Vascular endothelial growth factor in lacrimal fluid as a marker of the effectiveness of treatment of patients with diabetic retinopathy against the background of hypertension

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Resume. Central role in the development of diabetic retinopathy. The biological effect is mediated by binding to specific receptors on the cell surface . Ranibizumab (lucentis) is an antigen-binding fragment of a humanized monoclonal antibody to endothelial growth factor A (VEGF-A). Ranibizumab prevents the interaction of all VEGF-A isoforms with its VEGFR1 and VEGR2 receptors on the surface of endothelial cells, which leads to suppression of vascular proliferation and neovascularization .
Keywords.Diabetic retinopathy, hypertension, ranibizumab, neovascularization.

Goal. To determine the role of vascular endothelial growth factor in lacrimal fluid as a marker of the effectiveness of treatment of patients with diabetic retinopathy on the background of hypertension.

Materials and methods. The total number of patients (40 people) was divided into two groups. The first group of patients underwent panretinal LCS. The group consisted of 20 patients, 13 women and 7 men (40 eyes) with proliferative diabetic retinopathy (DR IIIa according to the classification of Bochkareva A.A. and Ivanishko Yu.A.) aged 57 to 63 years, on average 59.8±0.8 years. In the second group of 20 patients, 16 women and 4 men (40 eyes) with a similar stage of diabetic retinopathy aged 54 to 66 years, on average 59.2±2.1 years, panretinal LCS with intravitreal administration of ranibizumab (IVVR) was performed. All patients of the first and second groups were diagnosed with type 2 diabetes mellitus, all patients were under the supervision of an endocrinologist and a therapist. The third control group consisted of 20 healthy people (40 eyes) aged 49 to 73 years (average age 60.9±7.4 years).

Transpupillary panretinal LC was performed in four sessions with an interval of 2 weeks.

A laser with a working body made of aluminum-yttrium garnet was used,activated neodymium (Nd:YAG laser), "VISULAS" 532 nm according to the standard method with a radiation power of 180-420 MW, a coagulate diameter of 500 microns and an exposure time of 0.1 ms. The total number of coagulates was 2500-3000, some patients underwent additional focal laser coagulation of the central retinal area for diabetic macular edema with a 532 nm VISULAS laser with a radiation power of 60-120 MW, a coagulate diameter of 50 microns and an exposure time of 0.05–0.1 ms. IV LP was performed in patients of the main group after the first LCS session on the 7th day. The content of VEGF in lacrimal fluid was studied by enzyme immunoassay

using test systems ("Human VEGF ELISA Kit", BioSource International Inc., USA; "ChemiKineTM Pigment Epithelium-Derived Factor Sandwich ELISA Kit",Chemicon International Inc., USA). Lacrimal fluid was collected before the treatment, on the 14th day after laser intervention and 1 month after the treatment.

Results and discussion: The criteria for evaluating our studies were the condition of the fundus, as well as indicators of VEGF content, visual acuity and retinal thickness according to optical coherence tomography of the macular area. After the first session of LCS in patients of the first group, a complete regression of retinal neovascularization (desolation of newly formed vessels) was ophthalmoscopically observed in 14 (35%) eyes, in the second group, after the first session of LCS and IVR, a regression of neovascularization occurred in 100% of cases (40 eyes). Analysis of cases of proliferative diabetic retinopathy, when there was a need for vitrectomy for complications associated with hemorrhages in the vitreous, suggests that panretinal LCS should be carried out in full already at the initial stage of proliferative diabetic retinopathy. The results we obtained showed that LCS in the early stages leads to an increase in the synthesis of angiogenic factors. With insufficient LCS, neovascularization progresses in this group of patients, which indicates a negative effect on the organ of vision and the risk of further vision loss. IVR contributes not only to the reduction of macular edema and regression of neovascularization, but also makes it safer to perform panretinal LCS and achieve a more pronounced stabilization of the course of diabetic retinopathy.

Conclusion. Analysis of cases of proliferative diabetic retinopathy, when there was a need for vitrectomy for complications associated with vitreous hemorrhages, suggests that panretinal LCS should be performed in full already at the initial stage of proliferative diabetic retinopathy. The results obtained by us showed that the FOREST in the early stages leads to an increase in the synthesis of angiogenic factors. With insufficient LCS, neovascularization progresses in this group of patients, which indicates a negative effect on the organ of vision and the risk of further vision loss. EVR contributes not only to the reduction of macular edema and regression of neovascularization, but also makes it safer to perform panretinal LCS and achieve a more pronounced stabilization of the course of diabetic retinopathy.

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