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Original Article

Cicatricial ectropion: repair with myocutaneous flaps and canthopexy

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ABSTRACT

Background: To evaluate the effectiveness of myocutaneous upper eyelid flaps combined with canthopexy to treat cicatricial lower eyelid ectropion.

Methods: A prospective non-comparative case series undertaken in a private practice setting. Consecutive patients with moderate lower eyelid cicatricial ectropion and upper eyelid dermatochalasis underwent transfer of a bipedicle or monopedicle flap from the upper eyelid combined with canthopexy. The main outcome measures included the occurrence of complications, eyelid position and cosmesis.

Results: Sixty-two consecutive cases of cicatricial ectropion repair using myocutaneous flaps and canthopexy. After a mean follow up of 20 months, 58 (93.5%) of the cases had the lower lid punctum facing posterosuperior into the tear lake, showed lid globe apposition and satisfactory eyelid position. There was mild recurrence of cicatricial ectropion in four patients (6.5%). There were no cases of graft failure or granuloma formation.

Conclusion: The use of a myocutaneous flap from the upper eyelid combined with a canthopexy suspension suture for repair of cicatricial ectropion may offer good eyelid position and function. This technique has the advantage of avoiding full thickness blepharotomy and was associated with a low incidence of early recurrence.

Key words: ectropion, eyelid, myocutaneous flap.

INTRODUCTION

Foreshortening or lack of tissue in the anterior lamella of the eyelid is common to all cases of cicatricial ectropion. Treating patients with mild cicatricial ectropion by a lower eyelid tightening procedure that does not sacrifice lid tissue can yield acceptable results.[1,2] However, more severe cases of cicatricial ectropion require lengthening of the anterior lamella of the lower lid, usually by skin grafting or local flaps.[3] The most commonly used procedure involves full thickness canthotomy, requiring lateral canthal reconstruction by way of tarsal strips and lateral canthal tendon repair,[4] in combination with full thickness skin grafting.

In 1885 Landolt first described and illustrated the transfer of an upper eyelid bipedicle flap into the lower lid to repair various lower eyelid defects.[5] Several authors have advocated the use of these flaps in combination with lid shortening procedures, such as wedge resections, to treat cicatricial ectropion.[6–8]

Wedge resections and canthotomy however, have potential disadvantages including lid notching, punctal displacement and distortion of the canthal angle. This study reports on the unique combination of bipedicle and monopedicle myocutaneous flaps with canthopexy to treat cicatricial ectropion. This technique may provide an effective alternate surgical technique while avoiding potential disadvantages of full thickness blepharotomy.

METHODS

A prospective study was undertaken involving 62 consecutive cases of moderate cicatricial ectropion repair in the clinical practice of one surgeon from January 2000 to July 2002. This included 51 patients in whom unilateral procedures were undertaken in 40 cases and bilateral procedures in 11 cases. Of the 51 patients 32 were male and 19 were female with an overall mean age of 68 years (range 47–91). Fifty-six cases were considered actinic and the remaining six cases were in the context of previous facial surgery. Each patient underwent repair using the technique detailed in this paper which involves a myocutaneous flap combined with canthopexy. Informed consent was obtained from each patient for inclusion into the study.

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Cicatricial ectropion was considered to be present if the lid margin was being pulled away from the globe by a shortage of anterior lamella tissue. The cicatricial ectropion was classified as moderate if horizontal distraction of the eyelid alone could not reverse the ectropion and excess skin from the cheek was required to be pushed over the inferior orbital margin in order to relieve the lower eyelid ectropion. Patients were assessed as having predominantly medial, lateral or generalized ectropion.

Preoperative assessment of these patients included measurement of anterior lamella deficit and extent of dermatochalasis. Patients without sufficient upper eyelid dermatochalasis to allow for an adequate myocutaneous donor flap were excluded from the study. Distraction and lid snap back tests were used to assess the degree of horizontal lid and canthal tendon laxity. Punctal position and patency by lacrimal syringing were recorded.

The main outcome measures of this study included eyelid position, cosmesis and the occurrence of intraoperative or postoperative complications. Cosmesis was assessed by the surgeon at 3 months and eyelid position was considered satisfactory if the lower eyelid was less than 2 mm below the inferior limbus and was apposed to the globe with no accompanying lagophthalmos. Specific postoperative complications recorded were recurrence of ectropion, displaced punctal position, limited vascularity and granuloma formation.

Each patient was reviewed postoperatively by the surgeon at 1 week, 1 month, 3 months and annually thereafter until stability was noted.

Surgical technique

The surgical techniques used in this study varied according to whether the ectropion was predominantly medial, lateral or generalized. All procedures were performed under local anaesthetic and sedation; lignocaine 1% with adrenaline 1:100 000 was injected into both upper and lower lids after appropriate measurements and markings were made.

In generalized ectropion the incision line is marked 2 mm below the lash line for the entire length of the lower eyelid, curving up above the canthal ligaments medially and laterally to meet a similar marking along the lid crease. Using forceps and callipers the excess skin in the upper eyelid is then pinched at the skin crease to determine the extent of the myocutaneous tissue that can be removed in the form of a flap while preserving upper eyelid function. The upper border of the flap is determined in this fashion and marked parallel to the markings in the skin crease of the upper eyelid creating the outline of a bipedicle flap. For a bipedicle flap to be utilized, the amount of redundancy in the upper eyelid should correspond to the defect in the lower lid when measured. The first incision is along the mark of the lower eyelid and the skin is then undermined to the cheek to ensure that all cicatricial bands are free and no tension exists on the lower eyelid. The resulting defect in the anterior lamella of the lower lid is measured with the lower eyelid on upward traction to ensure that it is slightly smaller than the flap marked out in the upper eyelid previously. Incisions are made in the upper eyelid markings and a bipedicle flap dissected incorporating orbicularis muscle and overlying dermatochalasis. Lateral and medial canthal support is achieved by suturing the edge of the lower tarsus to the periosteum of the corresponding orbital margin with 5/0 polydioxanone sulphate suture, thereby avoiding a full thickness horizontal shortening procedure. The lacrimal canaliculus is avoided during the placement of medial canthopexy sutures by following a subconjunctival passage from the medial tarsus to the periosteum in the region of the posterior lacrimal crest. It is important to not to establish excessive canthopexy suture tension in order to avoid a concertina-effect on the lacrimal apparatus. The bipedicle flap is then rotated into the lower eyelid defect and sutured into place with 6/0 sutures (Polyglactin 910 or silk) and the upper eyelid defect is similarly sutured closed.

For predominantly medial and lateral ectropion a similar technique is used however, the markings and incisions are confined to the area of the lid affected and the myocutaneous flap is mobilized to form an acute angle Z-plasty. A canthopexy is performed as described above before the flap is sutured into place. If more than two-thirds of the lower eyelid is involved then the bipedicle flap technique is used. Figures 1–5 depict the main steps of this technique as used in lateral ectropion repair.

Additionally routine posterior retractor plication was used as an adjuctive procedure to improve punctal position.

RESULTS

All 62 cases had sufficient upper eyelid dermatochalasis to allow for an adequate myocutaneous donor flap. All available follow-up data were used and the mean follow up was 20 months (range 18–36 months). No patients were excluded from this study or lost to follow up. Forty-one (66.1%) cases underwent lateral, 15 (24.2%) medial and six (9.7%) bipedicle myocutaneous flaps with canthopexy.

Complications

No significant intraoperative complications were encountered using this technique. After a mean follow up of 20 months there was mild recurrence of cicatricial ectropion in four patients (6.5%). Fifty-eight (93.5%) of the patients had their lower lid punctum facing posterosuperior into the tear lake.

Fifty-four patients (87.1%) had subjective improvement in epiphora 1 month postoperatively. Of the remaining eight patients, five (8.1%) suffered from concurrent nasolacrimal duct obstruction.

There were no cases of graft failure or granuloma formation.

Figure 1. Prior to a left-sided ectropion repair this patient demonstrates predominantly lateral cicatricial ectropion and dermatochalasis.

Figure 2. Markings are made 2 mm below eyelashes on lower lid and along the lid crease of the upper lid. Using forceps and callipers to determine available excess tissue the upper border of the flap is determined and marked.

Figure 3. The flap in the upper eyelid is oversized by about 10% and freed to rotate into the defect in the lower lid. Routine posterior retractor plication improves punctal position.

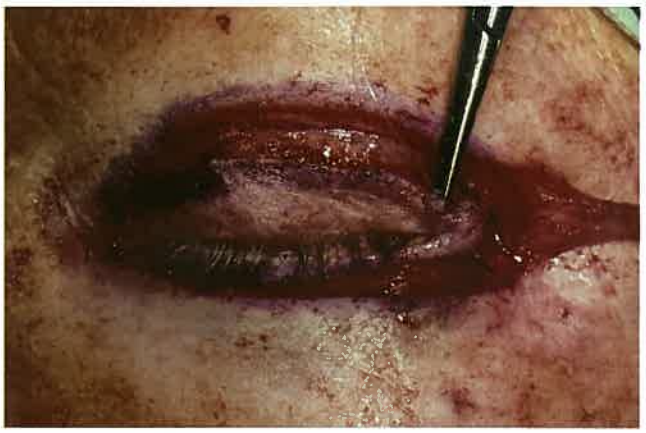

Figure 4. A lateral canthopexy suture is placed with 5/0 polydioxanone.

Figure 5. After rotating the myocutaneous flap into the lower lid defect the skin is closed with continuous 6/0 polyglactin 910 or silk sutures.

Figure 6. Appearance 12 months after a left-sided ectropion repair demonstrates good lid position, punctal position and cosmesis.

Cosmesis

All patients showed a good match of flap colour and contour to the lower eyelid tissue. One month postoperative lid position remained affected by mild oedema in 22 cases (43.1%). However, by 3 months postoperatively and after the mean follow-up period 58 cases (93.5%) showed lid globe apposition and eyelid position within 2 mm of limbus with no lagophthalmos.

Discussion

The use of a flap from the upper eyelid for repair of lower eyelid cicatricial ectropion has been previously described by many authors.[6,8,9] O'Donnell and Anderson *et al.* have used skin only monopedicle flaps rotated from medial or lateral upper eyelids to lower eyelids.[10,11] O'Donnell combined this with canthoplasty, horizontal eyelid shortening and inferior retractor repair.[11] Siegel *et al.* reported the use of an island of skin on a bipedicle muscular flap from the upper lid with no horizontal lid shortening procedures.[12] Leone and Levin combined lateral canthotomy with lateral or bipedicle myocutaneous flaps from the upper eyelid whereas Hurwitz *et al.* combined monopedicle myocutaneous flaps with wedge resection of the lower eyelid.[6,7,9] Anderson and Weinstein described a procedure involving a full thickness bipedicle eyelid flap rotated downward to totally reconstruct a full thickness lower eyelid defect.[13] All forms of wedge resection and canthotomy share certain disadvantages including the potential for lid notching, lateral displacement of the punctum, sacrifice of tear producing structures, phimosis of the lid and distortion of the lateral canthal angle. The procedure described in this study differs from previous reports of cicatricial ectropion repair in that there is no sacrifice of lower eyelid tissue or lateral displacement of eyelid structures owing to the use of a canthopexy suture to correct horizontal laxity. Although the benefits of a myocutaneous flap have been long recognized, to our knowledge its use in combination with canthopexy have not previously been reported.

No significant intraoperative complications were encountered with the use of this surgical technique. Postoperatively, the incidence of displaced punctal position was low with 93.5% of puncta facing posterosuperiorly into the tear lake. We suggest the relatively low incidence of displaced puncta is because the punctum is not pulled laterally as in other lid shortening procedures such as wedge resection.[8,12] Additionally lateral lid shortening may fail to invert the eyelid and punctum if the ectropion is mainly medial whereas the myocutaneous flap's rotatory force aids punctal position.[10]

In this series there were no cases of flap failure. This is consistent with the established survival advantage of myocutaneous flaps over skin grafts owing largely to the provision of blood supply via perforator musculocutaneous branches to a subdermal plexus.[7,9,14] Bipedicle myocutaneous flaps in particular are likely to ensure adequate blood supply in elderly patients who may have some degree of vasculopathy and thereby may increase the chance of flap survival.[6]

Mild recurrence of the cicatricial ectropion occurred in 6.5% of patients. A low rate of recurrence may be partially related to the less than 10% tissue shrinkage associated with myocutaneous flaps as compared with the 20–30% that may be expected with skin grafts.[7–9,12,14]

Canthopexy provides initial additional support to the myocutaneous flap while avoiding a lateral canthotomy and lateral strip procedure. The use of polydioxanone sutures which are absorbable (6 months) allows good healing while potentially decreasing the granuloma formation sometimes seen with permanent sutures. After a mean follow up of 20 months no cases of postoperative granuloma formation were noted in this case series.

We found the myocutaneous flaps provided good cosmesis in the majority of patients (Fig. 6). They maintain their original colour and texture after transfer, and owing to their local origin they best match the eyelid.[8,14] The subcutaneous layer maintains surface contour which prevents the possible shrunken appearance associated with skin grafts.[8,14] Additionally, adherence to bony structures and the slight bulk of myocutaneous flaps are more in keeping with the ageing facial features of the patient.[8,14]

It is postulated that this method may use less tissue from the upper lid as compared with the equivalent skin graft as there is less contraction in myocutaneous flaps postoperatively.[12] Additionally as the flaps follow relaxed skin tension lines the scars generally heal to be inconspicous.[8,14]

The mechanical effect of the bipedicle myocutaneous flap has the functional advantage of forming a sling supported by the upper lid. Postoperative contraction forces in the flap have an inward and upward propensity that tends to enhance and maintain the result. These forces help to push the lower lid posteriorly,[10] counteracting the downward and outward effect of the ectropion.[7,8,12] The passive sling support is further aided by active orbicularis muscle providing dynamic mechanical support.[8] Siegel and Mustarde propose that the root cause in nearly every case of severe ectropion is impotence of the pretarsal orbicularis muscle and propose dynamic muscular support is required to maintain good lid

position.[12,15] Tripier sought to preserve as much nerve supply to the transposed muscle as possible with the expectation that it would decrease recurrence from stretching forces.[16] Siegel's electromyographic studies show denervation of orbicularis in a transposed flap 3 weeks postoperatively with normal electromyography in the same muscle after 6 months.[12] The reinnervation in these flaps needs further investigation but we anticipate functioning orbicularis muscle aids to decrease the chance of recurrence.

Within the limitation of a non-comparative case series, this study demonstrates promising results with the use of an alternate surgical technique. However, one constraint with this technique is that the degree of ectropion repaired is dependent on the amount of upper lid redundancy.[6] Additionally, unilateral procedures may not be as cosmetically acceptable as a bilateral procedure as these may result in an asymmetric unilateral blepharoplasty. Finally, with monopedicle flaps one should always consider the length to width ratio; if this exceeds 4:1 the flap may receive inadequate blood supply.[17] The generous vascularity of periocular tissues however, may provide an extra degree of safety.[6]

We suggest that this procedure provides excellent results in patients with moderate cicatricial ectropion with accompanying upper eyelid dermatochalasis and horizontal lid laxity. With the potential advantages of avoiding full thickness blepharotomy and having demonstrated a low incidence of recurrence, it provides surgeons with an alternative to already available techniques.

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