Mirror Image Anisohypermetropia with Unnoticed Amblyopia in a Sister and Two Brothers

Hina Kauser

Assistant Professor, Department of Ophthalmology, Hamdard Institute of Medical Sciences and Research

Jamia Hamdard, Hamdard Nagar, New Delhi -110062. INDIA.

Corresponding Address:

hina3kauser@yahoo.co.in, muneeb2rehman@hotmail.com

Case Report

Abstract: We report mirror image hypermetropic anisometropia leading to amblyopia in a sister and her two brothers which got unnoticed by all three siblings. The first two brothers had hypermetropic right eye and the sister had mirror image hypermetropia in left eye. All the three siblings did not notice amblyopia in one eye as the vision in other eye was normal. Mirror image anisometropia was reported in monozygotic and dizygotic twins earlier and only one case till date was reported of mirror image anisometropia in two siblings that too of anisomyopia. No case of mirror image hypermetropic anisometropia leading to amblyopia in all the three siblings has been reported till date. The present case suggests that if vision is normal in one eye and there is no esotropia then amblyopia may get unnoticed, so screening of every child should be done and all the siblings should be examined as hypermetropic anisometropia may be genetically related.

Keywords: hypermetropic anisometropia, genetic inheritance, amblyopia.

Key Messages: unilateral amblyopia may get unnoticed and hypermetropic anisometropia may be genetically determined.

Introduction

Amblyopia is derived from the Greek word *amblyos*, meaning dull, and *opia*, meaning vision. It refers to a decrease in best-corrected visual acuity in an eye having no organic pathology. There are three types of amblyopia: anisometropic, strabismic, and deprivation. Anisometropic amblyopia occurs in children with a difference in refractive error between the two eyes, usually hypermetropia or astigmatism, and occurs in the more ametropic eye. When the difference in refractive error between the two eyes exceeds approximately 1 diopter, anisometropia begins to be associated with amblyopia. Anisometropic amblyopia is more common with anisohypermetropia as compared to anisomyopia.[1]

Case History

The elder brother aged 19 years came to our hospital for medical screening required for overseas employment.There was no specific birth history and no history of consanguineous marriage of parents.. The patient was.not giving any history of visual disturbance and he was surprised when his visual aquity was noted. Visual aquity in right eye was finger counting at 1 meter, and left eye was 6/6. The cycloplegic refractive power was +8Dsph +1.25D cyl Ax 130^0 (right eye) and +0.25Dsph +0.5 Dcyl Ax 110^0 (left eye). He brought his younger brother and sister in his next visit. The brother was 15 years old and Visual aquity in right eye was finger counting at 2 metres, and left eye was 6 /6,. The cycloplegic refractive power was +6 Dsph +2.5 Dcyl Ax 90^0 (right eye) and +0.75Dsph (left eye). The sister was 9 years old and Visual aquity in right eye was 6/6, and left eye was finger counting at 2 meters. The cycloplegic refractive power was +0.5Dsph +0.5 Dcyl Ax 130^0 (right eye) and +6.5 Dsph +0.75 Dcyl Ax 110^0 (left eye).All the three attended school and were good in studies but neither screened in school nor noticed decreased vision in one eye themselves. They were diagnosed first time in our hospital of having anisometropia leading to amblyopia.Slit lamp and fundus examination was normal in all the three siblings. There was no squint and ocular movements were normal. There was no difference in corneal diameters between both eyes (measured with caliper). The refraction and the radius of the anterior corneal curvature were measured using an autorefractokeratometer. (Table 1). A –scan ultrasonography was performed. An axial length in hypermetropic eye was smaller as compared to other eye in all the three siblings. The results of A-mode ultrasonography are presented in (Table 2). Siblings in the present study had almost similar axial lengths in their hypermetropic eyes which is smaller as compared to other eye. The sister and two brothers in this study had mirror image anisohypermetropia leading to amblyopia which got undetected. Detecting amblyopia is difficult, as the patient may not be aware of having one strong eye and one weak eye. If the patient has a squint some other abnormality, he/she may notice that something is wrong, otherwise it get unnoticed.

Table 1: Refraction in all three siblings of the family showing mirror image anisohypermetropia in sister (left eye) and her two brothers (right eye)

Participants	Right eye	Left eye	Difference in Refraction in two eyes	Best corrected visual acquity		keratometry	
				Right eye	Left eye	K h/ Kv (RE)	Kh/ Kv (LE)
Elder brother 19 years	+8Dsph +1.25D cyl Ax 130^0	+0.25Dsph +0.5 Dcyl Ax 110^0	+8.125D	finger counting at 1 meter	6/6	41.75/ 42	41.25/ 41.5
2nd brother 15 years	+6 Dsph +2.5 Dcyl Ax 90^0	+0.75Dsph (left eye).	+6.5 D	was finger counting at 2 metres	6/6	39.75/ 42.75	41/ 41.5
Youngest sister 9years	+0.5Dsph +0.5 Dcyl Ax 130^0	+6.5 Dsph +0.75 Dcyl Ax 110^0	+6.125D	6/6	6/60	41.25/ 41.5	41 /42

Table 2: Results of A-Scan in all Siblings showing smaller axial length in hypermetropic eye

Participants	Axial length (mm)		Anterior chamber depth (mm)		Lens thickness (mm)	
	Right eye	Left eye	Right eye	Left eye	Right eye	Left eye
Elder brother 19 years	20.15	22.98	2.48	2.59	4.5	4.6
2nd brother 15 years	20.29	23.09	2.83	2.87	3.50	3.86
Youngest sister 9years	23.85	20.60	2.9	2.68	3.68	3.9

Discussion

It is well recognized, that anisometropia can lead to amblyopia, but the exact mechanism is not clear, although according to von Noorden, to eliminate sensory interference, there may be active inhibition of the fovea which is caused by superimposion of a focused image in one eye and a defocused image in other eye.[2] Genetic factors are primarily responsible for the development of a refractive errors and contribute up to 84-86% of the cases of myopia and hypermetropia and 50% of total and 60% of corneal astigmatism,. On the analysis of a genetic component to hypermetropia there have been fewer reports only.[3] Mirror image myopic anisometropia were reported in monozygotic and dizygotic twins in literature but no case of mirror image hypermetropic anisometropia leading to amblyopia with no squint and which was detected by chance in all the three siblings is reported till date. De Jong *et al.*. described anisometropia of more than 20 dioptres in both left eyes of a pair of monozygotic 64-year old twins.[4] Okamoto *et al.*. reported "mirror image" myopic anisometropia in two pairs of monozygotic twins.[5] Stanković *et al.* reported 2 pairs of identical twins having mirror image myopic astigmatism in one pair and mirror image hypermetropic astigmatism and esotropia in the other pair and pointed to the role of genetic factors in the development of refractive error and squint.[6] A case of one sister and brother with mirror image myopic anisometropia was reported by Park *et al.*. and believed that severe myopic anisometropia may be genetically determined.[7] Five individuals were reported in a Chinese family with severe myopic anisometropia within 4 generation family, including the pair of MZ twins.[8.] In our case one sister and her two brothers were having mirror image anisohypermetropia leading to amblyopia. As vision is normal in one eye and there was no esotropia, the amblyopia got unnoticed in all the three siblings,Early diagnosis of these problems in this family would have resulted in earlier and more successful treatment, and this must be kept in mind that if one child in a family shows any of these problems then it is important that all other siblings in that family should undergo vision assessment and refraction to ensure that no treatable abnormalities are present. The co-occurrence of mirror image hypermetropic anisometropia in all the three siblings of a family is extremely rare and we believe that hypermetropic anisometropia is genetically determined and further studies should be done to confirm genetic inheritance.

References

1. Prakash P. Amblyopia in myopia. Indian J Ophthalmol. 1983;31:807-12.
2. von Noorden GK. Binocular Vision and Ocular Motility. 4th ed. C.V. Mosby: St. Louis; 1990. p. 208- 13.
3. Hammond CJ, Snieder H, Gilbert CE, Spector TD. Genes and environment in refractive error: the twin eye study. Invest Ophthalmol Vis Sci. 2001; 42(6):1232-6.
4. De Jong PT, Oostra BA, De Faber JT. High symmetric anisometropia in monozygotic twins. J Ophthalmic Paediatr Genet. 1993; 14(1):29-32.
5. Okamoto F, Nonoyama T, Hommura S. Mirror image myopic anisometropia in two pairs of monozygotic twins. Ophthalmologica. 2001; 215:435-8.
6. Stanković-Babić G.,Vujanovic M,Cekic S.Identical Twins with "Mirror Image" Anisometropia and Esotropia Srp Arh Celok Lek. 2011;139(9-10):661-665

7. Sung Joon Park1, Joo Yeon Kim1, Seung-Hee Baek1, Eung Suk Kim2, Ungsoo S Kim1. One Sister and Brother with Mirror Image Myopic Anisometropia. Korean J Ophthalmol 2010;24(1):62-64

8. Feng L, Candy TR, Yang Y. Severe myopic anisometropia in a Chinese family. Optom Vis Sci.2 012 Apr;89(4):507-11. doi: 10.1097/OPX.0b013e318249d73a.

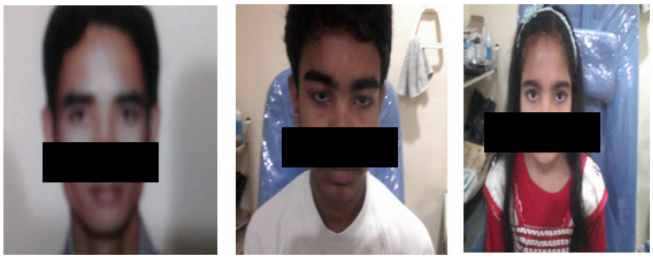

Figure 1: All the 3 siblings of a family were diagnosed of having unilateral amblyopia which got unnoticed by all three as vision in other eye was normal(6/6) and there was no squint at all in all of them