Original Article

A Study of Amblyopia in Ametropic Patients

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Abstract

Introduction: Amblyopia means dull vision. It is a condition of diminished visual form sense which is not a result of any clinically demonstrable anomaly of the visual pathway and which is not relieved by the elimination of any defect which constitutes a dioptric obstacle to the formation of the foveal image. It is a disorder of reduced visual function from abnormal visual experience caused by Strabismus, Anisometropia, Ametropia or Visual Form Deprivation during the critical period of visual development. Amblyopia is one of the most common causes of monocular visual impairment in children and young adults. Refractive errors include myopia (short-sightedness) and hyperopia (long-sightedness) with or without astigmatism(when the eye can sharply image a straight line lying only in one meridian). **Aims and Objective:** To find out prevalence of amblyopia in ametropic patients. **Methodology:** This was prospective study of all the children and young adult patients who attended the eye clinic in one year period were included into the study, after a thorough work-up of the eye patients a total of 63 cases having diminution of vision with ametropias only were identified and patients having reduction of visual acuity of greater than two lines between the eyes or an absolute reduction in acuity below 6/9 either eye in Snellen's Vision Chart which cannot be corrected by refraction were enrolled into study. **Result:** Majority of the amblyopic patients were having Hyperopia and Anisohyeropia (46.03%) or Hyperopic astigmatism (17.46%). This was followed by Myopic astigmatism (15.87%), Myopia and Anisomyopia (14.29%) and Mixed Astigmatism (6.35%). Majority of the patients were Males 55.56% followed by Females 44.44%. In Laterality of Amblyopia Majority of the patients were having Monocular amblyopia 73.02% followed by Binocular 26.98%. **Conclusion:** The Amblyopia is associated with the ametropia so early detection of refractive errors and corrections should be prompt everywhere since from the young age.

Key words: Amblyopia, Ametropia.

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INTRODUCTION

Amblyopia means dull vision. It is a condition of diminished visual form sense which is not a result of any clinically demonstrable anomaly of the visual pathway and which is not relieved by the elimination of any defect which constitutes a dioptric obstacle to the formation of the foveal image. It is a disorder of reduced visual function from abnormal visual experience caused by Strabismus, Anisometropia, Ametropiaor Visual Form Deprivation during the critical period of visual development. Amblyopia is one of the most common causes of monocular visual impairment in children and young adults. Refractive errors include myopia (short-sightedness) and hyperopia (long-sightedness) with or without astigmatism(when the eye can sharply image a straight line lying only in one meridian). Recent studies have confirmed the existence of a large burden of uncorrected refractive errors, although the interventions required are significantly cost effective, and have an important impact on economic development and quality of life. Severe refractive errors have been estimated to account for about 5 million blind people. Refractive errors can be rectified with appropriate optical correction while people with low vision may be helped with low vision devices.[1] A large number of persons, including school children, require correction of refractive errors such as short sightedness and long sightedness. VISION 2020 partners develop models to provide affordable optical correction and low vision aids to persons in need worldwide, specifically those from poor urban and rural areas with limited available services. The availability of these services helps ensure a better future for visually

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impaired children and adults. Appropriate correction prevents the development of childhood Amblyopia and enables better performance at school.[1] 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 psychological distress.[2] The overall prevalence of Amblyopia varies between 1.6 to 3.6% in different regions of the world.[2] Simon observed that Screening for Strabismic, refractive and ocular disease conditions directly associated with Amblyopia is more clearly proven"[3] Stager suggested that Amblyopia is one of the most common eye ailments in children. Early treatment can frequently eliminate this problem.[4] According to Friendly, "Amblyopia is a reduction in the quality of central, corrected vision resulting from a disturbance in retinal image formation during the first decade of human life". [5]Sapkota deduced that Visual impairment with myopia among upper-middle socioeconomic school children in Katmandu is higher than that in rural Nepal, and a with a prevalence of 2-4% in the North American population.[7] The status report of DGHS, Govtpublic health problem because nearly half are without corrective spectacles. Effective strategies are needed to eliminate this easily treatable cause of visual impairment.[6] Amblyopia is responsible for more unilaterally reduced vision of childhood onset than all other causes combined, of India shows ametropias as the second largest cause of blindness after cataract.[8]

METHODOLOGY

This was prospective study of all the patients children and young adult patients who attended the eye clinic in one year period were included into the study after taking history, visual acuity test by Snellen's Vision Chart, cycloplegic refraction in children and dry or wet retinosocopy in young adults, a thorough anterior and posterior segment eye examinations by slit lamp biomicroscope and ophthalmoscope to exclude other amblyogenic factors like strabismus and visual stimulation deprivation; and other causes of diminution of vision.Thus, after a thorough work-up of the eye patients a total of 63 cases having diminution of vision with ametropias only were identified in one year period and patients having reduction of visual acuity of greater than two lines between the eyes or an absolute reduction in acuity below 6/9 either eye in Snellen's Vision Chart which cannot be corrected by refraction were enrolled into study. For categorization of refractive errors the following criteria were used:

***Anisometropic amblyopia*:** This included patients who hadamblyopia in the presence of anisometropia that was 1 Dor greater in spherical equivalent, or a 1.5 D or greater difference in astigmatism between both the eyes.

***Ametropic amblyopia*:** Patients with refractive errors more than 1 D spherical equivalent in both eyes resulting in subnormal vision in one or both eyes and no associated strabismus or any other ocular pathology were classified under this category.

***Meridional amblyopia (Amblyopia with Astigmatism)*:** Patients with regular astigmatism ≥ 1.5 D of astigmatism in any meridian or those with irregular astigmatism in both eyes, resulting in a decrease in vision in one or both eyes and no associated strabismus were classified as having meridional amblyopia. Patients with significant anisometropia along with a difference of 1.5 D or greater astigmatism between the two eyes were excluded from this category and
grouped under the anisometropic amblyopia group.

RESULT

Table 1: Distribution of amblyopic patients as per the type of Ametropia

Type of Ametropia	No	Percentage (%)
HyperopiaandAnisohyperopia	29	46.03
Hyperopic astigmatism	11	17.46
Myopia andAnisomyopia	9	14.29
Myopic astigmatism	10	15.87
Mixed astigmatism	4	6.35
Total	**63**	**100**

Majority of the amblyopic patients were having Hyperopia and Anisohyeropia(46.03%) or Hyperopic astigmatism (17.46%). This was followed by Myopic astigmatism (15.87%), Myopia and Anisomyopia (14.29%) and Mixed Astigmatism (6.35%)

Table 2: Distribution of Study patients as per Sex

Sex	No	Percentage (%)
Male	35	55.56
Female	28	44.44
Total	**63**	**100**

Majority of the patients were Males 55.56% followed by Females 44.44%.

Table 3: Distribution of Study Patients as per the Laterality of Amblyopia

Laterality	No	Percentage (%)
Monocular	46	73.02
Binocular	17	26.98
Total	**63**	**100**

In Laterality of Amblyopia Majority of the patients were having Monocular amblyopia 73.02% followed by Binocular 26.98%.

DISCUSSION

Von Graefe described amblyopia as that condition in which the observer sees nothing and the patient very

little. Amblyopia is a unilateral or bilateral decrease in visual acuity, caused by deprivation of form vision or abnormal binocular interaction, or both, for which no organic causes can be detected.[9] It results from inadequate or abnormal stimulation of the visual system during a critical early period of visual development.[10] This disorder uniquely occurs during early childhood. Its effects may be permanent if not treated earlier and adequately. Some amblyopes may show retinal abnormalities, but these are not general features of amblyopia. [11]There is cell shrinkage in the parvo cellular layers, which receive input from the amblyogenic eye. This was more marked in the ipsilateral lateral geniculate nucleus.[12] The constant unilateral optical blur due to a difference in refractive error between the two eyes causes cortical suppression of the more ametropic eye and leads to amblyopia. In anisometropia the retinal image in one eye is always de-focused. Moreover, the binocular competition between the blurred image and clear image leads to suppression and consequently amblyopia of the blurred image. In anisohyperopia amblyopia usually develops in the more hyperopic eye, because the less hyperopic eye is used to focus at all distances, and the more hyperopic eye receives constantly blurred images. The prevalence of amblyopia is reported to reach 100% in anisohyperopia with a difference of 3.5 dioptres. High isometropic amblyopia is reduced vision due to bilateral high uncorrected ametropias. A high bilateral hyperopic ametropia greater than 4 dioptres can cause ametropic amblyopia.[13] In our study we have observed that majority of the amblyopic patients were having Hyperopia and Anisohyeropia (46.03%) or Hyperopic astigmatism (17.46%). This was followed by Myopic astigmatism (15.87%), Myopia and Anisomyopia (14.29%) and Mixed Astigmatism (6.35%). Majority of the patients were Males 55.56% followed by Females 44.44%. In Laterality of Amblyopia Majority of the patients were having Monocular amblyopia 73.02% followed by Binocular 26.98%. Similar distribution of refractive error among amblyopic patients have been demonstrated by. Menon *et al*[14] and other workers. [15,16,17]

CONCLUSION

The Amblyopia is associated with the ametropia so early detection of refractive errors and corrections should be prompt from the young age.

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