Original Article

Incidence of Amblyopia in Strabismic Population

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Purpose: To find the incidence and density of amblyopia with reference to the type of squint among the strabismic patients visiting eye department.

Material and Methods: This prospective study was started in January 2000 and a total of 177 patients have been dealt with. Both male and female patients of all age groups and all types of squints were included. All the patients underwent standard procedure of assessment including history, examination and investigations to find the type of deviation, amount of the deviation, the presence of amblyopia and the depth of amblyopia. It was then followed by analysis to see the effect of different factors on the depth of amblyopia

Results: Out of 177 patients 94 had uniocular squint (Group-I) and 83 alternating squint (Group-II). Majority of patients in Group-I had some degree of amblyopia (82%). Amblyopia was much less in group-II (18%). All the 106 patients having amblyopia showed at least two lines difference of Snellen's Acuity between both eyes. Amblyopia is relatively denser in uniocular than alternating strabismus. It is more common and dense in esotropia than exotropia.

Conclusion: Strabismic amblyopia is a condition of arrested development of vision due to misalignment of visual axis in the first 5-6 years of life. This can be avoided if it is treated at the right time. Earlier detection and treatment of squint in the amblyogenic years can save the patient from this life long disability.

Strabismic amblyopia is a serious blinding condition, which affects the patients in very early part of their life, due to misalignment of one of the eyes while the other eye remains straight. When a child is born his retina is almost fully developed structurally, but his vision is very poor (6/60) as it has not fully developed functionally. To develop its full function it requires a clear sharp image formed on its center (macula) within 5-6 yrs of age (vision developing age or amblyogenic age). If squint develops within this period, the eye will not be straight or directed towards the object of regard and the image of this object will not be formed on the macula rather it will be formed in the periphery. So there will be no further development of macular vision.

Visual acuity will remain arrested either at 6/60 or it will develop partially to few more lines but it will never become normal (6/6).

There are many causes of amblyopia but strabismus is one major treatable cause not only in other parts of the world but also in our country. In Pakistan no reliable statistical data is available up till now. We have therefore started a study in Lahore, to find out the percentage of amblyopia in strabismic patients of our population. Among the other causes of amblyopia including, anisometropia, high ametropia, and visual

deprivation due to diseases like cataract, are also common. By ruling out all other causes and treating strabismus in early years of life we can prevent the child from such a grave problem, the affects of which are life long.

MATERIAL AND METHODS

This study on incidence of strabismic amblyopia was conducted in Department of Ophthalmology Fatima Jinnah Medical College and Sir Ganga Ram Hospital, Lahore from January 2000 to December 2002. Patients of squint attending the eye out patient department were screened for amblyopia. The percentage of amblyopia in strabismic patients and the density of amblyopia in relation to the type of deviation was evaluated. 177 patients of all age groups, both sexes and all types of squint were included.

All the patients who visited the eye department and were found to have squint underwent thorough orthoptic assessment which included history, examination and a series of diagnostic tests. Visual acuity was recorded in all cases applying different test types for different age groups. Gross and slit lamp examination was done to rule out any cause of visual deprivation in anterior segment. Cover tests was an essential to label the type of squint. Ocular movements in six cardinal positions of gaze and convergence helped to detect any restrictive or paralytic element. Prism and alternate cover test and synoptophore were main tools to detect the amount of deviation. For binocular functions and suppression, worth four dot test, Bagolini striated glasses, Frisbee test or synoptophore were applied. Retinoscopy (cycloplegic or non-cycloplegic) was also done in every patient to find out the refractive status of each eye. Ophthalmoscopy, direct or indirect, was always performed to rule out any organic cause of reduced vision in the posterior segment.

All the findings detected by above mentioned series of tests were recorded in a performa which was later on was used for further study.

RESULTS

Total number of patients in the study were 177. Age of the patients ranged from 3 years to 40 years Females were found to be more than males (56% vs. 44%) Fig 1. Two major groups of the patients were uniocular squint in 94 cases (Group-I) while 83 cases had alternating variety of squint (Group-II). Corrected visual acuity was 6/6 in both eyes in 71 cases while amblyopia was recorded in 106 cases (59.9%) (Table 1). 82% of total amblyopes belonged to group- I (uniocular squint) while only 18% were from Group-II (alternating squint).

As far as the density of amblyopia is concerned, mild amblyopia (two lines Snellen's chart difference) was seen in 30 patients (28.3%), moderate amblyopia (3 lines Snellen's chart difference) in 51 patients(48.1%) and dense amblyopia(4 or more lines Snellen's chart difference) in 25 patients(23.6%) (Fig. 2 and Table 2).

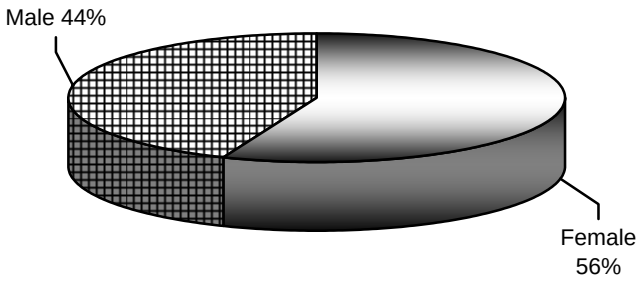

Fig. 1: Sex distribution

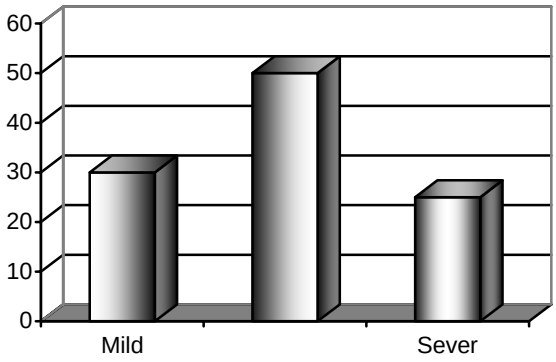

Fig. 2: Density of amblyopia

The effect of the type of deviation on the density of amblyopia is quite evident (Table 3). The risk of development of amblyopia is more in patients of unilateral squint (87 out of 94, 92.5%) while the risk is four times less in alternating squint (19 out of 83, 22.9%). In esotropia the amblyopia is more common (60 out of 91, 66%) and more dense (mild in 13 cases while moderate to sever in 47 cases) while in exotropia, the amblyopia is relatively less common (46 out of 87, 53.5%) and less dense (mild to moderate in 39 cases while severe in only 7 cases).

DISCUSSION

Amblyopia and strabismus are the most common ocular conditions occurring during childhood. Amblyopia is the leading cause of visual loss in childhood. Strabismus is a significant cause of ocular morbidity leading to amblyopia and psychosocial distress[1]. The overall prevalence of amblyopia varies between 1.6 to 3.6% in different regions of the world[2]. Almost all age groups have been studied and the recorded prevalence in children is 3.0%[3], in untreated adults 3.0%[4] and untreated olds 2.9%[5]. Although it has been recorded low in certain countries but there is no significant difference seen in different racial groups[6].

Strabismus has been proved to be the most common cause of amblyopia[7-8]. Other causes are anisometropia, combined strabismus with anisometropia and sensory deprivation[9-10]. In our study out of 177 strabismic patients 106 had some degree of amblyopia regardless of the type of deviation. So the overall incidence of amblyopia in strabismic population was 59.9 % (Table-1).

Table-1: Incidence of Amblyopia

Group	Type of squint	No of Patients	No. of amblyopia Patients	Overall Incidence
I	Unilateral	94	87	49.1
II	Alternating	83	19	10.8
Total		177	106	59.9

Table-2: Density of Amblyopia

Type of strabismus	No of ambly-opic Patients	Density of Amblyopia		
		Mild	Mild	Mild
Uniocular	87	16	47	24
Alternating	19	14	4	1
Total	106	30	51	25

It is important to note that the incidence of amblyopia in unilateral squint was found to be higher (49.1%) Fig. 3, than alternating squint (10.8%) Fig. 4. It is quite clear that those strabismic patients who develop alternation are at 4 times less risk of developing amblyopia than the uniocular squinters. The direction of the deviation definitely has some relation to the development of amblyopia. According to our study the prevalence of amblyopia in esotropia was higher (66%) than its prevalence in exotropia (53.5%). Similar but slightly higher figures are seen in other international research work[11].

Density of amblyopia in our study has been graded on basis of difference of corrected visual acuity between the two eyes in the absence of any organic reason for reduced vision.

Three recognized categories are mild, moderate and severe or dense. It is mild if there is difference of two lines, moderate if difference of three lines and

Fig. 3. Left Exotropia with sever amblyopia

Fig. 4: Alternating Exotropia with normal visual acuity

severe or dense if difference of four or more lines between the visual acuity of two eyes. 28.3% of the amblyopes had mild amblyopia, majority of these belonged to alternating squint and more so to exotropia (Fig 5). 48.1% of the amblyopia is moderate and is seen almost equally in uniocular esotropia and exotropia (Fig 6). Remaining 23.6% amblyopia is severe or dense and most of it seen in uniocular esotropia. (Table 3).

Presence of strabismic amblyopia in all age groups in our study indicates the lack of treatment in early

Table 3: Effect of type of strabismus on density of amblyopia

Type of Squint		No of Patients	No of Amblyopic Patients	Density of Amblyopia		
				Mild	Moderate	Severe
Esotropia	Uniocular (Rt or Lt)	53	48	6	25	17
	Alternating	38	12	7	4	1
Exotropia	Uniocular (Rt or Lt)	41	39	10	22	7
	Alternating	45	7	7	-	-
Total	177	106	30	51	25	Total

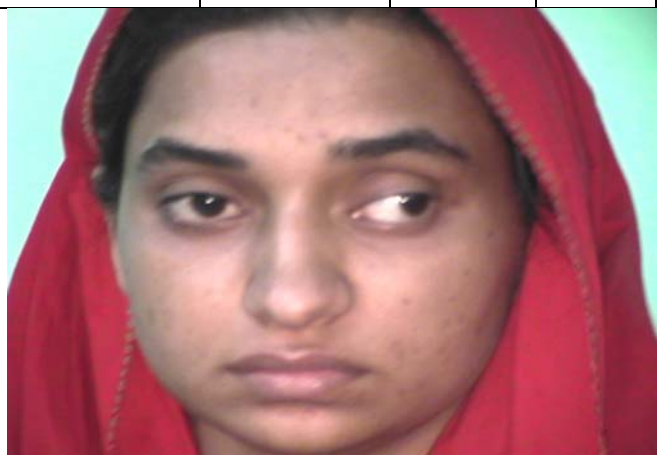

Fig. 5: Left Intermittent Exotropia with mild amblyopia

Fig. 6: Accommodative esotropia with right moderate amblyopia

years of life. Atropine penalisation has been shown to be as effective as occlusion therapy in the treatment of amblyopia[12-13]. These techniques can only be applied and become useful if the diagnosis of amblyopia is made early in amblyogenic or vision developing age. Early detection of amblyopia and its treatment can reduce the overall prevalence as proved by many studies in different parts of the world[14-15]. Early screening of visual acuity and strabismus is a real need of our country.

CONCLUSION

Amblyopia due to strabismus is a problem faced in all age groups in our society. To save the future generations from this life time visual disability, an enthusiastic approach to the problem is required, and this must be based on the identification and treatment of strabismus and amblyopia during the sensitive period. A comprehensive screening programme must be devised and applied. The best time for screening may be at school entry into the play group.

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