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THE CONTENT OF ENDOTHELIN AND HOMOCYSTEINE IN BLOOD AND LACRIMAL FLUID IN PATIENTS WITH HYPERTENSIVE RETINOPATHY

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Abstract
Currently, endothelin-1 (ET-1) is considered as a marker and predictor of the severity and outcome of many diseases associated with vascular pathology. Thus, the determination of ET-1 content in blood plasma is recommended to be used as a laboratory test in patients with arterial hypertension (AH) to determine the severity of vascular complications

Keywords: arterial hypertension, retina, endothelin, homocysteine

Introduction

Currently, endothelin-1 (ET-1) is considered as a marker and predictor of the severity and outcome of many diseases associated with vascular pathology. Thus, the determination of the content of ET-1 in blood plasma is recommended to be used as a laboratory test in patients with arterial hypertension (AH) to determine the severity of vascular complications. ET-1 is one of the most powerful vasoconstrictors. It is an oligopeptide that consists of 21 amino acids and is formed from proendothelin-1 under the influence of an endothelin -converting enzyme. ET-1 secretion is influenced by numerous physical (hypoxia) and humoral factors, such as cytokines. The concentration of ET-1 in blood plasma is usually insignificant (0.26-0.5 fmol / ml). At the same time, the role of ET-1 as a circulating hormone that affects hemodynamic parameters has been proven. Homocysteine is a natural sulfur-containing amino acid that is not found in proteins. There is information about the relationship between the exchange of endothelins and homocysteine. Elevated levels of ET-1 and homocysteine contribute to the death of ganglion cells in the retina, i.e. the development of hypertensive neuropathy and retinopathy Thus, in the pathogenesis of violations of regional microcirculation in the retina and the development of hypertensive retinopathy and neuroretinopathy, endothelins and homocysteine components play a large role. The question of their relationship in ophthalmic pathologies remains open.

The aim of the work is to study the content of endothelin and homocysteine in the blood and lacrimal fluid in patients with arterial hypertension.

Material and Methods

We examined 18 patients with HC (stages 1–2), mean age 45±4.3 years. The control group included 15 people who did not have a history of arterial hypertension. material for laboratory research were: serum blood (SC) and lacrimal fluid (CL). In all patients, tears were collected with a microcannula . from lower conjunctival vault eyes in dry sealed test tube. Blood took away on an empty stomach in morning clock from ulnar veins in dry centrifuge test tube . Determination of the content of ET-1 was carried out using the enzyme immunoassay method (Biomedica , Austria). Determination of the level of homocysteine in the blood serum was carried out by enzyme immunoassay using a set of the firm " Human ". All measurements were carried out on a plate analyzer (LM 01A, Immunotech , Czech Republic). Statistical processing of the obtained results was carried out using the program Statistica . Significance of differences was determined using Student's t-test.

Results and Discussion

As a result of the study in patients with HC , an increase in the content of ET-1 and homocysteine in the lacrimal fluid and blood was revealed. A significant increase ($p < 0.005$) by 3 times in the content of ET-1 and homocysteine in the lacrimal fluid with HC (4.9±0.48 fmol /ml) compared with the control group (0.87±0.4 fmol /ml) was shown.) .In the blood serum, there was a tendency to increase the level of ET-1 (1.9±1.0 fmol /ml, the norm is 2.3±0.6 fmol /ml). Patients also showed a significant increase in the content of homocysteine in the tear (49.1 ± 3.0 mmol / ml, the norm is 30.6 ± 2.8 mmol / ml; $p < 0.07$) and a tendency to increase the level of homocysteine in the blood serum (142.7 ± 39.9 mmol / ml, the norm is 113.3 ± 3.8 mmol / ml). However, no significant correlation was found between the levels of ET-1 and plasminogen in blood and tears in the examined patients.Based on the above, the data obtained indicate a significant (4.5-5.0 times) increase in the content of ET-1 and homocysteine in tears in patients with HC. At the same time, there was a tendency to increase the level of ET-1 and homocysteine in the general bloodstream. When studying the literature, we did not find information on the content of ET-1 in the lacrimal fluid in HC . Apparently, a local increase in the content of ET-1 and homocysteine is promoted by local hypoxia and ischemia, characteristic of HC , which enhance the transition of proendothelin to ET-1. In addition to its vasoconstrictive action, ET-1 triggers hyperplasia reactions, which can lead to the progression of

retinopathy . An increased content of ET-1 in the tissues and liquid media of the eye is one of the factors in the development of hypertensive neuroretinopathy in AH, as it leads to ischemia and hypoxia of the optic nerve due to a deterioration in its blood supply, which is the cause of ganglion cell death . At the same time, ET-1 enhances the formation of nitric oxide (NO), which also promotes apoptosis of retinal ganglion cells.A local increase in the level of homocysteine in HC may indicate its insufficient splitting, which leads to inhibition of the local fibrinolytic potential. A local increase in the content of ET-1 and homocysteine and a simultaneous decrease in the activity of fibrinolysis are among the most important causes of impaired microcirculation and microthrombosis of blood vessels in the retina in HC .

Conclusion

Thus, endothelin-1 (ET-1) and homocysteine (HC) - this powerful vasoconstrictors that are capable of intensify products cytokines chemoattractant molecules, potentiate synthesis And secretion of various growth factors such as fibroblast growth factor, epiregulin . A significant increase in the level of ET-1 and HC in the systemic circulation with cardiovascular diseases noted many researchers , but there are only single messages on marker research endothelial dysfunction in patients with retinal lesions on the early stages arterial hypertension . In this regard, we have shown that in eye diseases, in the pathogenesis of which local and systemic microcirculation disorders play an important role, there is a significant increase in the content of ET-1 and HC in the lacrimal fluid and blood . Measurement of the content of ET-1 and HC in tears and blood can be an additional informative and non-invasive method for predicting, assessing the severity and monitoring the treatment of local and systemic microcirculatory disorders in the eye.

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