Proliferative Diabetic Retinopathy in Right Eye and Choroidal Neovascular Membrane in Myopic Left Eye: Case Report

Sağ Gözde Proliferatif Diyabetik Retinopati, Miyop Sol Gözde Koroidal Neovasküler Membran: Olgu Sunumu

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ABSTRACT

Diabetic retinopathy (DR) is a common cause of vision loss. Axial myopia has been considered to be protective against DR although it is equivocal. We report a 61-year-old diabetic female patient presented with worsening vision in both eyes. Spherical equivalent refractive errors were +2.00 diopters on the right eye and -13.00 diopters on the left eye. Fundus examination revealed proliferative DR on the right eye and no signs of DR, but hemorrhage due to myopic choroidal neovascularization on the left eye. This case shows that expression of DR may differ according to the refractive status of the eye.

Key words: diabetic retinopathy; myopia.

ÖZ

Diyabetik retinopati (DR), görme kaybının önemli sebeplerinden biridir. Miyopinin DR gelişimini önleyici bir etken olduğu düşünülmektedir. Olgu sunumumuzda her iki gözde görme azalması ile kliniğimize başvuran 61 yaşındaki kadın hastayı sunmayı amaçladık. Hastanın refraktif değerlerinin sferik ekivalanı sağ gözde +2.00 dioptri sol gözde -13.00 dioptri idi. Gözdibi muayenesinde sağ gözde proliferatif diyabetik retinopati izlenirken, sol gözde ileri miyopiye bağlı gelişen koroidal neovasküler membran ve lezyon bitişiğinde hemoraji olduğu izlendi. Bu olgu, aynı hastada DR şiddetinin refraksiyon kusuruna göre değiştiğini göstermektedir.

Anahtar kelimeler: diyabetik retinopati; miyopi.

INTRODUCTION

Diabetic retinopathy (DR) has been regarded as the most common cause for vision loss which is identified by microaneurysms, hemorrhages, lipid exudates, macular edema, capillary occlusion, cotton wool spots and neovascularization (NV).[1,2] Myopia is confirmed as the second frequent reason for low vision and blindness.[3] From the 1960s, axial myopia has been suggested to be a probable preventive factor versus DR.[4,5] However, some other studies have reported inconsistent results.[6]Despite proven association among myopia and its refractive and axial components, it is not clear whether the structural or the refractive factors of myopia, or both, have a part in this relationship.[7] The data in literature about the association among axial myopia and DR are mainly attributed to the results of observational studies.

Here we report a case with proliferative DR in hyperopic eye and choroidal neovascular membrane in myopic eye.

CASE REPORT

A 61-year-old female presented at our clinic after becoming aware of decreased visual acuity (VA) in her both eyes.

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Her past medical history revealed that she had diagnosed as diabetes mellitus for seven years and was under insulin treatment. She stated that she had no treatment for diabetic retinopathy before.

Best corrected visual acuity was 0.1 in the right eye and hand movements in the left eye. Spherical equivalent refractive error was +2.00 diopters on the right eye and -13.00 diopters on the left eye. Axial length was 23.14 mm in right eye and 27.47 mm in left eye. Keratometric measurements were in right and left eye for flat meridian were 43.30 diopters and 44.55 diopters; for step meridian were 46.64 diopters and 45.73 diopters respectively.

Ocular examination showed a vitreous hemorrhage (VH) due to proliferative DR in her right eye (Fig1a) and a retinal hemorrhage on the macula of his left eye due to myopic choroidal neovascularization (Fig 1b). Fundus fluorescein angiography revealed neovascularization on right eye and hipofluorescence on the fovea due to hemorrhage in left eye. There wasn't any sign of DR on the left eye.

Carotid doppler ultrasound was performed to evaluate atherosclerosis of the carotid artery. However no stenosis was detected on both side.

After one month follow up, VH in the right eye was persisted and pars plana vitrectomy was performed. One dose intravitreal injection of ranibizumab was performed to the left eye and pro re nata (PRN) dosing regimen was planned for choroidal neovascularization.

DISCUSSION

Diabetic retinopathy and axial myopia are common disorders. DR was shown to be a rising risk for visual loss for people worldwide.[8] On the other side, the prevalence of myopia is predicted to rise up to 2.5 billion in 2020.[9] On that account the relation among axial myopia and DR is important for public health.

Numerous studies have showed that axial myopia protects against DR.[4,5,10] The mechanism of the association between axial myopia and decreased risk of DR is poorly described. A number of structural changes in myopic eyes are considered to have role in low DR risk. These changes are reported as elongation of the eye, change in the shape of the posterior pole, variation of ocular blood flow, decline in metabolic need and diluation of inflammatory cytokine concentration owing to increased ocular volume in myopic eyes.[11,12]

It is hypothesized that the shapes of retinal arterioles and venules in a myopic eye are changed.[13] The retinal blood flow decreases due to narrowed vessels.[14,15]In DR, increasing retinal blood flow causes increased retinal capillary pressure, capillary wall dilatation, leakage and rupture.[16,17] DR severity is thought to be related to increased retinal blood flow. Decreased retinal blood flow may be a protective factor for DR. However, Man et al, investigated the association between retinal capillary flow and DR in 2014.[18] The researchers showed that diminished retinal capillary flow was not a major factor underlying the protective association between axial elongation and DR.[18]

Another commonly held theory is the retinal neuron disfunction and neurodegeneration as a result of decreased retinal O_2 consumption in myopic eyes.[11] Axial elongation of the eye leads to streching and thinning of the retina causing a reduced retinal metabolism.[11]

Decreasing oxygen demand may mitigate hypoxic condition which is crucial for development of DR.[11]However Taskıran-Comez et al, found no difference between macular thickness and volume of the patients with anizometropia.[19]

In addition, degenerative variations of the outer retina may

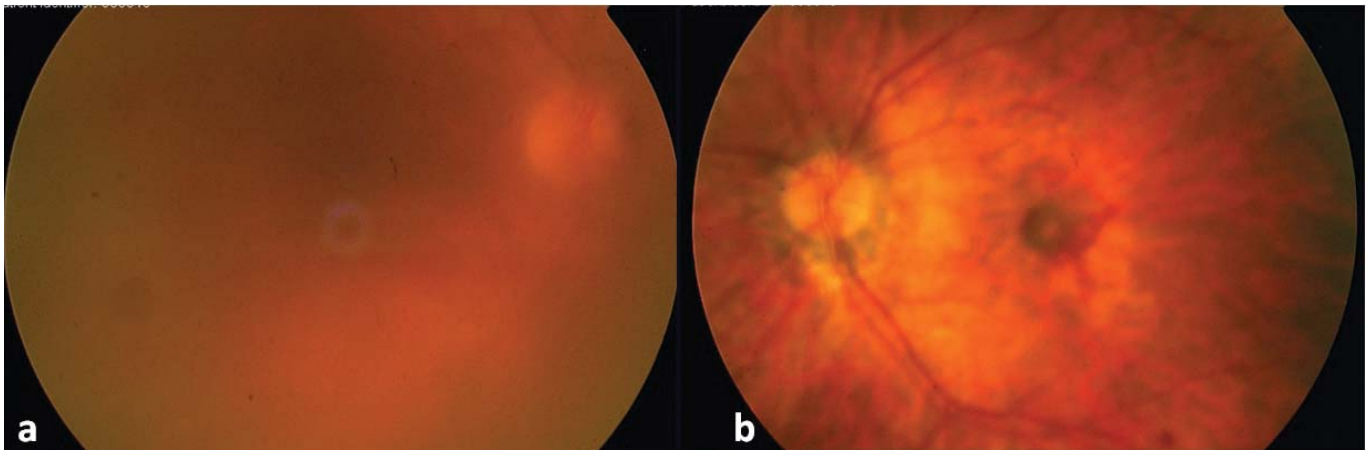

Figure 1. *Vitreous hemorrhage due to proliferative diabetic retinopathy obscuring the view of the fundus on the right eye (a) and hemorrhage due to myopic choroidal neovascularization on the left eye (b).*

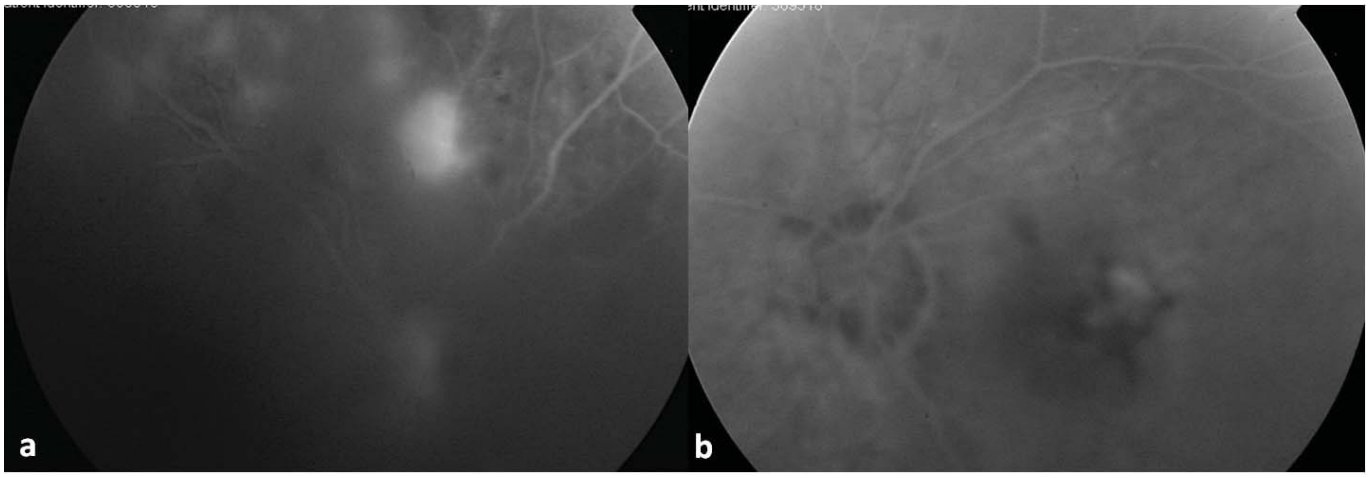

Figure 2. *Fundus fluorescein angiography of the late phases shows leakage from the neovascular tissue on the right eye (a), leakage from the myopic choroidal neovascularization and blokage of the hemorrrhage on the left eye (b).*

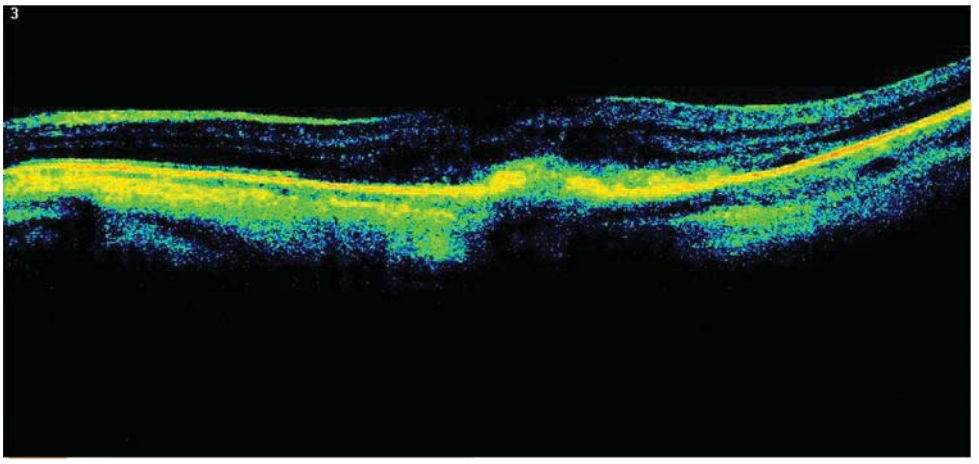

Figure 3. *Optical coherence tomography of the left eye shows choroidal neovascularization.*

alter the amount of produced inflammatory or proangiogenic cytokines involving vascular endothelial growth factor (VEGF)[20]. Even in myopic choroidal neovascularization VEGF levels in vitreous were found to be significantly lower than normal eyes.[20]

Posterior vitreous detachment (PVD) is associated with a reduced risk for proliferative DR.[21] PVD is common in myopic eyes and may be one of the protective factors for DR.[21]

In a recent study transthyretin (TTR); a protein which down regulates pro-angiogenic genes was found to be higher in myopic eyes.[22] Increased levels of TTR and reduced levels of VEGF may be the cause of decreased DR rate in myopic eyes.[22]

Myopic maculopathy is defined by the existence of one or more of the following changes: posterior staphyloma, lacquer cracks and myopic CNV, macular hole and chorioretinal atrophy in the macula. The presented case was presented with CNV.

The relation of myopia with low risk DR is highly identified but remained contentious. The current study well demonstrates the affect of myopia in DR development. Presumably all of the described mechanisms in literature have protective role for myopic eyes. Recognizing the inhibitory effect of axial myopia for DR may help the clinician to foresee a different individualized DR risk management for these patients. However future studies are necessary to explain the protective mechanisms and follow up procedure for DR in myopic eyes.

REFERENCES / KAYNAKLAR

1. Campochiaro PA. Ocular neovascularization. J Mol Med. 2013; 91: 311-21.
2. Barot M, Gokulgandhi MR, Patel S, et al. Microvascular complications and diabetic retinopathy: recent advances and future implications. Future Med Chem. 2013; 5: 301-14.
3. Grossniklaus HE, Green WR. Pathologic findings in pathologic myopia. Retina. 1992; 12: 127-33.
4. Lim LS, Lamoureux E, Saw SM, et al. Are myopic eyes less likely to have diabetic retinopathy? Ophthalmology. 2010; 117: 524-30.

5. Jain IS, Luthra CL, Das T. Diabetic retinopathy and its relation to errors of refraction. Arch Ophthalmol. 1967;77: 59–60.
6. Xie XW, Xu L, Wang YX, et al. Prevalence and associated factors of diabetic retinopathy. The Beijing Eye Study 2006. Graefes Arch Clin Exp Ophthalmol. 2008; 246: 1519-26.
7. Gonzalez BF, Sanz FJ, Munoz SM. Axial length, corneal radius, and age of myopia onset. Optom Vis Sci. 2008; 85: 89–96.
8. Bourne RR, Stevens GA, White RA et al. Causes of vision loss worldwide, 1990-2010: a systematic analysis. Lancet Glob Health. 2013; 1: 339–49.
9. Kempen JH, Mitchell P, Lee KE et al. The prevalence of refractive errors among adults in the United States, Western Europe, and Australia. Arch Ophthalmol. 2004; 122: 495–505.
10. Moss SE, Klein R, Klein BE. Ocular factors in the incidence and progression of diabetic retinopathy. Ophthalmology. 1994; 101: 77-83.
11. Man RE, Lamoureux EL, Taouk Y et al. Axial length, retinal function, and oxygen consumption: a potential mechanism for a lower risk of diabetic retinopathy in longer eyes. Invest Ophthalmol Vis Sci. 2013; 54: 7691–98.
12. Man RE, Sasongko MB, Wang JJ, et al. Association between myopia and diabetic retinopathy: a review of observational findings and potential mechanisms. Clin Experiment Ophthalmol. 2013; 41: 293–301.
13. Atchison DA, Jones CE, Schmid KL, et al. Eyeshape in emmetropia and myopia. Invest Ophthalmol Vis Sci. 2004; 45: 3380-6.
14. Lim LS, Cheung CY, Lin X et al. Influence of refractive error and axial length on retinal vessel geometric characteristics. Invest Ophthalmol Vis Sci. 2011; 52: 669-78.
15. Shimada N, Ohno-Matsui K, Harino S et al. Reduction of retinal blood flow in high myopia. Graefes Arch Clin Exp Ophthalmol. 2004; 242: 284–8.
16. Dimitrova G, Kato S, Yamashita H, et al. Relation between retrobulbar circulation and progression of diabetic retinopathy. Br J Ophthalmol. 2003; 87: 622-5.
17. Quigley M, Cohen S. A new pressure attenuation index to evaluate retinal circulation. A link to protective factors in diabetic retinopathy. Arch Ophthalmol. 1999; 117: 84-9.
18. Man RE, Sasongko MB, Xie J, et al. Decreased retinal capillary flow is not a mediator of the protective myopia-diabetic retinopathy relationship. Invest Ophthalmol Vis Sci. 2014; 55: 6901-7.
19. Taşkıran Çömez A, Şanal Ulu E, Ekim Y. Retina and Optic Disc Characteristics in Amblyopic and Non-amblyopic Eyes of Patients with Myopic or Hyperopic Anisometropia. Turk J Ophthalmol 2017;47:28-33.
20. Sawada O, Kawamura H, Kakinoki M, et al. Vascular endothelial growth factor in the aqueous humour in eyes with myopic choroidal neovascularization. Acta Ophthalmol. 2011; 89: 459-62.
21. Saw SM, Gazzard G, Shih-Yen EC, et al. Myopia and associated pathological complications. Ophthalmic Physiol Opt. 2005; 25: 381-91.
22. Shao J, Yao Y. Negative effects of transthyretin in high myopic vitreous on diabetic retinopathy. Int J Ophthalmol. 2017; 10: 1864-9.