

Study of Amblyopia Recurrence in Eastern Uttar Pradesh.

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ABSTRACT

Background: To evaluate the various factors associated with recurrence of Amblyopia. **Methods:** In this prospective observational study, 100 patient's diagnosed anisometropic and strabismic amblyopia. All patients were undergone squint workup and were treated with optical correction, occlusion therapy or penalization. Patients were divided into three groups - group 1 age (4-7 year), group 2 age(8-12 year), group 3 age(13-17 year). Patients were followed up to 12 months and various factors assessed which could be responsible for amblyopia and compared between three groups. **Results:** Recurrence of amblyopia was seen in 24% of patients which was more in group 1 & mixed amblyopia type (statistically significant $p < 0.05$). Recurrence of amblyopia was found to be independent of binocular vision and mode of treatment. Recurrence and its relation with length and dose of occlusion therapy were significant in those who were weaned off 6 hrs patching as compared to 2 hrs patching. Recurrence of amblyopia was found to be more in those who improved five lines as compared to two lines with statistically significant $p < 0.05$. Recurrence was more in the first 6 months as compared to the last 6 months during follow up. **Conclusion:** Recurrence is more commonly seen between the ages of 4-7 years and those with mixed amblyopia should be closely monitored during follow up. Occlusion therapy should be prescribed gradually, it should not be abruptly stopped. Since recurrence may occur even beyond 1 year hence, a longer follow up period would be advisable.

Keywords: Amblyopia, Anisometropia, Strabismus, Occlusion therapy.

INTRODUCTION

Amblyopia is considered an important public health disease because of its prevalence among children and visual impairment from amblyopia is life long and can be profound. Clinically, Amblyopia is defined as a two or more line difference in best corrected visual acuity between the eyes. It is classified according to its type, which can be strabismic, refractive, mixed or as a result of stimulus deprivation. Refractive amblyopia is also classified such as anisometropic, meridional and ametropic. Current literature shows a wide range of recurrence rates varying between 6% and 67%.^[1-5] Recurrence of amblyopia has a great impact on the patients not only in terms of visual handicap and financial burden but also on the child psychology. Hence it becomes imperative to identify the factors that could be associated with amblyopia recurrence and also to decide the duration of follow up for such patients so that these can be dealt with at the earliest. The present study was undertaken to evaluate various factors which could be responsible for recurrence of amblyopia like age of patient, type and

depth of amblyopia, binocular vision status, treatment modality prescribed, duration of occlusion and improvement in amblyopic eye visual acuity during earlier treatment. It also assessed the duration of follow up period needed for early detection of such amblyopia recurrence.

MATERIALS AND METHODS

A clinical Prospective observational study was conducted at tertiary eye care institutions after prior approval from ethical and DRC committee of Banaras Hindu University, Varanasi, Uttar Pradesh (India). The review committee waived the need for written informed consent.

Patients were recruited from department of ophthalmology, S.S. hospital Varanasi in between January 2012 to March 2015. Hundred patients diagnosed amblyopia and divided into three groups - group 1 age(4-7 year) 20%, group 2 age(8-12 year)38%, group 3 age(13-17 year)42% with certain inclusion criteria (1) age up to 17 years (2) Patients complaints for visual acuity assessment (3) History of treated amblyopia due to strabismus, anisometropia or both.(4) Distance visual acuity prior to treatment in amblyopic eye of 20/24 or worse with at least 2 log MAR levels of the interocular acuity difference.

Patients were excluded with stimulus deprivation amblyopia, any organic cause of decreased visual acuity, nystagmus, mental retardation, neurological

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diseases. Complete history was taken including ocular and systemic with detailed history of previous amblyopia. Detailed amblyopia workup was done such as Visual acuity assessed using ETDRS chart, The Brucker test was done to assess the clarity of visual axis, Anterior segment examination done using slit lamp, fundus examination done using direct and indirect ophthalmoscope, fixation was assessed by using star of ophthalmoscope. Squint work up was done such as cover test to confirm phoria or tropia, Hirschberg corneal reflex test & Prism cover test to see Angle of deviation. Synoptophore used to measure both objectively and subjectively all types of heterophoria & heterotropia. Grades of binocular vision assessed by Worth's four dot test and Synoptophore.

Different treatment modalities were used such as Optical correction in all patients (Retinoscopy using cyclopentolate 1% eye drop), few patients subjected to Occlusion Therapy using clastoplast occluder and prescribed two schedules (a) 6 hour per day – VA < 20/100 (b) 2 hour per day- VA > 20/80. Few patients subjected to pharmacological penalization by using atropine 1% eye ointment at weekend bed time. Patients were followed up initially at one month after completion of treatment and then 3 monthly thereafter for a period of one year. At each visit best corrected visual acuity, Ocular alignment, Binocular vision was assessed and changed if necessary. If vision deteriorated in the Amblyopic eye i.e., if amblyopia recurred, then patients were retreated with patching or pharmacological penalization. Various factors assessed which could be responsible for recurrence of amblyopia were its relation with age, type and depth of amblyopia, binocular vision status, treatment modality prescribed, duration of occlusion and number of lines improved in amblyopic eye during previous treatment. Chi square test was used for statistical evaluation and results were assumed to be significant if $p < 0.05$.

RESULTS

Table 1: Gender Distribution.

Gender	No. of Patients (%)
Male	62 (62%)
Female	38 (38%)
Total	100

Table 2: Age Distribution.

Age (In Years)	No. Of Patients (%)
4-7	20
8-12	32
13-17	42
Total	100

Table 3: Recurrence In Relation With Age

AGE (In Years)	Total No. Of Patients	Recurrence (%)
4-7	20	10(50%)
8-12	32	7(18.4%)
13-17	42	7(17.4%)
Total	100	24

Table 4: Recurrence In Relation With Type Of Amblyopia

Type Of Amblyopia	Total No. Of Patients	Recurrence (%)
Strabismic	42	7(16.67%)
Anisometropic	32	4(12.5%)
Mixed	26	13(50%)
Total	100	24

Table 5: Recurrence In Relation With Depth Of Amblyopia

Depth Of Amblyopia	Total No. Of Patients	Recurrence (%)
Moderate (VA 20/40 to 20/80)	64	14(21.8%)
Severe(VA 20/100 to 20/400)	36	10(27.7%)
Total	100	24

Table 6: Recurrence In Relation With Modality Of Treatment

Mode of treatment	Total no. Patients	Recurrence
Patching	68	16 (23.5%)
Pharmacological Penalization	32	8 (25%)
Total	100	24

Table 7: Recurrence and Its Relation with Length and Dose of Occlusion

Duration Of Occlusion	Total No. Of Patients	Recurrence (%)
2 Hrs Patching	28	3 (10.7%)
6 Hrs patching and no Weaning	20	10 (50%)
6 Hrs patching and Weaning	20	3 (15%)
Total	68	16

Table 8: Recurrence In Relation With Number Of Lines Improved During Previous Treatment

No. of lines improved during previous treatment	Total no. Of patients	Recurrence (%)
2 lines	17	3 (17.6%)
3 lines	35	6 (17.1%)
4 lines	34	7 (20.5%)
5 lines	14	8 (57.1%)
Total	100	24

Table 9: Recurrence In Relation To Period Follow- Up

Duration of follow up	Recurrence
1-3 months	3
4-6 months	12
7-9 months	5
10-12 months	4
Total	24

100 patients were enrolled between January 2012 to march 2015. Out of 100 patients comprises of 62 male & 38 female (sex ratio 1.63:1) [Table 1]. Most of the patients belonged to the group 3 (42%), followed by group 2(38%) while 20% belonged to group 1 [Table 2]. Recurrence of amblyopia was seen 24% of patients in our study. The group 1 (50%) had more deterioration in VA as compared to

group 3 (17.40%) ,so more recurrence of amblyopia occurred between age group 4-7 yrs [Table 3]. Maximum recurrence occurred in patients of mixed amblyopia (50%) as compared to strabismic (16.67%) & anisometropic (12.5%) and which was statistically significant. $P < 0.05$ [Table 4]. Depth of amblyopia was categorized as moderate (VA =20/40-20/80) and severe (20 /100 -20/400) on the basis of of BCVA, we found that recurrence was more in severe amblyopia (27.7%) as compared to moderate amblyopia (21.87%) [Table 5]. Recurrence was found to be independent of binocular vision status in which unocular vision 60 patients with 23.3% recurrence & binocular vision 40 patients with 25 % recurrence. Recurrence of amblyopia showed almost equal in both treatment modalities such as patching 23.5% (68 patients) & penalization 25% (32 patients) [Table 6]. Out of 68 patients were prescribed patching 2 hourly (28 patients), 6 hourly with no weaning (20 patients) 6 hourly with weaning (20 patients) respectively. Recurrence was seen to be more frequent (50%) in patients who stopped 6 hours of patching abruptly without weaning. It was significantly ($p < 0.05$) more as compared to patients who were weaned off from 6 hrs patching (15%) and those who were prescribed 2 hours of patching (10.7%) [Table 7]. Greater number of lines improved during previous treatment was also associated with more amblyopia recurrence (57.1%) when compared with patients who had less improvement (16.2 %). This difference was statistically significant ($p < 0.05$) [Table 8]. Patients were followed every three months once their treatment was successfully completed for a period of one year in the our study .Recurrence was significantly more in first 6 months of follow up($n=15$; 62.5%) as compared to last 6 month ($n=9$; 37.5%). [Table 9]

DISCUSSION

Most amblyopic vision is preventable or reversible with timely detection and appropriate intervention. Children with amblyopia or at the risk of amblyopia should be identified at a young age, when the prognosis for successful treatment is best. When amblyopia treatment is discontinued after successful completion, few patients may show some degree of recurrence, which can be easily reversed with renewed therapeutic effort. Thus it becomes essential to detect recurrence early, so as to treat it as soon as possible.

In present series, we found that that out of 100 patients between 4-17 years of age, 24 developed 2 or more log MAR level deterioration of visual acuity recorded on ETDRS chart. Thus the overall recurrence of amblyopia in our study was 24 %. This is in accordance with various other studies who have reported that 17% to 27% of patients suffer from amblyopia recurrence after successful treatment. According Pediatric Eye Disease Investigator group

(Homes Jm et al 2004), Bhola R et al (2006), Nilson jet al (2007) &Walash L A et al (2009) - amblyopia recurrence was seen 24%, 27%, 17%, 24% respectively.^[2-5] In our study recurrence between 4-7 years had found more as compared other group. It is clinically important because plasticity in the visual system appears to be two – edged sword. Von noorden and Camps et al,^[6] said “ Amblyopia tends to recur until children have reached 8 to 10 years old or even older because of the persistence of inhibitory effects from the fixating eye”.

Our observation is supported by PEDIG (2007),^[7] Hertle et al (2007),^[8] have also concluded that the risk of significant acuity worsening is low after cessation of amblyopia treatment in children between 7- 12 yrs of age. Bhola R et al (2006),^[3] who concluded that there is clinically important risk of amblyopia recurrence when occlusion therapy is decreased before the age of 10 years and also that risk of recurrence is inversely correlated with age. Levartovsky et al (1995) and Tacagni DJ et al (2007),^[9,10] who reported that patients with strabismic and anisometropic amblyopia had significantly greater amount of recurrence .Recurrence in relation to the depth of amblyopia & binocular status – almost similar observation was made by HomesJm et al(2007) & Tacagni DJ et al (2007),^[11,10] who concluded had no association with recurrence.

In our study, Recurrence of amblyopia showed almost equal in both treatment modalities such as patching 23.5% (68 patients) & penalization 25% (32 patients) which is supported by Pediatric Eye Disease Investigator group (2008) & Homes Jm et al (2007),^[11,12] who reported that deterioration of vision was similar, regardless of whether initial treatment was with atropine or patching.

Our finding are in accordance with those of Pediatric Eye Disease Investigator group (Homes Jm et al 2004),^[2] who reported that in patients treated with moderately intense patching (6to 8 hours per day), recurrence was more common (42%)when treatment was not reduced prior to cessation than when treatment was reduced to 2 hours per day prior to cessation(14%). Similarly, Nilson jet al (2007),^[4] in their study found that weaning off occlusion reduces risk of recurrence . Greater number of lines improved during previous treatment was also associated with more amblyopia recurrence (57.1%) when compared with patients who had less improvement (16.2 %). This difference was statistically significant ($p < 0.05$), an observation also made by Homes Jm et al (2007),^[11]

Recurrence was significantly more in first 6 months of follow up ($n=15$; 62.5%) as compared to last 6 month ($n=9$; 37.5%). Similar finding were documented by Nilson jet al (2007),^[4] who reported that all recurrence in their study occurred within 6 months afer primary treatment. However, De Weger

C et al (2010),^[13] in their study observed 95% of recurrences occurring within 24 months after cessation of treatment. A possible explanation for this discrepancy could be that the median follow up period in their study was 3.9 years where as it was just 1 year in our study.

CONCLUSION

Taken together with considerable evidence from our and other previous studies, these results suggest that various factors associated with recurrence of amblyopia such as relation with age, type of amblyopia, treatment modality prescribed, duration of occlusion and number of lines improved in amblyopic eye during previous treatment. Certain other factors. Which could have an associated with amblyopia recurrence like micro strabismus, stereoacuity. Hence, a longer follow up would be advisable to judge the long term stability of visual acuity improvement. So further clinical studies are necessary to elucidate other factors and relation of recurrence of amblyopia.

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