



PREVALENCE OF AMBLYOPIA IN CHILDREN (0-18 YEARS) WITH REFRACTIVE ERRORS

Ophthalmology

Dr. Neha Rathi Chief Resident, Dept of Ophthalmology, Govt. Medical College & Hospital, Aurangabad.

Dr. Vaishali Lokhande Une* Associate Professor, Dept of Ophthalmology, Govt. Medical College & Hospital Aurangabad. *Corresponding Author

ABSTRACT

Introduction- Amblyopia is most common cause of preventable monocular visual impairment in both children & adults under 40 years of age(1).

Aim- To study the prevalence of amblyopia in children (upto 18 years) with refractive error visiting the OPD of a tertiary care center

Materials & Methods- In study of 250 patients with refractive error, visual acuity was determined and those with vision $\leq 6/12$ were considered amblyopic. These patients were given adequate spectacle correction and occlusion therapy for duration of about 6 months followed by gradual reduction.

Results- Prevalence of amblyopia in patients with refractive error was 12.4%. Of these spectacle correction was given to 11, patching to 12 and penalization to 8 patients.

Conclusion- Prevalence of Amblyopia in patients with refractive error (0-18 years) was 12.4%. Proper counselling and motivation of parents and children and awareness in society in general, about REVERSIBILITY of preventable cause of childhood blindness is necessary.

KEYWORDS

Amblyopia, refractive error, spectacle, patching, penalization.

INTRODUCTION-

The Human Eyes are by far the most precious of all our sense organs. It is the mirror of soul and body's window to the outside world. Childhood holds a very important place in the life of every human being. Visual impairment due to refractive errors is one of the most common childhood problems and the second leading cause of treatable blindness.⁽²⁾

Von Graefe has defined amblyopia as the condition in which the observer sees nothing and the patient very little.⁽³⁾ Amblyopia may lead to failure to develop binocular vision and the associated cosmetic disorder may interfere with social and psychological development.⁽⁴⁾

MATERIALS & METHODS

It was a prospective hospital based study conducted at a tertiary care center.

Aim was to study the prevalence of amblyopia and thereby its management in children (upto 18 years) with refractive error visiting the OPD of a tertiary care center.

Total 250 patients fulfilling the inclusion criteria were included in study which was conducted over a period of 2 years.

1. Inclusion criteria-

I) Patients (upto 18 years) with refractive error (myopia SE ≥ -0.75 DS, Hypermetropia SE ≥ 2 DS, Astigmatism SE ≥ 0.75 DC)

2. Exclusion criteria-

Patients with the following features :

- ii) Global developmental delay
- iii) Congenital anomalies of eye.
- iv) Media opacities.
- v) Ocular trauma
- vi) Nystagmus
- vii) Posterior segment diseases
- viii) Ptosis
- ix) Ocular surgery

Ethical committee approval was taken before starting study and written consent was taken from patients.

Detail history was taken from the patients and complete systemic and ocular examination was done.

Subjective and objective refraction was done and Best corrected visual acuity (BCVA) of the patients was determined. If uncorrected vision was $\leq 6/9$ in either eye, the child was declared to have defective vision and vision with the help of pin hole was taken in these patients.

BCVA of less than or equal to 6/12 or if there was difference of 2 lines on Snellen's chart than patient was considered amblyopic.

The patients with amblyopia were given adequate spectacle correction and occlusion therapy in the form of penalization or patching for duration of about 6 months followed by gradual reduction

OBSERVATIONS & RESULTS

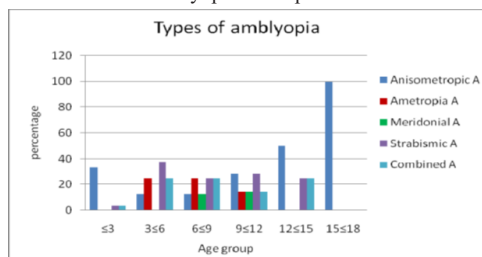
Total 250 patients were included in the study with age group from 0-18 years.

The prevalence of amblyopia in a tertiary eye care center, in patients up to 18 years of age with refractive error was 12.6%.

Mean age of patients with amblyopia was 8.40 ± 3.88 years. Highest prevalence (3.2%) was found in the age group of 3-9 years ($3 \leq 6$ and $6 \leq 9$ years) with a decrease in the prevalence as the age advances (2.8% in $9 \leq 12$ years, 1.6% in $12 \leq 15$ years, 0.4% in $15 \leq 18$ years).

Out of 31 patients with amblyopia 17 (54.84%) were males and 14 (45.16%) females but difference is not clinically significant (Unpaired T Test $p=0.59$).

Amongst all, 10 patients (32.26%) had binocular involvement, 21 patients (67.74%) had monocular involvement. Children with bilateral amblyopia were younger (mean age = 7.57 ± 3.22 years) compared to unilateral cases (9 ± 4.29 years) but this difference was not clinically significant (Unpaired T test $p=0.32$). The age of the patients with unilateral and bilateral amblyopia is comparable to each other.



Amongst the 31 patients of amblyopia, 9 patients (29.03%) had strabismic amblyopia and was the commonest type, 8 patients (25.81%) had anisometropic amblyopia, 7 patients (22.58%) had combined amblyopia, 5 patients (16.13%) had ametropic amblyopia, 2 patients (6.45%) had meridional amblyopia.

The type of refractive error was found to be associated with the type of amblyopia.

Mean hypermetropia in ametropic amblyopia was $6.25 \pm 1.405D$. The magnitude of myopia was more than that for hypermetropia ($7.25 \pm 1.5 D$) in this age group. Similarly mean myopia was higher ($4.30 \pm 2.63D$) in the anisometropic age group as compared with hyperopsics ($3.91 \pm 2.63 D$). In strabismic eyes mean hyperopia was $2.6 \pm 0.51 D$ and mean myopia was $3.91 \pm 0.46D$.

Mean age of patients with anisometropic amblyopia was 10.22 ± 4.49 years, which was significantly more (Kruskal Wallis test with post hoc Dunn test. $P < 0.0001$) than that of patients with ametropic amblyopia (7.90 ± 2.83 years), mixed amblyopia (7.5 ± 4.46 years), strabismic amblyopia (7.06 ± 3.30 years). The average age of presentation with meridional amblyopia which was 10 ± 2.828 years, was comparable to patients with anisometropic amblyopia (10.22 ± 4.49 years).

Table 18. Refractive Status of Amblyopic Eye

Type of amblyopia	Myopia	Hypermetropia	Total
Strabismic A	3	6	9
Combined A	2	5	7
Anisometropic	4	4	8
Ametropic	3	2	5
Total	12(45.31%)	17(54.83%)	29

*2patients with meridional amblyopia were not included.

Of the 31 patients 17 (54.83%) had hypermetropia and 12 (45.31%) had myopia. 2 patients had meridional amblyopia. Among the Hypermetropic amblyopic patients, 6 (35.29%) had mild, 7 (41.18%) had moderate, 4 (23.53%) had severe hypermetropia. Among the Myopic amblyopic patients, 2 (14.29%) had mild, 5 (25.71%) had moderate, 7 (50%) had severe myopia.

The depth of amblyopia was not associated with the type of refractive error (Chi square test, $p > .05$). Myopia includes simple myopia and myopic astigmatism (simple, compound). Similarly hypermetropia group includes simple hypermetropia and hypermetropic astigmatism (simple, compound).

Table 2 . Visual Acuity in Amblyopic Eye

Severity of amblyopia	Mild (6/12-6/18)	Moderate (6/18-6/24)	Severe ($>=6/36$)	Total
Total	9(29.03)	12(38.71)	10(32.26)	31(100)

The depth of amblyopia was not associated with age (one way ANOVA, $p > 0.05$) and gender (X^2 test > 0.05).

Table 3. Profile of Strabismus in Amblyopia

Causes	No strabismus	Strabismus present		Total
		Esotropia	Exotropia	
Strabismic A	0	7(77.78)	2(22.22)	9(100)
Combined A	0	4(57.14)	3(42.86)	7(100)

Out of 31 patients, 16 (51.61%) with amblyopia had strabismus.

Esotropia was the most common deviation seen (68.75%) followed by exotropia (31.25%).

Management of amblyopia

Out of 31 patients who were given amblyopia therapy, 5 were noncompliant (16.12%) and 3 patients (9.68%) were lost to follow up. Of those who were given spectacles (11 patients) improvement was seen in 6 patients (54.54%) patients. Patients of less than 10 years of age (8) were given amblyopia treatment in the form of full time occlusion (patching). Patients who were older than 10 years (4) were given treatment in the form of penalization. All the children were advised to undergo occlusion of the better eye with adhesive patch applied for at least 80% of all waking hours/day and this was termed 'full time occlusion' (FTO). Children were followed up monthly to document improvement and record compliance.

This treatment was continued till there was no further improvement for at least three consecutive visits or attainment of VA equal to that of the initially dominant eye.

Thereafter, maintenance patching (6 h/day) was used for further 6 months to prevent recidivism. Those patients with penalization were given 1% atropine e/d daily and were followed up in the same way. The initial visual acuity ranged from FCCF to 6/18 and the BCVA ranged

from FC 2 m to 6/18. Improvement from gross eccentric fixation to Central steady fixation which can be maintained with preference of other eye was seen in 1 patient (5%), improvement from unsteady central fixation to central steady fixation but not maintained was seen in 1 patient (5%). 2 patient (10%) improved from FCCF to FC 2m. 1 line improvement on Snellen's chart was seen in 1 patient (5%), 2 line improvement on was seen in 4 patients (20%) and 3 line improvement in 1 (5%). No improvement was seen in 2 patients (10%)

DISCUSSION-

The prevalence of amblyopia in a tertiary eye care center, in patients up to 18 years of age with refractive error was 12.8%. Mean age of amblyopia was 8.40 ± 3.88 years. Highest prevalence (3.2%) was found in the age group of 3-9 years ($3 \leq 6$ and $6 \leq 9$ years) with a decrease in the prevalence as the age advances (2.8% in $9 \leq 12$ years, 1.6% in $12 \leq 15$ years, 0.4% in $15 \leq 18$ years).

Alemayehu Woldeyes et al⁽⁵⁾ underwent a hospital-based cross sectional from January- June 2007 and found that the prevalence of amblyopia was 9.1%. The mean age at presentation was 6.9 ± 3.0 years.

In our study strabismic amblyopia (29.03%) was the commonest type and meridional amblyopia (6.45%) was the least common type.

Menon et al⁽⁶⁾ found that out of a total of 733 eyes, 274 eyes (37.38%) had strabismic amblyopia, 151 eyes (22.1%) had anisometropic amblyopia, 126 eyes (18.44%) had combined amblyopia, 88 eyes (12.88%) had ametropic amblyopia, 38 eyes (5.56%) had meridional amblyopia, while the remaining 56 patients (7.63%) had sensory deprivation amblyopia.

Esotropia was the most commonest deviation seen (68.75%) followed by exotropia (31.25%) in our study. Polling et al⁽⁷⁾ observed that esotropia was the most common deviation seen (101=78.9%) followed by exotropia (26=20.3%).

Mean age of anisometropic amblyopia 10.22 ± 4.49 years, which is significantly more (Kruskal Wallis test with post hoc Dunn test. $P < 0.0001$) than that of patients with ametropic amblyopia (7.90 ± 2.83 years), combined amblyopia (7.5 ± 4.46 years), strabismic amblyopia (7.06 ± 3.30 years). Arnold RW⁽⁸⁾ found that the average age of presentation of patients with anisometropic amblyopia was 10.03 ± 6.92 years, which was significantly more than the average age of patients with strabismic amblyopia (7.67 ± 5.55 96years), combined amblyopia (8.62 ± 6.23 years), ametropic amblyopia (8.22 ± 5.93 years), and sensory deprivation amblyopia (8.33 ± 6.63 years).

CONCLUSION

The prevalence of amblyopia in a tertiary eye care center, in patients up to 18 years of age with refractive error was 12.8%. Among those who were given amblyopia therapy, 26% were noncompliant and lost to follow up. Amongst those who were given spectacle correction improvement was seen in 55% patients and improvement in 40% in those with occlusion therapy. Thus proper counseling of patients is essential to reduce the burden of preventable blindness.

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