EARLY CORRECTION OF SEVERE UNILATERAL INFANT PTOSIS WITH THE MERSILENE MESH SLING

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SUMMARY

Ten consecutive cases of severe unilateral congenital ptosis were surgically corrected before 1 year of age (range 3–11 months) in an attempt to achieve early functional and cosmetic improvement. In all cases, a frontalis suspension using Mersilene mesh was performed. With a mean follow-up of 40.3 months (range 33–54 months), all patients achieved normal or near normal eyelid position and all had their chin-up head posture resolved. One patient developed a mild exposure keratitis that was treated successfully with topical antibiotics and lubricants. Our findings suggest that the Mersilene mesh sling has good potential for ptosis management in infants who are too young for fascial harvesting. However, a larger series with a longer follow-up period is required before the eventual safety and efficacy of the Mersilene mesh sling can be properly ascertained.

The optimal time to correct severe unilateral congenital ptosis has yet to be defined. It has been hypothesised that for children under 1 year of age, early surgical repair of severe congenital ptosis could alleviate associated functional, developmental and cosmetic problems.[1] Associated bizarre head postures are frequently present in infancy that may contribute to problems of sitting and walking, and difficulty in achieving other developmental milestones.[2]

There is a 14–20% incidence of amblyopia in patients with ptosis, of which 2.3–4% is directly attributable to stimulus deprivation.[3–5] The period of reversibility, or critical period, for deprivation amblyopia remains to be determined. For unilateral congenital cataract, however, there is evidence suggesting that surgical and refractive correction must be done within the first 4 months of life if good visual outcome is to be obtained.[6] Nevertheless, this may not apply to ptosis, especially when the child makes an attempt to use both eyes together by head posturing.

A major problem for the correction of ptosis in infants is the lack of an ideal sling material. Different types of material for brow suspension have been advocated, but the use of autogenous fascia lata remains the most popular and the most effective.[7–10] However, this is not possible in children under 3 years of age because fascia lata has not yet developed sufficiently.[11] Stored, irradiated and lyophilised fascia has been used, but the results are less satisfactory and fascial banks are necessary for storage.[12] Other synthetic materials such as Supramid, Prolene and silicone give only temporary results and are not good for permanent use.[8,13–15] Mersilene mesh (MM) is a synthetic non-absorbable macromesh and is biocompatible. It has been used successfully in a variety of clinical settings including general, vascular and orthopaedic surgeries. The mesh has been shown to be able to act as a permanent scaffold supporting fibrovascular ingrowth.[16] Initial results using MM for sling surgery have been encouraging.[17–19] We report herein a prospective study of a series of 10 consecutive infants who underwent corrective ptosis surgery prior to 1 year of age. To our knowledge, this is the first reported series in the literature using MM for correcting severe unilateral congenital ptosis in infants.

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MATERIALS AND METHODS

Subjects

Patients were recruited from the Eye Unit of the Prince of Wales Hospital from March 1992. All patients were less than 1 year of age (range 3–11 months) at the time of surgery. They were otherwise healthy. A pre-operative complete eye examination including full face photography was performed for all patients. All had a normal blink reflex and good Bell's phenomenon. The degree of ptosis was assessed by estimating the difference between the palpebral apertures in primary gaze. All patients had poor levator function (less than 5 mm) on the affected side. Informed consent was obtained from the parents of all patients.

Sling Materials

We prepared the sling in a manner similar to that described by Downes and Collin.[17] The sling was cut from a sheet of MM (supplied by Ethicon) to the dimensions of 15 cm long by 7 mm wide. The MM strips were then autoclaved, packed and stored for later use.

Surgical Techniques

The surgical technique employed was a double trapezoid procedure as described by Iliff.[20] After the ends of the two MM strips had been passed through the brow incision over the temporal side, they were pulled tight until the lid rested just above the superior limbus. They were then tied with two 5.0 Ethibond sutures passed through the MM just within the brow incision. The ends on the nasal side were tightened and tied in a similar fashion. The excess MM was trimmed and the sling allowed to retract back into the deep brow space. Pulling from the lid margin with a blunt-toothed forceps helped to ensure adequate retraction of the MM into the deep brow tissue and reduced the chance of delayed mesh extrusion. The brow incisions were closed with a 6-0 silk suture and a Frost suture was then applied. Broad spectrum oral antibiotics were prescribed for 1 week. Topical antibiotics and lubricants were routinely used for the first 2 weeks and subsequently as required.

RESULTS

Ten consecutive patients, each with severe unilateral congenital ptosis (Fig. 1) occluding part or all of the visual axis and with a prominent chin-up posture, underwent frontalis suspension using the MM sling. Surgical outcome was judged as either good, moderate or poor, based on the criteria described by Manners:[13]

1. *Good*: the post-operative lid position was maintained within 1 mm of the superior limbus.

Fig. 1. *Case 1. Right congenital ptosis pre-operatively.*

2. *Moderate*: the post-operative lid position dropped more than 1 mm below the superior limbus but remained clear of the visual axis.
3. *Poor*: the post-operative lid position dropped to obscure the visual axis.

The results of the 10 patients are shown in Table I. All patients maintained a lid position clear of the visual axis (Fig. 2). With a mean follow-up of 40.3 months (range 33–54 months), all except one had good results with the lid position maintained within 1 mm of the superior limbus. All patients had a smooth lid contour. Three patients had clinically insignificant lagophthalmos at the latest follow-up whereas the other 7 had complete lid closure.

Patient 7 developed mild recurrence of ptosis at about 3 months after surgery, but the visual axis remained clear. There were no instances of wound infection, stitch granuloma, fistula or extrusion of the sling in the follow-up period. Patient 5 developed mild exposure keratitis 3 weeks after the operation. This was treated successfully with topical antibiotics and lubricants with no consequence.

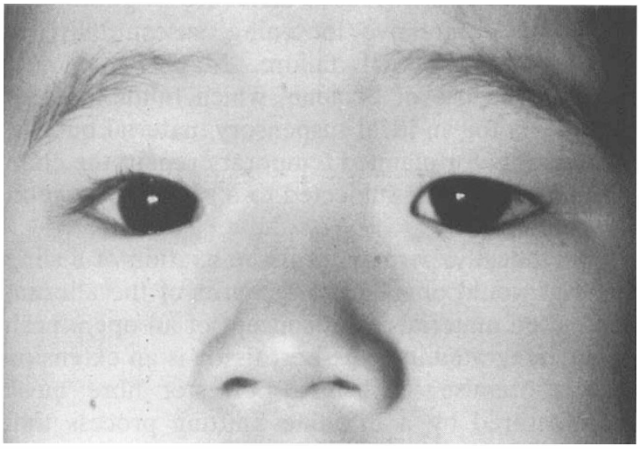

Fig. 2. *Case 1. Post-operative appearance.*

Table I. Results of brow suspensions with the Mersilene mesh sling

Patient no.	Side	Age at surgery (months)	Ptosis (mm)	Follow-up time (months	Result
1	Right	7	6	54	Good
2	Left	4	6	44	Good
3	Right	3	5	44	Good
4	Right	6	4	42	Good
5	Right	11	4	42	Good
6	Left	11	4	37	Good
7	Left	6	5	36	Moderate
8	Left	9	5	36	Good
9	Left	6	4	35	Good
10	Left	6	5	33	Good

DISCUSSION

Although frontalis suspension is a useful method for raising the upper eyelid in severe ptosis with minimal levator function, we are still in search of the ideal sling material. Autogenous fascia lata has been used most frequently, mainly for its long-lasting effect, but it has its own problems. There is also a certain reluctance to use it on the part of ophthalmic surgeons because it involves a separate operation in an area unfamiliar to them. General anaesthesia is invariably required and controversy exists on the best means of obtaining such tissue to minimise complications. These factors, along with the lack of availability of suitable tissue in children under the age of 3 years, are major drawbacks.

Wilson *et al.*[21] investigated the permanence of banked lyophilised human fascia lata in a study with a mean post-operative follow-up of 7.2 years and found increasing numbers of failures with increasing length of follow-up, the success rate from surgery falling from 90% at 2–3 years to 50% at 8–9 years. In addition, many parents feel that the use of donor material in their children is unacceptable because of the potential risk of cross-infection.

The most widely used synthetic material is a polyfilament cable-type suture, which has the advantages of ease in handling and commercial availability but does have an increased incidence of granuloma formation, progressive loosening, susceptibility to trauma and eventual failure. Manners *et al.*[13] reported the use of Prolene, which fulfils most of the criteria for an ideal suspensory material but can be used only for planned temporary repair; the child therefore has to be subjected to a second operation later in life.

Theoretically, permanent tissue fixation of a sling material would obviate the demerits of the alternatively used materials. The concept of an open mesh that is integrated into the host tissue is an extension of this premise. MM is a polyester fibre mesh manufactured by a machine knitting process that interlocks individual fibre junctions. This feature prevents unravelling and facilitates cutting of the mesh without disruption of adjacent fibre junctions.[22] Downes and Collin[16] reported a case in which evidence of permanent tissue incorporation was seen at the time of re-operation on the patient. A portion of the excised mesh showed ingrowth of fibrovascular tissue within the mesh structure. The subsequent incorporation of the mesh into the host tissue, apart from providing a theoretical basis for a possible long-lasting suspensory effect, may also account for the good lid movement and closure.

It is well recognised that occlusion of the visual axis by a ptotic upper eyelid in infancy and early childhood may lead to sensory deprivation amblyopia with or without strabismus.[4,5] Ptosis also markedly influences vision, after maturation of the visual pathways, if severe enough to occlude the visual axis partially or totally. In each of the situations, early ptosis surgery is indicated and preferred.

Mersilene mesh is our preferred suspension material for infants as it is inexpensive, readily available, and easily prepared and handled. We have found that brow suspension with Mersilene mesh can be easily performed even in infants under 1 year of age.

Our medium-term results obtained with the Mersilene sling suggest that it may be a good alternative to other materials available for use in brow suspension ptosis surgery for infants. However, we are still awaiting results regarding its long-term effect on a larger number of patients to ascertain accurately the eventual long-term success and complication rates.

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Key words: Brow suspension, Infant, Ptosis, Mersilene mesh.

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