



PROGNOSTIC MARKERS AND EARLY PREVENTION OF ACUTE CEREBRAL CIRCULATION DISORDERS DEPENDING ON CARDIOVASCULAR FACTORS

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ABSTRACT

Among all strokes, cardioembolic strokes account for 15-30%, and this type of stroke has a higher risk of death than others. Prevention, early diagnosis and treatment of cerebrovascular diseases is one of the most urgent problems and is the most priority direction of modern neurology. In the United States, stroke is the third leading cause of death and the leading cause of long-term disability. In post-stroke cases, these types of strokes have a high rate of serious disability. Therefore, early prevention of cardioembolic stroke has a significant impact on disability and mortality rates among the population.

ПРОГНОСТИЧЕСКИЕ МАРКЕРЫ И РАННЯЯ ПРОФИЛАКТИКА ОСТРЫХ НАРУШЕНИЙ МОЗГОВОГО КРОВООБРАЩЕНИЯ В ЗАВИСИМОСТИ ОТ СЕРДЕЧНО-СОСУДИСТЫХ ФАКТОРОВ

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ABSTRACT

Кардиоэмболические инсульты составляют 15-30% всех инсультов, и этот тип инсульта несет в себе более высокий риск смерти, чем другие. Профилактика, ранняя диагностика и лечение цереброваскулярных заболеваний являются одной из наиболее актуальных проблем и считаются наиболее приоритетными направлениями современной неврологии. В Соединенных Штатах инсульт является третьей по значимости причиной смерти и основной причиной длительной инвалидности. В случаях, следующих за инсультом, эти типы инсультов



с высокой вероятностью приводят к серьезной инвалидности. Таким образом, ранняя профилактика кардиоэмболического инсульта окажет существенное влияние на показатели инвалидизации и смертности населения.

Introduction. Heart diseases, namely valvular insufficiency, atrial fibrillation, endocarditis and recent myocardial infarction, are the causes of cardioembolic strokes. Cardioembolic strokes account for 15-30% of all ischemic strokes. The high incidence of these strokes is associated with the high incidence of heart disease. Artificial heart valves are also among the etiological factors. These diseases and pathological conditions lead to the formation of small blood clots in the heart valves. These small blood clots break off and travel through the bloodstream to the brain vessels and block them. Atrial fibrillation in particular accelerates the release of blood clots from the valves. This process is also accelerated by rheumatic endocarditis, arterial hypertension, atherosclerosis and various viral infections.

Theoretical foundations. Risk factors for the development of cerebrovascular diseases. Arterial hypertension, as the main risk factor, among the fatal complications of hypertension, the leading role belongs to myocardial infarction and cerebral vascular accidents. Chronic cerebral ischemia is more common in older patients than in other neurological diseases, and the lack of timely detection and treatment of neurological and neuropsychological syndromes in this disease leads to disability in patients. In recent years, it has become clear that the risk factors for the development of chronic cerebral ischemia are arterial hypertension, heart disease, diabetes mellitus, hypercholesterolemia, smoking, old age, and a family history of early cardiovascular disease. In addition, asymptomatic carotid artery stenosis, obesity, a sedentary lifestyle, alcohol abuse, kidney disease, psychological and social factors.

Hypoxic changes in the brain, which cause the development of neurological diseases and decompensation of defects in cerebrovascular pathology, are largely determined by the reserve capabilities of central and cerebral hemodynamics. Brain lesions of various nature, which arise as a result of changes in blood vessels in hypertension, are called "hypertensive angioencephalopathy". The blood supply of the three large cerebral arteries of the brain is not limited to their respective basins, since the branches of the arteries anastomose extensively with each other. The presence of a large number of anastomoses creates optimal conditions for rapid reperfusion in case of circulatory disorders of individual arteries. At the junction of the anterior and middle, anterior and posterior, middle and posterior cerebral arteries, these anastomoses are especially large and continuous. Here, on the convexital surface of the cerebral hemispheres, they form zones of adjacent blood supply.

With a long-term increase in blood pressure, blood flow in the intracerebral and extracranial arteries (carotid and vertebral) changes, their elasticity is disrupted, the internal elastic membrane is destroyed and the muscle layer is damaged, smooth muscle fibers die. Changes in large blood vessels are observed not only during persistent arterial hypertension, but also during a sharp increase in blood pressure. A sharp increase in blood pressure, especially in combination with plasmorrhagia and fibrous necrosis of the muscle lining of the



arteries, can lead to at least two pathological consequences: the formation of miliary aneurysms with the subsequent development of circulatory disorders in the brain, as well as leading to swelling, narrowing or closure of the arteriole wall with the development of lacunar cerebral infarction.

With increased blood pressure in the arterial system, swelling of the vascular wall, hyalinosis and sclerosis occur; in the venous system, angiogenesis is activated. Early diagnosis of cerebral vascular pathology is very important for the effective implementation of treatment and preventive measures. An integral part of the symptom complex of hypertension and atherosclerosis are their neurological and psychopathological complications, which largely determine the outcome of chronic insufficiency of cerebral blood supply. At the same time, clinical manifestations are based on a violation of the autoregulation mechanisms of cerebral circulation.

It is believed that the vasoconstriction of the cerebral vessels due to venous stasis in the vascular wall plays a certain role in the pathogenesis of headaches. Due to the obstruction of venous outflow from the cranial cavity, headaches are manifested by a feeling of heaviness in the occipital region (projection of the merging of the intracranial venous sinuses). Sometimes the pain spreads to the fronto-orbital region, "pressing from the inside into the eyes." As it increases, the bursting pain becomes diffuse. The occurrence of such pain is facilitated by all factors that impede venous outflow from the cranial cavity with low venous tone: a horizontal position of the body or a lowered or tilted position of the head, physical stress, coughing, straining, wearing tight collars ("tight collar" symptom). The pain intensifies when taking even small doses of alcohol.

Conclusion. Therefore, several prognostic markers are used to prevent the development of cardioembolic stroke. Although their accuracy and significance depend on the individual characteristics of the patient, the following are commonly used markers:

Heart-related markers:

1. Atrial fibrillation (AF): This is the most important and common prognostic marker. Patients with arterial hypertension have a significantly higher risk of cardioembolic stroke. The duration and severity of arterial hypertension are also important in determining the level of risk.

2. Heart valve diseases: Diseases such as stenosis or prolapse of the mitral or aortic valves can lead to blood clots and increase the risk of cardioembolic stroke.

3. Heart failure: Heart failure can contribute to the formation of blood clots and their travel to the brain vessels.

4. Myocardial infarction (heart muscle attack): A previous myocardial infarction increases the risk of blood clots.

5. High risk of thrombus formation: This can be detected through various laboratory tests, such as indicators of the activity of the blood coagulation system.

Stroke-related markers:

1. High blood pressure: High blood pressure can damage blood vessels and lead to the formation of blood clots.



2. Hyperlipidemia (high levels of lipids in the blood): High cholesterol and triglycerides can lead to atherosclerosis of the arteries, which increases the risk of blood clots.
 3. Smoking: Smoking narrows blood vessels and increases blood clotting.
- Other markers:
- Age: The risk of cardioembolic stroke increases with age.
 - Gender: Men may have a slightly higher risk of this stroke.
 - Family history: The risk increases if there is a family history of cardioembolic stroke.
4. Diabetes: Diabetes damages blood vessels and leads to the formation of blood clots.
 5. Obesity: Obesity increases the risk of vascular disease.

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