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THE ROLE OF NEUROPEPTIDES AND TREATMENT IN THE ACUTE PERIOD OF ISCHEMIC STROKE

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Резюме

Цереброваскулярные заболевания являются одной из наиболее актуальных медико-социальных проблем современности. Нарушение кровообращения в головном мозге приводит к смерти многих пациентов и тяжелой инвалидности, что приводит к серьезному социально-экономическому дефициту.Согласно официальной статистике Министерства здравоохранения Республики Узбекистан, общее количество больных с инсультом в Узбекистане в 2018-2020 годах составило 177 935 человек (с ишемическим инсультом – 166 288 человек). Внедрение новых анализов нейробиомаркеров и апробированных алгоритмов в цереброваскулярную неврологию уже много лет является актуальной научной задачей радиологии.

Ключевые слова: нарушение кровообращения нейропептид ишемического инсульт

Хулоса

Bosh miya qon tomir kasalliklari hozirgi kunning eng dolzarb tibbiy va ijtimoiy muammolaridan biridir. Miyada qon aylanishining buzilishi ko'plab bemorlarning o'limiga va og'ir nogironligiga olib keladi, bu esa jiddiy ijtimoiy-iqtisodiy tanqislikka olib keladi. O‘zbekiston Respublikasi Sog‘liqni saqlash vazirligining rasmiy statistik ma’lumotlariga ko‘ra, 2018-2020-yillarda O‘zbekistonda insult bilan kasallanganlarning umumiy soni 177 935 nafarni (ishemik insult bilan — 166 288 nafar) tashkil etgan. Serebrovaskulyar nevrologiyaga yangi neyrobiomarker tahlillari va tasdiqlangan algoritmlarni joriy etish ko'p yillar davomida radiologiyada dolzarb ilmiy muammo bo'lib kelgan.

Kalit so'zlar: qon aylanishining buzilishi, neyropeptid. ishemik insult.

Summary

Cerebrovascular diseases are one of the most urgent medical and social problems of our time. Violation of blood circulation in the brain leads to the death of many patients and severe disability, which leads to a serious socio-economic deficit. According to official statistics from the Ministry of Health of the Republic of Uzbekistan, the total number of patients with stroke in Uzbekistan in 2018-2020 was 177,935 people (with ischemic stroke - 166,288 people). The introduction of new neurobiomarker assays and proven algorithms into cerebrovascular neurology has been an urgent scientific problem in radiology for many years.

Key words: circulatory disorders neuropeptide ischemic stroke

Introduction. Stroke remains a serious health issue that impacts millions of individuals worldwide, representing the second-most common cause of mortality and the third-most common cause of disability . Approximately 60–80% of all strokes are ischemic and result from thrombotic or embolic occlusion of a cerebral artery . The management of acute ischemic stroke has undergone many changes. Regarding recanalization therapies such as thrombolysis and mechanical thrombectomy, the number of patients who may benefifit from them is still low. Therefore, different therapeutic strategies have been developed, targeting the pathophysiological cascade that starts with ischemia and leads to irreversible tissue damage

Today, the insufficiently published data on the study of post-stroke neurological disorders, the interaction of neuroplastic mechanisms with neuropeptides. Considering the complexity of the morphological structure of the vessels of the brain and brain tissue, the heterogeneous process does not occur with the activation of one biomarker. Therefore, the purposeful study of a wide circle of molecules, representing neurons, neuroglia and endothelial cells, expressed in different phases of ischemic stroke, with points of observation of their role in the activation of the mechanism of its function. The breakdown of this complex system leads to a change in the concentration of biomarkers in the peripheral blood, reflects the expression of insufficiency of blood circulation in the brain and gives information about the processes of neurogenesis, angiogenesis and angiogenesis.

When choosing neuropeptides, it is important to take into account two main aspects: 1) the involvement of all morphological components of the brain tissue in the secretion of specific neuroproteins; 2) the dynamic nature of the pathophysiological processes occurring in the vessels of the brain in the acute period of ischemic stroke [Del Zoppo, G.J., 2013; A. Lasek-Bal et al., 2015]. Monitoring of brain tissue neurobiomarkers at different stages of stroke can be of great diagnostic and prognostic value. Externally acting neurotrophic factors are able to change the strength of neuronal connections and the number of synaptic connections in the acute phase of a stroke, contributing to post-stroke recovery [M.S. El Tamawi et al., 2014; H. Lan et al., 2014; B.F. Kaniya et al., 2017; M. Toricelli et al., 2021; V. Johnson et al., 2016]. Today, much attention is paid to the optimization of pathophysiological mechanisms and methods of stroke treatment in stroke. One of the effective ways to maintain brain homeostasis in rhythm after a stroke is the use of drugs aimed at stopping the rapid reactions of the glutamate-calcium cascade.

The number of truly effective drugs currently undergoing randomized clinical trials in patients with acute cerebrovascular disease is very small. Calcium channel blockers have a pronounced hypotensive effect and in some cases adversely affect the state of cerebral perfusion. Other drugs that stabilize the glutamate-calcium cascade and have a neuroprotective effect are still in laboratory testing. Recent studies have shown that the mechanism of action of amantadine sulfate, previously considered

only an antiparkinsonian agent, not only actively stimulates the release of dopamine from neuronal depots, increasing the sensitivity of dopaminergic receptors to dopamine and normalizing neurophysiological intracerebral processes by blocking glutamatergic receptors, but also stops the release of glutamate and reduces its concentration. in blood.

The purpose of the work is to evaluate the role of neuropeptides in the acute phase of ischemic stroke and develop comprehensive diagnostic and therapeutic measures.

1. Evaluation of the dynamics of clinical indicators of rehabilitation potential in patients with acute ischemic stroke and its determinants;
2. To study the relationship of blood serum neuropeptides with rehabilitation potential in the acute period of ischemic stroke;
3. Describe the dynamics of clinical indicators of rehabilitation potential depending on the microstructural parameters of the brain reserve;
4. To determine the efficacy, safety and effect of amantadine sulfate and tricortin on their rehabilitation potential in patients with acute ischemic stroke.

Material and methods. The object of the study were 56 patients with first-time acute ischemic stroke in the system of the middle cerebral artery, admitted to the "Tashkent Regional Clinical Hospital" within 24 hours from the moment of occurrence of focal neurological symptoms and observed after discharge from the hospital for 60 days.

During operation, the following checks are carried out:

- Collection and analysis of somatic and neurological conditions according to the questionnaire; Objective assessment of the degree of clinical symptoms in stroke according to NIHSS (National Stroke Health Scale), assessment of everyday skills (Bartel scale), degree of disability (Rankine scale), hand function (French test). Laboratory studies: detection of neuropeptides (BDNF, NGF) in blood serum. -Instrumental studies: MRI, MSCT.

Statistical analysis.

The diagnosis was verified in accordance with WHO clinical criteria and confirmed by neuroimaging data. The sample was formed based on the inclusion criteria: first-time ischemic stroke in the basin of the middle cerebral artery; voluntary consent of patients or theirrelatives to participate in the study. Criteria for non-inclusion/exclusion:hemorrhagic stroke; transient ischemic attack, including history; repeated ischemic stroke, including those that occurred within 90 days from the start of enrollment in the study; thrombolysis or thromboextraction.

Patients were divided into groups according to clinical severity,assessed by the National Institutes of Health Stroke Scale (NIHSS) (Kwah L.K., Diong J., 2014). Group A consisted of 12 people (NIHSS = 4 (3; 4) points - mild stroke); group B - of 32 patients (NIHSS = 9 (6; 11) points - moderate stroke); group C included 6 patients (NIHSS = 18 (17; 19) points - stroke between moderate and severe), group D consisted of 5 patients (NIHSS = 23 (22;25) points - severe stroke). The comparison group Z consisted of 39 volunteers (mean age 64 (58; 71) years) with no history of acute cerebrovascular accident (ACV) and other lesions of the central nervous system (CNS).

Results and discussion. Assessment of neurological symptoms in the first 24 hours of acute ischemic stroke according to the NIHSS-I scale revealed contralateral central hemiparesis in 100% of patients in of the study population, contralateral hemihypesthesia - in 39% of patients,

aphasia occurred in 67% of cases. Syndrome "three hemi-" (hemiparesis, hemianesthesia and hemianopsia), associated with occlusion of the proximal part of the main trunk of the middle cerebral artery, was detected in 2% of patients with a normal level of consciousness according to the GCS-I scale. The absence of impaired consciousness in this case could be associated with functionally effective leptomeningeal collaterals, which made it possible to reduce the size of the infarct and, as a result, swelling of the brain tissue. In 7% of patients, acute cerebral ischemia was accompanied by depression of consciousness to the level of deep stupor and coma according to the GCS-I scale.

In this regard, it was not possible to assess the presence of hemianopsia, hemihypesthesia and aphasia in them. However, given the anatomical features of the blood supply to the middle cerebral artery proximal to the lenticulostriate branches, it is obvious that the anterior and posterior legs of the internal capsule, as well as cortical centers of speech, explaining the probable presence of the described symptoms, which was taken into account when calculating the total score on the NIHSS-I scale. Among the symptoms of acute cerebral ischemia, paresis of the lower group of muscles of the face occurred in 86% of patients during examination on the first day of a stroke and could be due to both occlusion of the middle cerebral artery distal to the lenticulostriate branches, occlusion of the artery of the central sulcus, and swelling of the brain tissue as a result of ischemic damage.

Conclusion. The severity of neurological symptoms and the severity of functional disorders in patients statistically significantly correlate with high concentrations of neuron-specific enolase, protein S100β and antibodies to it ($p < 0.001$), with low concentrations of brain-derived neurotrophic factor ($p < 0.001$) in blood serum in the first 48–72 hours of ischemic cerebral stroke, characterizing processes of neurodestruction in the core of infarction, protective-compensatory humoral reactions and neuronal survival. Independent factors in the prognosis of patient survival in the first 14 days of illness are S100β protein concentrations in the first 48–72 hours and Glasgow Coma Scale score ($\chi 2 = 67.6$; $p < 0.001$; sensitivity 94% and specificity 76%).disability of patients significantly depend on the number of rehabilitation programs performed from 14 to 90 days of stroke ($p = 0.025$). The high-tech AR-rehabilitation method statistically significantly increases the expression of the brain-derived neurotrophic factor ($p = 0.012$), stimulates synaptic neuroplasticity and motor recovery ($p < 0.001$), reduces the degree of functional impairment ($p < 0.001$).

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