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DIABETIC RETINAL NEURODEGENERATION : A CASE STUDY

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Abstract:

According to the International Diabetes Federation, there are 537 million people with diabetes in the world [1]. Patients with diabetes mellitus (DM) are at a significantly higher risk of developing complications of the underlying disease, including diabetic retinopathy (DR). Diabetic retinopathy is not only the most common complication of diabetes but it is also recognized as the most severe, as it often leads to irreversible vision loss. In 2021, there were 103 million people worldwide with some form of diabetic retinopathy, accounting for 22.3% of the total number of diabetic patients (Teo et al., 2021).

Keywords:

Modern research methods have made it possible to consider DR not only as a vascular complication of diabetes but also as a neurodegenerative process. At the same time, modern research methods make it possible to detect retinal neurodegeneration much earlier than vascular signs of DR, such as microaneurysms and retinal hemorrhages [2, 3]. The most common signs of neurodegeneration detected by optical coherence tomography (OCT) were ganglion cell death and retinal thinning [4, 5]. Also, according to electroretinography (ERG), signs of glial activation were revealed.

THE PURPOSE OF THE STUDY: is to analyze the morphofunctional changes in the visual organ in a patient with retinal neurodegeneration and no DR symptoms

MATERIALS AND RESEARCH METHODS. This article presents the results of two patients with diabetes mellitus and signs of retinal neurodegeneration. The patient underwent a routine ophthalmological examination, including determination of visual acuity and best-corrected visual acuity by keratorefractometry, non-contact tonometry, static perimetry on an APS-6000BER computer autoperimeter, biomicroscopy of the anterior segment of the eye, and biomicroscopy of the superior lens. (60 and 78D). Optical coherence tomography was performed on a DRI OCT Triton scanner, which includes multimodal fundus examination and tomography using Swept Source technology. In addition, patients underwent routine laboratory tests: blood sugar, biochemical blood tests, lipid profiles, etc. In addition, consultations were held with relevant specialists: endocrinologist, neurologist, otolaryngologist, nephrologist, etc. Magnetic resonance imaging (MRT) of the brain was performed. The patient gave voluntary informed consent to participate in the study and to publish the results of the study in the specialized press

RESEARCH RESULTS. Sample 1. A woman born in 1959 (64 years old) with a diagnosis of type 2 diabetes, who has been suffering for 12 years, was admitted to the RIEIATM consultation polyclinic named after Academician YH Torakulov. applied. The patient has no visual complaints. Visual acuity tests showed a mild decrease in vision to 0.85 in the right eye, which could not be corrected. Left eye visual acuity remained high = 1.0. Refractometry indicators in both eyes sph +0.25. No pathological changes were detected in the anterior segment (cornea, conjunctiva, anterior chamber) in both eyes. In both eyes of the patient, despite the patient's young age, small foci of opacification were detected in the pearls. Perhaps this situation is related to the patient's long duration of type 2 diabetes and poor glycemic control. At the same time, according to ultrasound biomicroscopy, there was no geminal thickening at the level that would lead to the displacement of the midocean diaphragm. As a result, according to the Nidek pneumotonometer, the intraocular pressure in both eyes did not exceed the norm and was 16 and 17 mm Hg. Microaneurysms and single hemorrhages were detected in the fundus of the eye, and vessels in the macular area were corkscrew-shaped. The most significant changes were noted in OCT (Figures 1 and 2). Based on the Retina Map protocol, a total thickness map of the inner and outer layers was made in the study of nine zones: fovea (diameter 1 mm), parafovea (diameter 3 mm), and perifovea (diameter 5 mm). The para- and perifovea are divided into four quadrants: superior, inferior, nasal, and temporal. Also, the thickness of the retinal ganglion cell complex and the size of their focal and total losses were determined using the GCC protocol.

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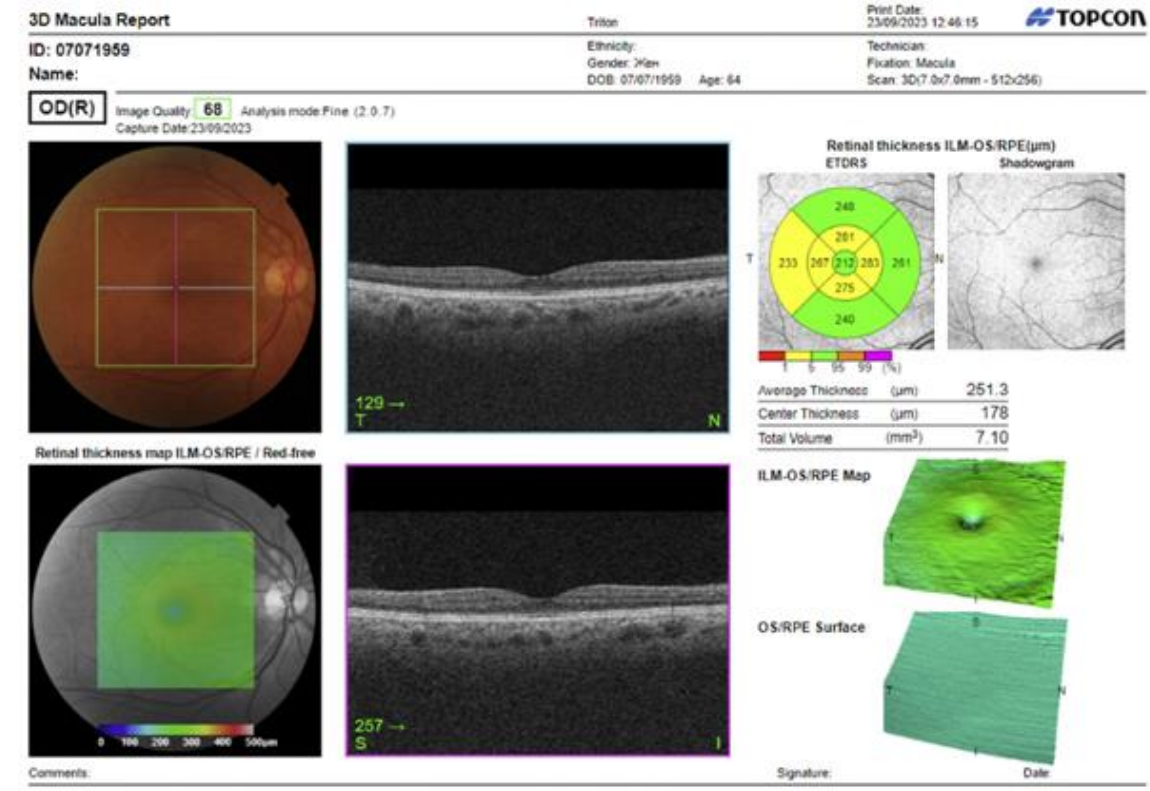

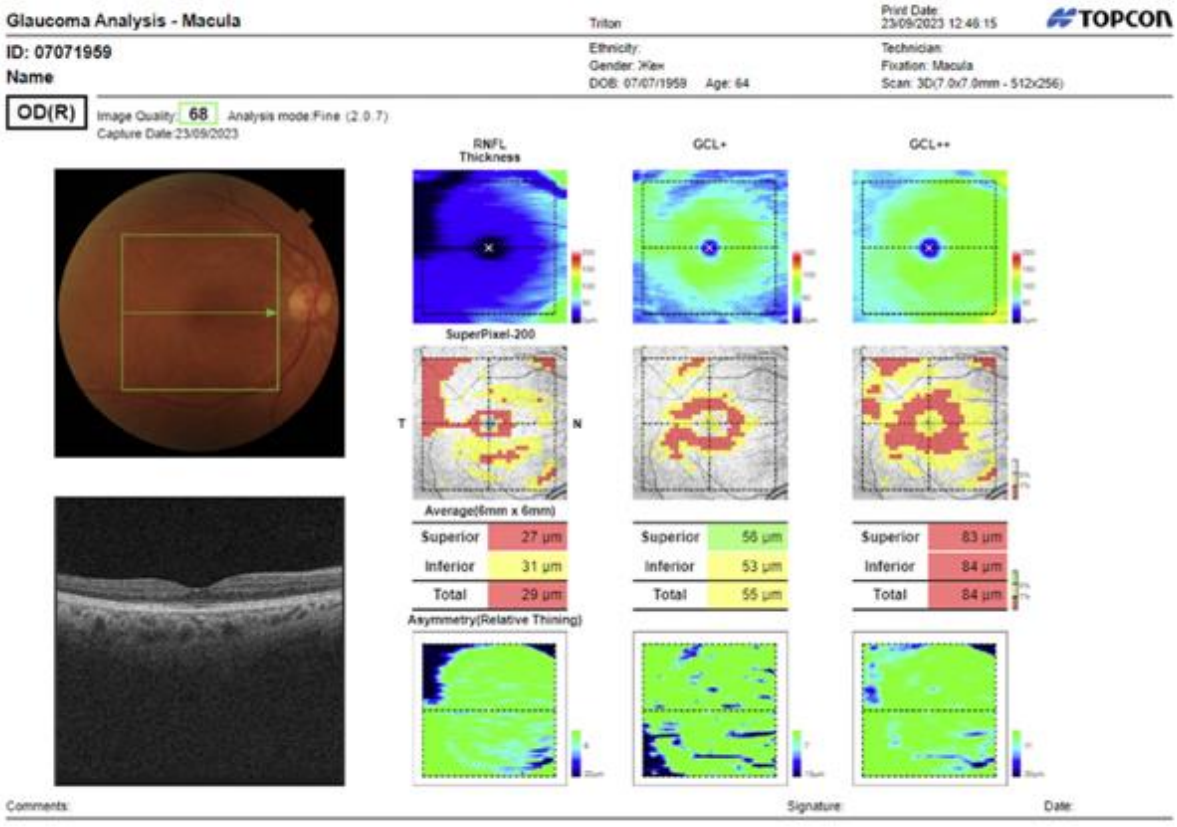

Picture 1. Picture of OCT

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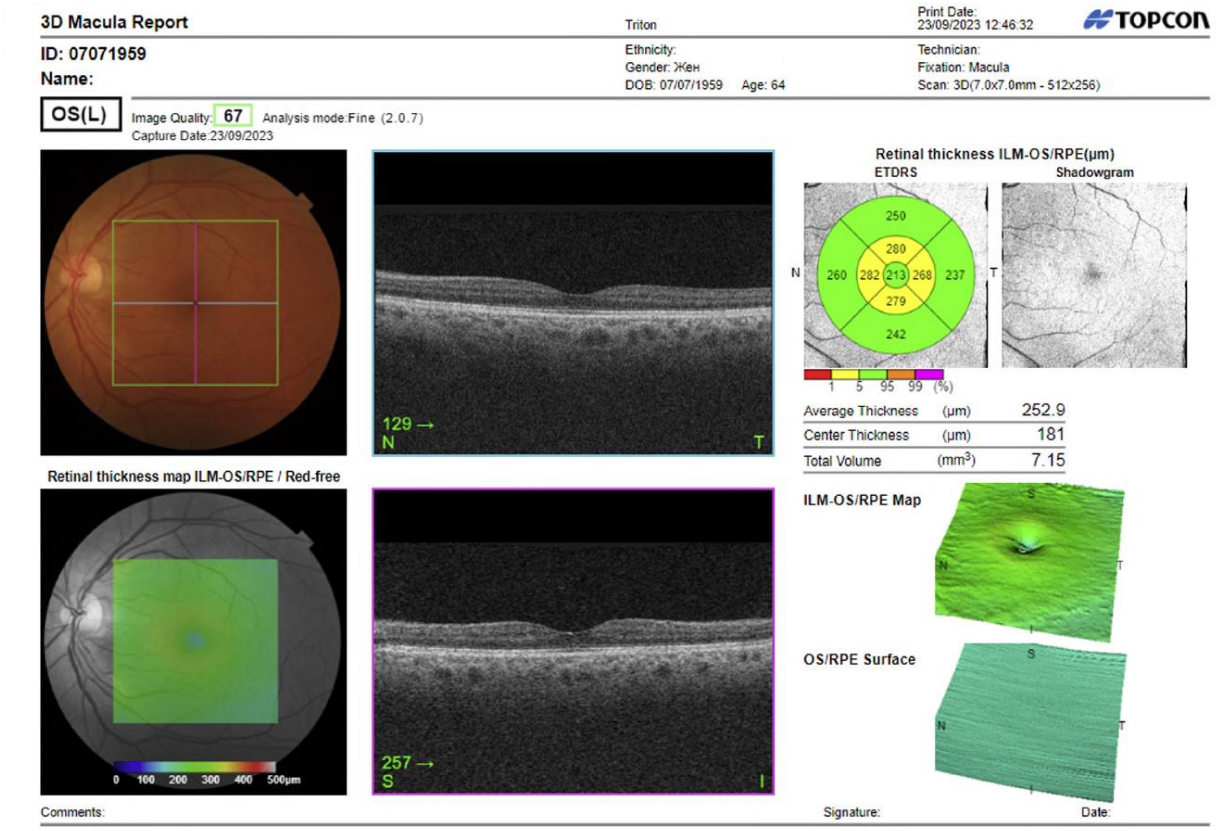

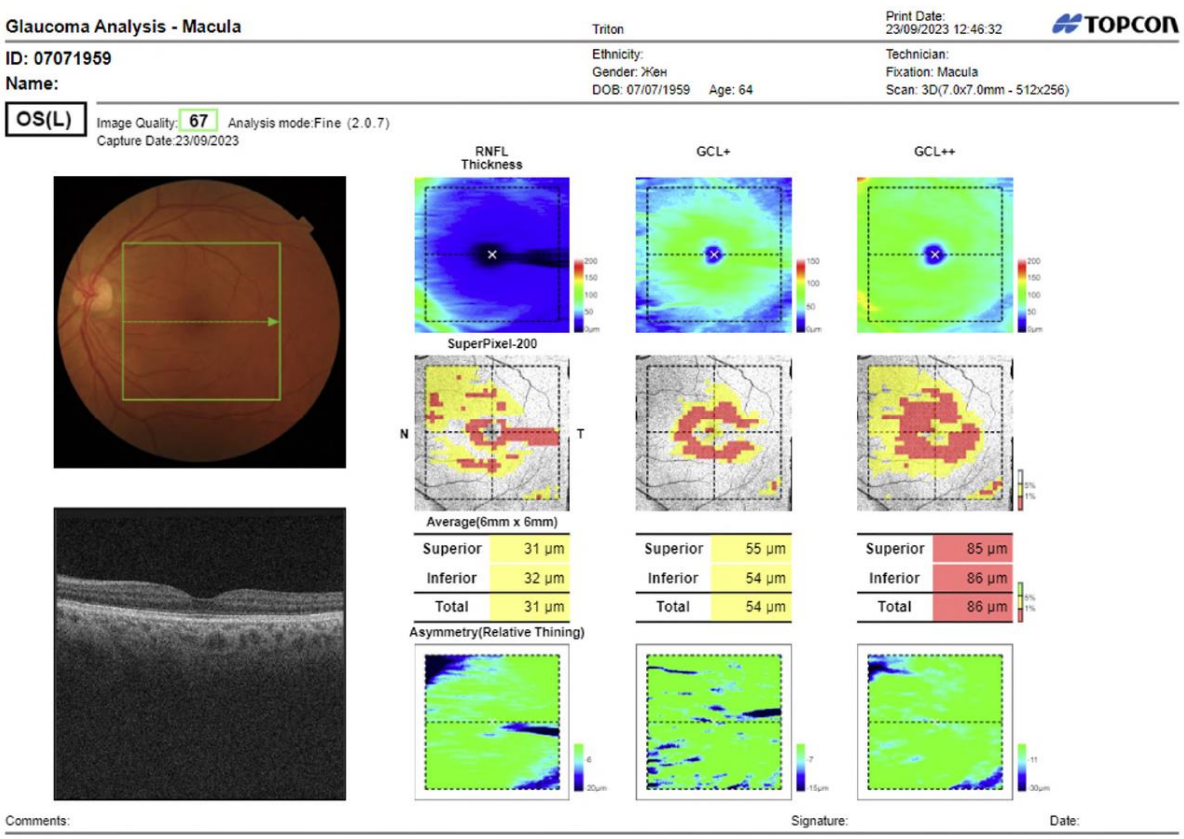

Figure 2. Left side* OCT *image

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According to the OCT results, in both eyes of patient M., retinal thinning was noted in 8 out of 9 zones of the retina in the right eye, and in 7 out of 9 zones in the left eye. The average thickness of the retina in this zone was 245.8 μm in the right eye and 252.1 μm in the left eye, and the total volume of the macular area was 7.05 mm3 in the right eye and 7.12 mm3 in the left eye. The most significant thickening in both eyes was noted in the retinal nerve fiber layer (RNFL) equally in the inferior and superior segments. Also, the thickness in the ganglion cell layer (GCC) was greater in the lower segment. According to the laboratory tests, only the blood sugar level increased in our patient, the rest of the parameters remained within the age-related norm. According to MRI data, changes in cerebral blood vessels were detected.

SUMMARY. According to the OCT data, the changes in the retinal structure detected in our patient may indicate neurodegenerative weakening of the retina due to the effects of diabetes. The results of OCT show a significant increase in the focal loss of ganglion cells in the observed patient, which corresponds to the data obtained by other authors and confirms the hypothesis that the processes of retinal neurodegeneration in diabetes begin with apoptosis (death) of ganglion cells [6, 7].

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