

Modern Approaches to the Correction of Endothelial Dysfunction in Patients with Arterial Hypertension and Retinal Damage

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Abstract: Arterial hypertension (AH) is one of the most common chronic diseases, closely associated with the risk of developing various vascular disorders, including retinal damage. One of the key pathophysiological mechanisms underlying these conditions is endothelial dysfunction, which plays a crucial role in vascular permeability, blood flow regulation, and the activation of inflammatory processes. Endothelial dysfunction contributes to the progression of both arterial hypertension and retinal pathologies, such as hypertensive retinopathy, necessitating a comprehensive approach to diagnosis and correction.

Key words: This study aims to analyze modern approaches to correcting endothelial dysfunction in patients with arterial hypertension and retinal damage, as well as to identify the most effective treatment methods.

Introduction. Arterial hypertension (AH) is one of the most common chronic diseases, closely associated with the risk of developing various vascular disorders, including retinal damage. One of the key pathophysiological mechanisms underlying these conditions is endothelial dysfunction, which plays a crucial role in vascular permeability, blood flow regulation, and the activation of inflammatory processes. Endothelial dysfunction contributes to the progression of both arterial hypertension and retinal pathologies, such as hypertensive retinopathy, necessitating a comprehensive approach to diagnosis and correction. This study aims to analyze modern approaches to correcting endothelial dysfunction in patients with arterial hypertension and retinal damage, as well as to identify the most effective treatment methods.

Materials and Methods The study included 150 patients with arterial hypertension and retinal damage who were monitored in ophthalmology and cardiology departments from 2022 to 2024. The average patient age was 62 years. Among them, 80 patients (53.3%) had hypertensive retinopathy of stages I–II, and 70 patients (46.7%) had stages III–IV. All patients underwent a comprehensive examination, including ophthalmological assessments (ophthalmoscopy, fluorescein angiography) and endothelial function evaluation using vascular reactivity tests.

Results The study revealed that patients with arterial hypertension and retinal damage exhibited pronounced endothelial dysfunction, characterized by impaired vascular tone, reduced microcirculation, and elevated inflammatory markers. Correction of endothelial dysfunction through combined therapy (antihypertensive drugs, antioxidants, microcirculation-improving agents, and vitamins) led to improved retinal functional parameters and stabilized blood pressure. The use of antioxidant therapy (vitamins C, E, and L-arginine) in combination with calcium channel blockers and ACE inhibitors resulted in a significant improvement in microcirculation and endothelial function. In 72% of patients with hypertensive retinopathy of stages I–II, retinal condition stabilization was observed, while in 60% of patients with stages III–IV, vision improvement and reduced retinal edema were recorded.

Discussion Endothelial dysfunction is a key element in the pathogenesis of hypertensive retinopathy. Retinal microcirculation disorders can lead to severe complications, such as neovascularization, thrombosis, and edema. Modern treatment approaches should include comprehensive vascular wall management, microcirculation improvement, and inflammation reduction. An essential strategy involves the use of antioxidants and drugs that modulate endothelial function. Moreover, blood pressure control remains the cornerstone of preventing hypertensive retinopathy progression. It is crucial that treatment be individualized and targeted at specific disease mechanisms.

Conclusion Correction of endothelial dysfunction in patients with arterial hypertension and retinal damage is a critical component of a comprehensive treatment approach. Modern methods, including antioxidants, microcirculation-improving agents, and antihypertensive therapy, can significantly improve clinical outcomes and prevent severe complications such as vision loss.

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