

Case Report

Subluxation of lens alarms to homocystinuria

Abhishek Mansinh Patel*, Khushnood M. Sheikh, Manisha B. Shastri

Department of Ophthalmology, Surat Municipal Institute of Medical Research and Education, Surat, Gujarat, India

Received: 17 October 2016

Revised: 24 October 2016

Accepted: 11 November 2016

***Correspondence:**

Dr. Abhishek Mansinh Patel,

E-mail: abhishek_m_patel@yahoo.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Homocystinuria is a disorder of methionine metabolism. The term Homocystinuria refers as abnormally large amounts of homocystine are excreted in the urine. The condition was caused by impaired functioning of the cystionin B-synthetase (CBS) enzyme. Homocystinuria is an autosomal recessively inherited defect in the trans-sulfuration pathway (homocystinuria I) or methylation pathway (homocystinuria II and III). The most common form of homocystinuria is characterized by near sightedness, dislocation of the lens at the front of the eye, an increased risk of abnormal blood clotting, and brittle bones that are prone to fracture or other skeletal abnormalities. Some affected individuals also have developmental delay and learning problems. Homocystinuria has a current cumulative detection rate of 1 in 344,000. A high concentration of homocysteine makes fibrillin unstable. Fibrillin is responsible to form the structures which hold the lens of the eye in place. We report a case of 28 year old male with unilateral Subluxation of lens following trauma coincidentally diagnosed to have Homocystinuria and bilateral Subluxation of lens. On account of case we would like to emphasize homocystinuria should be considered as differential diagnosis in Subluxation of lens.

Keywords: CBS enzyme, Homocystinuria, Spherophakia, Subluxation of lens

INTRODUCTION

The term homocystinuria refers to the fact that abnormally large amounts of homocystine are excreted in the urine. Homocystinuria was described for the first time in 1962 by Irish pediatricians Nina Carson and Desmond Neill. In 1964 it was established that the condition was caused by impaired functioning of the cystionin B-synthetase (CBS) enzyme. The reason that CBS does not function is a mutation in a gene on chromosome 21 (21q22) with inheritance pattern as autosomal recessive.¹ Homocystinuria has a current cumulative detection rate of 1 in 344,000.^{1,2} There are some countries, such as Ireland, where the disease is more common. The disease is sometimes asymptomatic and symptoms may also be mild or diffuse, which may account for the fact that so few people with the disease have been identified. High

concentrations of homocysteine affect supportive tissue in different parts of the body, for example by making fibrillin unstable. One of the functions of fibrillin is to form the structures which hold the lens of the eye in place. The accumulation of homocysteine also affects the skeleton's supportive tissue, damages the walls of blood vessels and can contribute to the formation of free radicals. In the brain, different receptors on the surface of nerve cells are affected.

CASE REPORT

A-28-years-old male was referred to our department due to the complaints of diminution of vision (DOV) in left eye due to trauma while working with grinding machine 5 days ago. The young adult had a past history of wearing of high power spectacles for which he was

uncomfortable. He had gradual, painless and progressive DOV in right eye (RE). His vision was better in left eye (LE) which deteriorated after trauma and resulted in diplopia, photophobia and something moving in front of eye. Family history was insignificant.

On physical examination, body weight, height and arm length were 48 kg, 171 cm, 171 cm respectively. Vital parameters were within normal range. His facial appearance showed oblong face, epicanthal folds, hypoplasia of cheeks, high arched palate suggestive of Marfanoid features certified by physician.



Figure 1: Abnormally long arm span.



Figure 2: Narrow long Face with long neck.



Figure 3: High arched palate.

His ophthalmic examination revealed vision of ½ meter finger count and 6 meter finger count in right eye and left eye respectively with no pin whole improvement. Left

eye persistent pupillary membrane, iridodonesis with inferonasal subluxated lens with few zonules holding lens in position with poor response to dilating drops. RE shows nuclear cataract grade III with iridodonesis with funnel shaped configuration of iris due to subluxation of lens posteriorly. His both eyes fundus were highly myopic with multiple lattices inferiorly and in supralateral quadrant with holes in periphery.



Figure 4: Abnormally long fingers.

On further evaluation, his both eye corneal diameter were 11.5 mm; undilated as well as dilated tension were 18 and 10 mmHg respectively in RE and LE with non-contact tonometer. Gonioscopic finding were suggestive of open angle, Right eye approximated lens diameter through fully dilated pupils were 6x6 mm with sphere shaped curvature suggestive of microspherophakia. His both eye axial length were 28.93 and 29.42 mm with immersion method in right and left eye respectively.

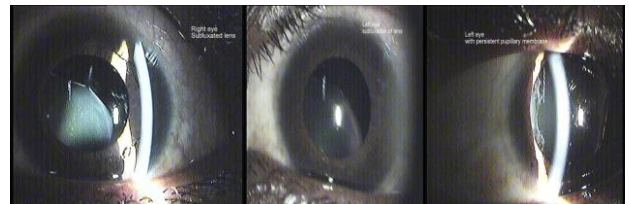


Figure 5: Pictures showing subluxation of lens both OD and OS.

All laboratory investigation were within normal range except Serum Homocystine level which was 20 µmol/L for which desirable level should be ≤10 µmol/L. His Chest X-ray and ECG were normal. His neurological examinations were within normal limits. Based on clinical laboratory a finding, patient was diagnosed with homocystinuria. Patient was a non-responder to pyridoxine tablets. He was advice laser barrage by the vitreoretinal surgeon and was further managed by both eye lensectomy + vitrectomy with aphakia with spectacle correction one month later after re-evaluating fundus. Patient was satisfied with postoperative vision of both eye as 6/18 and disappearance of complains at the end of 8months. Improvement of vision beyond 6/18 was not there because of evidence of high axial length and

unawareness of high refractive error confirming amblyopia.

DISCUSSION

Deterioration in the metabolism of methionine which is an essential amino acid that contains sulfur leads to homocystinuria. The most frequent cause of homocystinuria is cystionin B-synthetase (CBS) deficiency (type I); other causes are deficient methylcobalamine or abnormality in methylene tetrahydrofolate reductase (MTHFR) (type II and III).

The disease inherited is autosomal recessive pattern. Other ocular abnormalities are ectopia lentis, cataract, severe myopia, iridodonesis, glaucoma, retinal degeneration, retinal detachment and corneal abnormalities.³⁻⁵ By certain period, miscellaneous variations may develop in patients who involve eye, circulatory system, CNS and bone. The diagnosis is mainly determined after 3 years of age by seeing binocular lens subluxation.^{6,7} In present case patient presented later due to inciting force of even trival trauma; he neglected previous other problem due to poverty and illiteracy. We could not perform familial study in detail as patient alone was a migrant from other state of India, as per history his parents and brothers did not have any such problems.

The complaints of our case were compatible with literature showing right eye cataract changes starting in childhood when patient was approximately 6 year old with persistent pupillary membrane, with spherophakia with iridodonesis with high myopia. Left eye showed persistent pupillary membrane, inferonasal subluxated lens with few zonules holding lens with iridodonesis and high myopia with peripheral lattice degeneration. Marfan syndrome like appearance, arachinodactyly, scoliosis, pectus excavatum or carinatus, genu valgum and spinal osteoporosis is frequent radiological finding for homocystinuria.⁸ In line of our literature our patient had Marfan syndrome like appearance but with no osteoporotic changes on spinal x rays.

Spherophakia is a rare condition in which the crystalline lens assumes a spherical shape with an increase in anteroposterioi diameter and reduced equatorial diameter. Spherophakia can occur as isolated anomaly or in association with systemic disorder such as Weill-Marchesani syndrome, Marfans syndrome, Mandibulofacial dystosis, Alport syndrome and Klinefelter's syndrome.^{9,10} Present patient had spherophakia with funnel shaped configuration of iris as well as iridodonesis due to weakened zonules that had been stretched.

CONCLUSION

Consequently, on account of the case we would like to emphasize homocystinuria should be considered as

differential diagnosis in cases of unilateral subluxated lens following trauma. Diagnosing such case is important as it may prove helpful for awareness of patient and his family, and preventing any complication arising in future like maintaining hydration and avoiding nitrous oxide during general anesthesia as well as managing complications.

This will also bring awareness among doctors for screening patient for early therapy in childhood for proper diagnosis as this could prevent complication in adult age group.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: Not required

REFERENCES

1. Yap Sufin. Homocystinuria due to cystatione B-synthase deficiency: orphaned. 2005.
2. Burke JP, Keefe M, Bowell R, Naughten ER. Ocular complications in homocystinuria-early and late treated. *British J Ophthlmo.* 1989;73:427-31.
3. Rezvani I, Rosenblatt DS. Metabolic disease, Methionine. In: Behrman RE, Kliegman RM, Jenson HB. *Nelson Textbook of Pediatrics* (18th Ed). Philadelphia: WB Saunders. 2007:536-9.
4. Sulochana KN, Amirthalakshmi S, Vasanthi SB, Tamilselvi R, Ramakrishnan S. Homocystinuria with congenital/developmental cataract. *Indian J Pediatr.* 2000;67:725-8.
5. Gupte SD, Jain IS, Kumar J. Acquired cataract in homocystinuria. *Indian J Ophthalmol.* 1971;19:49-51.
6. Yılmaz C, Güven AS, Yılmaz N, Kaya A, Çaksen H, Cesur Y, et al. A Case of Homocystinuria Presenting with Unilateral Cataract, Systemic Hypertension and Purpura Fulminans: *Van Tıp Dergisi:* 2013;20:97-9.
7. Rais L, Wafi M, Lahbil D, Iraki M, Fekkak J, Hamdani M, et al. Ocular and systemic complications of homocystinuria: a report of five cases. *J Fr Ophtalmol.* 2003;26:1045-50.
8. McCully KS. Homocysteine, vitamins, and prevention of vascular disease. *Mil Med.* 2004;169:325-9.
9. Maken PL, Pavlin CJ, Tuli R, Trope GE. Ultrasound biomicroscopic feature of microspherophakia. *Australian and Newz J Ophthalmology.* 1995;23:217-20.
10. Willoughby CE, Wishart PK. Lensectomy in the management of glaucoma in spherophakia. *J Cataract and Refractive Surgery.* 2002;28:1061-4.
11. Sakamoto A, Nishimura Y, Ono H, Sakura N. Betaine and homocysteine concentrations in foods. *Pediatr Int.* 2002;44:409-13.
12. Silva GS, Almeida CM, Félix EP, Fukujima MM, Ferraz HB, Gabbai AA. Cerebral venous thrombosis

- and homocystinuria: case report. *Arq Neuropsiquiatr.* 2001;59:815-6.
13. Tamburrini O, Bartolomeo-De Iuri A, Andria G, Strisciuglio P, Del Giudice E, Paescandolo P, et al. Bone changes in homocystinuria in childhood. *Radiol Med.* 1984;70:937-42.
 14. Sakamoto A, Ono H, Mizoguchi N, Sakura N. Betaine and homocysteine concentrations in infant

formulae and breast milk. *Pediatr Int.* 2001;43:637-40.

Cite this article as: Patel AM, Sheikh KM, Shastri MB. Subluxation of lens alarms to homocystinuria. *Int J Res Med Sci* 2016;4:5466-9.