

ТЕМА НА БРОЯ HOT TOPIC

DIABETES AND NEOVASCULAR GLAUCOMA

E. Filandrianou, D. Kazakova

Department of Ophthalmology, University Hospital "Lozenets", Sofia

Key words: *Glaucoma, neovascular glaucoma, diabetic retinopathy, rubeosis iridis, vascular endothelial growth factor*

ДИАБЕТ И НЕОВАСКУЛАРНА ГЛАУКОМА

Е. Филандриану, Д. Казакова

Клиника по офталмология, Университетска болница „Лозенец“ – София

INTRODUCTION

Glaucoma is nowadays described as an optic neuropathy rather than a disease of elevated blood pressure of the eye. It is considered the leading cause of irreversible blindness worldwide and it is estimated that by the year 2040, more than 10 million will be affected. There are 2 types of glaucoma: open-angle and angle-closure. Glaucoma usually results from congenital or acquired lesions of the anterior segment of the eye that mechanically obstructs aqueous outflow. Primary glaucoma can occur without evidence of preexisting ocular or systemic diseases while secondary glaucoma can result from inflammatory processes that affect the eye. Neovascular Glaucoma (NVG) is a type of secondary glaucoma, where the angle of the eye (between iris and cornea) is closed by newly formed blood vessels, hence the name neovascular. The neovascularization of the iris is known as rubeosis iridis. It typically develops in eyes with severe retinal blockage or diabetic eye disease.

DIABETIC RETINOPATHY

Approximately one third of the patients with rubeosis iridis suffer from diabetic retinopathy [1]. The likelihood of NVG developing in diabetic patients is correlated with glucose control. In such cases, the retina becomes ischemic, meaning it does not have adequate oxygen supply. At that point retina begins

to release chemicals to counteract the lack of oxygen, including vascular endothelial growth factor (VEGF). VEGF promotes new vessel formation, a fact that theoretically could enhance the oxygen supply to the affected ischemic zone of the retina, but in contrast these new vessels are leaky and abnormal. Patients having a Central Retinal Vein Occlusion (CRVO) are at greater risk of developing NVG. Neovascularization sometimes can cause severe bleeding, filling the vitreous cavity with blood [2].

SYMPTOMS

Symptoms can include pain, redness and decreased vision, however in the early stages of the disease it is possible to appear asymptomatic.

DIAGNOSIS

In the prerubeosis stage the anterior segment is unremarked with normal Intraocular Pressure. Fluorescein Angiography (FA) is recognized as an important diagnostic tool. It requires venipuncture and it is related to contrast injections.

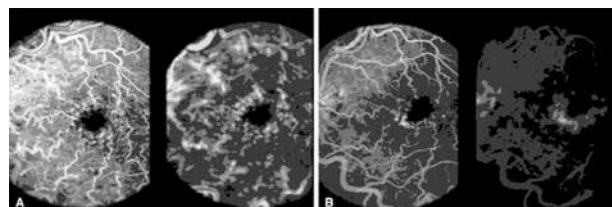


Fig. 1

First, dilation of the pupil must occur (drops are used), secondly a yellowish colored dye (fluorescein) is injected in a vein, usually of the arm. It takes about 10-15 seconds for the dye to travel throughout the body. When the dye finally reaches the blood vessels of the retina, it causes them to «fluoresce». As fluorescein passes through the retina, a special camera is used to take pictures. These pictures are then used to observe the nature and the exact locus of the problem. Side effects of FA include blurry vision and light sensitivity.

Optical coherent tomography angiography (OCTA) is a non-invasive imaging technique developed for the observation of the blood vessels of the retina. It accesses the retinal structures in a microscopic level. The process is fast and reliable. It permits the study of choroidal and retinal circulation via motion contrast imaging [3]. Slit spectrum amplitude decorrelation angiography combined with OCTA helps to the further understanding of retinal and choroidal vascular diseases. It allows the evaluation of retinal microvasculature and identification of subsequent disorders such as microaneurysms, arterial wall staining and intraretinal vascular abnormalities [4].

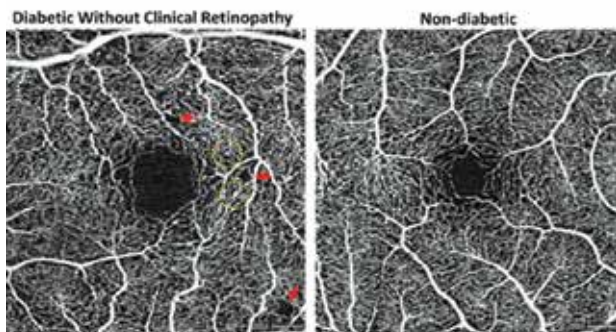


Fig. 2

TREATMENT

Treatment of NVG includes two parts. Treating the ischemic retina and lowering the IOP through medications, laser, surgery or combination of these types of treatment. Retinal laser is used to decrease the production of VEGF. Another approach with similar effect is administration of anti-VEGF medication. Both treating methods cause the abnormal vessels to regress or disappear.

SURGICAL APPROACH

If the IOP is not adequately controlled, surgery is often the next step. Tube shunt surgery and trabeculectomy are the most common surgical procedures. If vision is very poor, a less invasive type of laser that destroys ciliary body is used [5].

PREVENTION

Should be focused on preventing the most common underlying cause of NVG, including retinal vein blockage and diabetic retinopathy. Controlling blood pressure and diabetes is imperative, and especially for diabetes, for individuals above the age of 65 years, a comprehensive eye examination every one or two years is recommended [6].

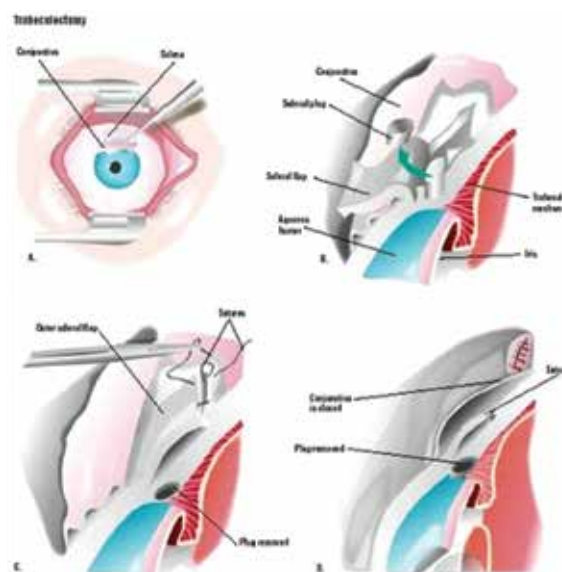


Fig. 3

CONCLUSION

Early diagnosis of the NVG with identification of the underlying cause followed by immediate and aggressive treatment is the key to a better outcome. In managing neovascular glaucoma it is essential to maintain a high index of predisposing posterior segment conditions.

REFERENCES

1. Kanski JJ. Diabetic Retinopathy. In: Clinical Ophthalmology. Third edition, 344-357.
2. Kanski JJ. Common Secondary Glaucoma. In: Clinical Ophthalmology. Third edition, 257-263.
3. Takase N, Nozaki M, Kato A et al. Enlargement of foveal avascular zone in diabetic eyes evaluated by en face optical coherence tomography angiography. Retina, 2015; 35(11):2377-83.
4. Hwang TS, Gao SS, Liu L et al. Automated quantification of capillary non-perfusion using optical coherence tomography angiography in diabetic retinopathy. JAMMA Ophthalmol, 2016 Jan 21; 1-7.
5. Sogava K, Nagaoka T, Ishibazara A et al. En face optical coherence tomography angiography of neovascularization elsewhere in hemispherical retinal vein occlusion. Int Med Case Rep J, 2015 Oct 23; 8; 263-6.
6. Friberg FJ, Pfau M, Wons J et al. Optical coherence tomography angiography of the foveal avascular zone in diabetic retinopathy. Graefes Arch Clin Exp Ophthalmol, 2015 Sep. 4.