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The Role of Endothelial Function Biomarkers in Predicting the Course of Retinopathy in Hypertensive Patients

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A B S T R A C T
Hypertension is a chronic disease that significantly affects various organs and systems, including the retina. The progression of retinopathy in hypertension is associated with endothelial damage, which disrupts retinal microcirculation and promotes pathological changes that can lead to blindness. In recent years, increasing attention has been paid to biomarkers that can predict and assess the degree of endothelial dysfunction at an early stage.

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INTRODUCTION.

Hypertension is a chronic disease that significantly affects various organs and systems, including the retina. The progression of retinopathy in hypertension is associated with endothelial damage, which disrupts retinal microcirculation and promotes pathological changes that can lead to blindness. In recent years, increasing attention has been paid to biomarkers that can predict and assess the degree of endothelial dysfunction at an early stage. This is crucial for monitoring the condition of patients with hypertension and retinopathy.

Materials and Methods.

The study included 150 patients with arterial hypertension, divided into two groups:

1. Group 1: 80 patients with retinopathy of varying severity.
2. Group 2: 70 patients without signs of retinopathy.

The patients' ages ranged from 45 to 75 years, with a mean age of 62 years. All patients underwent clinical and ophthalmological examinations, as well as an assessment of endothelial function. Biomarkers such as circulating endothelial cells (CEC), endothelial nitric oxide synthase (eNOS), and hydrogen sulfide (H_2S) levels were measured using serological tests.

Results.

The group with retinopathy showed a significant increase in circulating endothelial cell levels compared to the group without retinopathy ($p < 0.05$). The eNOS level was significantly reduced in patients with progressive retinopathy, confirming the presence of endothelial dysfunction associated with hypertension ($p < 0.01$). The correlation between biomarker levels and retinopathy stages was highly significant ($r = 0.72$, $p < 0.01$).

Discussion.

The study results confirm that endothelial function biomarkers can be used to predict the course of retinopathy in hypertensive patients. Elevated circulating endothelial cell levels and decreased eNOS

activity are markers of early endothelial dysfunction, serving as prognostic factors for the development and progression of retinopathy. These findings may be useful for developing early diagnostic methods and optimizing treatment strategies for hypertensive patients.

Conclusion.

Integrating endothelial dysfunction biomarkers into clinical practice can significantly improve the prediction of retinopathy progression in hypertensive patients. Further studies with larger sample sizes will help to more precisely define their role in early diagnosis and treatment efficacy assessment.

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