



SPECIFIC FEATURES OF BRAIN MRI EXAMINATION IN PATIENTS WITH CHRONIC HEART FAILURE

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Article history:	Abstract:
<p>Received: April 10th 2021 Accepted: April 22th 2021 Published: May 21th 2021</p>	<p>The occurrence of subjective symptoms of chronic cerebral ischemia in patients with chronic heart failure raises the question of the development of criteria for magnetic resonance imaging of the brain. The study examined 42 patients with chronic heart failure and 35 patients in the control group. According to the results of the study, MRI analysis in patients with chronic heart failure revealed the presence of many relatively large subcortical focal and the presence of diffuse leukoareous zones, with a predominance of signs of cerebral atrophy.</p>
<p>Keywords: Chronic heart failure, chronic cerebral ischemia, magnetic resonance imaging, cerebral.</p>	

Chronic heart failure is a multidisciplinary disease in which the primary dysfunction of the heart causes a series of hemodynamic, nervous and humoral adaptive reactions aimed at ensuring blood circulation in accordance with the needs of the body. Chronic heart failure can be caused by any cardiovascular disease. Heart failure is 1.5-2% among the population and 6-10% among people over 65 years of age. Despite significant advances in the treatment of cardiovascular disease, the burden of declining prevalence of heart failure has been steadily increasing, and this is associated with an increase in the age of the population. In patients with chronic heart failure, a decrease in the heart rate and cerebral hypoperfusion result in chronic cerebral ischemia. The use of neuroimaging techniques to detect information about hemodynamic and structural changes in the brain in such patients allows early diagnosis and early application of treatment measures in the patient.

THE PURPOSE OF THE STUDY.

Detection of MRI signs of chronic cerebral ischemia in patients with chronic heart failure.

MATERIALS AND METHODS.

77 cardiology patients were examined for research purposes. Of these, 42 patients were included in the main group and diagnosed with chronic heart failure. Of these, 42 were SYuE I, 31 were SYuE II A, and 9 were SYuE II B. The control group included 35 patients without SYuE. The mean age of the patients was 60.2 ± 0.8 . Patients were examined in the transverse, sagittal, coronary plane in the T1-SE, T2-SE, T2-FLAIR mode by MRI tomography with a magnetic field resistance of 0.6-1.5 Tl. Quantitative results of plane and diffuse changes were analyzed in the study. Depending on the location of the planes: subcortical, periventricular, basal nucleus lesion or not. Depending on the number of aircraft: the presence of up to 5 furnaces - multiple furnaces, the presence of 5 to 10 furnaces - medium, the presence of 10 and more - multi-aircraft. By size: small diameter furnaces <5 mm and large diameter furnaces 5-10 mm.

In T2-mode, the surface area (cm²) of leukoareous zones around the lateral ventricles was determined. Leukoareous zones were assessed as follows: 1- no foci, 2- local 3- diffuse combined. By location: anterior, lateral, posterior (according to the lateral ventricles and its anterior-posterior branches)

Depending on the width of the subarachnoid space of the brain, indicating external cerebral atrophy, its levels were determined: 3.0-3.2 mm mild atrophy, 3.3-3.5 mm moderate atrophy, 3.5 mm and more pronounced atrophy.

The cerebral ventricular system, which is a sign of internal cerebral atrophy, was identified according to the degree of enlargement. The transverse width of the lateral ventricles and the width of the third ventricle were examined. At the same time, the results show signs of internal atrophy with a degree of mild to 7.0-7.5 mm, moderate to 7.5-8.0 mm, 8.0 mm and larger.

RESULTS.

The results of the examination were determined based on the structural changes in the brain tissue in patients. In the hyperintensive, periventricular, and subcortical projection of the white matter of the brain, T2, in the FLAIR mode, small-volume, indistinct foci of multiple or multiple pathological intensities were observed in the basal

nuclei. In the first group of patients, ischemic planes were observed more often than in the control group. subcortical 12 (34.2%), periventricular 9 (25.7%), and basal ganglia damage 2 (5.7%).

furnaces	Patients with SYuE N=42	Patients without SYuE N=35
No.	4(9.5%)	12(34.2%)
Subcortical	17(42.8%)	12(34.2%)
Periventricular	15(38.9%)	9(25.7%)
Accompanied by damage to the basal nuclei	6(19.04%)	2(5.7%)

According to the number of foci occurring in brain tissue, we can see multiple focal changes in 19 (45.2%) patients in the main group, moderate focal changes in 14 (33.3%) patients, and common focal changes in 5 (11.9%) patients.

The amount of furnaces	Patients with SYuE N=42	Patients without SYuE N=35
No.	4(9.5%)	12(34.2%)
< 5	19(45.2%)	13(37.1%)
5-10	14(33.3%)	7(20.0%)
≥10	5(11.9%)	3(8.6%)

The area size ($M \pm m$, cm²) of brain tissue leukoareous zones in the MPT T2-mean was 9.8 ± 1.4 on average in the baseline group and $4.5 \pm 1.5^*$ in the control group. The incidence of such outbreaks was found to be 23% higher in the main group of patients.

Parameters	Patients with SYuE N=42	Patients without SYuE N=35
The area size of leukoareosis is MPT T2-pejim	$9.8 \pm 1,4$	$4,5 \pm 1,5^*$
($M \pm m$, cm ²)	8(19.0%)	15(42.9%)
No.	21(50.0%)	13(37.1%)
Local	13(30.1%)	7(20.0%)

The table below analyzed the subarachnoid space, lateral ventricles, and third ventricular dimensions in the patients examined. Accordingly, it was found that symptoms of internal and external cerebral atrophy were observed more frequently in patients with SYuE than in patients in the control group.

	Patients with SYuE N=42	Patients without SYuE N=35
Subarachnoid space	$3,7 \pm 0,4$	$3,2 \pm 0,1$
Anterior horn of lateral ventricles	$26,8 \pm 1,4$	$20,1 \pm 0,6$
Lateral ventricular body	$29,7 \pm 1,1$	$21,1 \pm 0,6$
The posterior horn of the lateral ventricles	$29,8 \pm 1,9$	$22,2 \pm 0,6$
Third ventricular width	$8,1 \pm 0,4$	$7,1 \pm 0,1$

CONCLUSION.

Chronic cerebral ischemia due to chronic heart failure is one of the most informative methods of MRI in the detection of a number of local and diffuse changes in the structure of the brain. allows early application of therapeutic measures.

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