

Association between hypertriglyceridemia and open angle glaucoma: A case report

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Hypertriglyceridemia is a metabolic disorder that can cause vascular dysfunction and be causally associated with glaucoma. Herein we present the case of a 16-year-old boy with hypertriglyceridemia with open-angle glaucoma.

Key words: Hypertriglyceridemia, juvenile open angle glaucoma, primary open angle glaucoma

Increased intraocular pressure (IOP) is the most prominent cause responsible for the development of glaucoma, but there are many other risk factors also which are involved in the pathogenesis of glaucoma, including structural abnormalities and functional dysregulation of the vasculature supplying the optic nerve and the surrounding retinal tissue that also contribute for causation of glaucoma.^[1] Hypertriglyceridemia is one such metabolic factor, it causes vascular dysfunction that can further lead to glaucoma.^[2] So, a thorough ocular and systemic examination can help us to treat the patient rationally.

Case Report


A 16-year-old boy was referred to our outpatient department. His chief complaints were loss of vision and redness in the right eye associated with headaches since 5 months. Patient also gave history of gradual increase in the size of right eye since 5 months. There was no gross anomaly detected on general examination. He had undergone a whole spectrum of systemic investigations including brain MRI and everything had turned out to be negative. There was one red flag sign in the battery of

investigations that had been done. His triglyceride level was 679 mg/dl, which was abnormally high for his age group and he was taking lipid lowering treatment for the same (Tablet Lipaglin OD for 3 months) advised by the physician.

His ocular examination showed best corrected visual acuity of hand movement close to face in the right eye and 6/9 in the left eye. On slit lamp examinations, right eye had diffuse conjunctival congestion, mild corneal haze, normal anterior chamber depth, relative afferent pupillary defect, and small twigs of iris neovascularization in pupillary margin in 2'o clock hours. Left eye anterior segment was within normal limits, with a clear cornea and reacting pupil. Lens was clear in both the eyes. IOP by Goldmann's Applanation tonometer was 54 mmHg in right eye and 15 mmHg in left eye. Gonioscopy revealed open angles up to scleral spur in both eyes. Fundus examination with 90D lens showed glaucomatous optic atrophy with cup to disc ratio of 0.9:1 (disc pallor) in the right eye [Fig. 1] and 0.3:1 in the left eye, with normal blood vessels and bright foveal reflex. He was using following eye drops: brimonidine and brinzolamide combination BD, timolol BD and tablet acetazolamide SR BD, which was prescribed to him 2 days ago elsewhere. We added liquid glycerol 1 oz BD.

At 1 week follow-up, the pressure in right eye was 32 mmHg and left eye was 16 mmHg, and the neovascularization had resolved. He was intolerant to systemic antiglaucoma medications. The IOP was not under control with topical antiglaucoma treatment alone, we advised to go for right eye trabeculectomy with mitomycin C. The surgery in the right eye was done uneventfully. On first postoperative week, right eye IOP was 10 mmHg with a well-formed anterior chamber and good functioning bleb [Fig. 2]. Because of discontinuation of systemic antiglaucoma medications, the left eye IOP had increased to 34 mmHg and he was prescribed eye drops: timolol BD, brimolol, and brimonidine combination BD and bimatoprost HS. Two weeks after giving maximum topical antiglaucoma treatment, the pressure of left eye was still 32 mmHg. This was a challenging situation for us as the left eye was the only seeing eye, IOP uncontrolled by topical antiglaucoma drugs, and the patient was intolerant to systemic medication.

Since trabeculectomy with MMC showed good response in the right eye, we performed the same procedure in the left eye. Seven days later, the inIOP in the right eye was 10 mmHg and

Access this article online	
Quick Response Code:	Website: www.ijjo.in
	DOI: 10.4103/ijjo.IJO_1618_18

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Manuscript received: 08.10.18; **Revision accepted:** 21.01.19

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Cite this article as: Khamar MB, Sthapak AP, Vijayavarshcini D, Patel PM. Association between hypertriglyceridemia and open angle glaucoma: A case report. Indian J Ophthalmol 2019;67:1202-4.

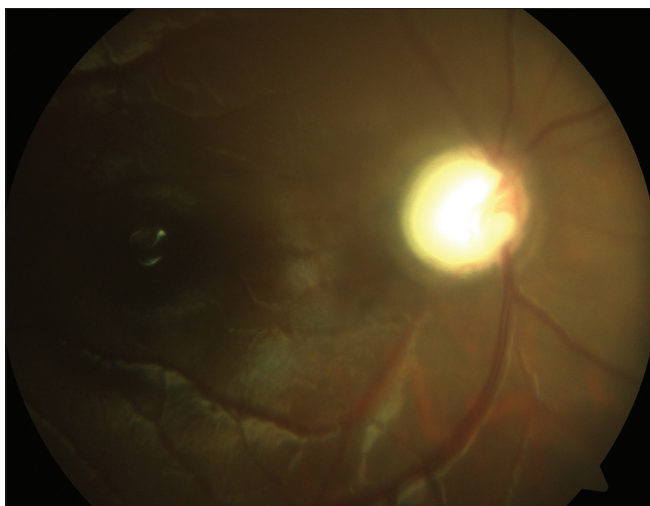


Figure 1: Right Eye fundus showing glaucomatous optic atrophy

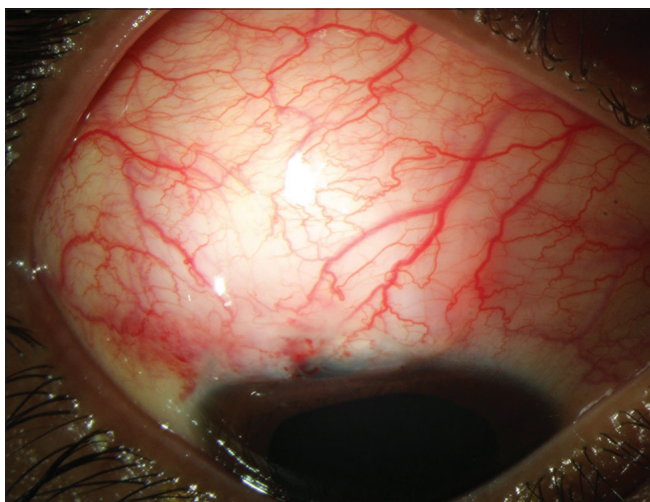


Figure 2: 1 week postoperative image of Right Eye showing well formed bleb and formed anterior chamber

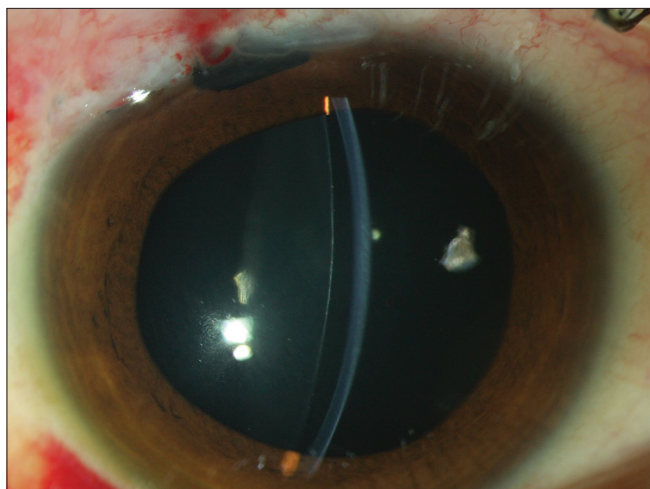


Figure 3: 1 week postoperative image of Left Eye showing well formed bleb and formed anterior chamber

in left eye was 8 mmHg. Patient had visual acuity of 6/18 in the left eye. Slit lamp examination of left eye revealed a well-formed anterior chamber with good functioning bleb [Fig. 3]. His serum triglyceride levels had also come down to normal with systemic lipid lowering medications.

Discussion

Glaucoma can be seen as an optic neuropathy associated with characteristic structural damage to the optic nerve and associated visual dysfunction that may be caused by various pathological processes.^[3] An elevated IOP is an important modifiable risk factor for the development of glaucoma and by far the most common risk factor for visual loss in glaucoma. However, it is not the only factor involved because people with normal IOP have been shown to experience vision loss from glaucoma. On the other hand, some people with high IOP never develop optic nerve head damage.^[4] Therefore, there are multiple factors responsible for causation of glaucoma. The association of triglycerides and glaucoma has been a matter of debate in recent times. There are several studies which have found a significant association between high triglyceride levels and open angle glaucoma.^[5]

Generally, hypertriglyceridemia is often seen in adults, but in modern life style scenario there has been prevalence of high triglyceride levels in adolescent too. The occurrence of high triglyceride level (more than 200 mg/dl) reported in a study conducted in United States was 10.6%.^[6] Hypertriglyceridemia was found to be most prevalent factor associated with increase metabolic syndrome in the age group of 12--18 years.^[7] Hypertriglyceridemia causes vascular dysfunction that leads to increased blood viscosity which causes elevation of episcleral venous pressure.^[2,8] Several case-control studies report a significant association of triglycerides with glaucoma and with intraocular pressure.^[5,9,10]

Davari *et al.* in their study titled "A Survey of the Relationship Between Serum Cholesterol and Triglyceride to Glaucoma: A Case Control Study" found significant association between high triglyceride level and POAG (P value 0.001), they concluded that the chance of contracting primary open angle glaucoma (POAG) in people whose triglyceride is abnormal is 16.9 times the individuals with normal triglyceride.^[11]

Conclusion

Hence, observing this case scenario, we concluded that detailed ophthalmic examination including IOP and fundus evaluation should be done for all patients presenting with headaches. A thorough systemic evaluation should be carried out of all young patients with glaucoma. They should be treated aggressively.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

References

1. Venkataraman ST, Flanagan JG, Hudson C. Vascular reactivity of optic nerve head and retinal blood vessels in glaucoma—a review. *Microcirculation* 2010;17:568-81.
 2. Pertl L, Mossböck G, Wedrich A, Weger M, Königsbrügge O, Silbernagel G, *et al.* Triglycerides and open angle glaucoma—A meta-analysis with meta-regression. *Sci Rep* 2017;7:7829-37.
 3. Foster PJ, Buhrmann R, Quigley HA, Johnson GJ. The definition and classification of glaucoma in prevalence surveys. *Br J Ophthalmol* 2002;86:238-42.
 4. Huck A, Harris A, Siesky B, Kim N, Muchnik M, Kanakamedala P, *et al.* Vascular considerations in glaucoma patients of African and European descent. *Acta Ophthalmol* 2014;92:e336-40.
 5. Sahinoglu-Keskek N, Keskek SO, Cevher S, Kirim S, Kayiklik A, Ortoglu G, *et al.* Metabolic syndrome as a risk factor for elevated intraocular pressure. *Pakistan J Med Sci* 2014;30:477-82.
 6. Kit BK, Carroll MD, Lacher DA, Sorlie PD, DeJesus JM, Ogden C. Trends in serum lipids among US youths aged 6 to 19 years, 1988-2010. *JAMA* 2012;308:591-600.
 7. Misra A, Vikram NK, Sharma R, Basit A. High prevalence of obesity and associated risk factors in urban children in India and Pakistan highlights immediate need to initiate primary prevention program for diabetes and coronary heart disease in schools. *Diabetes Res Clin Pract* 2006;71:101-2.
 8. Rasoulinejad SA, Kasiri A, Montazeri M, Rashidi N, Montazeri M, Hedayati H. The association between primary open angle glaucoma and clustered components of metabolic syndrome. *Open Ophthalmol J* 2015;9:149-55.
 9. Aptel F, Bégulé A, Razavi A, Romano F, Charrel T, Chapelon JY, *et al.* Short- and long-term effects on the ciliary body and the aqueous outflow pathways of high-intensity focused ultrasound cyclo-coagulation. *Ultrasound Med Biol* 2014;40:2096-106.
 10. Ye S, Chang Y, Kim CW, Kwon MJ, Choi Y, Ahn J, *et al.* Intraocular pressure and coronary artery calcification in asymptomatic men and women. *Br J Ophthalmol* 2015;99:932-6.
 11. Davari MH, Kazemi T, Rezai A. A survey of the relationship between serum cholesterol and triglyceride to glaucoma: A case control study. *J Basic Appl Sci* 2014;10:39-43.
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