



ORIGINAL RESEARCH PAPER

Ophthalmology

SURGICAL CORRECTION OF UNILATERAL PTOSIS WITH UNILATERAL FRONTALIS SLING- OUR EXPERIENCE OF 30 CASES

KEY WORDS:

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ABSTRACT

Purpose: To evaluate the functional and cosmetic results after frontalis sling repair for unilateral ptosis associated with poor levator function.

Methods: Preoperative and postoperative photographs and records of 30 patients who underwent unilateral frontalis sling ptosis repair were retrospectively reviewed. An eyelid crease incision was used in all cases, with suturing of the sling material directly to tarsus.

Results: Preoperative diagnosis for all patients was unilateral poor-function blepharoptosis. Underlying cause was congenital in all. There was a mean follow-up of 8 months. Three eyelids required reoperation: 1 for undercorrection, 1 for overcorrection with keratopathy, 1 for removal of an infected exposed polytetrafluoroethylene sling. No other complications were reported, except for 1 suture granuloma. Good to excellent final postoperative eyelid height was achieved in 27 patients (90%) after all surgeries and with conscious recruitment of the frontalis muscle. A large majority of patients and/or parents expressed satisfaction with the final cosmetic result and were not bothered by any asymmetric lagophthalmos in downgaze or lack of a synchronous blink.

Conclusions: Unilateral sling provides good to excellent functional and cosmetic results in unilateral poor-function ptosis.

The ideal treatment of unilateral blepharoptosis with poor or asynchronous levator muscle function has yet to be established.¹ Three approaches to the contralateral eyelid have been advocated: to leave it undisturbed,¹ to suspend it from the frontalis muscle without excising the levator muscle,² or to extirpate the levator muscle so as to create a bilateral ptosis that is then corrected through a bilateral frontalis suspension.³ Khwarg et al.⁴ favored a bilateral frontalis suspension with contralateral levator weakening as the appropriate alternative for the treatment of Marcus Gunn jaw-winking ptosis. Similarly, in a more recent report, Bowyer and Sullivan⁵ recommended bilateral levator weakening followed by frontalis suspension "to ensure a symmetrical result in primary gaze and down-gaze." However we have initially performed unilateral suspension, with the possibility of subsequent contralateral surgery if the postoperative result is judged unsatisfactory.

METHODS

The records of all patients who underwent a unilateral frontalis suspension procedure to treat unilateral ptosis from 2015 to 2018 were retrospectively re-viewed. Preoperative and postoperative photographs in primary gaze and downgaze were compared and used in conjunction with the notes in the medical records to rate the final results. In all patients, margin reflex distances (MRD1) in primary gaze with frontalis muscle at rest were less than 1 mm. Levator function measured less than 5 mm in the majority of patients.

Informed consent was obtained from all patients or parents before surgery. Patients and/or parents were advised of the various options of repairing unilateral ptosis including unilateral frontalis suspension, bilateral frontalis suspension, or bilateral suspension with contralateral levator extirpation. Unilateral frontalis suspension was recommended, but the option of subsequent suspension of the contralateral eyelid was offered in the event of unsatisfactory postoperative asymmetry.

Surgery was performed under general anesthesia for all children and local anesthesia with sedation in all adults. Five to 6 ml of a 1:1, 2% lidocaine with 1:200,000 epinephrine and 0.5% bupivacaine was injected in surgical sites. Marks for the suprabrow incisions are made at the superior border of the eyebrow above the medial and lateral canthi, and a third incision site is marked halfway between these two. An eyelid crease incision site is marked in symmetry with the contralateral upper eyelid. Cutaneous incisions are made with a No. 15 blade at the three suprabrow sites, and 6-mm

subcutaneous pockets are dissected. The eyelid crease is incised; dissection is carried through the orbicularis muscle and levator aponeurosis to expose the proximal third of the tarsus. The sling material is sutured directly to the tarsus with two 5-0 vicryl sutures. Superior traction on the ends of the sling material allows inspection of eyelid contour; the vicryl sutures are repositioned as needed. The sling material is passed deep into the orbital septum with the aid of a Wright fascia needle and brought out through the medial and lateral suprabrow incisions. The ends of the sling are reintroduced through the medial and lateral stab incisions and brought together in the submuscular plane to the central brow incision, creating a pentagonal sling. The eyelid crease incision is closed with absorbable sutures fixed to the superior tarsal border. Careful tensioning of the two ends in the central brow incision allows adjustment of eyelid height. The two ends are tied; the knot and the ends of the sling are tucked deep to frontalis muscle through the central brow incision. The brow incisions are closed with interrupted absorbable sutures¹².

Postoperative eyelid height and contour, crease symmetry, eyelid height was assessed in primary gaze without the patient consciously recruiting the frontalis muscle.

Complications of infection, exposure of sling material, granulomas, undercorrections, overcorrections, exposure keratopathy, or poor cosmesis were noted.

RESULTS

12 right upper eyelids and 18 left upper eyelids of 30 patients underwent unilateral frontalis sling procedure for the correction of unilateral ptosis. There were 20 male and 10 female patients, ranging from 4 months to 55 years of age. Three patients had previous ptosis surgery performed elsewhere. With a mean follow-up of 8 months (range, 1 week to 48 months), final eyelid height was rated good to excellent in 27 of 30 cases (90%) after all surgeries and with the active recruitment of the frontalis muscle. The contour was found to be excellent in 93% of eyelids. Contour was rated unsatisfactory if it was peaked, asymmetric to the contralateral side, or still showing a substantial degree of lash ptosis. Reoperation was required in 3 eyelids. 1 for undercorrection, 1 for overcorrection with persistent keratopathy, 1 for infected sling removal. The time to reoperation ranged from 4 days to 6 months. There were 2 cases of presumed infection, both in exposed polytetrafluoroethylene cases; one resolved with oral antibiotic therapy, whereas the other required reoperation and sling removal. There were no cases of extrusion or eyebrow

reaction. The vast majority of patients or parents were satisfied with the functional and cosmetic result of the unilateral frontalis sling procedure.



Pre and post operative photographs of operated patients.

DISCUSSION

Resection of the involved levator muscle or aponeurosis is generally the procedure of choice when attempting surgical correction of unilateral ptosis. This procedure is less successful in patients with reduced levator function.⁵ In patients with poor levator function, "supra-maximal" levator resection has shown variable results,^{6,7} and it risks problematic lagophthalmos. Consequently, frontalis suspension surgery is generally the procedure of choice when the levator muscle either has poor function or is aberrantly innervated. A successful frontalis suspension procedure relies on the patient's spontaneous recruitment of the ipsilateral frontalis muscle to achieve a full binocular visual field.

Technically, the problem with the unilateral sling is that the good eye can be opened without frontalis muscle use; thus there is little incentive for the patient to use the frontalis to elevate the ptotic eyelid. By addressing this issue, good symmetry can usually be obtained in primary position by placing the ptotic eyelid at the desired "open" position without frontalis action¹². The orbicularis oculi muscle can be forcefully used to help close the eye. The simplest frontalis suspension approach includes a unilateral silicone sling of the affected side. The beauty of this material is that it can be tightened, loosened, or removed years later through a small frontal incision.⁸ There is increasing agreement that early placement in young children appears to yield the best results, as suggested by Kersten et al.

Alternatively, Beard⁹ described the weakening of the normal levator muscle, thus creating bilateral severe ptosis. This can be treated with bilateral frontalis slings, and good upper eyelid symmetry can be achieved in all positions of gaze, although there will be equal lagophthalmos in downgaze. The biggest problem with this approach is that most patients, or families of patients, are reluctant to destroy a normal levator for the sake of cosmesis.¹⁰ Therefore, many surgeons prefer to leave the normal levator alone, yet place bilateral "tight" slings at the desired "open" level with the frontalis relaxed ("Chicken" Beard procedure).¹¹ In this way, symmetry is achieved in primary position and downgaze (the normal eyelid movement is restricted by the sling in these positions, just as the abnormal side). However, there is still asymmetry in upgaze.

Kersten et al. present an interesting series reporting excellent success with unilateral slings. Although I agree that unilateral slings can be useful, it is unclear that this work validates this point. The paper is retrospective and measures success on the basis of patient photos and chart notes, with comments such as "the patients and/or parents expressed satisfaction with the cosmetic result . . ." Further, the follow-up is limited in many of the cases (mean, less than 1 year). These issues raise concern as to the value of their "success" scoring.

We have also included cases in this series in which the ptosis had various causes, including congenital ptosis, trauma, jaw-wink, IIIrd-nerve palsies, myasthenia gravis, chronic progressive external ophthalmoplegia, and "double elevator" palsies. These all have unique characteristics that predispose to various postoperative complications, and different types of ptosis may be better handled by one suspension material or another. Patients with IIIrd-nerve palsies, myasthenia gravis, and chronic progressive external ophthalmoplegia typically have limited ocular motility, particularly in upgaze. This places these patients at increased risk of postoperative corneal exposure due to a poor Bell's phenomenon¹². Thus, these patients should have slings placed that can be adjusted if necessary.

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