

Surgical Management of Congenital Ptosis: A Review of 20 Cases

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SUMMARY

In this study, twenty patients of Ptosis with fair to good levator function were chosen and surgery was conducted. All cases were of congenital origin. The amount of levator resection was calculated by two different formulae. The results were better in patients in whom the amount of levator muscle to be resected in millimeters was calculated according to the formula, levator excursion deficit multiplied by two.

INTRODUCTION

The word ptosis means drooping of the eyelid. It can be either congenital or acquired. There can be abnormal function of levator or Muller's muscles. Levator muscle dysfunction is commoner than that of Muller's muscle. Depending upon the function of levator muscle, levator muscle resection or frontalis suspension is conducted. Frontalis suspension is conducted in cases where levator muscle excursion is poor (less than 4 mm). If the levator muscle excursion is either fair (5-7 mm) or good (8-15 mm), levator resection is carried out.

Levator palpebrae superioris originates from the inferior surface of the lesser wing of sphenoid above and anterior to the optic canal. The tendon of insertion is an aponeurosis that descends into the upper lid posterior to orbital septum. Tendinous fibres then pierce the orbital septum and become attached to the anterior surface of the superior tarsal plate. Some of the fibres pass forward between the muscular bundles of the orbicularis oculi to attach to the skin. It is these later fibres that produce the horizontal furrow of the upper lid. The aponeurosis of the levator palpebrae superioris muscle is much wider than the muscle belly. The medial and lateral extensions are called the horns. The lateral horn indents the lacrimal gland so that the gland appears to wrap around the lateral border of the aponeurosis. This arrangement partially divides the lacrimal gland. The lateral horn is attached to the marginal tubercle of the zygomatic bone alongwith the lateral

palpebral ligament. The attachment of the medial and lateral horns serve to check the action of the muscle on the upper eyelid. Arising from the inferior surface of the aponeurosis is a thin sheet of smooth muscle, the superior tarsal muscle. The muscle is inserted into the upper edge of the superior tarsal plate. Arising from its superior surface is a layer of fascia that ascends behind the orbital septum to attach to the periosteum of the orbital rim. The main striated part of the levator palpebrae superioris is supplied by the superior branch of the oculomotor nerve. The smooth muscle (superior tarsal muscle) is supplied by the sympathetic nerves from the superior cervical sympathetic ganglion.

PATIENTS AND METHODS

We reviewed 20 patients of congenital ptosis managed between January 1989 to July, 1993 at the Department of Ophthalmology, Nishtar Hospital, Multan. Each patient of ptosis was evaluated completely.

Age, mode of onset and any antecedent factor e.g. trauma, fever etc, were noted. The amount of ptosis, amount of levator excursion, Muller's muscle function, level of eyelid crease, if present, were measured. Fatigue test for Myasthenia Gravis was performed. Jaw-winking phenomenon or any associated horizontal or vertical strabismus were looked into visual acuity, MRDI (margin reflex distance i.e.) the distance in millimeters from the light reflex on the patient's cornea to the level of the

centre of the upper eyelid margin with the patient gazing in the primary position), MLD (margin-limbus distance i.e. the distance from the 6 O'clock limbus to the central upper eyelid margin when the patient looks in extreme upgaze) and Bell's phenomenon were recorded. Biomicroscopy was conducted to observe any signs of trachoma or longstanding spring catarrh as they can lower the upper eyelid. Fundus examination was conducted as well.

Post-operatively, patients were asked to come for follow up after every two weeks for two months and then every month. The minimum follow up period was two months and the maximum 4½ years. Pre-operative and post-operative (two months after operation) photograph were taken of the patients who allowed us to do so.

We conducted levator resection surgery in twenty cases. Patients were divided into 2 groups. In group I of ten cases the amount of levator muscles to be resected was calculated by the formula: levator excursion deficit x2, taking the normal levator excursion as 16 mm (Table 1).

Table 1: Levator resection in group I patients.

Number of patients	Levator excursion in mm	Levator function deficit (mm)	Amount of levator resection (mm)
1.	6	10	20
2.	8	8	16
3.	6	10	20
4.	5	11	22
5.	7	9	18
6.	7	9	18
7.	6	10	20
8.	6	10	20
9.	7	9	18
10.	8	8	16

Formula: Levator Excursion Deficit x 2

In the remaining ten cases amount of levator muscle was determined by the formula: (9-MLD)x3, taking the normal marginal limbal distance as 9 mm. Transconjunctival isolation and transcutaneous resection of levator palpebrae superioris (combined approach) was adopted in our surgical procedure. General anaesthesia was given in all cases.

Table 2: Levator resection in group II patients.

Number of patients	MLD on upgaze (mm)	Levator resection (mm)
1.	2	21
2.	4	15
3.	3	18
4.	3	18
5.	1	15
6.	1	15
7.	3	18
8.	1	15
9.	1	15
10.	4	15

Formula: (9-MLD) x 3

PROCEDURE

After eversion of the eyelid over a Desmarre's retractor, 1 ml of 2% lidocaine with epinephrine 1:100,000 was injected in the space between the tarsal plate and orbicularis muscle. It separated the orbicularis muscle hydraulically from levator aponeurosis over the tarsus. Then in the everted eyelid, 4mm vertical incision was made at the temporal superior tarsus. Blunt-tipped scissors were passed in to the space between orbicularis and levator muscles. The tips of the scissors blades were pushed through the incision and another incision was made at the nasal point of the scissors. The blades of the scissors were spread to 15 mm above the superior tarsal border to reach above the orbital septal attachment to levator aponeurosis. Ptosis clamp was passed in over the scissors and the lower end of levator aponeurosis was grasped. Levator aponeurosis was isolated by cutting between the clamp and the superior tarsus. Levator aponeurosis was pulled down, sub-orbicularis fascia was dissected until orbital septum was approached. Orbital septum was then detached from the levator aponeurosis. The lid was placed back in normal position and a skin incision was given at the proposed eyelid crease site. Orbicularis was cut and the levator aponeurosis was brought in front through the skin incision.

Ptosis clamp was reapplied. The clamp was rotated superiorly to expose the conjunctival surface. The conjunctiva was separated from the levator and Muller's muscle upto the superior fornix. The

conjunctiva was then stitched back to the superior tarsal border. Required amount of levator aponeurosis was resected and the rest was attached to the tarsal plate 3mm below its superior border. Externally the skin incision was closed.

RESULTS

Patients were divided into two groups. Group I had levator resection according to the formula: levator excursion deficit multiplied by two and in group II the amount of levator muscle to be resected was calculated according to the formula: (9-MLD) x 3. In group I there were 3 females and 7 males while in group II there were 2 females and 8 males (Table 3). Ptosis was moderate (3mm) in all the patients in both groups. Levator muscle excursion was good in 2 patients in group I and in 6 patients in group II, fair in 8 patients in group I and 4 patients in group II (Table 4).

Table 3: Sex distribution.

Sex	Group I		Group II	
	No.	%	No.	%
Male	07	70	08	80
Female	03	30	02	20
Total	10	100	10	100

Table 4: Levator function.

Levator function	Group I		Group II	
	No.	%	No.	%
Good (8mm or more)	02	20	06	60
Fair (5-7mm)	08	80	04	40
Total	10	100	10	100

Levator muscle resection done was moderate (18-22mm) in 8 cases in group I and 4 cases in group II, minimal (14-17mm) in 2 patients in group I and in 6 patients in group II (Table 5). Postoperative lid

level was good (within 1mm of normal) in all the patients in group I (as shown in few photographs) and 6 patients in group II. Out of the remaining 4 patients in group II 3 had under correction of 2mm and one had overcorrection of about 2mm (Table 6). The one patient in group II with overcorrection developed exposure keratopathy that responded very well to tears naturale eye drops. Polyfax eye ointment was prescribed for night use. Patient was instructed to patch the eye during sleeping hours.

Table 5: Levator muscle resection.

Amount of levator	Group I		Group II	
	No.	%	No.	%
Moderate (18-22mm)	08	80	04	40
Minimal (14-17mm)	02	20	06	60
Total	10	100	10	100

Table 6: Postoperative lid level.

Lid level	Group I		Group II	
	No.	%	No.	%
Good (within 1mm / normal)	10	100	06	60
Under correction (2mm)	-	-	03	30
Over correction (2mm)	-	-	01	10
Total	10	100	10	100

DISCUSSION

Ptosis, which means drooping of the upper eye lid, is the most common lid anomaly seen by the ophthalmologists and most ptosis cases are congenital. Congenital ptosis is defined as the drooping of the upper eyelid present at birth whereas in the acquired variety it appears sometimes after birth. The frequency of congenital



Fig. 1: Bilateral ptosis right eye surgery done (for comparison).

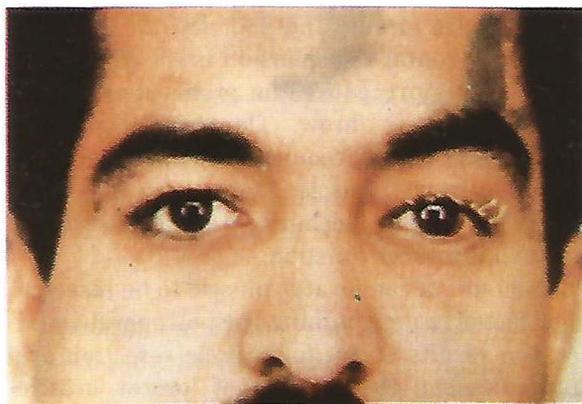


Fig. 2b: Left eye ptosis surgery done (post-operative).

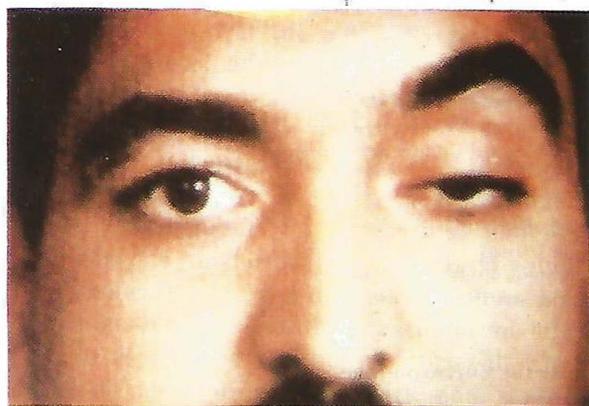


Fig. 2a: Left eye ptosis (pre-operative).



Fig. 3: Bilateral ptosis surgery done (post-operative).

ptosis compared to all forms of ptosis is described as follows: Berke 88% Smith 67% and Beard 62%¹.

Simple congenital ptosis is due primarily to defective structural development of the levator muscle. Histological study of the resected levator muscle reveals myogenic degenerative changes of the muscle. These dystrophic changes in the tissues of the upper lid explain the lid lag found in most congenital ptosis cases².

Surgical correction is almost universally directed at the ptotic eyelid. Ptosis appears to be difficult to treat as the postoperative eyelid position is highly unpredictable. Effective surgical treatment of ptosis depends on accurate assessment of degree of levator strength and of normal skin fold position.

Various surgical procedures available for the correction of ptosis are; Fasanella Servat operation, Frontalis sling procedure and the levator muscle

resection. Choice of operative procedure depends upon the degree of ptosis and the amount of levator function. For mild (up to 2mm) degree of ptosis with good levator function (8mm or more) Fasanella Servat procedure is often satisfactory³. In patients with severe ptosis (4mm) and poor levator function (4mm or less) Frontalis suspension is the procedure of choice¹. In this procedure the ptotic upper lid is suspended from the brow. Contraction of the Frontalis muscle then becomes responsible for lid elevation. Levator muscle resection is most appropriate for patients with moderate ptosis (3mm) and good to fair levator function.

The amount of the levator muscle to be resected is a major factor in determining the postoperative lid level. As the results of levator muscle resection are very unpredictable, the amount of levator muscle resection should be assessed carefully. In this study we compared the results of amount of levator muscle resection in millimeters calculated according to the levator muscle excursion deficit multiplied by two and (9-MLD) x 3.

In our study, surgery based on levator muscle excursion deficit proved better than the original approach recommended by Urist and Putterman⁵.

Although cases of Ptosis with strabismus need prior correction of strabismus, the patients with minimal vertical strabismus require treatment only of ptosis⁶.

In patients with minimal vertical strabismus, MLD formula is not valid, because the 6 O'clock limbal level in upgaze is abnormal owing to vertical deviation⁷.

Simultaneous innervation (Hering's law) has practical significance with unilateral ptosis surgery. Preoperatively elevate the ptotic eyelid while observing the contralateral eyelid. If the normal eyelid drops when this is done, this indicates that simultaneous innervation is a strong factor. The possibility that the apparently normal contralateral eyelid may drop with surgical repair of ptotic eyelid is discussed with the patient before surgery⁸.

Since our study consists of a limited number of

cases, more and more studies are invited to prove the accuracy and superiority of the formula levator muscle excursion deficit multiplied by two in determining the amount of levator muscle to be resected.

REFERENCES

1. **Anderson RL, Gordy DD.** Aponeurotic defects in congenital ptosis. *Trans Am Acad Ophthalmol* 1980; **85**: 1493-8.
2. **Fox SA.** Pathology. In: **Fox SA, ed.** *Surgery of ptosis.* London; williams and wilkins, 1980; pp. 159-161.
3. **Ropper Hall MJ.** The eye lids and reconstructive surgery. In: **Ropper-Hall MJ, ed.** *Stallard's eye surgery.* London. Wright, 7th ed. 1989; pp. 92-101.
4. **Cole MD, Connor GMO, Raafaie F, et al.** A new synthetic material for the brow suspension. *Br J Ophthalmol* 1989; **73**: 35-8.
5. **Putterman A, Urist.** Transconjunctival isolation and transcutaneous resection of levator palpebrae superioris muscle. *A.J.O.* 1974; **70**: 90.
6. **Gholam A, Peyman.** *Basic oculoplastic surgery, Principles and Practice of Ophthalmology.* Allen M., Putterman. W.B. Saunders Company/Philadelphia/Toronto/London 1980; pp. 2244-2273.
7. **Patrick D, Trevor.** *The eye and its disorders.* 2nd ed. 1984; 322.
8. **Bradley N, Lemke, Robert C, Della Rocca.** *Levator surgery, surgery of eyelids and orbit, an anatomical approach* 1990; 182.

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