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IMPORTANCE OF THE ANATOMICAL OUTCOME OF TREATMENT FOR LARGE MACULAR HOLES

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Abstract: Prognostic criteria for the anatomical outcome of surgical treatment of large idiopathic macular holes using the method of step-by-step formation of a fragment of the internal limiting membrane were determined. The study included 84 patients (84 eyes) with large idiopathic macular holes who underwent standard 3-port 25G vitrectomy using a technique of step-by-step formation of a fragment of the internal limiting membrane to close the macular hole, followed by tamponade of the vitreal cavity with gas (SF6).

Keywords: Prognostic criteria, surgical treatment, large macular holes, anatomical results.

INTRODUCTION: Currently, the standard of surgical treatment for large idiopathic macular holes (IMR) is subtotal vitrectomy with removal of the internal limiting membrane (ILM) and tamponade of the vitreal cavity with gas [1]. As prognostic criteria for the anatomical outcome of surgical treatment, specialists use various preoperative morphometric parameters of the macular hole obtained by spectral optical coherence tomography (SOCT): the maximum and minimum diameters of the hole, the height of the edge of the hole, various MR indices, and also the duration of existence of IMR and preoperative visual acuity [2].

MATERIALS AND METHODS: The postoperative functional result also correlates with these same indicators. According to L. Wakely et al., based on OCT data, the initial value of the diameter of the base of the tear most closely correlates with the anatomical and functional result of MR surgery [4]. A.A. Shpak et al proved the importance of the average retinal thickness in the foveal zone for predicting the anatomical outcome of surgical treatment of IMR, which is superior to most other criteria in prognostic terms [3].

The study included 84 patients (84 eyes) with large IMR, who underwent standard 3-port 25G vitrectomy using the technique of step-by-step formation of an ILM fragment to close the IMR, followed by tamponade of the vitreal cavity with gas (SF6) [4]. The age of the examined patients ranged from 56 to 77 years, among them there were 23 men and 61 women.

RESULTS AND DISCUSSION: Preoperative characteristics of the observation group for comparative analysis of the anatomical result of surgical treatment are presented in Table. 1.

Analyzing SOCT data at all periods of observation, it was revealed that at 2 weeks and 1 month, in 92.8% of cases (78 patients, 78 eyes) in the observation group, closure of the gap was accompanied by restoration of the normal structure of the retina. In this case, the outer boundary membrane was clearly defined. At the same time, the normal picture of the photoreceptor layer was not preserved throughout: in the fovea, in the area of the ellipsoidal zone of the photoreceptors, the formation of a hyporeflective area was noted (normally, this joint is a continuous line of high optical density), which was conventionally designated as a “defect”.

In these patients, the maximum size of the “defect” was measured in the place where the discontinuity of the line of the ellipsoidal zone of the photoreceptors was determined [3]. Subsequently, the width of the above “defect” decreased, and in some cases, when performing SOCT, the “defect” was not detected at all.

Table 1.

Preoperative characteristics of the observation group (n=84)

Characteristic	Meaning

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Age, years	56-57 (66,4±5,0)
Number of eyes	84
Number of men	23
Number of women	61
Complaint level, %	33-50 (35,93)
BCVA	0,04-0,2 (0,14±0,06)
SCHts	9,2-26,5 (19,56±3,05)
Scho	17,4-27,3 (22,93±2,09)
Stab-i-fi-i	12/14,3%
Min. diameter	401-903 (651,7±76,6)
Max. diameter	580-1810 (1132,6±214)
Tear Edge Height	294-615 (425,7±47,1)
MR index	0,2-0,71 (0,39±0,08)
MR diameter index	0,33-0,78 (0,54±0,08)
Traction index MR (THI)	0,64-1,46 (0,84±0,14)

In 7.1% of cases (6 patients, 6 eyes) at follow-up periods of 2 weeks and 1 month, closure of the gap was accompanied by gross disruption of the retinal structure and its sharp thinning in the fovea, which was regarded as the formation of scar tissue and, therefore, unfavorable both anatomical and functional results. In this case, the normal pattern of the outer layers of the retina was disrupted, the outer limiting membrane, and photoreceptor segments were not visualized. There were no significant dynamics at all subsequent follow-up periods.

Thus, at the early stages of observation in the observation group there were two types of MR closure: closure with a “defect” at the level of the ellipsoidal zone of photoreceptors and closure with the formation of scar tissue in the center of the fovea.

CONCLUSION: The average thickness of the retina in the fovea, measured by the SOCT method, is a highly informative indicator of the anatomical prognosis of surgical treatment of large IMRs, including tears larger than 650 μm. If the average thickness of the retina in the fovea is at least 302 μm, in 95% of cases a favorable anatomical outcome of surgical treatment is likely in the form of closure of the IMR with a “defect” at the level of the ellipsoidal zone of the photoreceptors or complete closure in long-term follow-up.

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