

Outcomes of Posterior Approach Ptosis Surgery

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ABSTRACT

Objective: To assess surgical outcomes of posterior approach ptosis surgery i.e., Conjunctivo-Muller resection for mild to moderate simple congenital ptosis.

Study Design: Quasi Experimental Study.

Place and Duration of Study: Orbit and Oculoplastic Department, Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan, a tertiary care ophthalmic facility for a period of 6 months from May to Dec 2022.

Methodology: A sample size of 22 was calculated. Data containing patient's age, gender, pre-op MRD-1, upper lid crease, post-Op MRD 1, inter-eye palpebral fissure height symmetry, post-Op Complications were documented on Microsoft Excel Sheet.

Results: Out of total 22 patients, 10(45%) were male and 12(55%) were females. There was a significant improvement in post-operative MRD1 a mean of 1.25 ± 0.33 mm. The mean pre-Operative MRD 1 was 2.72 ± 0.48 mm while mean post-Operative MRD 1 was 3.97 ± 0.36 mm

Conclusion: Posterior approach blepharoptosis repair is a safe and effective method for correction of mild to moderate simple congenital ptosis provided a good case selection especially if patient has fair pre-operative upper lid crease. The surgery has an acceptable cosmetic outcome as there would be no scar mark on eyelid skin. Furthermore, for moderate to severe ptosis the procedure can be opted as an initial surgical trial depending on case-to-case basis.

Keywords: Blepharoptosis, Conjunctivo-muller resection, Refractive error, Surgical ptosis repair, Upper lid crease.

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INTRODUCTION

Ptosis is the drooping of the upper eyelid margin which causes covering of the eye aperture. The normal margin for the upper eyelid in adults is 1–2 mm inferior to the superior corneal limbus and is highest just nasal to the pupil.¹ The drooped eyelid can obstruct the pupil and thus impair normal visual acuity. Presentation can be both unilateral and bilateral and can occur in isolation or in association with some other disorder.² It also referred to as blepharoptosis and abbreviated as ptosis.

Ptosis can be both acquired and congenital. In children it is a more concerning condition as impaired light entry into affected eye can impair normal vision development.³ In adults it may be the sign of some underlying disorder. Acquired ptosis has a number of causes and can be classified as neurogenic, aponeurotic, mechanical, traumatic and pseudoptosis.⁴ Congenital ptosis presents due to a developmental dysfunction of the levator palpebrae superioris and is commonly associated with some form of dysfunction of the extraocular muscles. This dysfunction can occur

in one or multiple muscles at the same time.²

In either case, initial management is preferred to be medical and surgical management is deferred unless medical management fails or the patient suffers from severe ptosis. The surgical procedure done to restore the upper eyelid to its normal curvature and position is called blepharoptosis surgery.⁵ The surgical goal is to elevate the eyelid to the upper cornea-scleral margin in primary gaze. It can be done with both functional and cosmetic goals in mind. Functionally, it restores the normal field of vision while cosmetically it creates symmetry between both eyelids. In case of congenital ptosis, the primary incentive for early surgical correction is to prevent developmental abnormalities like amblyopia in the eye. Congenital ptosis is typically non-progressive, but the inadequate entry of light into the affected eye leads to maldevelopment of the vision processing mechanism and can lead to long term defects in the affected eye.³

Multiple surgical approaches are available. The procedure used depends on the degree of levator function available in the patient. The most widely used is the frontalis sling procedure in which the surgeon attempts to connect the frontalis muscle and tarsus of the upper eyelid.⁶ This procedure allows intraoperative adjustment of the amount of eyelid elevation,⁷ and is

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used in patients who have poor levator muscle strength. Other procedures that can be used include the Whitnall sling and the Fasanella-Servat procedure. The Whitnall sling converts the action of the LPS from a horizontal to a vertical plane and provides greater upper eyelid support.⁸ Additionally, the Whitnall sling procedure allows better results in patients who have previously had a Frontalis sling and were not able to achieve satisfactory levator function.² The Fasanella-Servat is used in cases of mild ptosis with good levator function.⁹ It involves conjunctival excision, Mullers muscle excision and accessory lacrimal gland removal and reports a success rate of around 70%.⁴

For the purposes of this study, we shall be focusing on Mullers muscle conjunctival resection surgery. This surgery depends on the Mullers muscle and levator muscle function and is recommended in patients with relatively good muscle function.¹⁰ In this study we discuss the Conjunctivo-Muller resection via posterior approach, allowing eyelid contour restoration without any significant scar marks and comparing the results to the more widely done anterior approach.

METHODOLOGY

The quasi-experimental study was conducted at Orbit and Oculoplastic Department, Armed Forces Institute of Ophthalmology, Rawalpindi Pakistan a tertiary care ophthalmic facility for a period of 6 months from May to December 2022. Approval from institutional review board was sought before commencement of the research (ERC Ltr no. 274/AFIO dated 01 May 2022). Parents of the patients gave written informed consent for participation in the study. A sample size of 22 was calculated using OpenEpi software online keeping reference prevalence of 1.46% and confidence level of 95%.⁶

Inclusion Criteria: Patients of pediatric age group (2-12 years) with mild (marginal reflex distance 1[MRD1] of >4 mm) to moderate (MRD1 of 2-4 mm) unilateral simple congenital ptosis with a fair upper lid crease and a fair Levator function (5-11 mm) and showing good response to Phenylephrine eye drops 10% testing (showing improvement in ptosis for more than 2 mm after 5-10 mins of instillation of drops) were included in the study.

Exclusion Criteria: Patients having bilateral congenital ptosis, poor levator function, poor upper lid crease having associated ocular pathology and or amblyopia were excluded from the study.

Data containing patient’s age, gender, pre-op MRD-1, upper lid crease, post-Op MRD 1, inter-eye palpebral fissure height symmetry, post-Op Complications were documented on Microsoft Excel Sheet. Data was analysed using SPSS version 22 software (IBM, Chicago, Illinois). All patients were operated via posterior approach by Conjunctivo-Muller resection thus, avoiding any scar mark on eye lid skin.

RESULTS

Out of total 22 patients, 10(45%) were male and 12(55%) were females. Age range was from 2-12 years with a mean age of 6.50±2.50 years. The mean pre-operative MRD1 was 2.72±2.50 mm while mean post-operative MRD1 was 3.93±0.36 mm. Mean post-operative symmetry at 6 weeks between palpebral fissure height of 2 eyes was 1.31±0.56 mm. There was a significant improvement in post-operative MRD1 a mean of 1.25±0.33 mm. Frequencies of post-operative inter eye palpebral fissure height symmetry between two eyes are shown in Table-I. Table-II shows post-operative complications of posterior approach ptosis repair surgery. A correlation between pre-operative MRD1 and post-operative improvement in MRD1 is given in Table-III .

Table-I: Post-Operative inter eye Palpebral Fissure Height Symmetry between two eyes (n=22)

Post-op Symmetry	n(%)
<1.5mm	16(72.7%)
1.5-3 mm	5(22.7%)
>3mm difference	1(4.5%)

Table-II: post-Operative Complications of posterior approach upper lid blepharoptosis repair surgery (n=22)

Post-operative complications	n(%)
Overcorrection	4(18.20%)
Under correction	4(18.20%)
Lagophthalmos	3(13.60%)
Hematoma	2(9.10%)
Surgical Site Infection	2(9.10%)
Suture granuloma	1(4.50%)
No Complication	6(27.30%)

Table-III: Correlation between pre and post-operative Marginal Reflex Distance 1

	Improvement in Marginal Reflex Distance 1 (millimeters)			p-value
	1-1.5	1.6-2	2.1 and more	
Pre-operative Marginal Reflex Distance 1 (millimeters)				
2.00	1(4.54%)	1(4.54%)	2(9.09%)	<0.01
2.50	2(9.09%)	5(22.72%)	Nil	
3.00	7(31.81%)	1(4.54%)	Nil	
3.50	3(13.63%)	Nil	Nil	

The mean pre-Operative MRD 1 was 2.72 ± 0.48 mm while mean post-Operative MRD 1 was 3.97 ± 0.36 mm. In 7(31.82%) of patients, the post-op inter eye palpebral fissure height symmetry was <1.5 mm but the p -value was >0.05 . Figure-1 and 2 compare pre and post-op images of the patients.



Figure-1: Pre and post-Operative posterior approach ptosis repair surgery result of the patient with left eye congenital ptosis.



Figure-2: Pre and post-Operative posterior approach ptosis repair surgery results in patient with right congenital ptosis

DISCUSSION

The Conjunctivo-Muller resection was first described by Putterman and Urist in 1975.¹¹ The development of procedure can be traced back to 1961 when Fasanella and Servat first introduced the posterior lamellar approach for ptosis surgical correction.⁹ In 1972, Putterman presented an alternative approach with a newly designed serrated clamp. This aimed to improve on the original procedure which involved the use of a hemostat. Putterman's modifications allowed better handling during the procedure and improved postoperative tarsus contour.¹² In 1975 Putterman and Urist finally introduced the Mullers Muscle conjunctival resection).

The posterior approach produced excellent surgical results. However, it was not widely adopted due to

a lack of awareness regarding the levator aponeurosis at the time.

Jones *et al.*¹³ and Anderson and Dixon,¹⁴ proposed that since the ptosis causing defect not in Müller's muscle or tarsus but instead the aponeurosis, resecting tissues which are not the main cause of the disease is not appropriate. There were other cause points going against the posterior approach which proposed that it damaged the conjunctival goblet cells, meibomian glands, and lacrimal structures, which consequently resulted in impaired tear formation, dry eyes and subsequent corneal damage.

However, since then, the posterior approach has regained popularity in ptosis repair. Although the anterior approach allowed visualization of levator aponeurosis and ptosis correction, the surgical results are less predictable. Additionally, the anterior approach has a higher rate of complications and a higher rate of repeat surgeries. It must be mentioned that while it is a suitable choice for patients with decent Mullers muscle and levator muscle strength in cases of weakening of these muscles, other procedures should be considered.¹⁰ Thus, each case is considered on its own individual presentation.

The medial horn of the levator aponeurosis is weaker and thus it is prone to cause medial under correction.¹⁵ Nine percent of levator advancement procedures require a repeat surgical correction.¹⁶ Ben Simon *et al.* reported that while the external approach without blepharoplasty resulted in a 17.6 repeat surgical rate, the internal approach only needed repeat surgery in 2.5% of cases.¹⁷ Our study reports similar effectiveness of the Mullers resection surgery with posterior approach with statistically significant differences in pre- and post-op MRD-1. Another study assessing the MMRC procedure with posterior approach showed postoperative mean MRD-1 of 2.49 ± 0.53 mm agreeing with our study which showed a similar average post-op MRD-1 of 3.97 ± 0.36 mm.¹⁸ Another study showed a repeat surgical rate of 6.8% with the posterior approach and 9.5% with the anterior approach.¹⁹

LIMITATIONS OF STUDY

It included only 22 patients and thus, may not be better generalized to general population. Additionally, we only performed and documented patients treated with posterior approach ptosis repair surgery in this study. Studying pre- and post-op outcomes using both anterior and posterior approach can allow a better comparison between the two procedures and allowing a better way to assess which procedure is better in terms of ptosis repair and preventing post-op complications.

CONCLUSION

Posterior approach blepharoptosis repair is a safe and effective method for correction of mild to moderate simple congenital ptosis provided a good case selection especially if patient has fair pre-operative upper lid crease. The surgery has an acceptable cosmetic outcome as there would be no scar mark on eyelid skin. Furthermore, for moderate to severe ptosis the procedure can be opted as an initial surgical trial depending on case-to-case basis.

Conflict of Interest: None

Author's Contribution

Following authors have made substantial contributions to the manuscript as under:

TAK & MS: Supervision, Conception, Study design, analysis and Interpretation of data, Critically reviewed manuscript & approval for the final version to be published.

SN & AR: Co-supervision, Data entry, analysis and interpretation, manuscript writing & approval for the final version to be published.

TL & MA: Critically reviewed, Drafted manuscript & approval for the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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