Surgical Treatment of Lagophthalmos in Long-Standing Facial Palsy: Ear Cartilage Graft for Elongating the Levator Palpebrae Muscle

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Abstract

Lagophthalmos is a major problem facing any patient with long-standing facial palsy. Unopposed action of the levator palpebrae opposing orbicularis oculi paralysis gives an unnatural, wide-eyed look compared to the normal side. The resultant corneal exposure produces dryness and corneal keratitis. Many techniques have been described for correcting lagophthalmos in long-standing facial palsy.

The aim of this report is to present some clinical experience using the ear cartilage graft for surgical treatment of lagophthalmos in facial palsy. The graft is sutured between the tarsal plate and the levator palpebrae superioris. The graft provides elongation of the levator muscle and also decreases its strength, since there is no opposing orbicularis oculi muscle. This technique offers a better dynamic, aesthetic and functional results, improving significantly the eye symptoms in cases of long-standing paralytic lagophthalmos. Some technical refinements will be described in this paper to avoid postoperative ptosis and to decrease the residual lagophthalmos.

Key words: Lagophthalmos, Facial Palsy, Ear Cartilage Graft.

Introduction

Dryness, corneal keratitis, and continuous conjunctival irritation are disturbing consequences of facial paralysis with lagophthalmos. Cross-facial nerve grafts have become the treatment of choice for establishing the facial nerve stimulus in order to recover function of the facial muscles including the orbicularis oculi muscle. However, patients with a long-standing facial palsy are not candidates for cross-facial nerve grafts because this muscle is usually atrophic.

Artificial tears and topical ointments, as well as protective lenses have been utilised as palliative measures for long-standing paralytic lagophthalmos.

Several techniques to correct the lagophthalmos and the interpalpebral fissure have been described. Lateral tarsorrhaphies, canthoplasties, canthopexies, and autologous grafts in the lower eyelid have been reported. Auricular cartilage has been used to correct the paralysed lower eyelid. The cartilage provides a static not a dynamic correction. Other procedures include the application of lid magnets, silicone slings fixed to both canthal ligaments or wires that work as springs. Metals such as stainless steel, tantalium and gold, have been used to ameliorate the functional loss of the upper eyelid. Temporal muscle-fascia transposition used as a circumorbital sling and motor unit, have been also considered as an early treatment to provide dynamic correction of the eyelids.

Recently, an ear cartilage graft was sutured between the tarsal plate and the levator palpebrae superioris aponeurosis had been described by Inigo et al. The graft provides elongation of the levator muscle and also decreases its strength.
The aim of this report is to present the clinical experience in 10 patients using the ear cartilage graft for surgical treatment of lagophthalmos in long-standing facial palsy. The symptoms of paralytic lagophthalmos improved significantly in all patients. Critical points to avoid post-operative ptosis and to decrease the residual lagophthalmos are evaluated.

Patients and Methods

Ten patients were included in this work. They are 8 females and 2 males. Their ages ranged from 20 to 40 years. All patients had long-standing facial paralysis of at least 5 years duration without any previous surgical procedure for correcting this condition. All patients had an acquired facial palsy (Bell’s palsy). All patients had lagophthalmos of 5 to 6 mm in vertical length during attempted active approximation of the eyelids. Complete denervation of the orbicularis oculi muscle was demonstrated by electromyography in all patients.

Surgical Technique

An incision was made at the supratarsal fold of the upper eyelid. All planes were dissected and the insertions of the levator palpebrae and Muller’s muscles into the tarsal plate were identified (Fig. 1). The insertions of these muscles were dissected off the tarsal plate (Fig. 2). The conjunctiva was completely exposed and left intact. An auricular conchal cartilage graft taken with the same length as the tarsal plate and a maximum width of 4 mm for each millimeter of palpebral closure to be achieved (usually a width of 8 - 12 mm) for reducing the palpebral fissure by 2 - 3 mm. The cartilage graft was attached carefully inferiorly to the superior edge of the tarsal plate and superiorly to the levator palpebrae aponeurosis and Muller’s muscle to avoid a ptotic eyelid (Fig. 2). 5/0 non-absorbable sutures were used. The skin incision was closed with 6/0 non-absorbable sutures.

Results

The follow-up period ranged from 6 to 12 months. A reduction of the palpebral fissure was achieved in all cases. All patients had 1 to 2.5 mm residual lagophthalmos with significant improvement of the eye symptoms and non of them need further lengthening of the cartilage graft. One mm or less asymmetry of the vertical height of eyelids was observed in all patients. This asymmetry is accepted functionally and aesthetically and non of the patients developed ptosis that needs further correction. Three clinical cases illustrate the results of the technique case 1, (Fig. 3) Case II, (Fig. 4) and Case III (Fig. 5).

Fig. (1): Identification of the levator palpebrae superioris muscle.

Fig. (2): The levator palpebrae superioris and Muller’s muscles are detached from the tarsal plate and auricular cartilage graft is sutured inbetween.
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Case I: Fig. (3a, b): Preoperative view of 28 year-old female with longstanding facial palsy with secondary lagophthalmos.

Case I: Fig. (3c, d): Postoperative view after surgical amelioration of the lagophthalmos with an auricular cartilage graft.

Case II: Fig. (4a, b): Preoperative view of 25 year-old female with longstanding facial palsy with lagophthalmos.

Case II: Fig. (4c, d): Postoperative view with asymptomatic minimal residual lagophthalmos.

Case III: Fig. (5a, b): Pre-operative view of 40 year-old female with longstanding facial palsy with secondary lagophthalmos.
Discussion

Operations to improve the deformity of seventh nerve palsy can involve static, mechanical or dynamic techniques. Since the mechanical problem is not corrected, non surgical methods for treating paralysis of the orbicularis oculi muscle offer only palliative results. Some techniques, such as lateral tarsorrhaphy(4) and canthoplasties,(5) provide only a camouflage effect narrowing the interpalpebral fissure and reducing conjunctival exposure. A sufficiently radical lateral tarsorrhaphy, to protect the cornea, both obscures vision and is cosmetically unsatisfactory. However, it can be usefully employed in addition to other procedures(12).

Synthetic materials, such as lid magnets(7), silicone slings, wires that work as springs(8) and metals such as stainless steel, tantalium and gold, have the risk of exposure and it can be difficult to calculate the correct weight necessary to achieve appropriate results. Furthermore, they are usually visible beneath the eyelid skin(2). Ophthalmic surgeons use the sclera from donor eyes as a spacer for correcting eyelid retraction. Sclera is considered to contract more than auricular cartilage, which has been used as an alternative to correct the paralysed lower eyelid.

Temporal, muscle-fascia transposition provides a dynamic correction but can have the disadvantages of producing a slit-like closure of the palpebral fissure and involuntary closure of the eyelids during chewing(9).

The ideal method for treatment of lagophthalmos in facial palsy is to reinnervate the orbicularis oculi muscle. When this goal cannot be achieved because the patient has a long-standing facial palsy, a simple procedure of interposing a cartilage graft between the tarsal plate and the levator palpebrae aponeurosis had been described by Inigo et al(12).

They used this technique to treat 11 cases of lagophthalmos due to long-standing facial palsy. The pre-operative lagophthalmos was 5 to 6.5 mm and the residual post-operative lagophthalmos was 1 to 3 mm. They reported 2 cases of immediate post-operative ptosis corrected 2 weeks later by shortening of the vertical height of the cartilage graft. One patient had no post-operative improvement corrected 2 months later by further cartilage graft and a lateral tarsorrhaphy.

In this report, ten cases of lagophthalmos (5 to 6 mm) due to long-standing facial palsy were operated upon using the technique of Inigo et al(12). The pre-existing eye symptoms were significantly improved in all patients with residual lagophthalmos of 1 to 2.5 mm and non of the 10 patients need further cartilage graft.

All patients developed asymmetry of the vertical height of eyelids (the operated eyelid is 1 mm or less lower than the non operated eyelid). This minor a symmetry is accepted functionally and aesthetically. Non of the 10 patients developed ptosis that needs further correction. The critical points to avoid ptosis...
and to achieve accepted improvement of lagophthalmos using ear cartilage graft for elongating the levator palpebrae muscle are:

1. Complete detachment of the levator palpebrae muscle and Muller’s muscle from the tarsal plate before interposing the cartilage graft in between.

2. Meticulous reinsertion of the levator and Muller’s muscle to the cartilage graft (8 to 10 sutures).

3. Meticulous suturing of the cartilage graft to the tarsal plate (8 to 10 sutures).

4. The height of the cartilage graft is 10 to 12 mm at its center then it decrease gradually medially and laterally to be about 6 mm at both ends.

In conclusion the procedure of interposing a cartilage graft between the tarsal plate and the levator palpebrae aponeurosis offers a better dynamic, aesthetic and functional result, improving significantly the eye symptoms in cases of paralytic lagophthalmos. Following the above mentioned technical refinements will help to avoid complications especially ptosis and residual lagophthalmos.

References


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