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ORIGINAL ARTICLE

Blepharoptosis, at a tertiary care oculoplastic clinic

Naz Jehangir [1], Sofia Iqbal [1]

1: Department of Ophthalmology, Khyber Girls Medical College / Medical Teaching Institution Hayatabad Medical Complex (MTI-HMC), Peshawar, Pakistan

Email: njehangir@hotmail.com
Contact #: +92-335-9963743

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ABSTRACT

Objectives: To determine the frequency, patterns, etiology and management outcomes of ptosis in patients presenting to an oculoplastic clinic.

Methods: This cross-sectional observational study was conducted from August 2022 to May 2023, at Hayatabad Medical Complex, Peshawar, Pakistan. Patients of all ages presenting with ptosis were included. Detailed history and ocular examination were performed. Ptosis was categorized as congenital or acquired, levator function was assessed and management options were documented. Surgical procedures and postoperative complications were recorded.

Results: Thirty-eight patients (56 eyes) were enrolled (mean age 16.4±17.1 years); 22 (57.9%) were male and 28 (73.7%) were children. Congenital ptosis accounted for 28 patients (73.7%) and unilateral involvement for 22 (57.9%). Levator function was poor in 14 (40%), fair in 20 (57.2%), good in one (2.8%); and un-assessable in 3 (7.9%) infants. Surgery was performed in 33 (86.8%) patients. Etiology was associated with age group ($p<0.001$) and gender ($p=0.0017$) and treatment modality ($p=0.0001$). Frontalis sling with 2/0 prolene was most commonly performed procedure (42.4%), followed by levator resection (33.3%); levator extirpation for Marcus Gunn jaw-winking (12.1%) and levator advancement (9.1%). Complication observed for frontalis sling 2/0 proline, frontalis sling silicone tube and levator extirpation with sling were 14.3% (n=2/14); 100% (n=1/1) and 50% (n=2/4) respectively. No complications were observed for levator resections after 3-4 months of follow-up.

Conclusion: Congenital ptosis predominated, especially in children. Surgical correction guided by levator function was effective. Certain sling techniques showed variable early complication rates, highlighting the need for careful procedure selection and close postoperative follow-up.

Keywords: Blepharoptosis (MeSH); Amblyopia (MeSH); Levator function (Non-MeSH); Congenital ptosis (Non-MeSH); Oculoplasty (Non-MeSH); Oculomotor Muscles (MeSH).

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INTRODUCTION

Blepharoptosis, defined as drooping of the upper eyelid in the primary position, may be congenital or acquired and can occur as an isolated abnormality or in association with hereditary conditions, tumors, infections and immunological disorders.[1] Based on etiology, ptosis is broadly classified into myogenic, neurogenic, mechanical, traumatic, aponeurotic and pseudoptosis.[2]

Although the exact global incidence of congenital ptosis is unknown, a recent study reported that nearly 90% of ptosis cases were congenital, with bilateral involvement observed in only 3%.[3] Regional studies have estimated the prevalence of ptosis in adult populations to range from 4.7% to 13.5%.[4]

Congenital ptosis is present at birth or within the first year of life and may occur as an isolated condition or with associated anomalies.[5] Significant eyelid drooping can obstruct the visual axis, leading to deprivation amblyopia.[6] A 10-year retrospective review reported amblyopia in 26.5% of children with blepharoptosis.[5] Children with congenital ptosis should be evaluated for associated conditions, including Duanesyndrome,blepharophimosis–ptosis–epicanthus inversus syndrome (BPES), congenital fibrosis of the extraocular muscles (CFEOM) and congenital myasthenic syndrom.[5] Congenital ptosis is difficult to manage or more challenging because of difficulty in examination, risk of amblyopia, poor levator function and decision on when to do surgery.

Acquired ptosis may result from trauma, levator aponeurosis dehiscence, contact lens use, allergies, or neurological and muscular disorders such as third nerve palsy, myotonic dystrophy and myasthenia gravis. Sudden-onset ptosis can indicate a neurological emergency and warrants urgent evaluation.[2] A careful clinical assessment, including onset, variability, fatigability and associated visual symptoms, is essential and may guide the need for further investigations.[1,2]

Management options for ptosis include observation, ptosis crutches, medical evaluation, or surgical intervention.[1-3] The choice of surgical management depends on the severity of ptosis, involvement of the visual axis and levator function, necessitating meticulous preoperative assessment.[5] In children with amblyopia or a high risk of amblyopia, early surgical correction is recommended, whereas surgery may be deferred in the absence of amblyopia until reliable measurements can be obtained. Common surgical procedures include frontalis suspension and levator resection or advancement, selected according to preoperative findings.[2]

Surgical decision-making is primarily guided by the degree of ptosis and levator function: mild ptosis may be managed with Müller muscle resection or the Fasanella–Servat procedure; moderate ptosis with levator function of 5-10 mm is best treated with levator resection; and severe ptosis with poor levator function (<5 mm) typically requires brow or frontalis suspension.[1]

Marcus Gunn jaw-winking phenomenon (MGJW) is observed in approximately 5% of cases of congenital ptosis and is characterized by

involuntary eyelid elevation during jaw movement. Its surgical management differs from that of isolated congenital ptosis and requires a tailored approach.[5] The rationale for this study was to address the lack of local data on the burden and management of ptosis in Pakistan. Although often overlooked, ptosis can result in permanent visual impairment in children when the visual axis is obscured and may lead to significant functional and psychosocial consequences in adults.[7] Early recognition and timely intervention are therefore critical to prevent avoidable morbidity. Despite its clinical significance, there is a paucity of published evidence from Pakistan regarding the frequency, etiological patterns and management outcomes of ptosis. This study was undertaken to systematically assess the burden of disease, age at presentation, underlying causes and treatment approaches in our population, with the aim of generating locally relevant evidence to guide clinical practice and improve patient care.

METHODS

This cross-sectional observational study was conducted over a nine-month period from August 2022 to May 2023 at the Oculoplasty Clinic, Hayatabad Medical Complex, Peshawar, Pakistan. Ethical approval was obtained from the hospital ethics committee (letter no. HMC-QAD-F-00-1421 dated July 18, 2022). Written informed consent was obtained from all participants and the study was conducted in accordance with the Declaration of Helsinki.

Patients of all age groups, including children, presenting with ptosis were included. All clinical evaluations and surgical procedures were performed by a single surgeon. Data were collected on the pattern of ptosis, management approach (medical or surgical) and postoperative complications. A detailed history focusing on onset, variability, progression and associated symptoms was obtained, followed by a comprehensive ocular examination.

A detailed history was obtained, including age at onset, variability, progression of ptosis and associated symptoms, followed by a comprehensive ocular examination. The examination included assessment for head tilt or chin elevation, visual acuity, pupillary responses, margin reflex distance, lid crease height, pretarsal show, palpebral fissure height, levator function (LF), presence of Marcus gun jaw winking (MGJW) phenomenon, extraocular motility, Bell's phenomenon, fatigability and additional tests as indicated by initial findings.

In infants and very young children with isolated congenital ptosis who were difficult to examine, surgery was planned promptly after exclusion of associated syndromes if amblyopia was present or if the upper eyelid obstructed the visual axis. All pediatric patients were referred for cycloplegic refraction and amblyopia therapy when indicated. Levator function was assessed using lid excursion in older children and adults, while the Iliff test, involving lid eversion, was used in infants and younger children.

Surgery was performed under general anesthesia in infants and younger children, while local anesthesia was used for older children and adults. Surgical technique was selected based on levator function and etiology of ptosis. Patients with levator function ≥5 mm underwent anterior levator resection. In cases of poor levator function (<5 mm), frontalis suspension using the fox pentagon technique was performed, either as a closed procedure with 2/0 prolene sling or as an open procedure using a silicone tube. Patients with Marcus Gunn jaw-winking phenomenon underwent levator extirpation followed by frontalis sling. Levator advancement was performed in cases of levator aponeurosis dehiscence.

Postoperatively, patients were prescribed topical lubricants and antibiotic ointment for wound care and were advised nocturnal eyelid taping. Follow-up visits were scheduled on postoperative day 1, at two weeks and at three months to assess lid position and identify complications such as residual or recurrent ptosis, corneal exposure and contralateral lid droop.

Data were expressed as Mean± Standard deviation and frequencies with percentages. Associations between categorical variables were analyzed using the chi-square (X^2) test. Statistical analysis was performed using Microsoft Excel 2013.

RESULTS

A total of 38 patients (56 eyes) presented with ptosis in our outpatient's clinic ranging from 3 months old to 72 years (mean age =16.4±17.1 years). Patient characteristics are listed in Table I.

More than 2/3rd ptosis was found in children (0-17 years) 73.7%. The age at presentation ranged from infants (few days old) to 72 years, with more males than females (57.9% versus 42.1%). Congenital ptosis was seen in majority of 28 patients (73.7%) compared with acquired ptosis seen in 10 patients only (26.3%). Twenty-two patients had unilateral ptosis (57.9%) and 16 (42.1%) patients had bilateral ptosis. Levator function was poor <5mm in 14 (40%) patients, fair in 20 (57.2%) patients and good in 1 patient (2.8%). In 3 infants we could not assess function because of their age. The treatment was surgical in 33 patients (86.8%) and medical management in 5 patients (13.2%).

We divided our patients into two age categories, children (0-17 years) and adults (18 years and above). Congenital ptosis was found in 92.9% of the children and only 7.1% of adults with ptosis had congenital ptosis. Amongst those with acquired ptosis, 2 patients (20%) were children. There was a statistically significant relationship between age group and congenital and acquired categories (X^2=32.9 and p-value=0.000). Similarly, there was a significant relationship between gender and congenital and acquired ptosis (X^2 =9.9, p-value = 0.0017) [Table II].

Laterality: Unilateral ptosis was seen in 64.3% (18) of patients with congenital ptosis and in 40%, with acquired ptosis. Bilateral ptosis was seen in 10 patients (35.7%) with congenital ptosis and 6 patients with acquired ptosis (60%). There was no significant relationship between laterality of ptosis and congenital and acquired ptosis.

Levator function: Levator function was poor in 10 patients with congenital

ptosis (40%). Levator function was fair in 15 patients (60%) with congenital ptosis. Patients with acquired ptosis had poor levator function in 4 patients (40%) and fair levator function in 5 patients (50%). There was no significant relationship between levator function and the etiology of ptosis (X^2=2.6 p-value=0.1).

Treatment: All patients with congenital ptosis underwent surgical management. Surgical treatment was done in 5 patients (50%) with acquired ptosis. There was a significant relationship between the treatment and etiology of ptosis (X^2=16.1, p-value=0.0001).

Medical management: Medical management included a variety of investigations depending on the symptoms and signs. 1 patient was investigated for a 3rd nerve palsy with MRI scans. A patient was investigated for Kearns Sayre and advised ptosis crutches and referred to cardiology for further management as he had conduction defects on investigating. Myasthenia gravis was seen in 2 patients with positive ice pack test and acetyl choline receptor antibodies and management was done with ptosis crutches and referred to medicine department. Another patient was diagnosed with chronic progressive external ophthalmoplegia.

Other associations: Isolated ptosis was seen in 71.4% (20 patients) of patients with congenital ptosis and other associations were seen in 8 patients (28.6%) with congenital ptosis. These associations included: 1 patient had blepharophimosis, 1 case of hypertropia (surgically corrected previously) and 1 hypotropia for which we did Knapps procedure first. 1 patient had squint, but eyes were straight with

Table I: Blepharoptosis characteristics of the study subjects

Demographics and clinical characteristics		Number of cases (n=38)	Percentage
Gender	Male	22	57.9
	Females	16	42.1
Age group	Children (0-17 year)	28	73.7
	Adults (18-72 year)	10	26.3
Type	Congenital	28	73.7
	Acquired	10	26.3
Levator Function	Poor	14	40
	Fair	20	57.2
	Good	1	2.8
Laterality	Bilateral	16	42.1
	Unilateral	22	57.9
Treatment	Medical	5	13.2
	Surgical	33	86.8

Table II: Demographics and characteristics of congenital and acquired ptosis

Baseline Characteristics		Congenital Ptosis		Acquired Ptosis		p-value	X^2
		Frequency (n=28)	Percentage	Frequency (n=10)	Percentage		
Age (years)	0-17	26	92.9	2	20	0.000	32.9
	18-72	2	7.1	8	80		
Gender	Males	12	42.9	10	100	0.0017	9.9
	Females	16	57.1	0	-		
Laterality	Unilateral	18	64.3	4	40	0.18	1.78
	Bilateral	10	35.7	6	60		
Levator Function	Poor	10	40	4	40	0.1	2.62
	Fair	15	60	5	50		
	Good	0	-	1	10		
Treatment	Medical	0	-	5	50	0.0001	16.1
	Surgical	28	100	5	50		
Associations	None / Isolated	20	71.4	5	-	0.22	1.5
	-	-	-	-	50		
	Other Associations	8	28.6	5	50		

Table III: Surgical procedures and complications

Levator Resection	No of patients (n=33)	Percentage	Complications	Percentage	X^2
Levator Resection	11	33.3	0	0	$X^2=6.64$ p=0.01
Frontalis sling Silicone tube	14	42.4	2/4	14.3	
Frontalis sling Silicone tube	1	3.0	1/1	100	
Levator Advancement	4	12.1	2/4	50	
Levator Advancement	3	9.1	0	0	

glasses. Four patients had positive MGJW as an association with ptosis. Isolated ptosis was seen in 5 patients (50%) with acquired ptosis and remaining 50% had associations. These associations included trauma followed by involutional, myasthenia gravis (MG). Kearns Sayre syndrome and chronic progressive ophthalmoplegia (CPEO) and a 3rd nerve palsy case.

There was no significant relationship between isolated and associated ptosis with congenital and acquired ptosis (X^2 1.5, p value 0.22).

The most performed procedure was frontalis sling with 2/0 prolene (n=14/33; 42.4%), followed by levator resection (n=11/33; 33.3%). For patients with MGJW, levator extirpation (11.6%) with frontalis sling using proline or silicone tube was done in 4 patients. Levator advancement for involutional ptosis was done in 3 patients (9.1%). Frontalis sling with silicon tube open technique was done in 1 patient on both eyes (3%).. Complication rate observed for Frontalis sling 2/0-Proline; frontalis sling Silicone tube and Levator Extirpation with sling were 14.3% (n=2/14); 100% (n=1/1) and 50% (n=2/4) respectively. No complications were observed for levator resections after 3-4 months of follow-up.

Our first study patient had MGJW with ptosis and underwent levator extirpation with a frontalis sling using silicon tube (fox open technique) and developed right re-ptosis after 4 weeks. She was re-operated with a frontalis sling using 2/0 proline (closed). After 6 weeks, she presented with re-ptosis and pus/discharge from the forehead wounds. She was started on IV antibiotics and after controlling the infection, re-sling with 2/0 proline was done and wound was explored to remove old proline and silicone tube. Patient has been doing well with no complications at 3 and 6 months follow-up.

Our second patient who underwent bilateral sling with silicon tube (fox open technique) developed post op entropion in right eye and needed anterior lamellar repositioning after a week. Use of silicone tube in our frontalis sling procedure (open technique) resulted in complications a 3-year-old female developed re- ptosis in one eye after sling with 2/0 proline (bilateral) and underwent a redo procedure with removal of old 2/0 proline. A 7-year-old female underwent levator extirpation with sling with proline and developed re-ptosis after a week and underwent a re-sling and doing fine. One patient was operated elsewhere and presented with re-ptosis and underwent re sling with 2/0 proline. All these patients were followed up for 3-4 months and are doing fine with no complications.

There was a significant association between the type of surgical procedure and the complication rates.

specifically, procedures like the frontalis sling with silicone tube and levator extirpation with sling showed higher complication rates, while others like levator resection and levator advancement had none ($X^2=11.89$ p-value= 0.02).

DISCUSSION

Blepharoptosis was a common presentation in our outpatient clinic, with both congenital and acquired cases observed. Congenital ptosis predominated in our cohort and was more frequently seen in children, accounting for 73.7% (n=28) of cases. Among these, isolated congenital ptosis constituted 71% of congenital cases. A retrospective study by Griepentrog GJ, et al., showed that isolated congenital ptosis was observed in 1 of 842 births and was more common. Congenital cases have been seen more frequently than acquired ptosis.[3]

In our study we observed congenital and acquired forms were more common in males (57.9%) compared to females 42.1%. Other studies have also seen a similar association between congenital ptosis and male gender.[4,7-9] In acquired cases, adult males are more prone to trauma hence have a higher chance of traumatic ptosis.[4] Diseases such as Kearns Sayre syndrome are seen in males and has an association with ptosis.[10]

There were more observed unilateral congenital ptosis (64.3%) compared to bilateral congenital ptosis seen in 35.7 % of patients. There was no significant relationship between laterality and type of ptosis. Other studies have also shown mix results. Griepentrog GJ, et al., observed 90% of ptosis cases were congenital and only 3% were bilateral with the left side affected in 68%.[3] Lee V, et al., observed 82% unilaterality and 18% bilaterality in a study on pediatric ptosis.[7] Similarly another study reported a higher prevalence of congenital ptosis (69%) and unilaterality in 65% of cases with left eye being involved in 74% of cases.[11] Pavon P, et al., observed that the left eye lid was affected in 55% of ptosis patients and unilaterality in 91.5% of cases that were part of the study.[12] Beret CR, et al., in a review observed incidence of congenital ptosis to be 41% , with 65% unilateral and out of those 74% involved only the left eye.[5]

Surgery was done in all congenital ptosis casers (28/28) and 50% of acquired ptosis was managed surgically. The results are very similar to other studies where surgery was the commonest approach.[6] Timing of surgery is a critical factor especially in infants and children

who are at risk of deprivational amblyopia due to the ptotic lid involving visual axis.[6,13]

In our study, surgery performed most was frontalis sling fox closed technique with 2/0 proline followed by levator resection 42.4% versus 33.3%, respectively. This was not surprising as majority of our patients were children with congenital ptosis and the biggest group was 0-10 years with a less developed levator muscle. Bigger children and adults with levator functions of 5 or better, anterior levator resection was performed. Omotoye OJ, et al., also used levator function as a major criterion for deciding the best surgical option like our study.[6]

The indication for immediate surgery in children was risk of deprivational amblyopia due to ptotic lid involving the visual axis. Consistent with previous studies, early surgery was performed in children at risk of amblyopia.[6,13,14]

In patients with poor levator function, frontalis sling procedures were preferred, whereas levator resection was performed in those with levator function greater than 4 mm.[6,13,14]

We had a 100% success rate with levator resection with no complications up to 3-4 months of follow-up. This is not a surprise as other studies have had excellent results with levator resection compared to frontalis sling.[13] Another study showed levator resection was successful in 79% of patients.[15] Similarly, Cates and Tyers observed a success rate of 76% and it fell down by only 2% at 6 months postoperatively.[16] Several studies have done maximum anterior levator resections even in cases of poor levator function with excellent results and this may be considered a better option to avoid complications associated with frontalis sling.[13,17-19]

CONCLUSION

Blepharoptosis, particularly the congenital form, is a common presentation in childhood, often prompted by cosmetic concerns but with important visual implications. A thorough clinical evaluation is essential to identify associated abnormalities and guide management. Surgical intervention remains an effective treatment option and should be individualized based on the severity of ptosis, risk of amblyopia and levator function. Acquired ptosis requires careful assessment to determine the underlying cause and may necessitate additional investigations. Although surgical outcomes are generally favorable, potential complications emphasize the importance of appropriate patient selection, meticulous surgical planning and structured postoperative follow-up.

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AUTHORS' CONTRIBUTION

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

NJ & SI: Conception and study design, acquisition, analysis and interpretation of data, drafting the manuscript, critical review, approval of 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.

CONFLICT OF INTEREST

Authors declared no conflict of interest, whether financial or otherwise, that could influence the integrity, objectivity, or validity of their research work.

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DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request

KMUJ web address: www.kmuj.kmu.edu.pk
Email address: kmuj@kmu.edu.pk