Comparison of Mersilene mesh and autogenous fascia lata in correction of congenital blepharoptosis: A randomized clinical trial

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PURPOSE. *To asses the functional results and complications of Mersilene mesh as an alternative to autogenous fascia lata in the management of low function ptosis.*
METHODS. *In a randomized clinical trial, 31 eyelids with poor levator function were operated on. In 16 eyelids Mersilene mesh (Group A) and in 15 eyelids autogenous fascia lata were used for frontalis suspension procedure (Group B).*
RESULTS. *Nine patients with congenital unilateral and 11 patients with bilateral ptosis underwent sling procedure. There were no differences between the two groups with regards to functional (lid fissure height stability) and cosmetic (lid margin contour) results. Eyelid fissure increase was 4.00±1.46 mm in Group A and 3.13±1.72 mm in Group B. Change in eyelid fissure in both groups was significant (p=0.00, paired t-test), but intergroup difference was not significant (p=0.141, independent sample t-test). Follow-up for Group A was 14.2 (range 6–26) months and for Group B was 15.1 (range 9–29) months. Dermatochalasis was seen more in Group B (B/A = 10/2) and extrusion of Mersilene mesh was seen in two cases of Group A and none of Group B. Early complications such as corneal epithelial defects and entropion and late complications such as undercorrection were comparable in the two groups.*
CONCLUSIONS. *Mersilene mesh with long-term functional results and low rate of complications is a suitable alternative to autogenous fascia lata as a suspensory material in ptosis surgery. (Eur J Ophthalmol 2008; 18: 853-7)*

KEY WORDS. *Mersilene mesh, Autogenous fascia lata, Blepharoptosis sling ptosis surgery*

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INTRODUCTION

Blepharoptosis surgery is one of the most common oculoplastic procedures done for cosmetic reasons or for clearing visual axis obstacles. There are a number of considerable methods depending on the function of the levator muscles. With a poor levator muscle function the classic method is to sling the upper lids to the frontalis muscle by an exogenous or autogenous material (1, 2).
Different materials have been used for eyelid sling. Autogenous fascia lata is the preferred material because of low rate of complications and long-term viability and compatibility but according to some limitations of fascia lata we need to substitute other suitable material (3-11).
This study was designed as a prospective randomized clinical trial comparing fascia lata and Mersilene mesh for upper lid sling.

METHODS

All patients with unilateral or bilateral congenital ptosis who were referred to the oculoplastic service from July 2003 to December 2004 and fulfilled the criteria for sling

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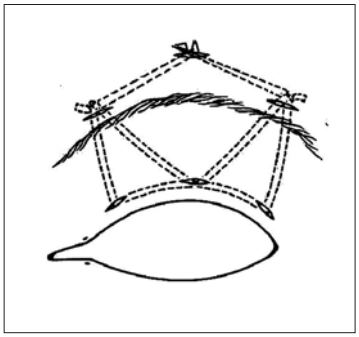

Fig. 1 - *Schematic presentation of sling in Group A, bitriangular method (Crawford method).*

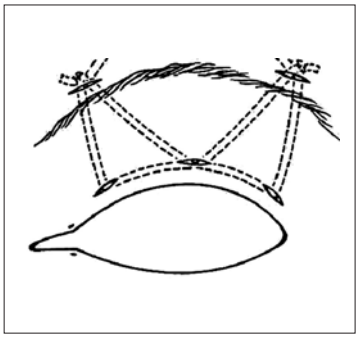

Fig. 2 - *Schematic presentation of sling in Group B, bitriangular method (modified Crawford method).*

surgery were randomly allocated to either group.

Inclusion criteria included very weak levator function (<4 mm) and a minimum age of 4 years for adequate harvestable autogenous fascia lata.

Exclusion criteria included weak Bell's phenomenon (less than 50% of normal) positive phenylephrine test, jaw winking phenomenon, blepharophimosis syndrome, systemic or myopathic disorders with secondary ptosis such as myasthenia gravis, myotonic dystrophy, chronic progressive external ophthalmoplegia (CPEO), Graves disease, any history of intra- or extraocular and eyelid surgery, and any history of sharp or blunt trauma to eyelids, eyelid tumors, and scars.

Complete eye examination including cyclorefraction, best-corrected visual acuity and biomicroscopic evaluation of lacrimal lake and extraocular movements, pupillary reactions, and corneal sensation was performed.

Special ptosis examination included height of eyelid creases, lagophthalmos, lid fissure height, levator function, upper lid margin-reflex distance (MRD_1), scleral show, lower lid margin reflex distance (MRD_2), Bell's phenomenon (4+ equals to complete disappearance and zero equals to no Bell's phenomenon), and jaw winking.

Consent for harvesting of fascia was obtained from patients of Group B. All patients were operated under general anesthesia by a single surgeon (A and B).

Harvesting fascia lata

With the knee and hip in flexion on one side, the thigh was fixed using adhesive plaster. An 8 cm lateral incision was made in the skin and subcutaneous tissues of the thigh, approximately 6 cm above the lateral femoral condyle and extending towards the anterior superior iliac spine. A strip of fascia in the length of 12 cm and width of 6 to 12 mm, depending on the number of lids needing operation, was harvested. The fascia strip was cleaned off of the surrounding tissue, and was cut into 3 mm width strips along the length.

Group A

A set of three 3-mm incisions were made above the eyebrow; two of these incisions were made parallel to the medial and lateral canthus and a third incision was made 7 mm above the center of the eyebrow, of equal distance between the two nasal and temporal incisions, deep to the frontal periosteum. A second set of three 3 mm incisions were produced on the upper lid, 2 mm above the eyelashes, the first one in the central upper lid and the other two, 10 mm nasal and temporal to it. Mersilene mesh stringing was done as in Figure 1 and the two ends of it were tied at two sites above the brow. After adjustment of eyelid height at the limbus, one arm from each Mersilene mesh string is fed through this third incision, tied together, and sutured with 5-0 Prolene and the tie was buried on the frontalis muscle and the skin was repaired with 6-0 Prolene.

Group B

Two 3-mm incisions, similar to those described for Group A, were made in the upper lid and two 3 mm incisions were made above the brow, parallel to the medial and lateral canthus and deepened to reach the frontal periosteum. Fascia lata stringing was done as in Figure 2 and the two ends were tied at two sites above the brow. After adjustment of eyelid height at the limbus, the ends of the fascia were tied at the two sites above the eyebrow; the fascia knots were sutured with 5-0 Prolene and buried in the frontalis muscle. The skin was closed with 6-0 Prolene.

In both groups, 4-0 silk frost suture was inserted in the center of the lower lid to prevent corneal exposure and eye was patched with Gentamicin ointment for 6 hours.

Fig. 3 - *A patient in Group A (Mersilene mesh) pre* (left) *and post* (right) *operative.*

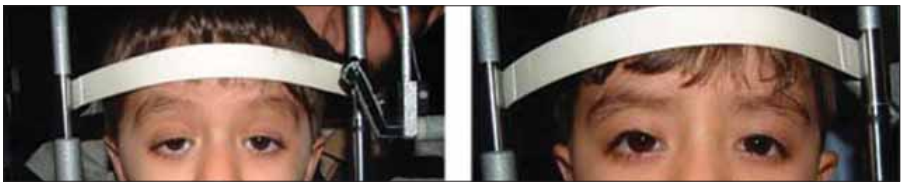

Fig. 4 - *A patient in Group B (fascia lata) pre* (left) *and post* (right) *operative.*

The patients received oral cephalexin 100 mg/kg for 5 days. If the corneal epithelium was intact, the frost sutures were removed after 24 hours and if there was epithelial defect it was removed after epithelial healing. Simple eye ointment was prescribed every 6–8 hours until the epithelium was healed.

Margin reflex distance (MRD_1) and eyelid fissure height were documented 1 week, 6 weeks, 3 months, and 6 months after the operation. Face photographs were taken before the operation and 1 week, 6 weeks, 3 months, and 6 months after the operation.

All complications including epithelial defect, overcorrection, undercorrection, granuloma, sling material exposure, and suture abscess were documented. Thigh scar and any abnormalities in gait were evaluated.

RESULTS

From July 2003 to December 2004, 9 patients with unilateral and 11 cases with bilateral ptosis were enrolled in this study. Sixteen eyelids of 10 patients entered Group A and 15 eyelids from 10 patients entered Group B. Mean age was 15.7±12.6 (range 3 to 42) years in Group A and 14.1±8.6 (range 4 to 26) years in Group B. Age and sex distributions in both groups were comparable. Follow-up for Group A was 14.2 (range 6–26) months and for Group B was 15.1 (range 9–29) months. Results were evaluated with independent sample *t*-test and paired *t*-test.

Mean lid fissure width in Group A before surgery was 4.56±1.59 mm which increased to 8.6±0.81 mm after the operation. Mean lid fissure width in Group B before surgery was 6.40±1.68 mm which increased to 9.53±0.63 mm after the operation. Lid fissure increased 4.0±1.46 mm in Group A and 3.13±1.72 mm in Group B.

Changes in lid fissure in both groups were statistically significant (p=0.00) but the difference between the two groups was not significant (p=0.141).

MRD_1 increased 3±1.46 mm in Group A and 2.87±1.36 mm in Group B (p=0.027) (Figs. 3, 4).

Short-term complications in Group A included corneal epithelial defect in 3 eyes (18.75%) and Mersilene mesh exposure in 2 eyes (12.5%), and long-term complications included mild undercorrection in 3 eyelids (18.75%).

Short-term complications in Group B included corneal epithelial defect in 7 eyes (46.6%) and entropion in 2 eyelids (13.3%). Long-term complications included 1 mm undercorrection in one eye and overcorrection in one eye (6.66%).

In all patients the eyelid margin was symmetric and remained so at all follow-up visits. Two lids in Group A (12.5%) and 10 lids in Group B (66.66%) needed trimming of the upper lid skin (upper lid blepharoplasty) for crease formation 6 months after surgery. No patients needed reoperation for recurrent ptosis.

One week after operation no patients had any complaints in gait and the thigh wound healed after 2 weeks.

DISCUSSION

Blepharoptosis surgery is a challenging area in oculoplastic surgery. The aim of surgical intervention is to acquire natural appearing and symmetric eyelids and improve the superior visual field and prevent amblyopia. In congenital or early onset, ptosis is an additional goal.

According to levator muscle function there are different methods for correction of blepharoptosis. Frontalis muscle suspension is used when levator function is poor (less than 4 mm) especially in the myogenic and neurogenic ptosis. In this method, frontalis power is transferred to tarsus of ptotic eye by a natural or synthetic material (1-3).

Supermaximum levator resection or Whitnall sling is used by some surgeons (12,13) and reverse use of protractor muscles such as the frontalis and orbicularis oculi as retractors is recommended by others (14-16).

There are different methods and different materials used for frontalis suspension but most authors are in agreement in that autogenous fascia lata is the best material (1-3).

Different materials have been used for eyelid sling; the most popular exogenous ones are silicon rod, Mersilene mesh, Supramid, and Gore-Tex. The most popular endogenous ones are preserved or fresh fascia lata and fascia temporalis even though autogenous palmaris longus tendon and umbilical vein have also been used. These materials have early and late complications such as cheese wiring, stretching, fracture, and infection, and their safety and effectiveness is not proven (4-11, 17-23).

Common methods of sling include single rhomboid, double rhomboid, and double triangular (1-5).

In some conditions fascia lata is not an appropriate material and is not recommended (i.e., ages less than 3 years old, extensive scar tissue at lateral side of leg, severe dry eye, decreased cornea sensation, inadequate Bell's phenomenon, and temporary correction of ptosis) and we need to use other suitable material such as Mersilene mesh (1-2).

Mersilene mesh, which is a cheap and available polyester fiber with relatively high tensile strength, can be used for eyelid sling and acts like a framework that fibrovascular tissue grows over and gradually integrates with normal tissue. Acceptable long-term results have been achieved with many studies. However, only in three of these studies were long-term results of sling with fascia lata with Mersilene mesh compared (24-26). The authors of these studies reported Mersilene mesh can be used as an alternative of fascia lata in some situations. According to other reports, long-term results of sling with Mersilene mesh are about 77–94.4%, which is comparable with our result (93.75%) (1-11, 24-26).

In all patients other than one case eyelid with 1 mm undercorrection, width was stable at the end of follow-up periods.

In our study two groups were compared and the results such as lid margin contour, palpebral fissure width, stability, and complications were alike.

Extrusion and granuloma formation at site of skin incision are two known complications of Mersilene mesh that seem to have occurred due to incomplete burial of Mersilene in depth of wound or foreign body reaction to synthetic material that eroded normal tissue. Precise wound repair and the burying of material beneath frontalis muscle can prevent this complication (27-29).

In two cases of Group A, extrusion was seen and was repaired successfully.

Finally, 10 cases in Group B and 2 cases in Group A needed blepharoplasty and crease formation. This may have been related to excess material that was added to lids in Group B in contrast to Group A.

According to results of our study and other similar reports, long-term stability and affectivity of Mersilene mesh and fascia lata are similar. In sling with Mersilene mesh:

The operation time was shorter.

Methods were easier.

Harvesting fascia lata was not needed.

Less skin wound sites were produced.

Theoretically, the chance of intraoperative complications, like hemorrhage, damage to soft tissues, and late complications such as scar formation, is less.

Mersilene mesh may be a material of choice for repairing congenital ptosis of small children with inadequate fascia lata. The weakness of this study was the relatively small number of cases and limited follow-up.

CONCLUSIONS

Mersilene mesh is an acceptable and suitable substitute for fascia lata as a suspensory material in ptosis surgery.

The authors have no proprietary interest.

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