

ENCEPHALOPATHY REMAINS A CURRENT PROBLEM IN MEDICINE

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Abstract. *Prevention and treatment of cerebrovascular diseases remain one of the most urgent and unresolved issues in clinical neurology. First of all, this concerns dyscirculatory encephalopathy, the relevance of which is due to the prevalence of the disease and polymorphic clinical manifestations. Dizziness, headache, memory loss, fatigue, sleep disturbance - this is not a complete list of initial symptoms that reduce the quality of life of a person, make it difficult to adapt to increased psycho-emotional and physical stress, making it impossible or difficult to continue professional activities.*

Key words: *encephalopathy, magnetic resonance imaging, cerebrovascular disorders.*

Vascular diseases of the brain in clinical neurology are rightfully considered the number one problem, which is explained by high levels of morbidity and mortality, long-term disability [1, 13]. Over the past decade, there has been a significant increase in the number of vascular diseases of the brain in young and middle-aged people, which are difficult to objectify in the early stages, and effectively treat in the later stages [5, 9, 16].

It is generally accepted that the frequency of dyscirculatory disorders in the vertebrobasilar system is 25-30% of all cerebrovascular disorders and about 70% of transient disorders [6, 17].

Not so long ago, the only diagnostic tool of a neuropathologist was a neurological hammer, which complements the ability to analyze and compare the symptoms of the disease, and carefully collect an anamnesis. In recent decades, the diagnostic capabilities of such imaging methods as radiography and complex ultrasound diagnostics have increased significantly. Great importance in the diagnosis of dyscirculatory encephalopathies is currently attached to modern methods of neuroimaging , primarily X-ray computed tomography and magnetic resonance imaging. More than half of the observations during computed tomography and especially magnetic resonance imaging studies reveal changes in the brain tissue, usually corresponding to the existing clinical symptoms. A timely and correct diagnosis contributes significantly to adequate treatment of the disease and provides a favorable prognosis [15, 16].

The use of magnetic resonance imaging in clinical practice has a relatively short history - since the 80s of the last century. But at present, magnetic resonance imaging is developing rapidly and offers the widest opportunities for diagnosing various aspects of cerebrovascular pathology [5, 9]. The diagnostic capabilities of MRI are determined by the set of performed examination modes, which is largely related to the magnetic field strength of the tomograph and its software. In the early stages of the development of MRI, slow scanning modes were used, but in the 90s, the arsenal of possible MRI modes expanded significantly due to the development of methods for controlling tissue contrast by suppressing the signal from certain tissue components, such as water or fat, and the introduction of fast pulse sequences, which made it possible to in particular, to obtain high-resolution MRI images in a short time [2, 4, 12, 19].

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Currently, opinions about the use of high-field magnetic resonance imaging are ambiguous. On the one hand, devices with a medium and low magnetic field differ from high-field systems in compactness and economy with satisfactory image quality, on the other hand, in some clinical situations, in particular when it comes to topical diagnostics, low- and medium-field magnetic resonance imaging is not enough. informative [8, 14, 18].

At the same time, various variants of MR angiography were developed and material was accumulated on the diagnostic capabilities of these research methods, especially in cerebrovascular diseases [6, 10, 13, 16]. In general, the current level of development of magnetic resonance diagnostics contributes to the successful solution of most diagnostic problems in cerebrovascular diseases. The use of modern programs for analyzing the results of magnetic resonance imaging in the dynamics of treatment allows you to control the course of structural changes in the area of damage, which opens up new opportunities in choosing the most appropriate methods of therapeutic intervention and in monitoring the effectiveness of methods for correcting cerebrovascular accidents [1, 3, 7, 11].

Thus, the analysis of current literature data indicates that magnetic resonance imaging plays an important role in the diagnosis of discirculatory encephalopathy. At the same time, the significance of MRI in the complex of methods of clinical and radiological diagnostics of the stages of DE has not been studied enough.

Encephalopathy is a group of diseases, a syndrome that is associated with degenerative changes in brain tissues. It manifests itself against the background of other disorders in the state of the body and affects both adults and children.

Some chronic illnesses or other ailments can lead to poor blood supply and oxygen supply to the brain cells. For this reason, dystrophy of the tissues of this organ occurs, which leads to the death of neurons.

The development of encephalopathy can be prevented, even if all the prerequisites for its occurrence have already appeared.

here are two types of classification of this disease - by the nature of the appearance and by its cause.

Kinds: doctors distinguish between congenital and acquired encephalopathy. The first occurs against the background of an abnormal course of pregnancy or childbirth and, often, develops even during the stay of the fetus in the womb. Its signs are detected immediately after childbirth or appear in the first weeks of life. Diagnosis and treatment of this condition are carried out by neonatologists and pediatricians.

Acquired encephalopathy occurs in adulthood. It is divided into several types depending on the cause of neuronal death:

post-traumatic: occurs against the background of a traumatic brain injury; often, it develops within a few years after it and often leads to severe mental disorders;

- toxic: associated with acute or chronic poisoning of the body with alcohol, poisons, drugs, medicines, salts of heavy metals, etc.; often, within this type, alcoholic encephalopathy is isolated separately;

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- metabolic: associated with metabolic disorders in the body; distinguish the following subtypes of pathology:
 - * hepatic: occurs when the liver or biliary tract is damaged;
 - * uremic: associated with impaired kidney function;
 - * diabetic: is one of the frequent complications of diabetes mellitus, occurs against the background of a persistent disturbance of microcirculation and an increase in blood viscosity;
 - * anoxic: develops after a clinical death and is associated with oxygen starvation of the brain with the subsequent development of a "metabolic storm";
 - * Gaye-Wernicke syndrome: encephalopathy caused by vitamin B1 deficiency;
 - * pancreatic: is a complication of inflammation of the pancreas;
 - * hypoglycemic: occurs against the background of a sharp decrease in blood glucose;
- dyscirculatory: associated with impaired blood circulation in the vessels of the brain; There are several forms of pathology:
 - * atherosclerotic: develops due to atherosclerosis and thickening of the walls of blood vessels;
 - * hypertensive: associated with a persistent increase in blood pressure;
 - * venous: occurs due to a violation of the venous outflow of blood.

Depending on the rate of development of the process, acute and chronic encephalopathy is distinguished. The first can develop within a few days or hours, more often occurs against the background of severe intoxication, trauma, and an infectious process. The chronic process can proceed for years and decades.

The nature of the disease can be:

- Congenital
- Acquired

The first type is manifested in newborns and can be diagnosed during pregnancy or in the first week after childbirth.

In adolescents and adults, this disease is acquired. And in this case, it can manifest itself for the following reasons:

- Violations in vessels and blood supply
- Pathological and atypical changes in brain tissues (discirculatory), which are divided into types:
 - * Venous
 - * Atherosclerotic
 - * Hypertensive
 - * Mixed
- Traumatic
- Alcoholic
- Toxic
- Beam

Stages of the disease

In modern medicine, there are four stages of encephalopathy:

- Initial
- Moderate
- Pronounced
- Heavy

In the first case, there may be no symptoms. In the second - they are not always obvious and characters. In the third, the symptoms manifest themselves much more strongly and increase as the condition worsens. At the last stage, there is a serious damage to the brain tissue.

Degrees

The boundaries between the severity of encephalopathy are arbitrary, but for convenience, doctors use the following classification:

- Grade 1: there are no clinical signs, a detailed examination reveals mild changes in brain structures;
- Grade 2: symptoms of encephalopathy are mild or moderate, often temporary;
- Grade 3: severe, irreversible changes, accompanied by severe symptoms, the patient becomes disabled.

Causes and symptoms

The appearance of encephalopathy is associated with impaired blood flow and supply of oxygen to brain tissues against the background of other pathologies and problems in the life of the body.

The reasons for this condition are:

Damage to nerve cells can occur against the background of exposure to various pathological factors.

- past trauma;
- acute or chronic intoxication with salts of heavy metals, drugs, alcohol;
- circulatory disorders (atherosclerosis, arterial hypertension, amyloidosis, etc.);
- infectious diseases (diphtheria, botulism, tetanus and others);

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- violations of the liver or kidneys, accompanied by the accumulation of toxins in the blood;
- disorders of glucose metabolism;
- lack of vitamins (especially group B);
- water retention, lack of sodium in the blood and edema provoked by this;
- immunodeficiency states;
- exposure to ionizing radiation;
- hypoxia: insufficient supply of oxygen to brain cells
- Atherosclerotic changes in the vessels (in this case, their walls become denser, and various plaques appear on them)
- Jaundice or other serious infectious disease that produces and does not dispose of excessive amounts of bilirubin
- Oxygen deprivation for a long time due to problems with pressure, interruption of breathing and other
- In congenital form - the mother during pregnancy certain drugs, harmful substances (alcohol, nicotine)
- Cardiopulmonary failure (most often seen in older patients)
- Diabetes
- Constant use of toxic substances and alcohol
- Too low blood sugar, poor nutrition
- Brain tumor
- Irradiation
- Very frequently changing intracranial pressure
- Regular stress
- Hereditary diseases - cardiovascular, neurodegenerative

Many of these disorders can be identified when a doctor orders an MRI of the brain for encephalopathy.

Symptoms of the disease

Signs of encephaloptia depend on the location of the focus of destruction, as well as the degree of development of the disease. Most often, patients and their relatives experience the following symptoms:

- headache: can capture the entire head or concentrate in its individual parts; intensity depends on the degree of damage and gradually increases; pain is poorly relieved by taking analgesics;
- dizziness: occurs sporadically, accompanied by a loss of orientation in space; often a person is forced to wait out this condition in bed, since the slightest movement enhances the symptom; the condition is often accompanied by persistent nausea and vomiting;
- impairment of cognitive functions: a gradual decrease in the ability to think adequately is a characteristic sign of encephalopathy; a person gradually becomes forgetful, distracted, poorly concentrates on a specific process and hardly switches between different activities;
- emotional and behavioral disorders: a person has difficulty controlling his emotions, becomes irritable, tearful, quickly excited; as the disease progresses, apathy, depression and complete unwillingness to do anything occur;
- increase or decrease in muscle tone; often accompanied by hyperkinesis (trembling in the limbs, obsessive movements, etc.);
- decreased vision and hearing;
- increased weather sensitivity.

In some patients, behavioral disorders predominate, while others cease to control their bodies normally; in others, it is mainly the sense organs that suffer. In severe cases, a person requires constant care and supervision of others.

Suspicion of encephalopathy of one nature or another occurs in the following cases:

- Prolonged depression, anxiety, manic
- Weakness, disability
- Slow reaction time, memory problems, cognitive impairment
- Spasms, pains, dizziness
- Violations of the motor activity of the limbs
- Manifestation of mental illness
- Impaired vision or hearing

At the last stage, it is possible to fall into a coma, paralysis, as well as a heart attack and stroke.

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Safety, painlessness and non-invasiveness - the integrity of the skin is not violated, X-ray radiation is not used

- The possibility of detecting the disease at the very first stage, in the absence of symptoms and other signs
- The examination takes place from different sides, the tomogram includes several slice images, but the patient does not need to move or turn over
- This study can be carried out repeatedly to track the results of treatment or surgery, the dynamics of the course of the disease without harming the body
- The result is recorded on electronic media and printed, and the speed of its appearance is no more than an hour from the moment of the procedure

Unlike some other methods, MRI can be used to diagnose pregnant women (but not recommended during the first trimester)

Since this method is based on the phenomenon of magnetic resonance, there are some contraindications for its use:

- The presence of heart valves, pacemakers and similar devices that interact with the magnetic field
- Installed electronic devices in certain parts of the body (such as prosthetic ears)
- The presence in the body of metal implants or fragments

For devices of the closed type, the patient's weight should be no more than 130 kilograms, and the girth should be up to 120 centimeters

- For patients with a severe phobia of closed space, being in the tube of the device will also be difficult
- It is difficult for mentally ill patients to be still for a long time
- In the first trimester of pregnancy (if life and health do not depend on this study), this method is not used
- If examination with contrast is required, the patient must not be allergic to its components.
- The presence of severe pain that prevents you from lying still on your back

In all other cases, MRI analysis can be performed.

The presence of open type devices due to their open design on the sides makes it possible to conduct magnetic resonance imaging for people with claustrophobia and high weight (up to 200 kilograms, body diameter is unimportant). It also helps to conduct such an examination for children, the elderly and patients with mental disabilities due to the possibility of monitoring the process.

Anesthesia can be used on a standard tunnel machine for restless or fearful patients.

Complications

Complications of encephalopathy are associated with severe and irreversible brain damage and represent the ultimate degree of observed symptoms:

- loss of ability to self-service due to motor or cognitive impairment;
- dementia: loss of knowledge and skills up to the complete collapse of the personality;

- loss of vision and hearing;
- severe mental disorders;
- convulsions;
- disorders of consciousness: stupor, coma;

- fatal outcome.

Conclusions.

1. The basis of the differential diagnosis of the stages of dyscirculatory encephalopathy according to the data of clinical and radiological examination is complex criteria, including characteristic complaints, diffuse neurological symptoms or distinct dominant syndromes, signs of lipid and carbohydrate metabolism disorders, structural changes in the brain substance in the form of cerebral atrophy, leukoaraiosis, focal changes in the substance of the brain, as well as signs of atherosclerotic lesions of intracranial arteries of varying severity.

2. Magnetic resonance imaging is an effective method for detecting foci of gliosis and leukoaraiosis in the substance of the brain, allows you to study the state of intracranial arteries, evaluate the ventricular system and subarachnoid space in three orthogonal projections. The overall accuracy of the method in diagnosing the stages of discirculatory encephalopathy was 90.2%.

3. The method for evaluating the results of magnetic resonance imaging should include a qualitative study of structural changes in the brain and a quantitative analysis of the area of areas of change in signal intensity, the size of the ventricular system of the brain, cerebroventricular indices, and the diameters of intracranial arteries.

4. Stage I dyscirculatory encephalopathy is characterized by polymorphism of complaints, the absence of focal neurological symptoms, a slight increase in the tone of the cerebral vessels, an increase in peripheral resistance, difficulty in arterial and venous outflow, moderate hydrocephalus, single small foci of dystrophy of the brain substance and initial atherosclerotic changes in the intracranial arteries.

5. Dyscirculatory encephalopathy stage II is characterized by complaints of an asthenic nature, scattered neurological symptoms, combined with a decrease in the linear velocity of blood flow through the cerebral and vertebral arteries, an increase in the tone of cerebral vessels and difficulty in blood flow through them, the presence of multiple small and single large ischemic foci, a tendency to expand the ventricular system of the brain, the presence of small areas of leukoaraiosis, as well as uneven narrowing of the intracranial arteries.

6. Diagnostic criteria for stage III dyscirculatory encephalopathy are gross focal neurological syndromes - pseudobulbar, parkinsonian, almmnesic, pronounced changes in intracranial arteries, a significant deterioration in blood flow through them, multiple areas of change in the intensity of the signal from the brain substance, including confluent ones, in combination with the presence of mixed hydrocephalus.

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