

Study on Management of Ptosis by Different Surgical Modalities

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Abstract

Background

Ptosis is derived from the greek word for falling and is the medical terminology describing a drooping or abnormal lowering of an anatomical area. Ptosis that obstruct the pupil may interfere with the normal development of vision, resulting in amblyopia in children². In adult it may impair the field of vision and interfere with activities of daily living Ptosis is broadly classified into congenital and acquired, based on age of onset of the ptosis. Ptosis that is present at birth or within the first year of life is called congenital ptosis. Ptosis that presents after the age of one year is termed acquired ptosis. The treatment of ptosis depends upon the underlying etiology. Ptosis usually does not improve over time and nearly always require corrective surgery. Depending upon the severity of congenital ptosis, patients should be monitored every 3-12 months for sign of amblyopia due to congenital ptosis. In mild cases of congenital ptosis observation is sufficient, if no sign of amblyopia, strabismus and abnormal head posture are present.

Methods

This study was conducted in the Upgraded Department of Ophthalmology, LLRM Medical College, Meerut during 2018–2019.

Study design-A Population based Prospective interventional study was done on patients selected from OPD and camps during 2018-2019.

Plan & Work All patients with ptosis who are attending ophthalmology OPD and admitted in eye wards were included in the study provided they fulfill the inclusion criteria.

Results And Conclusion

The subjects in our study were more males 12(66.66%) than females(33.33%). In our study there were 12(66.66%) patients of myogenic ptosis, out of them 11(61.11%) had frontalis sling surgery and 1(5.55%) had levator resection surgery.

There was 2(11.11%) cases of neurogenic ptosis which was congenital in nature and in which 1(5.55%) is operated with frontalis sling &1(5.55%) with levator resection surgery. Most commonly performed surgery was frontalis sling 14(77.77%) followed by levator resection 2(11.11%) and 2(11.11%).

Key Words:

MRD-Marginal Reflex Distance, ePTFE-Poly Tetra Fluoro Ethylene, B/L-Bilateral, U/L-Unilateral, FS-, Fasanella Servat, FSling-Frontalis Sling, LR-Levator Resection.

Background

Ptosis is derived from the greek word for falling and is the medical terminology describing a drooping or abnormal lowering of an anatomical area.

It refers to the unilateral or bilateral drooping of the

upper eyelid. It usually occurs from a partial or complete dysfunction of the muscles that elevate the upper eyelid: the levator palpebrae superioris and the muller's muscle¹.

Ptosis that obstruct the pupil may interfere with the normal development of vision, resulting in amblyopia

in children². In adult it may impair the field of vision and interfere with activities of daily living^{2,3}.

Types of ptosis

Ptosis is broadly classified into congenital and acquired, based on age of onset of the ptosis. Ptosis that is present at birth or within the first year of life is called congenital ptosis. Ptosis that presents after the age of one year is termed acquired ptosis.

Ptosis may also be classified by etiology:

- ✧ Congenital
- ✧ Neurogenic ptosis which includes oculomotor nerve palsy, Horner's syndrome, Marcus Gun jaw winking syndrome, third cranial nerve misdirection.
- ✧ Myogenic ptosis which includes oculopharyngeal muscular dystrophy, myasthenia gravis, myotonic dystrophy, ocular myopathy, simple congenital ptosis, blepharophimosis syndrome.
- ✧ Aponeurotic ptosis which may be involuntal or post operative.
- ✧ Mechanical ptosis which occurs due to edema or tumors of the upper lid.
- ✧ Neurotoxic ptosis which is a classic symptom of envenomation⁴ by elapid snakes such as cobras⁵, kraits, mambas and taipans.
- ✧ **Pseudoptosis due to:**
 1. Lack of lid support: empty socket or atrophic globe.
 2. Higher lid position on the other side: as in lid retraction.

Ptosis that obstruct the pupil may interfere with the normal development of vision, results in amblyopia in children. In adults it may impair the field of vision & interfere with activities of daily living. Thus the early diagnosis & treatment of ptosis is an important prognostic factor in its management.

Mortality/Morbidity

If congenital ptosis obscures any part of the paediatric patient's visual field, surgery must be performed to correct the problem early in life. Otherwise, a permanent loss of vision may occur as a result of amblyopia.

History

- a. The onset of ptosis
- b. Alleviating or aggravating factors
- c. Family history of ptosis
- d. History of trauma or ocular surgery are important clues to the etiology.
- e. Family photographs can help determine onset or variability of the ptosis.
- f. Providing photographs also gives the surgeon a chance to examine other family members. A patient with a strong family history of congenital ptosis may not need an extensive workup.
- g. A history of fluctuating ptosis with strabismus may indicate myaesthesia gravis. A recent report has also suggested the development of myasthenia like syndrome resulting in ptosis with the use of inhibitors of 3-hydroxy-3-methyl-glutaryl-COA reductase as statins. They are used in the treatment of hypercholesterolemia³³.
- h. Metastatic or primary orbital tumors can result in malpositioning of the eyelid. A history of trauma with orbital wall fractures can result in pseudoptosis with enophthalmos. Additionally, third cranial nerve palsy from trauma may result in ptosis.
- i. A history of difference in the size of the pupil may be helpful in diagnosing Horner syndrome. Patients with Horner syndrome have ptosis and miosis on the same side.
- j. A detailed history of present illness includes asking about the onset, duration, variability, progression and severity of ptosis. Also investigate whether there is involvement of one eye or both eyes simultaneously.

Symptoms

Most patients presents with drooping eyelids, giving a sleepy or tired appearance.

Undiagnosed congenital ptosis may result in amblyopia.

On inspection, the patients speacialy children may assume a head tilt backwards and chin up position.

Signs

A comprehensive ophthalmic examination should be done in all cases.

The examination begins with a careful external examination along with palpation of the eyelid and the orbital rim. Evaluate any clinical evidence of relative proptosis or enophthalmos in each eye.

The patient's head posture should be noted, document chin up position.

Eyelid measurement

To quantify the severity of ptosis, various eyelid measurements should be taken with the face held in the frontal plane and with frontalis muscle relaxed.

Palpebrae fissure height (PF) is the distance between upper and lower eyelid margins at the axis of the pupil. Normal measurement is 9-12mm.

Marginal reflex distance (MRD-1) is the distance between the central corneal light reflex and upper eyelid margin with eyes in primary position while MRD-2 is the distance between the central corneal light reflex and lower eyelid margin.

Levator function should be evaluated in all cases.

Other tests

Corneal sensitivity should be tested in all cases.

Bell's phenomenon should be tested to evaluate the risk of exposure keratopathy if surgery is being planned.

Jaw winking phenomenon a brisk upper eyelid retraction will be elicited when the patient is asked to open and close his/her eyes with protrusion or lateral movement of the jaw.

Treatment

The treatment of ptosis depends upon the underlying etiology.

Ptosis usually does not improve over time and nearly always require corrective surgery.

Depending upon the severity of congenital ptosis, patients should be monitored every 3-12 months for sign of amblyopia due to congenital ptosis.

In mild cases of congenital ptosis observation is sufficient, if no sign of amblyopia, strabismus and abnormal head posture are present.

If the child has a strabismus together with ptosis surgery to correct strabismus is usually done prior to

ptosis surgery.

Non surgical treatments also includes⁷

1. Lid crutches used to support a drooping lid mechanically.
2. Haptic contact lens with a shelf on which the margin of upper lid rests may be used.
3. Elevation of the lid by a mechanical force: a strip of highly magnetically metal is implanted in the upper lid and a magnet is placed behind the upper rim of frame.

Surgical care

Correction of ptosis in a child may often be delayed until the patient is 7 year old, although consistent chin up positions/complete ptosis may justify early surgery⁸

The method of repair depends on treatment goals, the underlying diagnosis, and the degree of levator function.

Surgical correction of ptosis can be undertaken at any age depending on the severity of the disease. Earlier intervention may be required if significant amblyopia or ocular torticollis is present. If intervention is not urgent, surgery is often delayed until age 3-4 years. Waiting until this age allows for more accurate measurements preoperatively.

1. Levator muscle resection

This procedure is the shortening of the levator-aponeurosis complex through a lid-crease incision. The skin incision is hidden either in the existing lid fold or in a new lid fold created to match that of the contralateral eyelid.

If the levator function is greater than 4 mm but less than 6 mm, a levator resection of greater than or equal to 22 mm is recommended. If the levator function is 6-8 mm, a levator resection of 16 -18 mm is indicated. If the levator function is greater than 8 mm, a levator resection of 10-13 mm is indicated.

Contraindications: An external levator resection is not indicated when the levator function is less than 4 mm. In such cases, a long-term surgical outcome may result in undercorrection. Poor Bell phenomenon reduced corneal sensitivity, or poor tear production can produce exposure keratopathy.

2. Frontalis suspension procedure

This procedure is designed to augment the patient's

lid elevation through brow elevation. Frontalis suspension procedures produce lagophthalmos in most cases. Some surgeons prefer to perform a bilateral suspension procedure for severe unilateral congenital ptosis to obtain symmetry.

The procedure is indicated when the levator function is less than 4 mm. Relative contraindications are poor Bell phenomenon, reduced corneal sensitivity, or poor tear production, which can produce exposure keratopathy. If surgery is still indicated, these patients need close postoperative follow-up care to avoid corneal exposure, infection, corneal ulcer and amblyopia.

Several materials are available to secure the lids to the frontalis muscles. These materials include the following:

- ❖ Autogenous fascia lata: Autogenous fascia lata can be obtained from the leg of patients older than 3 years .
- ❖ Preserved (tissue bank) fascia lata
- ❖ Nonabsorbable suture material (eg, 2-0 Prolene, Nylon (Supramid) or Mersilene) Silicone bands, silicone rods ePTFE.
- ❖ Autogenous materials used less frequently include palmaris longus tendon and temporalis fascia⁹⁻¹².

3. Fasanella-Servat procedure

The upper lid is elevated by removing a block of tissue from the underside of the lid. This tissue includes the tarsus, conjunctiva, and Muller muscle. This procedure is not commonly performed for cases of congenital ptosis.

Further Outpatient Care

Patients who underwent surgery for ptosis are initially monitored every 2-4 weeks for signs of exposure keratopathy, infection, granuloma formation, and overcorrection and undercorrection.

Following the surgery, visual acuity, head posture, and refractive error should be carefully monitored.

Complications

Complications associated with the frontalis suspension procedure for congenital ptosis repair include the following: Granuloma, Lid asymmetry, Overcorrection with exposure keratopathy and dry eyes.

Undercorrection: Suspension materials may dissolve or break.

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Plan & Work

All patients with ptosis who are attending ophthalmology OPD and admitted in eye wards were included in the study provided they fulfill the inclusion criteria.

Inclusion Criteria:

- ❖ All age groups
- ❖ All types of ptosis (congenital and acquired)
- ❖ Patient who gives written informed consent for examination, treatment and surgery.
- ❖ Patient with different degree of levator action
- ❖ Mentally and physically fit up to a minimum level required to participate in study

Exclusion criteria:

- ❖ Not interested/unable to provide informed consent.
- ❖ Patient with uncontrolled systemic illnesses
- ❖ Patients with myasthenia gravis
- ❖ Patient not fit for general anaesthesia

All patients with ptosis were evaluated on the basis of detailed history seeking symptoms of disease itself and its complications such as history of drooping of eyelid, decrease in vision, amblyopia, fever, ocular, nasal, facial surgery recurrent infection or trauma in the past. After taking detailed history general physical examination of the patient was done.

After general examination ocular examination was done which includes

1. Recording of vision
2. Papillary reaction
3. Vertical palpebral fissure height
4. Action of levator palpebrae superioris
5. Marginal reflex distance 1 & 2

6. Lid crease height
7. Bell's phenomenon
8. Corneal sensations
9. Schirmer's test

The cases were managed by standard ptosis correction surgical procedures in various describe indications.

Results

The subjects in our study were more males 12(66.66%) than females(33.33%).

Most subjects were in the age group of 4-21years.

Congenital ptosis 14(77.77%) was found to be most common types of ptosis. Most of the cases of congenital ptosis were myogenic 12(66.66%). Amongst the acquired cases of ptosis aponeurotic 4(22.22%) were the most common.

In our study there were 12(66.66%) patients of myogenic ptosis, out of them 11(61.11%) had frontalis sling surgery and 1(5.55%) had levator resection surgery.

There was 2(11.11%) cases of neurogenic ptosis which was congenital in nature and in which 1(5.55%) is operated with frontalis sling & 1(5.55%) with levator resection surgery.

Of all the cases of aponeurotic ptosis -4(22.22%)were acquired in nature . 2 patients were operated using frontalis sling and 2 patients were fasanella servat operation.

Most commonly performed surgery was frontalis sling 14(77.77%) followed by levator resection 2(11.11%) and 2(11.11%).

No mechanical or traumatiic case was found in our study.

Complication were seen in 3(16.66%) cases but they could be managed by post operatively in six months follow up.

Complication like overcorrection 2(11.11%) and granuloma formation in 1(5.55%) were seen. Over correction was resolved after follow up in 6 months and granuloma formation was corrected after repeat surgery. Other complication like infection , lid assymetry were not seen.

There was significant cosmetic improvement in the drooping of eyelids attributable to the surgery of ptosis

and no progression of amblyopia in congenital cases.

Conclusion

The subjects in our study were more males than females. Congenital ptosis was found to be most common types of ptosis. Most of the cases of congenital ptosis were myogenic. Amongst the acquired cases of ptosis aponeurotic were the most common. Most of the myogenic ptosis had frontalis sling surgery and had levator resection surgery. All the cases of aponeurotic ptosis were acquired in nature, some patients were operated using frontalis sling and some were fasanella servat operation. Most commonly performed surgery was frontalis sling followed by levator resection and fasanella servat operation.

There was significant cosmetic improvement in the drooping of eyelids attributable to the surgery of ptosis and no progression of amblyopia in congenital cases.

Table 1 : Unilateral or Bilateral

	U/L	U/L(%)	B/L	B/L(%)
Congenital	12	66.66%	2	11.11%
Acquired	0	0%	4	22.22%
Total	12	88.88%	6	11.11%

Table 2 : Choice of operation

Pre op amount of ptosis	Levator function	Type of operation
Severe	<= 4mm	F Sling
Moderate	5-10mm	LR
Mild	>=11	F servat

Table 3 : Degree of ptosis & Surgery

S. No	Type	No of pt/%	Sx		
			F. Sling	F. servat	L.R.
1	Myogenic	Mild	0(0.00%)	0(0.00%)	0(0.00%)
		Moderate	2(11.11%)	1(5.55%)	0(0.00%)
		Severe	10(55.55%)	10(55.55%)	0(0.00%)
2	Neurogenic	Mild	0(0.00%)	0(0.00%)	0(0.00%)
		Moderate	2(11.11%)	1(5.55%)	0(0.00%)
		Severe	0(0.00%)	0(0.00%)	0(0.00%)
3	Aponeurotic	Mild	1(5.55%)	0(0.00%)	1(5.55%)
		Moderate	2(11.11%)	1(5.55%)	0(0.00%)
		Severe	1(5.55%)	1(5.55%)	0(0.00%)
4	Mechanical	Mild	0(0.00%)	0(0.00%)	0(0.00%)
		Moderate	0(0.00%)	0(0.00%)	0(0.00%)
		Severe	0(0.00%)	0(0.00%)	0(0.00%)
Total		18(100%)	14(77.77%)	2(11.11%)	2(11.11%)

Table 4 : Types of operation & success rate

Type of Op.	Success rate					
	Good		Fair		Poor	
	No.	%	No.	%	No.	%
F Sling	10	55.55%	4	22.22%	0	0.00%
LR	2	11.11%	0	0.00%	0	0.00%
F Servat	2	11.11%	0	0.00%	0	0.00%
Total	14	77.77%	4	22.22%	0	0.00%

Table 5 : Complication of ptosis surgery

S. No	Type of operation	No of patients%	Complication
1	F Sling	3(16.66%)	Granuloma-1 Overcorrection-2
2	F servat	0(0.00%)	0
3	LR	0(0.00%)	0
	Total	3	

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