b), Outcome after several months (2-c).



Figure - 3-a Figure - 3-b Figure - 3-c

An Extensive Ulcerated growth (BCC) involved total lower lid with part of upper lid and upper part of the cheek (3-a) was reconstructed by Forehead flap with cheek rotational flap and with Mc- Gregor flap (3-b). Final outcome after 1 month (3-c).

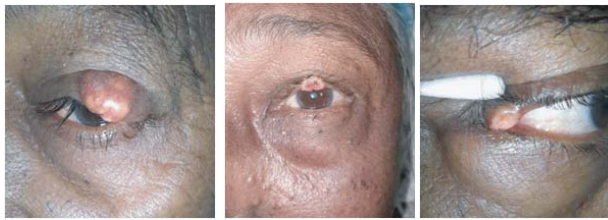


Figure 4 - a Figure - 4-b Figure - 4-c

3 patients with Meibomian gland carcinoma was operated by (4-a) Reverse Tenzel, (4-b) Cutler beard , (4-c)Tail Flap technique



Figure - 6-a Figure - 6-b Figure - 6-c

Post operative photograph after successful removal of tumour and lid reconstruction.

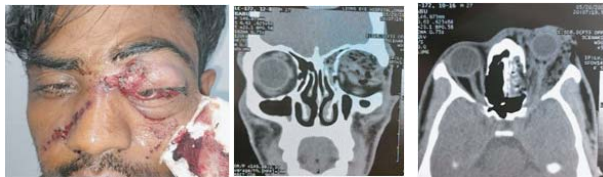


Figure - 7-a Figure - 7-b Figure - 7-c

Industrial chemical burst injury causing orbital trauma of a young patient, subsequent development of orbital emphysema and retained foreign body(metal piece with grease oil), with marked loss of upper lid, medial canthus, part of root of the nose. He was operated by several settings of orbitotomy to remove retained chemical agent and regular dressing. But eventually developed scar and contracture due to severe inflammation and thus formed a large wound gap. That was reconstructed by Composite flap technique.



Figure - 8-a Figure - 8-b Figure - 8-c

This vigorous trauma and severe inflammation had caused superior division of 3rd nerve palsy also. That results defective up gaze movement and ptosis . Ptosis cannot be corrected due to absence of Bells Phenomenon .



Figure - 9-a Figure - 9-b Figure - 9-c

A patient with dog bite with marked loss of upper lid was reconstructed by Orbicularis oculi sandwich technique with local advancement flap . Surgery was done 18 days after trauma due to delaying in systemic management of dog bite in General hospital .

Discussion

Attention to reconstructive goals of every subunit is important to optimize outcomes.^{1,2} Lower eyelid has 3 subunits: pretarsal, preseptal, and lid–cheek junction. Reconstruction relies on restoring structural support to prevent postoperative malposition. A study showed that in addition to size and width of the defect, the missing vertical subunit(s) plays an important role in predicting functional and cosmetic outcomes.³

Lid Reconstruction follows mathematical formulation and geometry. When primary defect is less than 1/3rd direct closure with canthotomy and cantholysis is sufficient. Defects between 25% and 50% of the lid margin can typically be closed with a Tenzel semicircular flap in combination with cantholysis⁸. But other options are- for more than 1/3rd to less than 2/3rd defect, other than Tenzel and Reverse Tenzel, Mc gregor flaps, Tail flap or triangular flap are used . More than 2/3rd lid is reconstructed by Cutler beard for upper lid and Hughes for lower lid, and also mustrades cheek rotational flap is used. Marked loss of medial site of lid with canthus is reconstructed by glabellar flap and forehead flap, where lateral part of lid with peri-ocular tissue loss is reconstructed by

forehead flap where lateral canthus is reconstructed by peri-osteal flap with various techniques. Actually total lid defect or more than lid with peri-ocular structure was reconstructed by composite flap techniques. These defects in isolation are at low risk for eyelid malposition. For isolated anterior lamellar defects, if the defect is small and the patient has preexisting skin or skin–muscle laxity in the lower lid, a blepharoplasty flap is ideal⁶. The surrounding tissues are undermined in a subcutaneous or suborbicularis plane and closed. Great care must be taken to avoid tension; only excess tissue that is readily apparent should be mobilized. For other wounds, full-thickness grafts can have good aesthetic results.⁷

Limitation and Recommendation

Some post and per operative complications were noticed during application of technique. Bleeding, excessive traction in flap tissue, massive dog ear formation, scarring, Corneal irritations by suture materials, persistent epiphora, loss of tear fluid due to lacrimal duct injury, unpredictable cosmetic outcome, patients poor satisfaction were noted. So proper knowledge and help from other discipline are needed for fruitful outcome.

Conclusion

Before lid reconstruction proper knowledge about anatomy and physiology of eyelid and peri-ocular structure should be achieved. Not only cosmesis but also post operative complications should be properly managed. Specially post-operative dry eye syndrome and ocular irritation by misdirected

lash or suture materials should be checked repeatedly. So local or regional flap technique for lid reconstruction is very effective after trauma or surgical removal of tumour.

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