

Tarsal fixation of Fascia lata in Frontalis Sling Ptosis Surgery

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Pak J Ophthalmol 2006, Vol. 22 No. 3

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Received for publication
September' 2005
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Purpose: To evaluate the results of tarsal fixation of fascia lata in frontalis sling ptosis surgery

Design: Interventional case series.

Material and Methods: Retrospective review of all cases of ptosis surgery performed between January 2000 and June 2005 in one of the units of Institute of Ophthalmology, Mayo Hospital, Lahore. Patients with levator function of less than 4 mm in the worst affected eye were included. All patients undergoing frontalis sling with materials other than fascia lata and all children under 5 years were excluded. Bilateral frontalis sling was performed only in cases having ptosis on both sides while unilateral surgery was done in other cases.

Results: Out of 108 cases of ptosis frontalis sling for the correction of poor function ptosis was performed on 57 eyelids of 41 patients. Out of 41 cases of poor function ptosis 16 cases (39 %) were bilateral and 25 cases were unilateral (12 right and 13 left). Thirty six patients had simple congenital ptosis with poor levator function, 3 patients had jaw winking unilateral ptosis and 2 cases had blepharophimosis syndrome. All patients had severe ptosis with average pre-operative margin to reflex distance (MRD) of -0.95 ± 1.33 mm. All eyelid in unilateral cases and worst eye in bilateral cases had poor levator function averaging 3.8 ± 1.35 mm in average levator function in better eyelid of bilateral cases was 4.25 ± 2.29 mm. Amblyopia was seen in 8 patients and strabismus was seen in 6 patients. Average post-operative MRD with brow up was 3.55 ± 0.73 mm and with brow down was 2.15 mm at 3 months after surgery. Unilateral cases had results comparable to bilateral cases although it took the patients a few months before learning to keep the 2 sides at equal height. All patients had a well formed lid crease and were happy with the postoperative lid height. No patient had lagophthalmos of more than 2 mm. Two cases undergoing unilateral surgery had slippage of the sling which needed to be readjusted at the end of the first week. Five eyes had mild exposure keratopathy initially which was resolved with lubricants over 1 month. Mild nasal peaking was seen in 4 eyelids which was apparent only on the limit of brow action and was cosmetically acceptable to the patient.

Conclusion: Tarsal fixation of fascia lata sling produces a deep lid crease with reliable correction of poor function ptosis.

Congenital poor function ptosis has been managed in different ways over the years. Unilateral cases have been treated using bilateral frontalis sling with or without extirpation of the normal levator muscle on the unaffected site. Various materials including fascia lata^{1,2}, Palmaris tendon³, deep temporal fascial graft⁴, Mersilene^{5,6}, Gortex⁷, silicone rods⁸⁻¹⁰ and different sutures¹¹ have been used to fashion the frontalis sling. Recently frontalis muscle advancement¹² has been used to bypass the sling. Autogenous fascia lata remains the time tested material over the years with best biocompatibility. The technique for making a sling has also been quite varied. Some people use a lid crease incision with tarsal fixation of the fascia lata compared to others who use supralash stab incisions to pass the fascia lata beneath the orbicularis without anchorage¹³. Fox pentagon¹⁴ or Crawford double triangle¹⁵ are the two different methods of passing the fascia lata. In our series we report tarsal fixation of the fascia lata using a modified fox pentagon to correct poor function congenital ptosis.

MATERIALS AND METHODS

Retrospective review of 108 cases of ptosis surgery at the Institute of Ophthalmology, Mayo Hospital, Lahore showed that frontalis sling for the correction of poor function ptosis was performed on 57 eyelids of 41 patients. All patients were photographed pre and post operatively using a digital camera and the pictures were stored in a computer database. All patients were seen first day, first week, first month and 3 months post-operatively. Few patients had a follow up of one year. The pre-operative and last post-operative photographs was analysed on a computer database to check for pre-operative MRD, levator function and lagophthalmos. Post-operative MRD with brow up and brow down, lagophthalmos and lid contour was also analysed. Patients with levator function of less than 4 mm in the worst affected eye were included. All patients undergoing frontalis sling with materials other than fascia lata and all children under 5 years were excluded. Difficulty in assessment of pre and post-operative measurements and inadequate length of fascia lata were the reasons for excluding children less than 5 years. Autogenous fascia lata was harvested in all patients using a fascia stripper through a 2.5 cm incision. Frontalis sling was made using a modified fox pentagon and fascia lata was sutured to the tarsal plate using a lid crease incision. Tarsal fixation of the lid crease was also done in all

cases to form a deep lid crease (Fig. 1). The affected lid was raised to a level just below the superior limbus in all cases as they had good bell's phenomenon and severe ptosis. Bilateral frontalis sling was performed only in cases having ptosis on both sides while unilateral surgery was done in other cases. All patients were told to practice lifting their brows in front of the mirror to control the amount of lift required.

RESULTS

Out of 41 cases of poor function ptosis 16 cases (39 %) were bilateral and 25 cases were unilateral (12 right and 13 left). Thirty six patients had simple congenital ptosis with poor levator function, 3 patients had jaw winking unilateral ptosis and 2 cases had blepharophimosis syndrome. Patients with jaw winking ptosis underwent levator excision along with frontalis sling. Jaw winking was reduced but not abolished. Cases of blepharophimosis syndrome underwent correction of telecanthus 6 months before ptosis surgery. Telecanthus was corrected using double Z plasty and plication of the medial canthus tendon.

All patients had severe ptosis with average pre-operative margin to reflex distance (MRD) of -0.95 ± 1.33 mm (Table 1). All eyelids in unilateral cases and worst affected eye of bilateral cases had poor levator function averaging 3.8 ± 1.35 mm. Mean levator function in better eyelid of bilateral cases was 4.25 ± 2.29 mm. Table 2 gives a breakdown of the levator function in all cases. Amblyopia was seen in 8 patients and strabismus was seen in 6 patients. Post-op MRD was measured with brow down and up. Average post-operative MRD with brow up was 3.55 ± 0.73 mm and with brow down was 2.15 mm at 3 months after surgery (Table 3). All patients had poor or absent lid crease pre-operatively. Tarsal fixation of the lid crease incision above the fascia lata produced a deep lid crease in all cases. Unilateral cases had results comparable to bilateral cases although it took the patients a few months before learning to keep the 2 sides at equal height (Fig. 2-4). All patients were happy with the postoperative lid height. No patient had lagophthalmos of more than 2 mm but they were advised to use lacrilube eye ointment (Allergan Pharmaceuticals) daily at night time indefinitely.

Complications (Table 4) included slippage of the sling in 2 patients which needed to be readjusted at the end of the first week. Five patients had mild exposure keratopathy initially which was resolved with

lubricants over one month. Mild nasal peaking was seen in 4 cases which was apparent on the limit of brow action. It was cosmetically acceptable to the patient.

DISCUSSION

The surgical approach to congenital ptosis is generally based on the amount of levator function. Patients with congenital ptosis have been grossly divided into three groups based on the levator function: (1) those with poor levator function of 4 mm or less, (2) those with fair levator function of 5-7 mm, and (3) those with good levator function greater than 8 mm¹⁶.



Fig. 1: Tarsal fixation of fascia lata



Fig. 2: Pre-operative photo, Rt simple congenital ptosis



Fig. 3: Post-operative photo, Rt frontal fascial lata sling



Fig. 4: Pre-operative photo, Bilateral simple congenital ptosis

Fascia lata slings have been primarily used for the permanent surgical correction of congenital ptosis with poor levator function (0 to 4 mm). Levator resections and levator aponeurotic advancements have been performed in cases with fair (5 to 7 mm) or good (>8 mm) function¹⁶.

For cases of severe unilateral congenital ptosis with poor levator function, the decision as to the type of surgery that should be performed is problematic. Beard¹⁷ advocates the removal of the normal levator muscle in the opposite eyelid, thereby converting the case to one of severe bilateral ptosis, and then performing bilateral frontalis suspension to obtain symmetry. Callahan¹⁸ suggested the use of bilateral slings (while leaving the normal levator muscle intact) so the normal eyelid does not move down on down gaze, thus making the lids more symmetrical. Some authors have performed unilateral brow suspensions

on the ptotic lid, while others have advocated super maximum (>30 mm) levator muscle resection¹⁹. Whitnall's sling technique²⁰ provides another alternative for cases with levator function ranging from 3 to 5 mm.

Congenital poor function ptosis is commonly seen as unilateral or bilateral dysfunction of the levator muscle. We found that unilateral cases (68%) were more common than bilateral cases (32%). We found the average levator function to be 3.8 mm in worst affected eye of our cases and poor function to be present in 55% of all cases of ptosis. It can be associated with jaw winking²² which was seen in 5 % cases. Bilateral poor function ptosis can be associated with blepharophimosis syndrome which was seen in

Table 1:

Pre-op MRD Mm	No of cases n (%)
-3	9 (15.8)
-2	12 (21.1)
-1	12 (21.1)
0	15 (26.3)
0.5	1 (1.8)
1	7 (12.3)
1.5	1 (1.8)

Table 2:

Levator function Mm	No. of cases n (%)
2.00	7 (12.3)
3.00	8 (14.0)
4.00	39 (68.4)
5.00	1 (1.8)
6.00	1 (1.8)
12.00	1 (1.8)

Table 3:

Pre-op MRD	Levator Function (worst affected eye)	Post-op MRD Brow Up	Post-op MRD Brow Down
-0.95 ±	3.8 ± 1.35 mm	3.55 ±	2.15 mm

1.33		0.73 mm	
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Table 4

Complications	No. of Patinets	Management
Exposure Keratopathy	5	Resolved with lubricants in 1 month
Slippage of sling	2	Re-tightened 1 week postoperative
Nasal Peaking	4	On extreme lifting of brow only

3% of our cases. Dystrophy of the levator muscle produces retraction of the upper lid on down gaze due to the inability of the muscle to relax. This lid lag on down gaze becomes more pronounced in cases of frontalis sling. Fatty infiltration of the levator muscle was also seen clinically during surgery in majority of the cases. We performed unilateral sling surgery in all cases of poor function ptosis with good cosmetic results (Postoperative MRD 3.55 mm with brow up)

Mahmood H²¹ achieved good results in 87.5 % of patients with poor levator function of 2-4 mm by performing 15-26mm of levator resection. Anderson RL et al²⁰ found that Whitnall's sling is best suited for cases where the opposite fissure height is 9 mm or less and levator function of the ptotic eyelid is 3 to 5 mm.

Fascia lata can be harvested from autogenous source or donor lyophilized¹ or irradiated material can be used. Other materials are also used for frontalis sling which include palmaris tendon graft³, deep temporalis fascia graft⁴, merseline mesh^{5,6}, gortex⁷, silicone rods⁸⁻¹⁰, supramid¹¹ or various other sutures. Fascia lata has the advantage of having the best biocompatibility with least chances of extrusion or granuloma formation. It is more time intensive compared to other techniques. Silicone rod has an advantage of being elastic and is the material of choice in chronic external ophthalmoplegia to overcome residual lagophthalmos. Suture sling is usually used in children less than five years of age because of inadequate length of fascia lata. Mersiline mesh is the preferred material of some surgeons but it does have a tendency to extrude and produce granulomas. Frontalis muscle advancement¹² is a new procedure

which has been showed to be quite effective in poor function ptosis.

Lid crease incision with tarsal fixation was used in our cases which has the advantage of forming a deep lid crease and making a secure attachment to the tarsal plate. Lash ptosis when present can be easily corrected with this technique. Other frequently used technique is supralash stab incisions. It has the advantage of producing minimum disturbance of the lid structures and keeping the levator insertion intact which is disinserted in the lid crease technique. Lid crease incision has been found to be superior to supralash stab incision in a study of 27 patients by Yagci A¹³. We found tarsal fixation to be helpful in obtaining a deep lid crease and everting the lashes in our cases.

Modified fox pentagon¹⁴ was used in all our cases in which the tip of the pentagon was at the superior border of the brow. It has the advantage of being simple and accurate when used with lid crease incision. Crawford double triangle¹⁵ is the other method of performing the procedure which gives good control of contour of the lid. The length of fascia lata required in technique was about 12 mm which was removed through a 2.5 cm incision using a fascia stripper. Long incisions to expose the total length of the fascia lata are rarely used because of cosmetic reasons.

The preferred height of the operated lid after frontalis sling depends upon the degree of ptosis and the degree of bell's phenomenon. This will determine the amount of postoperative lagophthalmos. Patients with poor levator and good bell's phenomenon should have their lids raised to a level just below the upper limbus. While patients with poor bell's phenomenon are at risk of developing significant postoperative lagophthalmos and their lids should be lifted just enough to clear the visual axis. Generally younger patients tolerate more lagophthalmos than older patients. All our patients had lagophthalmos of < 2mm which prevented exposure keratopathy.

CONCLUSION

Tarsal fixation of frontalis sling provides reliable correction of poor function ptosis. The passage of the sling material behind the orbital septum by direct visualization in the eyelid crease approach is one of

the main factors affecting the surgical success of the frontalis sling operation.

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