RESULTS OF ASSESSING THE LEVEL OF ENDOTHELIN-1 AND D-DIMERS IN TEAR FLUID IN PATIENTS WITH ARTERIAL HYPERTENSION

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Abstract. *When studying the level of endothelin-1 and D-dimers in the tear fluid, tears were collected according to the method described in Chapter 2. Moreover, in all patients with GAR, tear fluid was collected from the "worst eye," that is, in the eye in which the stage of GAR was more advanced. In patients of control groups 1 and 2, tears were also collected from only one eye. The results of determining the levels of endothelin-1 and D-dimers are presented in Table 1*
Keywords: *moreover, in all patients with GAR, tear fluid was collected from the "worst eye," that is, in the eye in which the stage of GAR was more advanced.*

Table 1

Results of assessing the levels of endothelin-1 and D-dimers in tear fluid in patients.

Index	Main group 1 (n= 30)	Main group 2 (n =30)	Control group 1 (n=3 0)	Control group 2 (n=3 0)
	M±m	M±m	M±m	M±m
Endothelin-1, fmol/ml	2.52 ± 0.28 ^*	2.88 ± 0.44 ^ *	1.76 ± 0.36 ^ _	0.97±0.31
D-dimers, ng/ml	1128±321	1326±2 44 ^	894±164	865±186

**- significant in relation to the indicators of control group 1 at p <0.05;*
^- significant in relation to the indicators of control group 2 at p <0.05.

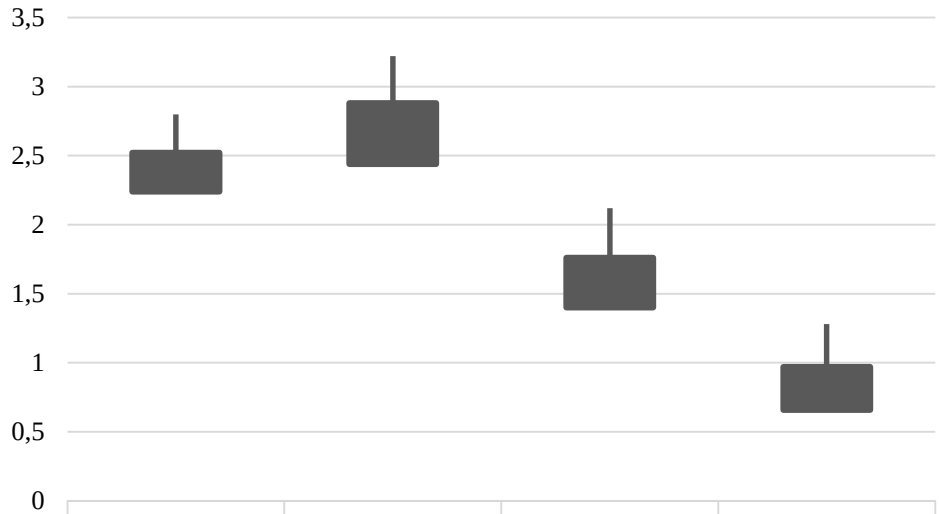
The table data showed that in the group of healthy patients without hypertension, the level of endothelin-1 was significantly lower than in the blood. At the same time, in the tear fluid of patients with hypertension it was significantly higher (p <0.05) than in control group 2.

The highest indicator was noted in the main group 2 - 2.88±0.44 fmol/ml, it was significantly higher than the indicators of both control groups. In the main group 1, the indicator was 2.52±0.28 fmol/ml, here it was also significantly higher than in the control groups.

There were no statistically significant differences between the average indicators of the 2 main groups.

At the same time, in patients with stage 1 hypertension without manifestations of hypertension in the fundus, the level of endothelin-1 in the tear fluid was significantly higher than in the group of healthy patients without hypertension.

For clarity, a comparative analysis of the level of endothelin-1 in tear fluid in patients is presented as a graph in Figure 1

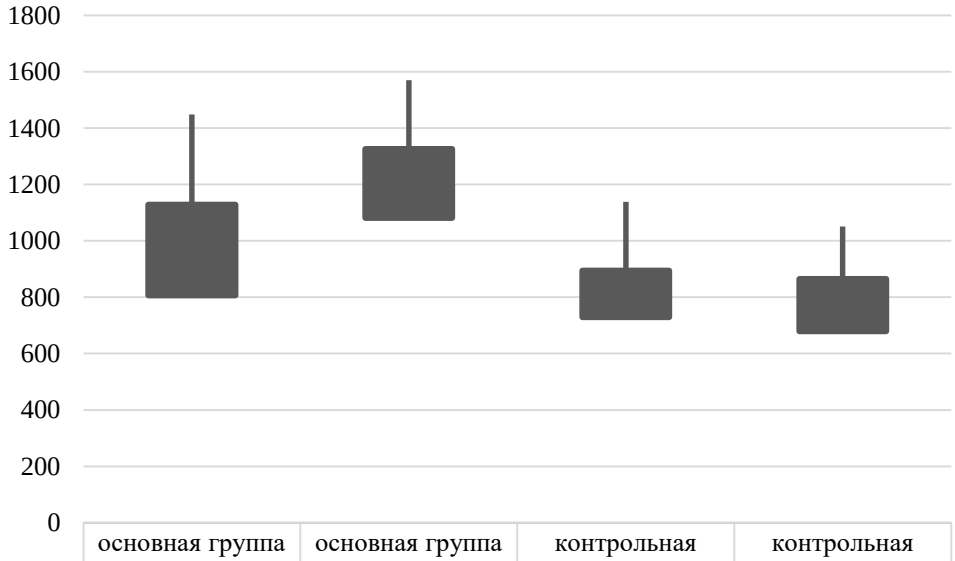


	основная группа 1	основная группа 2	контрольная группа 1	контрольная группа 2
среднее значение	2,52	2,88	1,76	0,97
Максимальное значение	2,8	3,22	2,12	1,28
Минимальное значение	2,24	2,44	1,4	0,66

Figure 1. Comparative analysis of endothelin-1 levels in the tear fluid of patients.

The results obtained showed that the average level of D-dimers in the tear fluid of the examined patients was higher in comparison with the average level of D-dimers in the blood. At the same time, no significant differences were found in the study groups, with the exception of the indicators of the main group 2 in patients with stage 3-4 hypertension, who had the highest average indicators, which were significantly higher than in the group of healthy patients without hypertension.

Figure 1 shows a graph showing a comparative analysis of the results of assessing the level of D-dimers in the tear fluid of patients in the study groups.



	основная группа 1	основная группа 2	контрольная группа 1	контрольная группа 2
среднее значение	1128	1326	894	865
Максимальное значение	1449	1570	1138	1051
Минимальное значение	807	1082	730	679

Figure 1 Comparative analysis of the level of D-dimers in the tear fluid of patients.

table 2

Results of assessing the correlation between the level of endothelin-1 and D-dimers in the blood and tear fluid.

Clinical indicators	Main group 1 (n= 30)	Main group 2 (n =30)	Control group 1 (n=30)	General sample of patients with hypertension (n = 120)	Control group 2 (n=30)
	r (correlation coefficient)				
	Blood endothelin-1 level				
Endothelin-1 level in tear fluid	0.623	0.610	0.635	0.625	0.423
	Level of D-dimers in the blood				
Level of D-dimers in tear fluid	0.486	0.545	0.424	0.412	0.320

An assessment of the correlation between the levels of endothelin-1 and D-dimers in the blood and tear fluid of patients showed that there is a strong correlation between the level of endothelin-1 in the blood and tear fluid in patients with hypertension, which was highest in control group 1 in patients with Stage 1 headache without manifestations of hypertension. Moreover, in all groups of patients with hypertension, a correlation coefficient of >0.6 was observed. Correlations between the levels of D-dimers in the blood and tear fluid of patients revealed lower values of the correlation coefficient. The highest level, corresponding to the average strength of correlation, was noted in main group 2 (Table 1).

Table 3

Results of assessing the correlation between the level of endothelin-1 in tear fluid and ophthalmological parameters in patients.

	Endothelin-1 level in tear fluid				
Clinical indicators	Main group 1 (n= 30)	Main group 2 (n =30)	Control group 1 (n=30)	General sample of patients with hypertension (n = 120)	Control group 2 (n=30)
	r (correlation coefficient)				
GAR stage	0.616	0.619	-	0.609	-
BCVA	0.482	0.546	0.233	0.442	0.032
CTX	0.621	0.591	0.610	0.615	0.098
Total VD	0.624	0.587	0.598	0.608	0.112
General PD	0.655	0.628	0.615	0.636	0.120
CFA	0.662	0.607	0.635	0.648	0.124

Table 3 presents the results of assessing the correlation between the level of endothelin-1 in tear fluid and ophthalmological parameters in patients. The results showed a strong correlation between the level of endothelin-1 in tear fluid and the ophthalmoscopic stage of GAD in the

general sample of patients with GD. A strong correlation was also identified for OCT and OCTA parameters (CTX, total vessel density and perfusion, and choriocapillary flow area). The relationship with respect to BCVA was of medium strength. The highest correlation coefficients were determined in main group 1 in patients with stages 1-2 of GAD.

Table 4

Results of assessing the correlation between the level of D-dimers in tear fluid and ophthalmological parameters in patients.

	Level of D-dimers in tear fluid				
Clinical indicators	Main group 1 (n= 3 0)	Main group 2 (n =30)	Control group 1 (n=3 0)	General sample of patients with hypertension (n = 120)	Control group 2 (n=3 0)
	r (correlation coefficient)				
GAR stage	0.2 8 4	0.3 35	-	0.308	-
BCVA	0.0 88	0.2 43	0.0 7 5	0.124	0.032
CTX	0.2 9 4	0.3 46	0.211 _	0.308	0.067
Total VD	0.3 14 _	0.319 _	0, 22 4	0.296	0.094
General PD	0.32 8 _	0.3 77 _	0.302 _	0.344	0.102
CFA	0.33 5 _	0.36 2 _	0.318 _	0.336	0.115

Table 4 presents the results of assessing the correlation between the level of D-dimers in tear fluid and ophthalmological parameters in patients. The results of the correlation analysis revealed the presence of a moderate correlation between the level of D-dimers in the tear fluid and the ophthalmoscopic stage of HAR, as well as OCT and OCTA indicators. The highest correlation coefficients were determined in main group 2 in patients with stages 3-4 of GAD.

Thus, it was found that patients with stages 3-4 of HAR had a significant ($p < 0.05$) increase in the level of endothelin-1 in the blood in comparison with the group of healthy individuals. Moreover, the average level of endothelin-1 in the blood had a direct correlation with the stage of HAD. At the same time, a weak correlation was determined between the average level of endothelin-1 in the blood and the main ophthalmological indicators of the severity of GAR ($0.2 > r < 0.4$). There were no statistically significant differences or pronounced correlations with respect to the level of D-dimers in the blood in patients with different stages of GAD.

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