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Case Report

Management of Strabismic Amblyopia Associated with Accommodative Esotropia with Haidinger Brushes – A Case Report

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Abstract

Background: Strabismic amblyopia is characterized by an imbalance of the sensorial and motor system. Differences between both eyes due to squinting during 1st months of life can originate an entire fovea fixation and ARC, which is a binocular condition generated by the absence of a correct bi-foveal fixation [2]. Accommodative esotropia usually presents between 2 and 4 years of age with an increase in accommodative needs and is directly linked to the amount of hypermetropia [9]. Although patching remains the gold standard therapy of amblyopia, several new treatment options have emerged over the years. These include refractive adaptation, atropine penalization, and several binocular activities with varying success rates [10].

Case Report: 6-year-old male presented with complaints of inward deviation, and blurring of vision for distance and near. A proper squint evaluation was performed to determine the presence of the type of squint. Accommodative esotropia with amblyopia in one eye was reported. Synoptophorehaidinger brushes were recommended for foveal stimulation for the amblyopic eye followed by patching. The patient reported good compliance and significant vision improvement in the amblyopic eye and no longer blur and deviation with glasses were observed.

Conclusion: Accommodative esotropia with amblyopia showed substantial improvement with the help of Haidinger brushes in the amblyopic eye. A combination of patching and Haidinger brushes is an efficacious approach for achieving an improvement in visual acuity and binocular function in strabismic amblyopia.

Keywords: Accommodative Esotropia; Strabismic Amblyopia; Haidinger Brushes; Synoptophore

Introduction

Amblyopia (lazy eye) is described as a limitation of the visual function of one or both eyes with no pathological cause. It is a disorder of spatial vision that cannot be improved by refractive correction [1]. Strabismic amblyopia is caused by the deviation in one of the eyes. In this case, the brain receives two different images with different spatial projections, one of them coming from the eye with the squint. This situation leads to neuronal vulnerability as the brain cannot create a combination of images from both eyes to generate a stereoscopic vision [1]. Strabismic amblyopia is characterized by an imbalance of the sensorial and motor system. Differences between both eyes due to squint during 1st months of life can originate an entire fovea fixation and ARC, which is a binocular condition generated by the absence of a correct bi-foveal fixation [2]. Strabismus develops in approximately 5% to 8% of the general population [3]. The visual cortical structure is generated during fetal development in the absence of external causes and without any light stimuli. There is a consensus in the literature

that there is a significant hereditary component in the cause of strabismus [4].

Accommodative esotropia usually presents between 2 and 4 years of age with an increase in accommodation needs and is directly linked to the amount of hypermetropia. Children with under or uncorrected hypermetropia need to exert a greater accommodation effort when viewing near. If this is associated with normal or increase in AC/A ratio, can lead to the development of esotropia that is more obvious at near [9].

In case of a low or normal AC/A ratio, they may remain orthophoric or become esophoric. Relaxing their accommodation using plus lenses, suspends this effort and with it the convergence response. The treatment is the prescription of the full 'plus' obtained after cycloplegic refraction. In those with a high refractive prescription, this may need to be stepped up to the full prescription or atropine drops used initially to aid compliance [9]. In addition, strabismic amblyopia is present within the first year of life in a great part of cases [5]. Early diagnosis, strabismus surgery [6], and active and/o passive [7,8].

Adequate treatment selection is an important factor to recover imbalance. This case report aimed to assess the improvement in visual acuity with 10 days of exercise with Haidinger brushes in a patient with strabismic amblyopia associated with accommodative esotropia.

Case Report

A 6-year-old male presented with a complaint of inward deviation of both eyes and blurring of vision for distance and visited our hospital. There was normal birth history (full term, normal delivery, birth weight 3.00 kg) and normal development. Milestones and ocular history were normal. On examination, his distance visual acuity without correction was 6/12 (P) in OD and 6/60 in OS, near vision N8 in OD and N24 in OS using Snellen's visual acuity chart. Dry Retinoscopy showed +2.00DSPH in OD and +4.00DSPH in OS. Atropine refraction was advised for the patient and he was called for wet retinoscopy under atropine. Atropine refraction was +5.00d in OD and +6.00d in OS. He has advised glasses for continuous wear and then was called for a detailed squint evaluation with glasses after 1 month.

Management plan

Patients were prescribed full atropine correction for both eyes for continuous wear for one month. Before participating in the synoptophore Haidinger brushes exercise. Patients were made to view the Haidinger brushes through the amblyopic eye for 15 min/day for a total of 10 consecutive days. Part-time occlusion with near activities was commenced thereafter. The vision was recorded before the commencement of the exercise, after the conclusion of the same, and at a 2-month review.

Haidinger brushes

The good eye was patched, and the patient wore his refractive correction. All exercises were administered in the hospital on the department synoptophore. Head, chin, and forehead rest were adjusted to maximize patient comfort. A blue filter is placed in front of the exercising eye and the Haidinger brushes were placed in the slot. The wheel of the Haidinger brushes was rotated clockwise for 3 minutes and anticlockwise for 2 minutes. This was repeated a total of three times and the speed was increased each time. The reversal in direction was primarily to engage the attention of the child on the brushes.

Further, the attending optometrist also ensured that the child's attention was focused on the rotating brushes. The exercise was administered for 10 consecutive days (except Sunday). The visual acuity with Snellen's chart was checked with a refractive correction before and completion of the exercise. Patients were advised to continue wearing glasses after completion. Part-time occlusion with near activities of the good eye was advised when appropriate (3-4 hours/day) after the completion of the exercise.

Discussion

Accommodative esotropia usually presents between 2 and 4 years of age with an increase in accommodation needs and is directly linked to the amount of hypermetropia. Children with under or uncorrected hypermetropia need to exert a greater accommodation effort when viewing near. If this is associated with normal or increase in AC/A ratio, can lead to the development of esotropia that is more obvious at near [9]. Decompensation of

Test	Data Before 10 Days of Exercise	After 10 Days of Exercise
Visual Acuity (Aided)	OD: 6/9 N6 OS: 6/18 N8	OD: 6/9 N6 OS: 6/9N6
Present Glass Power	OD: +5.00DSPH, OS: +6.00DSPH	OD: +5.00DSPH, OS: +6.00DSPH
Stereopsis	800 Sec of Arc	50 Sec of Arc
Worth Four dot test	NRC	NRC
Cover Test	Alternate Esotropia, OD prefer to fixate	Ortho for distance and esophoria for near
Extraocular Motility Test	Full Range Of Motion (OU)	Full Range Of Motion (OU)
Prism Bar Cover Test (Without correction)	D: 20PD, N: 18PD	D: 10PD, N:12PD
Prism Bar Cover Test (with correction)	D: 4PD, N: 8PD Eso	D: Orthophoria, N: 2PD Esophoria
Negative relative accommodation (with correction)	+3.25DSPH	+2.75DSPH
Positive relative accommodation (with correction)	-3.75DSPH	-3.00DSPH
MEM (Monocular estimation method)	+1.25	+0.75
Negative Fusional Vergence (with correction)	N: 16/14, D: 10/6,	N: 18/14 D: 10/6
Positive Fusional Vergence (with correction)	N: 18/16, D: 14/10,	N: 20/14 D: 20/14

Table 1: Diagnostic data from the initial evaluation and: Vision status of the amblyopic eye after ten days of exercise. OD = Oculus Dextrus; OS = Oculus Sinister; On examination he was Diagnosed with accommodative esotropia with strabismic amblyopia.

Test	After 1-Month Follow Up	After 2-Month Follow Up
Visual Acuity (Aided)	OD: 6/6 N6 OS: 6/9N6	OD: 6/6 N6 OS: 6/9N6
Present Glass Power	OD: +5.00DSPH, OS: +6.00DSPH	OD: +5.00DSPH, OS: +6.00DSPH
Stereopsis	50 Sec of Arc	50 Sec of Arc
Worth Four dot test	NRC	NRC
Cover Test	Ortho for distance and esophoria for near	Ortho for distance and esophoria for near
Extraocular Motility Test	Full Range Of Motion (OU)	Full Range Of Motion (OU)
Prism Bar Cover Test (with correction)	D: Orthophoria , N: 2PD Esophoria	D: Orthophoria , N: 2PD Esophoria
Negative relative accommodation (with correction)	+2.50DSPH	+2.25DSPH
Positive relative accommodation (with correction)	-3.00DSPH	-2.50 DSPH
MEM(Monocular estimation method)	+0.75DSPH	+0.50DSPH
Negative Fusional Vergence (with correction)	N: 20/16, D: 8/6	N: 18/12, D: 10/4
Positive Fusional Vergence (with correction)	N: 18/10, D:16/12	N: 16/12, D: 14/8

Table 2: Vision status of the amblyopic eye after 1-month and after 2-month follow-up.

Follow-up After 1 month/after 2 months follow-up vision improved and other parameters were well maintained. Table two shows the diagnostic data from follow-up evaluation.

fully accommodative esotropia may occur even in the presence of apparently good binocular vision [11]. This case report shows that a short course of exercise with Haidinger brushes results in a substantial and rapid visual gain in the amblyopic eye. Accommodative esotropia is one of the most common conditions present in young kids. This could impact academic performance and ultimately degrade the quality of life. In this case, the patient was 6 years old when we treated him. Therefore timely diagnosis can help manage the case of accommodative esotropia with amblyopia with the help of Haidinger brushes.

Conclusion

Accommodative esotropia with strabismic amblyopia showed substantial improvement with the help of Haidinger brushes. 10 days of exercise with Haidinger brushes produce significant vision improvement in a patient with strabismic amblyopia associated with accommodative esotropia. A combination of patching and Haidinger brushes is the efficacious approach for achieving an improvement in visual acuity and binocular function in strabismic amblyopia.

Bibliography

1. Milla Myriam and David P Piñero. "Characterization, passive and active treatment in strabismic amblyopia: a narrative review". *International Journal of Ophthalmology* 13.7 (2020): 1132-1147.

2. García-García Manuel Ángel., *et al*. "Optical Coherence Tomography in Children with Microtropia". *Journal of Pediatric Ophthalmology and Strabismus* 55.3 (2018): 171-177.

3. Shapira Yinon., *et al*. "Amblyopia and strabismus: trends in prevalence and risk factors among young adults in Israel". *The British Journal of Ophthalmology* 102.5 (2018): 659-666.

4. Preising M N., *et al*. "ZurRekrutierunggeeigneter Familienfür die Identifikationursächlicher Gene des erblichen Strabismus" [Recruitment of Suitable Families to Identify Causative Genes in Hereditary Strabismus]". *KlinischeMonatsblatter fur Augenheilkunde* 232.10 (2015): 1158-1164.

5. Guimaraes Sandra., *et al*. "New pediatric risk factors for amblyopia: strabismic versus refractive". *European Journal of Ophthalmology* 28.2 (2018): 229-233.

6. Koo Euna B., *et al*. "Treatment of Amblyopia and Amblyopia Risk Factors Based on Current Evidence". *Seminars in Ophthalmology* 32.1 (2017): 1-7.

7. Ing Malcolm R., *et al*. "A prospective study of alternating occlusion before surgical alignment for infantile esotropia: one-year postoperative motor results". *Journal of AAPOS : The official publication of the American Association for Pediatric Ophthalmology and Strabismus* 10.1 (2006): 49-53.

8. Osborne Daniel C., *et al*. "Atropine Penalization Versus Occlusion Therapies for Unilateral Amblyopia after the Critical Period of Visual Development: A Systematic Review". *Ophthalmology and Therapy* 7.2 (2018): 323-332.

9. Jain Saurabh. "Simplifying Strabismus: A Practical Approach to Diagnosis and Management". Simplifying Strabismus (2019): 81-82.

10. Sahu CL., *et al*. "A preliminary study on the treatment of amblyopia with Haidinger's brushes". *Journal of Clinical Ophthalmology and Research* 8 (2020): 10-13.

11. Mulvihill A., *et al*. "Outcome in refractive accommodative esotropia". *The British Journal of Ophthalmology* 84.7 (2000): 746-749.