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ANALYSIS OF DIFFERENT DIAGNOSTIC METHODS IN DIAGNOSING CENTRAL SEROUS CHORIORETINOPATHY

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ABSTRACT

Central serous chorioretinopathy (CSCR) is now common among the population depending on the way of life, and the fact that the disease occurs in middle-aged people and affects their ability to work requires timely detection of the disease and taking treatment measures. Differential diagnosis between both forms of acute and chronic CSR is important, because the clinical course of this disease and the treatment strategy require a separate approach for each of them. During the examination, when the data obtained by the use of minimally invasive methods, including optical coherence tomography (OCT) and fundus autofluorescence (FAF), are analyzed together, valuable information about the changes in the neuroepithelium (NE), pigment epithelium (PE), choroidal structures and the pathogenesis of the disease is obtained.

Key words: Central serous chorioretinopathy, optical coherence tomography, fundus autofluorescence, neuroepithelium, pigment epithelium.

INTRODUCTION

Central serous chorioretinopathy (CSCR) has become an urgent problem in recent years due to the increase in the number of patients and the development of this disease not only among young working-age people, but also among older people [6]. There are 2 types of acute and chronic forms of the disease. The difference between the forms depends on the duration of serous migration of the neuroepithelium and the presence of changes in the retinal pigment epithelium

(PE) [4]. There is no clear understanding of the difference between the acute and chronic forms of CSCR according to the duration limit. Many sources state that this period is 3-4 months [10,12].

The chronic form is characterized by the detachment of the neuroepithelium, the presence of foci of PE diffuse atrophy, and hyper-hypoautofluorescence of the fundus [5,13].

The advent of optical coherence tomography (OCT) has made it possible to evaluate the thickness of the choroid, and the function of angiography with Swept Source technology also allows studying the chorioretinal blood flow at different levels of segmentation. Fundus autofluorescence (FAF) is now considered a noninvasive imaging technique that not only measures the thickness of choroidal blood vessels more accurately [3], but also allows the detection of naturally occurring fluorophores. The main object of FAF is PE lipofuscin, which is a product of incomplete degradation of photoreceptor outer segments [1,2,8]. According to a number of studies, the area of FN that occurs in acute CSCR disease corresponds to the affected area of PE in the form of hypoautofluorescence (hypo AF) in 70-90% FAF [7,11]. Initial hypo AF occurs due to screening by the detached NE, and in the chronic form, the increase in dots and spots in the NE detached ridges is replaced by hyper AF, and this process occurs due to the accumulation of fluorophores in the elongated outer segments of photoreceptors [9].

Fundus autofluorescence (FAF) plays an important role in differentiating between acute and chronic forms of central serous chorioretinopathy (CSCR). In this case, the results of fundus autofluorescence (FAF) and optical coherence tomography (OCT) provide valuable information about the pathogenesis of the disease.

Based on the above, we can say that timely and correct differential diagnosis of various forms of CSCR is important in choosing the right type of treatment, preventing complications and improving lifestyle.

Purpose of investigation. Differential diagnosis of forms of central serous chorioretinopathy using various minimally invasive methods.

MATERIAL AND METHODS OF RESEARCH

We examined 40 patients (42 eyes) who were referred to the Republic's specialized eye microsurgery scientific-practical medical center, suffering from the disease of the CSCR. 16 (40%) of the patients are women with an average age of 39.15±6.33 and 24 (60%) are men with an average age of 32.17±5.24. Patients were divided into 2 groups: group 1 included 21 patients (21 eyes) with acute form

of the disease, and group 2 included 19 patients (21 eyes) with chronic forms of the disease.

The patients were included in the study based on the following criteria: did not receive anti-VEGF injections, no cases of neovascular vascular growth were detected in the choroid layer, did not undergo various laser treatments, did not undergo photodynamic therapy (PDT), were suffering from an acute form of the disease for the first time, suffering from a chronic form of the disease that he was referring to for the first time. All patients underwent standard and additional examinations.

All patients were examined by OCT and OCT-A using Line and 3D-reference scanning protocols on DRI OCT Triton Plus (Topcon, with Swept Source technology). The height of the detached area of the retinal neuroepithelium was measured from the inner limiting membrane to the pigment epithelium, and in cases where RPE detachment was present, from Bruch's membrane to the inner border of the pigment epithelial cells. The thickness of the vascular layer included the distance from the center of the fovea, from Bruch's membrane to the area of the chorioscleral junction.

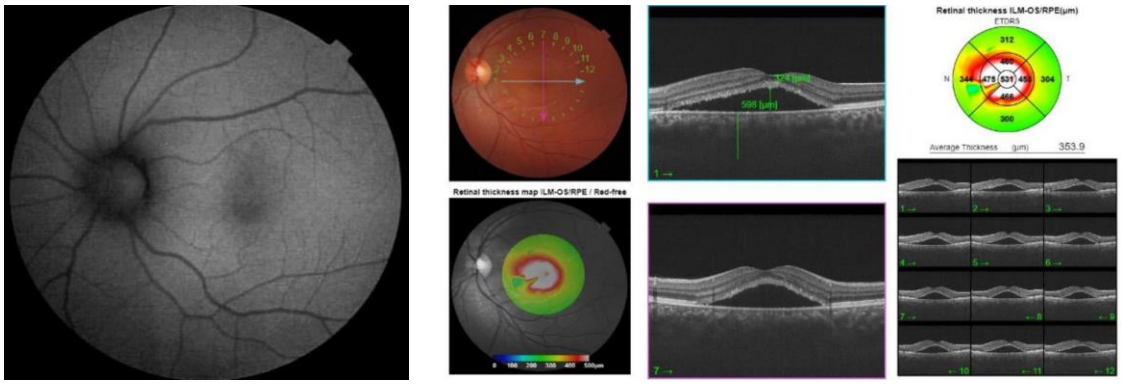
Retinal short-wavelength autofluorescence TRC-NW8F Plus Topcon (Japan) mentioned above; done using the device. The study is based on natural illumination by fluorophores without additional dyes. The functions of fluorophores are melanin in PE, choroidea and lipofucin in PE. This test allows the fluorescence of lipofuscin to be evaluated.

Based on the results of short-wavelength autofluorescence, the form of autofluorescence, its type (focal, diffuse, mixed), and the level of hyperAF brightness are studied. Statistical analysis of all results was performed in Microsoft Excel 2012 and presented as M±m.

RESULTS AND DISCUSSION

During biomicroophthalmoscopy, all 21 (21 eyes) patients with the acute form of the disease had well-defined dome-shaped NE detachment, and 17 (19 eyes) had poorly defined NE detachment in the chronic form, in this form, in 2 patients (2 eyes), NE detachment was not clearly visible and was detected only on OCT and FAF examinations. In the acute form of the CSCR, fluid accumulated under the NE blocks autofluorescence and forms hypofluorescence zones. These zones are usually visible as darkness and help determine the location and size of the area of fluid collection. Zones of hypoAF were detected in 8 patients (8 eyes) with acute form (38.1%) (Fig.1).

Figure 1



In Fig. 1, *we can see in the acute form of CSCR a) hypoAF zone in the macular area in FAF b) serous detachment of NE and diffuse thickening of the choroid in OCT examination.*

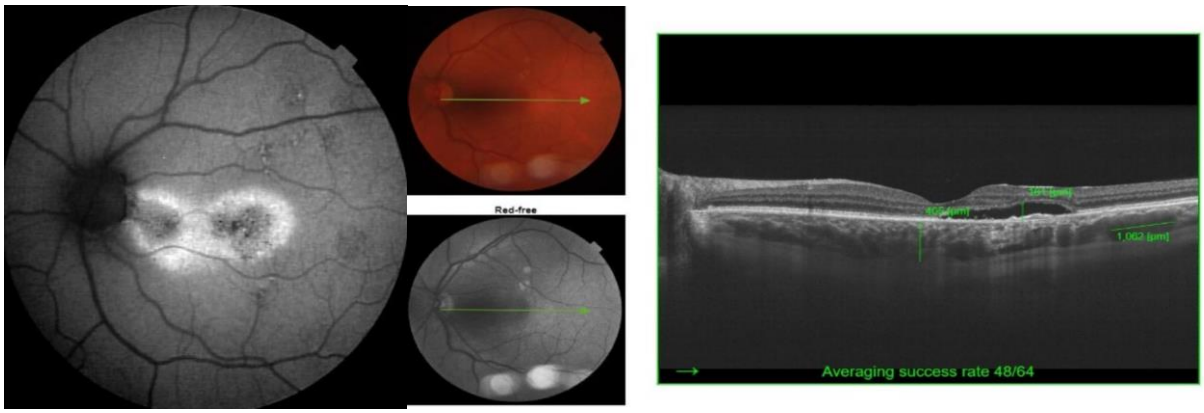
In 8 (3 eyes) patients (14.3%) hyperAF with clear borders was observed. In the acute case, hyperfluorescent zones are visible with clear boundaries, since the PE injury is not yet deep. This represents the active period of the disease, during which the accumulation of lipofuscin in PE or its destruction begins. 10 (10 eyes) (47.6%) foci of focal hyperAF were detected. Zones of serous detachment seen on OCT appear as focal hyperAF (bright zone) in FAF. It shows the locations of serous fluid leakage and the accumulation of lipofuscin in PE. In a chronic state, lipofuscin accumulates due to PE damage and diffuse hyperfluorescence is formed. These areas of hyperfluorescence do not have a clear border because the degenerative changes in PE have been prolonged. Diffuse hyperAF was observed in 5 patients (5 eyes) with chronic form (26.3%). Due to the degeneration of PE, light and dark zones are observed in a mixed manner in chronic CSCR. OCT shows areas of hypo- and hyperfluorescence indicating PE degeneration, lipofuscin accumulation, or PE detachments. These zones indicate the depth of PE damage. Mixed hypo and hyperAF zones were detected in 4 patients (6 eyes) with chronic form (21.1%) (Fig.3).

NE serous detachment on OCT images was observed in 33 (34 eyes) (82.5 %) patients, but the nature of NE detachment in the two groups had some differences. In acute forms, its height was 274.2±146.6 µm, and in chronic form it was 223.4±102.2 µm.

A total of 11 patients (12 eyes) (27.5 %) examined had dome-shaped detachment of PE with an average height of 264.5 ± 142.6 µm. Thickening of the photoreceptor layer due to the elongation of the outer segments was observed in all patients, it was found that destruction zones and subretinal deposits appeared as the process continued for a long time and turned into a chronic form. Subretinal deposits were not observed in patients with an acute form, in the chronic course of

the process, they were observed in 8 (9 eyes) (42.1%) patients, and these deposits are manifested in the form of hyperAF in FAF examination (Fig. 3).

Figure 3



In Figure 3, *in the chronic form of the disease, we can observe a) mixed hypo and hyperAF zones in FAF, b) shallow detachment of NE, subretinal deposits, slit-like detachment of PE and local destruction zones in OCT, we can observe a local thickening of the choroid layer and an increase in the reflectivity of the choroid layers in the areas of PE destruction.*

Analysis of the choroid involves evaluating the reflectivity of the choroidal vessels, the presence of hyperreflective vascular points. In acute forms, intrachoroidal hyperreflective points were detected in 3 (3 eyes) patients (14.2%), in chronic form in 9 (11 eyes) patients (47.3%), and the presence of hyperreflective vascular points revealed focal hyperAF during FAF examination. Increased reflectivity of vascular walls was found in 19.04% of patients with acute form and 89.4% of patients with chronic form.

PE was evaluated systematically with the most obvious changes observed in the area of dilated vessels. In the acute form of the disease, slit-like detachment of PE was not observed, and in the chronic form it was found in 4 patients (5 eyes) (21.1%). Patients with slit-like detachment of PE underwent OCT-A examination in order to rule out CNV blood vessels. Examination results CNV blood vessels were not detected. In acute patients, the presence of photoreceptor destruction zones was not observed, and in 9 patients (10 eyes) of chronic form, it was observed in 47.3% of cases, hypoAF foci in FAF were detected in these patients. In the chronic form, elongation or loss of the photoreceptor layer is observed in OCT, and in FAF, these changes appear as a hypofluorescent zone. Areas associated with photoreceptor atrophy or degeneration appear dark in FAF. In 5 patients (7 eyes) with chronic form, local atrophy of PE was detected on OCT, hypoAF zones associated with atrophy of PE were detected on FAF. Atrophy of

PE cells produces hypofluorescence in FAF. These dark areas are not illuminated and represent atrophy or lipofuscin deficiency in PE.

CONCLUSION

As a result of research, clear differences were observed between acute and chronic CSCR:

• In acute form: hypofluorescent zones and well-defined hyperfluorescence in FAF, high neuroepithelial detachment, diffuse thickening of the choroid were noted in OCT.

• In chronic form: diffuse hyperfluorescence, mixed state of hypo- and hyperfluorescent zones in FAF, local thickening of choroid, degradation of photoreceptors and subretinal deposits were observed in OCT.

Based on the above, various less invasive and accurate differential diagnosis allows for effective organization of treatment in complex clinical cases and prevention of complications. Also, these methods are of great importance in monitoring the duration and activity of the disease.

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