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Results of 32 patients' ptosis surgery with a new sutures technics

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Abstract
Objective: To evaluate the one-year follow-up results of 32 patients' 36 eyes with ptosis were performed by new sutures in surgical technics.
Methods: Clinical trial on consecutive selected patients, non- randomized.
1. Principal measurements: mm of lid slit, lagophthalmia.
2. A new less invasive surgical technics: modified Fascanella Servat –Simonton:
   - The levator aponeurosis (F.1a-b) was bifolded (by doubling over) inversely by the first suture, followed by a second and third suture. (F.1c)
   - The lid crease was recreated by three vertical sutures tied with a round gauze (1.5 cm in diameter) at the superior eyebrow (F1d), postoperatively,
   - For the loosen lid crease by removing the gauze for over- correction, or
   - For the tighten lid crease by replacing the original gauze with a bigger gauze (eg. >2cm) in the case of under-correction.

Results: Before surgery: lid slit= 3.55mm ± 0.81 (while opened eye). One year after surgery: Opened eyes: lid slit = 7.57mm ± 0.79mm; closed eyes: lid slit = 0.
Conclusions: The upper blepharoplasty procedure described in this paper, in which the levator muscle is doubled over and three correctable interrupted sutures are placed, may be a good alternative for ptosis surgery with difference ages. This is a less invasive procedure and with adjust sutures may be the easy choice for indicated ptosis correction with some satisfying results mentioned.

Keywords: less invasive procedure, adjusts sutures post surgery, no lagophthalmia, under-correction, over-correction, safe and satisfied results

1. Introduction

1.1 Congenital Ptosis

This condition is present at birth, may be mild or severe, and affects one or both eyes. Although the cause is often unknown, the most common cause is thought to be improper development of the levator muscle. Other problems that may be present include amblyopia, strabismus, refractive errors, astigmatism, or blurred vision. Treatment is surgical and, in non-severe cases, will be performed when the child is 3 to 5 years old. However, surgery will be performed earlier if the ptosis interferes with visual development [1].

1.2 Acquired Ptosis

Acquired ptosis is the most common form of upper eyelid ptosis. It is generally due to stretching of the levator muscle and may occur as a result of ageing, diabetes, trauma, muscular or neurological disease. Ptosis may be one of the first presentations of myasthenia gravis, a condition in which the muscles become weak and tire easily (Fig.3). If no underlying problems are identified, surgical correction is the next step [1].

1.3 Pseudoptosis

In this condition, patients develop a drooping eyelid but in the absence of any levator muscle pathology. One of the causes is an excessive amount of eyelid skin that appears to cover the eye.
In this paper the results of 32 patients' 36 eyes with ptosis were performed by the new sutures procedure which is modified from Fasanella-Servat [2, 3, 4] after one-year follow-up with results as: Opened eyes: lid slit = 7, 57mm ± 0,79mm. Closed eyes: lid slit=0. Lagophthalmia: 0 eye.

2. Materials and Methods

Clinical trial on consecutive selected patients, non-randomized, self- control: before and after intervention.
Diagnosis, procedure for intervention, principal measurements:

- **Excluded:** Ptosis caused by myasthenia gravis (excluded by ice test) [5, 6] (Fig 3)
- **Principal measurements:** measure mm of lid slit, lagopthalmia at before and after surgery: three month, six month, and one year follow-up.
- **Diagnosis According to Beard [1]:** Eyelid drooping of £2 mm from its desired level is arbitrarily defined as mild, 3 mm as moderate, and ³4 mm as severe. The upper eyelid level in its normal position results in a lid slit of 9 mm. In mild ptosis, the lid slit will be 7 mm, and in moderate and severe ptosis, it will be 6 mm and 5 mm respectively. Levator function of ³8 mm is considered to be good; 5-7 mm is fair; £4 mm is poor [1].
- **Procedure for intervention:** The new technics in sutures for surgical ptosis correction is less invasive and is

detailed below [2]

1. Two ml of 2% lidocaine was injected into the skin of the upper lid.
2. An incision of 5 mm above the eyelid margin, parallel to the lid cilia, was made. The inferior skin orbicularis flap was freed from the tarsus. The superior skin orbicularis flap was freed from the orbital septum to the level of Whitnall's ligament. (Figure 1a, 1b). When stripping the orbital septum, care must be taken to avoid exposing orbital fat. (Fig. 1c)
3. Three 5 O Vicryl mattress sutures were placed from the superior eyebrow, across the levator muscle, to the upper edge of the tarso plate with a 4 mm width, returning through the levator muscle and out of the skin of the eyebrow. The first suture was placed at the central upper lid. The second suture was placed at the lateral lid and the third at the nasal lid.(Fig. 1c). These sutures can be removed: 2 lateral red sutures (cut off 1 week after surgery) and 1 central yellow suture (cut off 2 weeks after surgery).(Fig 2)
4. The levator aponeurosis was bifolded (by doubling over) inversely by the first suture, followed by a second and third suture. The lid crease was recreated by three vertical sutures tied with a round-gauze (1.5 cm in diameter) at the superior eyebrow (Fig. 1d). It is possible, in the first week postoperatively, to loosen the lid crease by removing the gauze for over- correction, or tighten the lid crease by replacing the original gauze with a bigger gauze (e.g. >2 mm in diameter) in the case of under-correction. (Fig. 4)
5. The skin edges were closed with silk 6-0, with side-to-side running or interrupted sutures. If excessive, lid skin may be incised (Fig. 2)

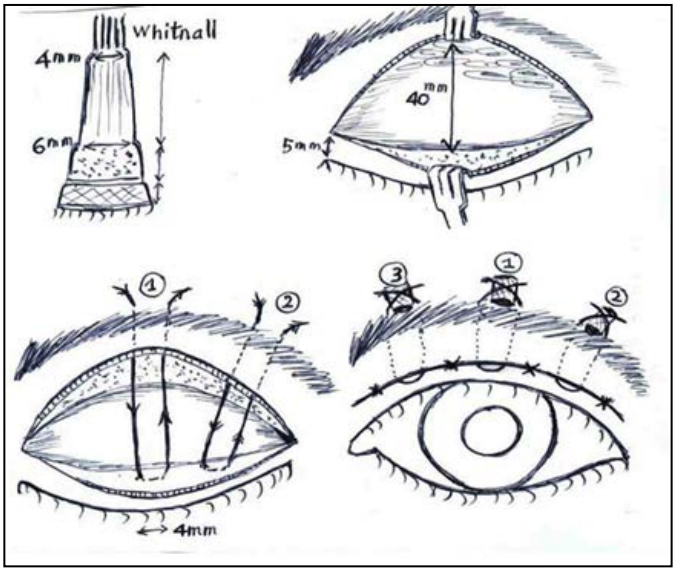

Fig 1: a-b (upper) c-d (lower), a) (left top). The levator system, b) (right top) Placing the 1st, 2nd and 3rd sutures with the bifolded invert, c) (left bottom) Disinsertion of the levator aponeurosis, d) (right bottom) Tied three mattress sutures with three round gauzes with adjustable sutures. Closed eyelid skin with interrupted sutures.

Fig 2: LE= 3 adjustable sutures through superior tarsus to eyebrow; + 2 lateral red sutures (cut off 1 week after surgery), + 1 center yellow suture (cut off 2 weeks after surgery)

Fig 3: Preo & post ice test on ptosis with Myasthenia Gravis for exclusion

Fig 4: Ptosis (RE+LE): Pre and Postoperation on 72 year-old, man with diabetes.

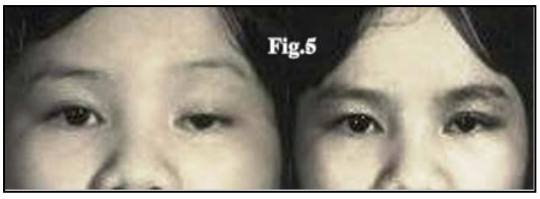

Fig 5: Ptosis (LE): Pre and Postoperation (1 year follow-up) on 16 year-old girl

3. Results & Discussion

Table 1: Results of 32 patients' 36 eyes: Pre and post operation

Patient	Age	Sex	Opened eye	Lid slit Mm		Closed eye: lid slit Lagophthalmia mm
			Preoperation	Postop 1month	Postop 1year	Postop 6 month
1	22	F	2	7	5	
2	19	F	2	7	5	
3	17	F	2	7.5	6	
4	17	F	2	7.5	6	
5	18	M	2.5	7.5	6.5	
6	18	F	2.5	7.5	6.5	
7	72	M	2.5	7.5	7	
			2.5	8	7	
8	20	M	2.5	8	7	
9	20	M	3	8	7	
10	20	F	3	8	7	
11	21	F	3	8	7	
12	22	F	3	8	7	
13	22	M	3	8	7	
14	19	F	3	8	7	
			3	8	7	
15	23	F	3	8	7	
16	24	M	3	8	7	
17	25	F	3	8	7	
18	16	F	3.5	8	7	
19	17	M	3.5	8	7	
20	17	F	3.5	8	8	
21	18	F	3.5	8.5	8	
21	19	M	4	9	8	0.5
23	23	F	4	9	8	0.5
24	35	F	4	9.5	8	0.5
25	39	F	4	9.5	8	0.5
			4	9.5	8	0.5
26	42	F	4	9.5	8.5	0.5
27	45	M	4	9.5	8.5	0.5
28	45	F	4.5	10	8,5	1
			4.5	10	8,5	1
29	16	F	5	10	9	1.5
30	40	M	5	10	9	1.5
31	20	F	5	10	9	2
32	58	M	5	10	9	2
Total	849		113.5	276.5	227	12.5
Means	26.53		3.55	8.64	7.57	0.96
SD	±13.5		±0.81	±0.90	±0.79	±0.59

Note: Means age of 32 patients: 26,53 ± 13,50

Before surgery: Mild ptosis=0 eye, moderate = 13 eyes and severe ptosis = 23 eyes Lid slit= 3, 55mm± 0,81 (while opened eye). Six months after surgery: closed eyes: Lagophthalmia: 13 eyes

One year after surgery: Opened eyes: lid slit = 7, 57mm ± 0,79mm. Closed eyes: lid slit=0.

About 55 to 60% of all ptosis cases are congenital. True congenital ptosis can be associated with other muscular abnormalities. In some cases, ptosis will have been present since birth; in others, it will have arisen from birth injuries. The actual mechanism causing ptosis is obscure, but it may be due to third nerve damage [7]. Electron microscopy studies have suggested that it may be due to muscular dystrophy [8]. There are several classifications of ptosis [9].

- With normal superior rectus;
- With superior rectus weakness;
- blepharophimosis;
- neurogenic, congenital third palsy;
- Horner and Marcus-Gunn's syndrome [9].

These 32 cases had group 1 ptosis, the most common form. The ptosis is commonly unilateral rather than bilateral. Treatment consists of assessing the ptosis and performing the most appropriate surgery, taking care not to under correct the condition. Moderate correction should be the aim for older children with a long history of ptosis. The Fasanella-Servat procedure is performed in patients with minimal ptosis (1 to 3 mm) and achieves good levator function (9 to 13 mm). A modified Fasanella -Servat procedure [4] was performed, since unmodified, the procedure should not be performed on patients over the age of 11. There are, however, some drawbacks to the procedure, including overcorrection, under correction, malposition of the lid crease, and malposition of

cilia, peaking of the lid margin, excessive lid lag, inadequate lid closure, and conjunctiva prolapse [10, 11].

A disadvantage of this modified procedure is that the bifolded levator muscle causes thickening of the upper lid for at least 6 months following surgery. In these patients, the lid became thinner 1 year later and the patient now has normal eyelid closure [3]. According to Burnstine and Putterman their upper blepharoplasty procedure (removal of all excess skin and orbicularis between the eyebrow and eyelid margin) performed in six patients (twelve eyelids) showed an improvement in upper eyelid ptosis (as measured by margin reflex distances), without any worsening of lagophthalmos or corneal keratopathy [8]. The modified procedure with levator excision and frontalis suspension achieves satisfactory correction of ptosis without corneal exposure [10 11]

This less invasive technic can be applied on older patient with diabetes (Fig 4) who was suffered from ptosis both eyes with safe and satisfied results. After one year follow-up the result is still good on patient with congenital ptosis (Fig 5).

4. Conclusions

The upper blepharoplasty procedure described in this paper, in which the levator muscle is doubled over and three correctable interrupted sutures are placed, may be a good alternative for ptosis treatment. This new less invasive procedure with adjustable sutures may be the easy choice for indicated ptosis correction on elder age as well as older age patients both eyes with some satisfying results mentioned above.

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