



Advanced Analysis of Strabismus Amblyopia

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A bstract

Purpose: To assess the incidence of amblyopia in strabismus patients with reference to age, sex, density, type of deviation and its classification (strabismus amblyopia and combined amblyopia).

Materials and Methods: This study had been carried out at out patients department of SIMS/Services Hospital Lahore from August 2010 to August 2012. The material used for the study was Snellen chart, Prism bar, Retinoscope, ophthalmoscope, Trial box, Attractive toys. Visual acuity, squint assessment, cycloplegic refraction and fundoscopy were done in patients from 4 years to all age groups. Refractive prescription, and occlusion therapy was given according to patient's visual needs. Patients referred to consultant ophthalmologist for strabismic reconstructive surgery (traditionally called as cosmetic surgery).

Results: Eighty four patients out of 322 (26%) had amblyopia. Fifty amblyopic patients (60%) were above the age of ten years. Male were (60%), female were (40%). Sixty two patients (74%) had dense amblyopia. Exotropic amblyopia (52%) was found to be more as compared to Esotropic amblyopia (48%). Strabismus amblyopia (71%) was more common as compared to combined amblyopia (29%).

Conclusion: Amblyopia in strabismus patients is 26% with 74% severity or density. To decline its significant high rate and density, the eye health administration should launch an Amblyopia control program that will work at two levels; at community level and at hospital level.

Key words:

Esotropia (ET), Exotropia (XT), Strabismus amblyopia. Combined amblyopia, Amblyopia therapy, Orthoptics Department.



INTRODUCTION

Apparently normal looking eye can be blind functionally is beyond the comprehension of the patients. Albrecht von Graefe is said to have defined amblyopia is a condition in which the observer see nothing but the patients see very little.¹ The study on amblyopia has a significant position in Ophthalmology. Amblyopia is the most common cause of visual impairment in both children and adults. Its prevalence varies from country to country and within the population under study. In most developed countries, the prevalence is one to five percent². Strabismus has been proven the most common cause of amblyopia. In Pakistan, as far as the strabismic amblyopia is concern, its prevalence was 62.3%. The condition is alarming and threatening, as the three studies showed that, Sadia et al 71%,³ M. Shafiq et al 59%⁴, Muffariq et al 57% had strabismic amblyopia⁵. It is a major preventable and treatable cause and the fact that untreated amblyopia is a major cause of monocular and binocular low vision in childhood with the associated deterioration in the quality.

Amblyopia is defined as at least 2 Snellen lines difference in visual acuity between the eyes, but amblyopia is truly a spectrum of visual loss, ranging from missing of few letters on the 20/20 lines to hand motion vision. Functional amblyopia or "amblyopia" must be distinguished from organic amblyopia, which is a poor vision caused by structural abnormalities of the eye or brain that are independent of sensory input, such as optic atrophy, macular scar, or anoxic occipital brain damage. Functional amblyopia is reversible when treated with appropriate visual stimulation during early childhood, whereas organic amblyopia does not improve but visual stimulation.⁶ Occlusion therapy is a gold standard method for treating amblyopia. This treatment was first time described by Thabit Ibn Qurrah whose date of birth is not known but who died in AD 900⁷. The type of occlusion was first time suggested by August, Comte de Buffon a French naturalist and botanist in European literature in 18th century and in Erasmus Darwin the grandfather of Charles Darwin early 19th century in English literature⁸. Minimal occlusion therapy of as little as 20 minutes per day combined with active use of amblyopic eye in a visually demanding game. I felt this method is better suited to maintenance of acuity gained by more energetic treatment in the older cooperative children⁹. The conventional amblyopic treatment is not undertaken the older children and adults. However new clinical and experimental studies in both animals and humans provide evidence for neural plasticity beyond the critical period. The result suggest that perceptual learning and video game play may be effective in improving range of visual performance measures and importantly the improvements may transfer the better visual acuity and stereopsis. It might be a time to reconsider our notion about neural plasticity¹⁰.

Mostly members of our community, including general physician or even in some reported cases the general ophthalmologist belonging to peripheral areas say that as the child grow up, the problem will be settled down automatically. The parents often say that their children teased for wearing of glasses. Child often broke /loses the glasses or the glasses slides down from the nasal bridges. Due to tight schedule of school and tuitions, the children often do not find sufficient time for amblyopia therapy. The parents did not find time to take regular follow up for squint assessment and amblyopic therapy advice. Parents also did not pay attention so much because they wanted to seek some others experts that might be cure theirs children problem with some medications, instead to go so long time consuming exercise. In this way, they wasted the precious time of their children regarding to restoration of visual acuity. Amblyopia should be treated before surgery and not as advocated by some authors due the following reasons the earlier in life, the treatment is begun shorter the treatment of duration. The diagnosis of amblyopia and the monitoring of fixation preference during treatment are more difficult once the eyes are aligned or nearly aligned by surgery than in the presence of large angle of esodeviation. Once the eyes are aligned some parents may be lulled into thinking that all problems are over and become negligent in keeping their follow up appointments. The outcome of surgery is less favorable who remain amblyopic at the time of surgery.¹¹

Materials & Methods

Inclusion Criteria:

- Strabismus patients from four years to all age groups.
- Functional amblyopia.

Exclusion Criteria:

- Patient with Pseudo strabismus and convergence insufficiency
- Organic, Refractive and sensory deprivation amblyopia.
- Follow up patients were considered as a single time.

Sample Size:

322 strabismus patients, Eighty four (84) amblyopic (50 male and 34female).

Study Design:

Descriptive/ cross sectional study

Results:

Table-1: Distribution of Patients According to Age:

Age	No of patients	Percentage
<10	34	40.4 8%
11 -20	26	30.95%
21 -30	16	19.0 5%
>31	08	9.52%
Total	84	100%



The Table-3, Showed that 48% Esotropes and 52% Exotropes had amblyopia. Strabismus amblyopia (60/84, 71.42 %) more as compared to combined amblyopia (24/84, 28.57%). Strabismus XT amblyopia was (25/60 = 71.42%) high as compared strabismus ET (35/60=29.76%). Combined ET amblyopia was (15/24 =62.5%) greater then combined XT amblyopia (9/24= 37.5%).

Discussion:

This study discusses an advanced analysis about the strabismus amblyopic patients. The advanced analysis in the sense that several studies had been carried out on amblyopia but no one had given a detail account about the strabismus amblyopic classification (strabismus and combined amblyopia) regarding to age, type of deviation, depth of amblyopia (density) and the recommendations that a clinician must be given to the parents/guardians and children for effective functional amblyopic therapy. As far as the anisometric patients without strabismus has no concern regarding to treatment in Orthoptic clinic, that's why this group of amblyopia patients, did not discussed in this study. The amblyopia was analyzed according to age, gender, density, type of deviation (ET and XT) and subtypes of strabismic amblyopic (Strabismus amblyopia and combined amblyopia). Both these types of amblyopia were further classified into XT and ET.

Of 322, eighty four patients (84/322, 26%) were reported as an amblyopic. As, the mean amblyopia of three Pakistani based studies (Sadia et al, Muffariq et al, Shafiq et al) was 62.3%. This highest incidence had been declined to 26% according to the author's study but still significant high and to further decline its rate and density (74%), there is a need to launch "An Amblyopia control program" under the umbrella of NPPCB. The reason of declined amblyopia rate is a great impact of National program for prevention and control of blindness (NPPCB) under the supervision of Emeritus professor dr. Asad aslam khan who continually upgrading the ophthalmic department with latest eye equipments and had introduced a new cadre of visual sciences specialists (Optometrist, Orthoptist, investigative oculist and Refractionist) who are providing their services along with ophthalmologists to decline the prevalence of blindness from THQ Level to center of excellence. Fifty patients (50/84, 60%) were reported after the age of eight years in out patients department of orthoptic clinic (subspecialty of ophthalmology) with a complaint of squinting eyes and decreased visual acuity which is basically a useless time regarding to the restoration of visual acuity up to normal limit in an affected eye. Severity and depth of amblyopia is still a challengeable issue. The severity or density of amblyopia occurred when the difference of VA between two eyes more than four lines. In this study, the

thirty two patients (32/84, 38%) had unilateral best corrected visual acuity is 6/60 and unilateral density is 74%. Severe amblyopia persisting in adulthood is a significantly risk factor for blindness in case, if individual losing sight in the fellow eye.¹² Due to this reason, the parents and children precautionary avoid to move outside and playing supports just because of fear of losing their sight in good eye. In this instance, their social and extracurricular activities must be restricted and all the visual related work has to be done by a lonely one eye. Can you imagine that how much eye muscles have to suffer in asthenopia at the end of day? Ultimately due to fatigue their temperament in professional work would not to be considered well himself.

Males (60%) had more amblyopia as compared to females (40%) and that was close to the result of others studies that had been done on amblyopia regarding to gender. As far as the type of deviation concern, the exotropes (44/84, 48%) had more amblyopia as compared to esotropes (40/84, 52%). This is apparently seems to be contrary to three Pakistan-based studies that agreed that amblyopia is more common in esotropes as compared to exotropes. In M Shafiq et al study, the focus is on incidence and depth of amblyopia. The age group (3 to 40 years) was mentioned but no detailed analysis had been studied regarding to distribution of patient's age with reference to amblyopia. Sadia et al, Muffariq et al studies group encountered with age limit up to 14 years but in this study, the patients studied from 4 to all age groups. Generally, the incidence of esotropia is most common during the first decade of life¹³. After this age, the incidence of esotropia starts to be tapered. That's why, in these studies, the percentage of esotropes is higher as more children had esotropia in first decade of life. In the current study, 60% patients had come with age more than ten years. This could be the reason of comparatively less esotropic incidence. Strabismus amblyopia (71%) was two times more than combined amblyopia. Sadia et al study 71% had strabismic amblyopia, (56% Strabismus amblyopia and 16% Combined amblyopia) and 29% had others non strabismic amblyopia. Muffariq et al study showed that 57% had strabismic amblyopia (38% Strabismus amblyopia and 19% Combined amblyopia) and 43% had anisometric amblyopia. Both studies, showed that the strabismic amblyopic percentage is significantly higher but comparatively low to author's study because their studies also accounts other types of amblyopia (anisometropia, ametropia etc.) but in this study, the anisometric and ametropic amblyopia had been excluded. Strabismus XT amblyopia (71%) was much more as compared to strabismus ET amblyopia (29%). Combined ET (62.5%) amblyopia was higher than combined XT amblyopia (37.5%). This is another advanced analysis that had not been yet studied.



During active patching therapy, videos, tracing pictures, thread beads and fine drawing play an important role in improving visual acuity especially at near but sometimes patient visual acuity is not sufficient to see the targets with affected eye. So, a clinician must rule out the appropriate distance for far and near vision where the child can easily see the videos and do fine drawings etc. advise the parents that should do active patching therapy at this defined distance (that had determined by the clinician for the patient) and then reassigned a new appropriate distance on different follow ups. In hypermetrope patients, the need of bifocal correction must be evaluated. Occlusion must be preceded in a progressive way, do not jump from first day to occlude the eye for four to six hours. Instead of this, must instruct the patient that should start occlusion therapy for one to two hours in first week and then gradually increase per hour per week till the patient's patching therapy must be reached up to six hours in a day. Close monitoring of parents regarding to vision and general health is so significant to minimize the effect of asthenopia. Do not stop amblyopia therapy abruptly because one seventy nine patients (179/653, 27%) experienced recurrence of amblyopia during the first year after treatment.¹⁴

Conclusion:

Appropriate management can be provided after careful Orthoptic assessment and to realize the parents/guardians about its treatment is so much significant that during amblyopia therapy delay or laziness for weeks or months go side by side in term of visual loss. Parents/guardians should have to rescheduled their children's academic framework just because to avail sufficient hours daily for effective amblyopia therapy. Risk of recurrence is greater, if the treatment was stopped abruptly rather to tapered. Unpleasant patching experiences have a strong association with psychological impact. So, do not use any adhesive covering material, for amblyopia therapy, that put scratches on the glasses and produces infection or inflammation on the eyeball and adnexa. Spectacles must be selected with the recommendations of clinician (Ophthalmologist, Optometrist, Orthoptist). Parents should check glasses weekly or monthly basis and replace with new one if, they see scratches on them. Children spectacles should always be provided with plastic lenses to reduce the risk of injury. Should prescribe photo brown glasses that would help in declining, the magnitude of squint for the observers. Regular follow ups with compliance are necessary for effective amblyopia therapy.

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