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Prevalence of Amblyopia in Congenital PTOSIS Patients <10yrs Attending Ophthalmology OPD – A Hospital Based Study.

Authors:
Corresponding author – Dr.S.Neela Priyadharshini*
Co authors – Dr.K.Namitha Bhuvaneshwari, Dr.C.Indhu

Affiliations:
Dr.S.Neela Priyadharshini -final year MS OPHTHALMOLOGY postgraduate student* ,
Dr.K.Namitha Bhuvaneshwari, - Professor and Head of department ,
Dr.C.Indhu- Associate professor
Department of Ophthalmology
Meenakshi Medical College Hospital and Research Institute, Enathur, Kanchipuram.
Meenakshi Academy of Higher Education & Research (MAHER), Chennai.

*Correspondence: Dr.S.Neela Priyadharshini
Postgraduate, Department of Ophthalmology
Meenakshi Medical college Hospital and Research Institute, Enathur, Kanchipuram
Meenakshi Academy of Higher Education & Research (MAHER), Chennai.

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KEYWORDS
Prevalence, Amblyopia, Congenital Ptosis, hospital based study.

ABSTRACT:

Background: Congenital ptosis is a condition in which the upper eyelid droops and can become noticeable at birth or within the first year of life. It can be caused by issues with the muscles that control the eyelid or nerve problems, such as third nerve paresis or Horner syndrome. The prevalence of congenital ptosis ranges from 0.18% to 1.41% and may also be associated with refractive errors, strabismus, or occlusion of the visual axis, which can increase the risk of developing amblyopia.

Materials & Methods: In this prospective cross-sectional study, 50 patients with congenital ptosis were examined in the Ophthalmology Department of a Private medical college between January 2023 and December 2023. The collected data was entered in Microsoft Excel. Coding of the variables was done. Analysis was done using SPSS software (Version 27, IBM). Descriptive statistics was used. Association between categorical tests. P value less than 0.05 was considered significant.

Results: The mean age (± SD) was 7.95, years ranging from 2 years to 10 years. They were 24 (48%) male and 26 (52%) female patients, 32 (64%) unilateral and 18 (38%) bilateral ptosis. 40% of the sample population exhibits signs of amblyopia. The p Value of association between the Congenital ptosis and amblyopia is 0.000 which is less than < 0.05 so, its statistically significant.

Conclusion: This study emphasizes the importance of comprehensive assessments for patients with amblyopia and congenital ptosis, which should include measuring ptosis, conducting cycloplegia refraction for refractive error evaluation, examining ocular motility, and facilitating visual rehabilitation following ptosis surgery.

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Introduction

Congenital ptosis is a medical condition characterized by the drooping of the upper eyelid, which may become apparent either at birth or within the first year of life. It can result from neurogenic factors, such as congenital third nerve paresis and congenital Horner syndrome, and myogenic factors, such as the poor functioning of the levator or superior rectus muscles[1,2]. The prevalence of congenital ptosis varies from 0.18% to 1.41%. This condition may also be linked to refractive errors, strabismus, or occlusion of the visual axis, which may increase the risk of developing amblyopia[3].

Amblyopia is often a one-sided condition, although it can occasionally occur in both eyes.[4] The incidence of amblyopia is higher in individuals with congenital ptosis than in the general population, which is attributed to the connection between ptosis, refractive errors, strabismus, and obstruction of the visual axis. Refractive errors are the most prevalent cause of amblyopia, followed by other causes such as anisometropia, isoametropic amblyopia, and meridional amblyopia, which are less commonly observed[5,6,7].

Strabismic amblyopia occurs when the visual axis of the deviating eye is suppressed monocularly[8]. Deprivation amblyopia typically results from occlusion of the visual axis due to lid, although this occurrence is rare in humans due to their compensatory head postures, including head tilt and chin elevation, which are more pronounced in cases of bilateral ptosis. While some authors suggest that amblyopia rarely develops from ptosis alone without other refractive or strabismic causes, others argue that the severity of the condition is directly proportional to the degree of ptosis[9,10]. This study aims to investigate the prevalence of amblyopia in congenital ptosis.

Materials & Methods

In this prospective cross-sectional study, 50 patients with congenital ptosis were examined in the Ophthalmology Department of a Private medical college between January 2023 and December 2023. All participants underwent a full ophthalmological assessment, which included evaluations of Best Corrected Visual Acuity (BCVA), refractive errors, neurological and ocular motility, strabismus, and ptosis. Patients with acquired ptosis or over 10 years of age were excluded from the study. Both consent to participate and consent to publish were obtained from each study participant.

Ptosis was assessed by measuring margin-reflex distance, palpebral fissure height, levator function, upper lid crease and pretarsal show. The severity of ptosis was classified to mild, moderate and severe depending on Marginal Reflex Distance 1 (MRD1) which was measured from the center of the upper lid to the pupillary light reflex. MRD1 equals 4 mm to 5 mm was considered to be normal, mild (MRD1 2 mm to 3mm), moderate (MRD1 1 mm to 2 mm) and severe (MRD1 0 or less).

Visual acuity was measured by Snellen chart. Amblyopia was considered in patients when the Best Correction of Visual Acuity (BCVA) difference is two lines with Snellen chart between the two eyes, or the BCVA is less than 6/60 (1 log MAR). Refractive error was measured by cycloplegia refraction using 1% cyclopentolate in younger patients and manifest refraction in older patients. Difference in refraction >1 diopter between the two eyes was considered as anisometropia. Astigmatism equals to 1D or more, hypermetropia more than 4D and myopia more than 6D were considered as amblyogenic.

The collected data was entered in Microsoft Excel. Coding of the variables was done. Analysis was done using SPSS software (Version 27, IBM). Descriptive statistics was used. Association between categorical tests. The outcomes of the treatment groups were compared using a test to reach the hypothesis, a P value less than 0.5 was considered significant.

Results

In this prospective cross-sectional study, 50 patients with congenital ptosis were examined in the Ophthalmology Department of a Private medical college between January 2023 and December 2023.

Table 1: shows the Age distribution among the study participants

Age	Frequency	Percentage (%)
< 5 years	19	38
>5 years	31	62
Total	50	100

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To represent the age distribution of a certain population, segmented into two categories: those under 5 years old and those under 5 years old or older. The table indicates that out of a total of 50 individuals surveyed, 19 fall into the category of being under 5 years old, while 31 belong to the group of 5 years or older. This breakdown shows that the majority, constituting 62% of the surveyed population, are 5 years old or above, while the remaining 38% are under 5 years old. The mean age (± SD) was 7.95, years ranging from 2 years to 10 years.

Chart 1: shows the gender distribution among the study participants

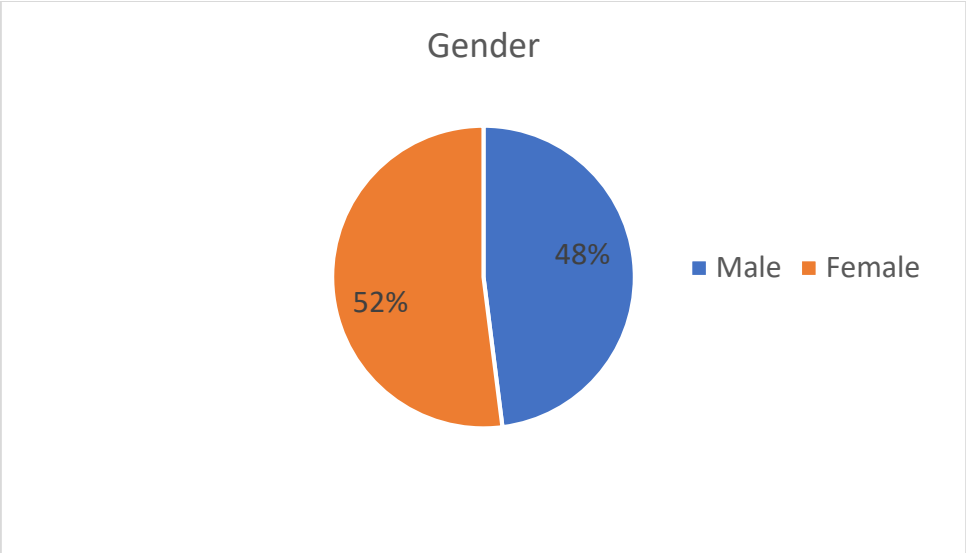
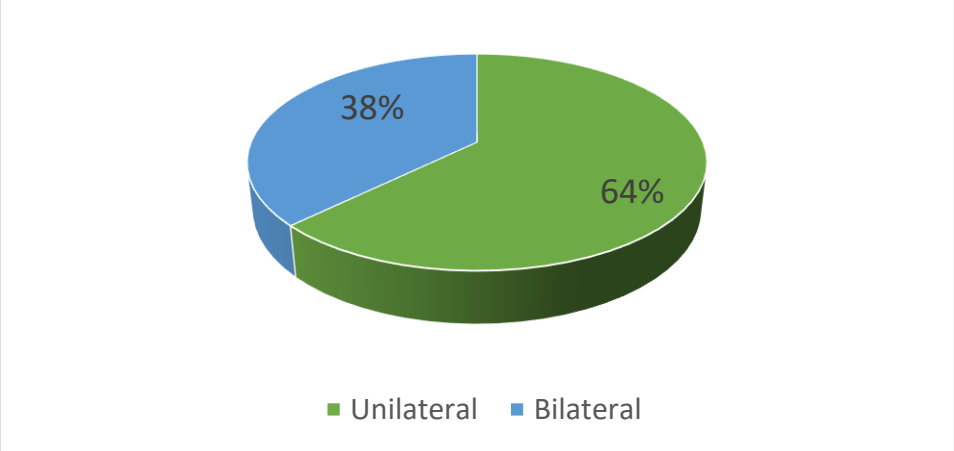


Chart 2: shows the Congenital ptosis presentation among the study participants



They were 24 (48%) male and 26 (52%) female patients, 32 (64%) unilateral and 18 (38%) bilateral ptosis.[Chart 1, Chart 2]

Table 2: causes of congenital ptosis among the study participants

causes of congenital ptosis	Frequency	Percentage (%)
Simple congenital ptosis	19	38
Mono-elevation deficit	4	8
Congenital third nerve palsy	7	14

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Congenital fibrosis syndrome	9	18
Blepharophimosis syndrome	11	22
Total	50	100

Within a sample population of 50 individuals the most common cause appears to be blepharophimosis syndrome, accounting for 22% of cases, followed by simple congenital ptosis at 38%. Congenital fibrosis syndrome and congenital third nerve palsy contribute to 18% and 14% of cases, respectively, while mono-elevation deficit represents the least common cause, with 8%.

Table 3: Prevalence Ambylopia

Ambylopia	**Frequency**	**Percentage (%)**
Present	20	40
Absent	30	60
Total	50	100

The prevalence of amblyopia, commonly known as lazy eye, within a sample population of 50 individuals. The table categorizes individuals based on whether amblyopia is present or absent, providing both the frequency and percentage for each group. According to the data, 40% of the sample population exhibits signs of amblyopia, while the remaining 60% do not have this condition.

Table 4: cause of Amblyopia among the study participants

Cause	**Amblyopia**	**Pvalue**
Refractive	11 (55%)	0.000
Deprivation	4 (20%)	0.002
Strabismus	3 (15%)	0.001
Mixed	2 (10%)	0.002
Total	20 (100%)	

The sample population of 20 individuals diagnosed with amblyopia. The most common type appears to be refractive amblyopia, accounting for 55% of cases, followed by deprivation amblyopia at 20%. Strabismic amblyopia represents 15% of cases, while mixed amblyopia constitutes 10%. Refractive amblyopia typically occurs when there is a significant difference in refractive error.

Table 5: Association between the Congenital ptosis and amblyopia

Variables		**Amblyopia**		**Total**	**P Value**
		Present	**Absent**		
Congenital ptosis	Unilateral	13(26%)	19(38%)	32(64%)	0.000*
	Bilateral	7(14%)	11(22%)	18(36%)	
	Total	20(40%)	30(60%)	50(100%)	

the variable "Amblyopia" totally segmented by the presence or absence of amblyopia and further categorized as unilateral or bilateral. The data represents a sample population of 50 individuals. Among these individuals, 20 are diagnosed with amblyopia, while 30 do not have the condition. Within the group diagnosed with amblyopia, 13 individuals exhibit unilateral amblyopia (affecting only one eye), while 7 individuals

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have bilateral amblyopia (affecting both eyes). In contrast, among those without amblyopia, 19 individuals have unilateral cases, and 11 individuals have bilateral cases. The p Value of association between the Congenital ptosis and amblyopia is 0.000 which is less than < 0.05 so, its statistically significant.

Discussion:

In this prospective cross-sectional study, 50 patients with congenital ptosis were examined in the Ophthalmology Department of a Private medical college between January 2023 and December 2023.

The importance of considering the risk of amblyopia in patients with congenital ptosis is paramount when assessing, treating, and following up postoperatively. Research suggests that the incidence of amblyopia in the general population is approximately 3.0% to 3.2%, with higher prevalence among those with congenital ptosis. A range of 14% to 48% has been reported in prior studies for amblyopia in all forms of congenital ptosis. In this particular study, the incidence of amblyopia was estimated to be 40% among the 50 patients involved. Notably, 13 patients (26%) experienced amblyopia due to unilateral ptosis, while only 7 patients (14%) had it as a result of bilateral ptosis. The most common form of congenital ptosis observed was simple congenital ptosis, which is in line with estimates from Griepentrog et al.[11] (14.8%), Srinagesh et al.[12] (25.3%), and Lin et al.[13] (21.5%).

The leading causes of amblyopia in patients with congenital ptosis are refractive error and strabismus. Almost all cases congenital ptosis with amblyopia had coexisted refractive error or strabismus. The refractive error was considered to have the major role in amblyopia in congenital ptosis as reported by Oral et al.[14] (71%). and Paik et al.[15] (78%). However, other studies found that the major cause of amblyopia was the strabismus and others deprivation amblyopia. In the present study we found that the refractive errors in any form is the major factor that caused amblyopia and it is contributing in about 55% of the amblyopic patients. While occlusion of the visual axis, causing deprivation amblyopia, is about 20% of the amblyopic patients and 15% due to strabismus and 10% due to combination of multiple factors of refractive error, squint or deprivation.

The incidence of strabismus in patient with congenital ptosis ranged between 10.3% to 31.9% in various studies this might be secondary to the occlusion of the visual axis by the ptotic eye causing disruption of the binocularity. The incidence of amblyopia related to strabismus alone had been reported by Schneider et al.[16] is 6%, and Oral et al.[14] is 3%. Amblyopia due to combination of strabismus, refractive error had been reported by Schneider et al.[16] 11% due to astigmatism with strabismus, Oral et al.[14] 17% due to strabismus and refractive error. In this study the incidence of strabismus is 17.9% and amblyopia related to strabismus is 16.6% of the strabismic patients. Amblyopia due to combination of strabismus, refractive error and deprivation amblyopia has been reported in 3 (20%) of amblyopic patients. Combination of astigmatism and strabismus in the one patient, strabismus and deprivation amblyopia in second patient and combination of astigmatism, deprivation and strabismus in the third case, the last two cases strabismus were due to third nerve palsy.

Regarding deprivation amblyopia, it has been estimated that between 1.6% and 12.3% of the patients with congenital ptosis will have deprivation amblyopia due to occlusion of the visual axis. While in Griepentrog et al.[11] study, they found that nearly half of the amblyopic patient with congenital ptosis were due solely to eyelid occlusion of the visual axis, approximately 1 in 7 patients diagnosed with congenital ptosis. This wide variation in incidence may be related to the decompensatory mechanisms that are adopted by the patient to decompensate the occlusion of the visual axis, like chin elevation, frontalis muscle recruitment, that decreased the risk of develop of deprivation amblyopia in even severely ptotic eyes especially in bilateral ptotic patients and acting as a protective mechanism against deprivation amblyopia. This was noticed in this study as the abnormal head posture and chin elevation were noticed in 18(38%) out of patients, all with bilateral ptosis and only two patients 7(14%) had amblyopia.

Congenital ptosis may be correlated with the development of deprivation amblyopia mainly, in addition to the other forms of amblyopia, refractive and strabismic amblyopia. In Hornblass et al.[18] study they found a significant relationship between the severity of ptosis and the development of amblyopia. Also Srinagesh et al.[11] found the same correlation with the severity of

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ptosis and the same with Merriam et al.[17] and Oral et al.[14] studies

In the contrary, Stein et al.[18] and Paik et al.[15] studies found no significant relationship between the severity of ptosis and the development of amblyopia, the same results reported by Beneish et al.[18] and ugurbas et al.[19]

Conclusion:

This study demonstrated the high incidence of amblyopia in association with congenital ptosis, therefore, it is highly recommended to fully assess those patients for the presence of any amblyogenic factor in the ptotic eye by measuring the ptosis, refractive error assessment using cycloplegia refraction, and ocular motility, and, more importantly, visual rehabilitation after surgical correction of ptosis.

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Conflicts of interest: Nil

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