Original Article

Frontalis Suspension for Unilateral Ptosis with Poor Levator Function

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Purpose: To assess the outcome and complications after frontalis suspension for unilateral ptosis with poor levator function

Material and Methods: Interventional case series of 30 eyes of 30 patients. Patients were selected on non-probability purposive basis from Oculoplasty clinic, Isra Post Graduate institute of Ophthalmology. All the patients with unilateral ptosis with poor levator function were included excluding those having poor Bell's phenomenon and associated pathology like jaw winking, 3rd nerve misdirection, squint, impaired corneal sensitivity and neoplastic lesions. Patients were diagnosed clinically on the basis of history, old photographs and clinical examination. Preoperative assessment included complete history, ocular and general examination including detailed ptosis examination with proper measurements. Informed consent was taken. Local anesthesia was used in adult patients while general anesthesia was used in children. All patients underwent unilateral frontalis suspension using polypropylene (prolene) 2/0 suture as sling material in a fox pentagon manner. Postoperatively measurements were taken at regular intervals and complications were noted and managed accordingly.

Results: 30 eyes of 30 patients were included in this study. All patients had unilateral ptosis. Age of the patients ranged from 2 years to 41 years (mean of 18.73 years). Nineteen (63.33%) patients were male while 11 (36.66%) were female. Twenty four (80%) eyes had good outcome (within 1 mm of normal), 4 (13.33%) had fair outcome (within 2 mm of normal) and 2 (6.66%) had under-correction but as the patients were satisfied cosmetically, no second procedure was attempted. Six (20%) eyes had lagophthalmos, which subsided with time without any further sequel. One (3.33%) eyes had knot failure, which was corrected by revising the sling procedure. Exposure keratitis was not noted in any patient as the lid lag was not serious or prolonged. Patients were followed for 2 years and no significant delayed failure or sling material related complication was noted.

Conclusion: Frontalis suspension is an effective procedure for the treatment of unilateral ptosis with poor levator function. Cosmetically acceptable symmetry can be achieved by addressing only the affected eye rather than operating both eyes including the normal eye. It is not associated with any serious complication. It shows promising long term results without any significant cosmetic decline.

Ptosis with poor levator function has always been challenging for an ophthalmologist or an oculoplastic surgeon. There are many options for its correction[1]. Usually, frontalis brow suspension is used for correction of ptosis with poor levator function[2]. Although other procedures like levator resection[3] alone or combined with tarsectomy[4] have also been successfully tried in this regard, however

most ophthalmologist agree on the superiority of frontalis sling for correction of ptosis with poor levator function.

Unilateral ptosis with poor levator function usually creates a dilemma for the surgeon. For long it has been advocated that the fellow normal eye must also undergo brow suspension to avoid any asymmetry. The decision of operating a normal eye is not easily accepted by the patient. In this study we performed unilateral frontalis suspension in patients having ptosis with poor levator function to assess the asymmetry in primary position.

MATERIAL AND METHODS

Thirty eyes of 30 patients were included in the study. The study was done at Oculoplasty clinic, Al-Ibrahim Eye Hospital, Isra Postgraduate Institute of Ophthalmology. Patients were included from January 2006 to December 2008. Patients were followed up for two years at regular intervals to look for subsequent complications and delayed failure. All the patients reporting at the institute for correction of unilateral congenital ptosis with poor levator function (i.e. less than 5 mm)[5] were included. Among these, some patients were excluded on the basis of having poor bell's phenomenon, Marcus Gunn jaw winking, 3rd nerve misdirection, squint, impaired corneal sensitivity and neoplastic lesions.

Patients with simple congenital ptosis were diagnosed clinically on the basis of history, old photographs and clinical signs i.e. ptosis, absence of lid crease and defective levator function.

Pre-operative assessment included a proper history including personal biodata, relevant information and an informed consent. A detailed ocular and general examination was performed with special emphasis on the lid measurements such as vertical fissure height (VFH), marginal reflex distance in primary gaze (MRD), levator function (LF) and marginal limbal distance (MLD). Associated features such as Bell's phenomena, jaw winking, corneal sensitivity status and evidence of any pre-existing inflammatory, infectious or neoplastic lesion of the eyelids was noted. Pre operative photographs were taken. All the information was recorded on a proforma.

Patients in whom procedure was done in general anesthesia, a detailed physical examination was done and relevant investigations such as complete blood count, random blood sugar and x-ray chest were done in consultation with an anesthetist.

General anesthesia was used in children under 15 years. In adults frontal block along with local infiltration along the track of the sling was sufficient. Additional sedation or analgesics were not required in any case. Sling was planned in a fox pentagon[1] design. Skin was marked at five points with gentian violet dye. Two marks were made along the lid margin, 2-3 mm superiorly near the medial and lateral extremes of the upper lid. Two brow marks were made in the upper margin of the brow, the lateral one just lateral to the lateral lid margin mark and the medial one just medial to the medial one on the lid margin. The final mark was made 10 mm superior to the brow line over the frontalis muscle in between the two brow marks. All marks were incised with 11 no. blade. 2/0 polypropylene (Prolene) suture was used as sling material. Wright's spatula needle was introduced through the incisions to drag the suture along until the two ends meet at the final incision over the frontalis muscle. Knot was tied by making sure that the lid margin stays at the level of superior limbus. 5-6 knots were tied to decrease the chances of knot unwinding. The knot was then buried deep under the frontalis muscle, by making a facial pocket, to avoid knot exposure. The upper three incisions were closed with 6/0 polypropylene suture. The lower two incisions near the lid margin were left unstitched as the close approximation of their lips by the sling rendered it unnecessary. The sling was not anchored separately to the tarsal plate. A frost suture was applied near the lower lid margin to close the lids and support the sling. Eye was closed with sterile eye pad with antibiotic eye ointment.

On the first post-operative day, frost suture was removed. Photographs were taken to record the outcome which was usually masked by some degree of lid edema. Complications were looked for, especially lagophthalmos which was relatively common but innocuous. Patients were discharged on oral NSAID's, topical lubricants and antibiotic drops for use on hourly or two hourly bases depending on the amount of lagophthalmos. Topical antibiotic ointment was prescribed for use at bedtime regularly.

Patients were followed on 1st post-operative week on which the skin sutures on the upper three incisions were removed. After that they were called on the 3rd week, then monthly for six months and then three monthly for next one and a half years. On each visit complete examination was performed to record the

MRD, amount of lid lag, any signs of exposure keratitis and delayed sling failure. Photographs were taken and examination recorded on the proforma.

RESULTS

Thirty eyes of 30 patients were included in this study. All patients had unilateral ptosis. Age of the patients ranged from 2 years to 41 years (average-18.73 years). 19 (63.33%) patients were male while 11 (36.66%) were female. Levator function ranged from 0-4 mm (average 2.7 mm) 24 (80%) eyes had good outcome (within 1 mm of normal), 4 (13.33%) had fair outcome (within 2 mm of normal) and 2 (6.66%) had under correction (table 1) but as the patients were satisfied cosmetically, no second procedure was attempted. 6 (20%) eyes had lagophthalmos, which subsided with time without any further sequel. Exposure keratitis was not noted in any patient as the lagophthalmos was not serious or prolonged. Frequent post-operative lubrication was also very important in avoiding exposure keratitis. It was usual for lagophthalmos to improve after one week as the lid edema would resolve significantly by then, but even then lubrication with ointment at bedtime was continued. 1 (3.33%) eye had knot failure (table 2), which showed up on the 1st post-operative week and was corrected by revising the sling procedure. All patients were followed up for 2 years and no significant delayed failure or sling material related complication such as extrusion, infection or granuloma formation was noted.

Table 1: Outcome of unilateral frontalis sling

Outcome	No. of Eyes n (%)
Good	24 (80)
Fair	4 (13.33)
Under corrected	2 (6.66)
Overcorrected	0 (00)

Table 2: Post-operative complications

Complication	No. of Eyes n (%)
Lid lag	06 (20)
Under correction	02 (6.66)
Overcorrection	00 (00)
Knot failure	01 (3.33)
Granuloma formation	00 (00)
Sling related infection	00 (00)
Sling exposure	00 (00)
Hypertrophied scar	00 (00)
Late failure	00 (00)

DISCUSSION

Unilateral ptosis with poor levator function has always been challenging for an oculoplastic surgeon. Bilateral frontalis brow suspension has long been advocated for attaining symmetrical result. However it's not easy to convince any patient to operate upon his normal eye. No surgical procedure is free of complications. Frontalis suspension is definitely no exception. Frontalis brow suspension in unilateral ptosis has not been frequently advocated[6,7] as it was thought to create gross asymmetry between the both eyes. However, in our study we found that in most of the cases the results are cosmetically acceptable.

The post-operative elevation with some amount of excess skin fold was invariably acceptable for the patients. Also we noted a decrease in the amount of this excess skin fold with time as the post-operative edema settled down. Few other studies have also shown promising results with unilateral slings; however most of them have studied Caucasian[8] and Oriental[9] eyes. Our study comprised of South Asian eyes which might reflect minor differences in anatomical details.

Use of fascia lata has long been advocated as sling material in frontalis suspension, as being superior in giving good results and fewer complications. However, in some circumstances the availability or harvesting of fascia lata is not possible or feasible, such as in extremes of age and cosmetic concerns. This opens the door to the option of using artificial materials for sling. Various materials have been successfully tried in this regard. These include silicon tubes[10], expanded polytetrafloroethylene (ePTFE),[11-13] braided polyester[14], nylon[15], mersilene and polypropylene[16] suture and strips of eTPFE and mersilene[17] mash. All these studies have shown their relevant merits and complications.

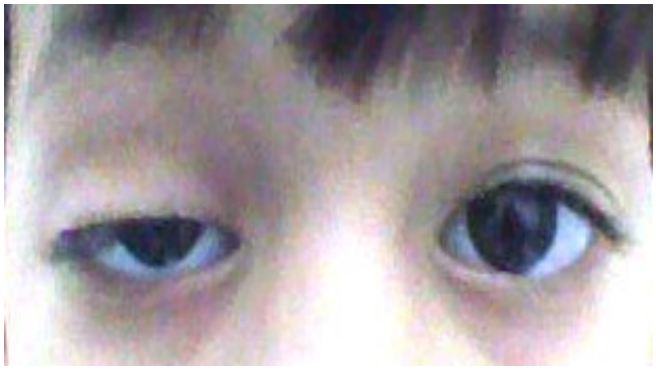

Fig. 1a. Five years old patient having OD severe ptosis with poor levator function

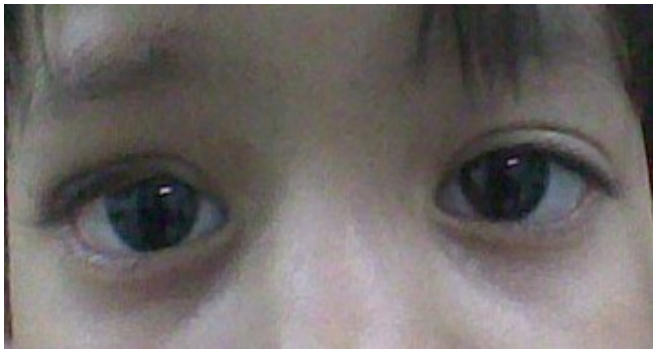

Fig. 1b. Same patient on 2nd (3 weeks post-operatively) follow up.

We have tried a very common and easily available suture i.e. polypropylene 2/0 for sling in frontalis brow suspension. This suture is a synthetic, monofilamantous, non-absorbable suture usually used in oculoplastic procedures in sizes of 5/0 or 6/0. The size of 2/0 is usually used in general surgical procedures. It gives good cosmetic results as it allows minimal fibrosis along suture tract. This suture has not been tried commonly so far. The reason for this was not evident from literature review. However we have successfully used it with excellent results.

We found the success rate very promising in terms of the final upper lid level or final MRD. In our study 93.33% (28 eyes) have satisfactory results. Among these 80% had good result i.e. their final MRD was within 1mm of normal and 13.33% had fair result i.e. MRD within 2 mm of normal. All these patients were cosmetically satisfied. These results are comparable to KKL Chong et al[9] (83.3%) and Kersten RC et al[8] (95%).This comparison sufficiently advocates the efficacy of procedure in south Asian eyes.

We experienced few complications in our patients. The commonest was lagophthalmos. We experienced lagophthalmos in 6 (20% eyes), but it was not severe enough to cause exposure keratitis in any patient. Lagophthalmos tends to improve with time and frequent use of lubricant drops and ointments especially during sleep is mandatory to avoid exposure keratopathy as do in our study. Post-operative lagophthalmos is usually attributed to overcorrection as by Lee V and Konrad H[18] and Kersten RC[8], however in our study there were no cases of overcorrection, hence we found the cause to be related to severity of ptosis and poor levator function. We found lagophthalmos as more of a sequel rather than a complication when we operate on eyes with poor levator function. The sling's syncytium with the frontalis muscle affords good lid closure with a little effort. However during sleep lubrication is vital in early post-operative period. We did not notice any prolong lid lag in any patients. It usually resolved significantly on 2nd follow up i.e. at the end of the 1stpost-operative week.

We experienced under correction in 6.66% (2 eyes), but as the patients were cosmetically satisfied, review surgery was not performed. However one patient (3.33%) presented in early post operative period with recurrence of ptosis due to knot failure. Sling had to be repeated in that patient to regain the symmetry successfully.

Apart from those above mentioned, we did not experience any complications. We followed up our patients for two years but did not experience delayed complications such as granuloma formation[11,13,15], suture infection[11,13,17], sling exposure[8,11] or hypertrophied scar formation[12]. This is in contrast to other researchers who have experienced all such complications with different sling materials. An important aspect to look for is that all these above mentioned complications were somehow related to the sling materials and not the surgical technique or expertise.

CONCLUSION

Frontalis suspension is an effective procedure for the cure of unilateral ptosis with poor levator function. Cosmetically acceptable symmetry in primary position can be achieved by addressing only the affected eye rather than operating both eyes including the normal eye. It is not associated with any serious complication. It shows promising long term results without any significant cosmetic decline.

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