Original Article

Type of Horizontal Deviation in Consanguinity

Samia Iqbal, Hakim Anjum Nadeem

Pak J Ophthalmol 2018, Vol. 34, No. 2

See end of article for authors affiliations

Correspondence to:
Samia Iqbal
Department of Ophthalmology,
The University of Lahore
Email: samiaiqbal988@gmail.com

Purpose: To find out the association and types of horizontal deviation in consanguinity.

Study Design: Cross-sectional study.

Place and duration of Study: Department of Ophthalmology, The University of Lahore teaching hospital from September to December 2017.

Material and Methods: In this study, 93 patients of 3 to 15 years, with diagnosis of horizontal deviation and positive history of consanguinity were included in the study. While the patients with vertical deviation and negative history of consanguinity were excluded from study. Data was collected by self-designed proforma after taking consent from patients having history of consanguinity. The visual acuity screening and orthoptic assessment were performed on the sample of 93 patients using snellen chart for visual acuity and pen torch for Hirschberg test, cover uncover test and alternate cover test and prisms for krimsky test. Data was analyzed using SPSS version 20.

Results: Out of 93 patients, 55 (59.1) had exotropia and 38 (40.8%) had esotropia. 17 (18.2%) had emmetropia, 22 (23.65%) had myopia, 7 (7.5%) had hyperopia, 25 (26.8%) had myopic astigmatism, 10 (10.7%) had hyperopic astigmatism and the remaining 12 (12.9%) had mixed astigmatism.

Conclusion: Consanguinity is related with horizontal deviation and refractive errors. Exotropia is found to be more common in these cases.

Key Word: Consanguinity, Horizontal deviation, Myopia.

Misalignment of the eyes is called deviation, squint or strabismus. It is a state in which the eyes do not appropriately align with each other while focusing at an object. Deviation can be constant or intermittent. Horizontal deviation is divided into two main types; esodeviation (convergent deviation) and exodeviation (divergent deviation) which can be present in one or both eyes[1].

Consanguinity is the belonging from the same kinship as another person. Characteristically descent from similar antecedent as another individual is seen especially in cousin marriages[2]. The credential of relative consanguinity may be confirmed with a consanguinity table wherein every level of lineal consanguinity (meiosis) appears as a row[3]. Consanguinity causes many disorders including[3] premature ear shot damage, premature visual system development and perceptive damage, intelligent delay or learning disorder, growing delay or failure, hereditary blood disease and mental disorder like epilepsy[4].

Several recent studies suggested that there is greater frequency of horizontal deviation amongst parental cousin marriages[5]. Survey of 7200 patients of strabismus has shown that almost 30% patients had a positive history of consanguinity[6].

The genetics of common styles of horizontal deviation is not properly diagnosed. The mode of horizontal deviation may be recessive, dominant or having different factors. Numerous chromosomal

susceptibility loci have been identified.[7] It appears that the dominant and recessive association and co-dominant heirloom type of transmission was associated with esotropia in early age. The horizontal deviation seen due to autosomal recessive genetics is mentioned in consanguinity[8].

Regarding these records, it appears that evidently recessive shape of heirloom shows an essential position within the case of horizontal deviation. Alteration in selection correspondences can be sought-after pre revealing of horizontal deviation in children of parental cousin marriages[9,10]. The purpose of our study was to find out the association and types of horizontal deviation in consanguinity in our population.

MATERIALS AND METHODS

It was a cross sectional study conducted on 93 patients. In this study 93 patients of 3 to 15 years, with diagnosis of horizontal deviation and positive history of consanguinity were included. While the patients with vertical deviation and negative history of consanguinity were excluded from study. Sample size was estimated by probability convenience method. All patients were diagnosed with horizontal strabismus by orthoptic assessment. Patients of all other ages or having no positive history of consanguinity were excluded from the study. The purpose of the study was to find the type of horizontal strabismus in consanguinity. Therefore, all patients underwent measurement of distance (6 m) and near (33 cm) visual acuity by using near visual acuity charts and Snellen distance charts. Orthoptic assessment, Hirschberg, cover uncover test and alternate cover test were done to rule out the horizontal deviation. Data was collected by self-designed proforma after taking consent from patients having history of consanguinity. The results were analyzed by using SPSS version 20.

RESULTS

There were 93 patients were included in study. Out of these 28 (30.1%) were males and 65 (56.9%) were females (Table 1). The age distribution is shown in table 2.

There were 55 (59.1) patients with exotropia and 38 (40.8%) had esotropia (table 3).

Table 1: Gender distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	65	56.9	56.9	56.9
	Male	28	30.1	30.1	30.1
	Total	93	100.0	100.0	100

Table 2: Age distribution.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	3 – 6	19	20.5	20.5	20.5
	7 – 11	38	40.8	40.8	79.5
	12 – 15	36	38.7	38.7	100.0
	Total	93	100.0	100.0	

Table 3: Type of deviation.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Esotropia	38	40.8	40.8	40.8
	Exotropia	55	59.1	59.1	100
	Total	93	100.0	100.0	

Table4: Distribution of patients according to Refractive Error.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Emmetropes	17	18.2	18.2	18.2

	Myopia	22	23.65	23.65	41.8
	Hyperopia	7	7.5	7.5	49.3
	Myopic Astigmatism	25	26.8	26.8	76.1
	Hyperopic Astigmatism	10	10.7	10.7	88.8
	Mixed astigmatism	12	12.9	12.9	100.0
	Total	93	100.0	100.0	

There were 17 patients (18.2%) with emmetropia, 22 had (23.65%) myopia, 7 (7.5%) were hyperopes, 25 (26.8%) showed myopic astigmatism and 10 (10.7%) had hyperopic astigmatism. The remaining 12 (12.9%) had mixed astigmatic error.

DISSCUSSION

The consanguinity and types of horizontal deviation is not properly identified. The mode of horizontal deviation inheritance can be dominant, recessive, or multifactorial[11]. Oligogenic heirloom for childhood esotropia was seen in a huge parental cousin marriage population[12]. Similar results were obtained from recent study. Autosomal recessive inheritance in horizontal deviation has been seen in consanguinity and mostly infantile esotropia seen with hypermetropia[13].

In our study we found that myopic astigmatism was the most common association with horizontal deviation. It is concluded from another study that due to autosomal recessive linkage, higher myopia was associated with exotropia in many children. All these children of myopia with exotropia had positive history of consanguinity[14]. Infantile esotropia with hypermetropia and exotropia with myopia cases were observed due to consanguinity. Anisometropic amblyopia in many school-going children was examined and 65% had positive history of consanguinity[15].

The parental cousin marriage is an extremely rooted community approach between one fourth of the world populace[3]. Consanguineous communities are trying to find counseling on consanguinity[16]. The number one health care agencies are faced with consanguineous couple stressful solutions to their questions on the predicted health dangers to their offspring[17]. In clinical inheritances, a parental cousin marriage is defined as a relation between two individuals who are associated as second cousins or closer, with the coefficient breeding equal or higher than 0.0157, where the coefficient characterizes extent of the ratio of loci at which the children of a parental cousin marriages is predictable to inherit identical copies of genes from both parents[18]. Similar studies suggested that inheritance has an important role in the etiology of strabismus. Previous studies indicated the occurrence rate of 70 to 85% among monozygotic twins and 35 to 50% among dizygotic twins and all these offspring have significant myopia with exotropia[19]. In another similar research, strong genetic element in hyperopic accommodative esotropia was observed[20].

We found esotropia in 40.8% of our cases while exotropia was seen in 59.1% cases. Schlossmann and Priestley suggested that 47.8% of patients with horizontal deviation, 49.9% with esotropia and 36.9% with exotropia, had positive history of parental cousin marriages[21]. Other similar research showed that incidence of horizontal deviation in consanguinity is 65% higher as compared to normal population[22]. The limitation of our study is the small sample size with single center. More studies are required to find a generalizable recommendation.

CONCLUSION

Consanguinity causes abnormality in the eyes and causes refractive errors. Horizontal deviation is seen in the children having age 3 to 15 years and positive history of consanguinity. It is concluded that consanguinity causes deviation in the eyes and exotropia is more common.

Authors Affiliation

Dr. Samia Iqbal (OD)
Doctor of Optometry, PGR MS opto(UOL).
Department of Optometry & Visual Sciences (DOVS)
The University of Lahore teaching hospital Lahore.

Dr. Hakim Anjum Nadeem (OD)
Doctor of optometry. PGR MS Opto (UOL).
Senior lecturer, DOVS, UOL Lahore.

Role of Authors

Dr. Samia Iqbal
Study design, review of literature and data analysis.

Dr. Hakim Anjum Nadeem
Article review and manuscript preparation.

REFRENCES

1. **Akrami SM, Montazeri V, Shomali SR, Heshmat R, Larijani B.** Is there a significant trend in prevalence of consanguineous marriage in Tehran? 2009; 18 (1): 82–86.
2. **Aurell E, Norrsell K.** A longitudinal study of children with a family history of strabismus: factors determining the incidence of strabismus, 1990; 74: 589–594.
3. **Cotter S, Varma R, Tarczy-Hornoch K, McKean-Cowdin R, Lin J, Wen G, Wei J, Borchert M, Azen SP, Torres M, Tielsch JM, Friedman DS, Repka MX, Katz J, Ibironke J, Giordano L.** Risk factors associated with childhood strabismus: the multi-ethnic pediatric eye disease and Baltimore pediatric eye disease studies, 2011; 118: 2251–2261.
4. **Dufier JL, Briard ML, Bonaiti C, Frezal J, Saraux H.** Inheritance in the etiology of convergent squint, 1979; 179: 225–234.
5. **Fujiwara H, Matsuo T, Sato M, Yamane T, Kitada M, Hasebe S, Ohtsuki H.** Genome-wide search for strabismus susceptibility loci. 2003; 57 (3): 109–116.
6. **Hamamy H.** Consanguineous marriages, 2012; 3: 185–192.
7. **Khan AO, Shinwari J, Abu Dhaim N, Khalil D, Al Sharif L, Al Tassan N.** Potential linkage of different phenotypic forms of childhood strabismus to a recessive susceptibility locus (16p13.12-p12.3), 2011a; 17: 971–976.
8. **Khan AO, Shinwari J, Al Sharif L, Khalil D, Al-Gehedan S, Tassan NA.** Infantile esotropia could be oligogenic and allelic with Duane retraction syndrome, 2011; 17: 001–002.
9. **Li D, Chen Y.** A consanguineous mating couple and their concomitant esotropia, 1991; 7 (3): 153–155.
10. **Matsuo T, Hayashi M, Fujiwara H, Yamane T, Ohtsuki H (2002).** Concordance of strabismic phenotypes in monozygotic versus multizygotic twins and other multiple births, 2007: 46 (1): 59–64.
11. **Oystreck DT, Lyons CJ.** Comitant strabismus: perspectives, present and future, 2012; 26: 265–270.
12. **Paul TO, Hardage LK.** The heritability of strabismus, 151–158.
13. **Saadat M, Ansari-Lari M, Farhud D.** Consanguineous marriage in Iran, 2004; 31: 263–269.
14. **Schlossmann A, Priestley BS.** Role of heredity in etiology and treatment of strabismus, 1952; 47: 1–20.
15. **Stoll P, Alembik Y, Dott B, Feingold J.** Parental consanguinity as a cause of increased incidence of birth defects in a study of 131,760 consecutive births, 2005; 49: 114–117.
16. **Tohishiko M, Takashi Y, Hirishi O.** Heredity versus abnormalities in pregnancy and delivery as risk factors for different types of comitant strabismus, 2001; 38: 78–82.
17. **Ziakas NG, Woodruff G, Smith LK, Thompson JR.** A study of heredity as a risk factor in strabismus, 2008.
18. **Simon D, Hadjiathanasiou C, Garel C, Czernichow P, Léger J.** Phenotypic variability in children with growth hormone deficiency associated with posterior pituitary ectopia. Clinical endocrinology, 2006 Apr. 1; 64 (4): 416-22.
19. **Alazami AM, Hijazi H, Al-Dosari MS, Shaheen R, Hashem A, Aldahmesh MA, Mohamed JY, Kentab A, Salih MA, Awaji A, Masoodi TA.** Mutation in ADAT3, encoding adenosine deaminase acting on transfer RNA, causes intellectual disability and strabismus. Journal of medical genetics, 2013 Apr. 24: Jmedgenet-2012. American Journal of Human Genetics, 1998 Aug. 31; 63 (2): 517-25.
20. **Carnevale F, Krajewska G, Fischetto R, Greco MG, Bonvino A.** Ptosis of eyelids, strabismus, diastasis recti, hip defect, cryptorchidism, and developmental delay in two sibs. American Journal of Medical Genetics Part A, 1989 Jun. 1; 33 (2): 186-9.
21. **Kekunnaya R, Gupta A, Sachdeva V, Krishnaiah S, Rao BV, Vashist U, Ray D.** Duane retraction syndrome: series of 441 cases. Journal of pediatric ophthalmology and strabismus, 2012 May 1; 49 (3): 164-9.
22. **Salgado LJ, Ali CA, Castilla EE.** Acrocallosal syndrome in a girl born to consanguineous parents. American Journal of Medical Genetics Part A, 1989 Mar. 1; 32 (3): 298-300.