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NEUROIMAGING INDICATORS OF CHRONIC ISCHEMIA OF THE BRAIN IN PATIENTS WITH SYSTEMIC LUPUS ERYTHEMATOSUS

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Abstract:

The pathological mechanism of chronic cerebrovascular accident is a unifying concept of slowly progressive damage to cerebral vessels. Small vessel disease (SVD) is a designation of symptoms similar to CVD, while at the same time emphasizing changes in the vessels of the cerebral arteries and veins, due to arterial hypertension, amyloid angiopathy, the consequences of inflammatory diseases and autoimmune pathology. Most "silent" strokes in the elderly are explained precisely by the BMS factor.

Keywords: cerebral arteries,veins,arterial hypertension, amyloid angiopathy, autoimmune pathology

According to the literature, more than 50 % of all cognitive impairments are determined due to BMS. Thanks to high-tech research methods, BMS can be examined during the life of the patient and the situation can be approached not as a single symptom, but as a disease of the whole brain (1, 5). Given the proposed types of BMS, the most typical are the consequences of vasculitis, in particular the disease of systemic lupus erythematosus (2, 6). The question of the presence of MRI markers of recognition remains open, since neurological changes consist of a multidisciplinary spectrum of syndromes, sometimes not confirmed by neuroimaging data. In total, according to the American College of Rheumatology, changes in the nervous system occur in SLE up to 80% of cases (3, 7). Data from around the world in recent years indicate a progressive increase in SLE disease, and the degree of activity of the underlying disease process is reflected in the nervous system (4, 8). The socio-economic prognosis of this disease is rising, the frequency of severe complications of nerve damage extends to a young age, the working population. As can be seen, damage to the nervous system, and this is mainly the central level of damage, remains an urgent problem and requires the development of modern diagnostic methods.

TARGET. To study and develop a modern level of diagnostics of neurological disorders of the brain in SLE.

MATERIAL AND RESEARCH METHODS. Patients with SLE were subject to examination 98 patients observed in Moscow Samarkand State Medical University in the department of rheumatology for 2020-2022, outpatient observation in polyclinics of Samarkand (No. 3, 7). The average age of patients was 36 ± 10 years, there were 80 women (which coincides with the literature data on gender differences), 18 men. The duration of the disease varied from 1 year to 5 years 40%, from 5 to 10 years 42%, the remaining percentage Patients with a disease experience of more than 10 years. Written permission was obtained from all patients for the study. The exception was patients with severe protracted forms of diseases of rheumatic origin, patients with a comorbid background of changes in the heart and kidneys. The examination began with a standard neurological examination, traditional laboratory tests, typical for this category of patients. Neuroimaging study (MRI of the brain, CT angiography), instrumental study of the EEG, ultrasound, ophthalmoscopy. Psych neurological testing. The results of the study were processed on an individual computer using generally accepted analysis criteria.

RESEARCH RESULTS. The study revealed two categories of patients with neurological signs of damage, confirmed by instrumental and neuroimaging data. The second category of patients had subjective (to a greater extent) and objective changes (at the time of examination), but there were no confirmatory neuroimaging data, there were fewer such patients (19 patients in total), in these patients the duration of the disease did not exceed 1 year, the course of the disease mostly noted as subacute, with moderate activity. Syndromes of changes in the nervous system, characteristic of all examined patients. In terms of frequency, the cephalgic syndrome prevailed in 96 % of cases, where 93% were

observed in patients with dyscirculatory encephalopathy and 95% of cases with a history of dyscirculatory encephalopathy who had cases of TIA. According to the strength of the headache, relative to the average intensity in 70 % of cases, with the localization of the parietal region. Headache according to the time of manifestation, more often in the morning hours in 60 % of cases. In all patients, in varying degrees of severity, asthenic syndrome was recorded in the form of a decrease in working capacity - 80%. Fatigue 59 %, weakness and lack of desire to perform household functions in 70% of cases. A frequent complaint in the examined patients, in parallel with asthenia, is a decrease in perception and memory for current events in 33.9 %. Neurological disorders were noted as characteristic syndromes, the signs were multidisciplinary, in the form of a vestibulocerebellar syndrome in 58 % of cases. Where a violation of the coordination tests was found in all patients, dizziness (usually non-systemic) in 65 % of cases, noise in the head and tinnitus in 66%, nystagmus (horizontal, sometimes installation) in 50% of cases. From the side of the cranial nerves, during the examination, only signs of mild facial asymmetry (of a central nature) were noted in 30 % of cases, convergence disorder in 31% of cases. Neurological examination of the motor sphere was marked by a variety and scattered symptoms. So in 24 % of cases hemiparesis was noted, in 10% of patients it was mild with a difference (asymmetry of the side reflexes). Pathological (axial) signs were noted in 39% of cases. Pain syndromes of a vertebrogenic nature were detected in 37 % of cases.

According to the goal, all patients underwent ultrasonic transcranial Doppler ultrasonography. In group I in the amount of 59 people, patients with signs of chronic cerebrovascular accident, with episodes of TIA, blood flow velocity data on the right CCA 66.0 ± 0 cm/s, on the left CCA 70.0 ± 0 cm/s. In group II (patients with neurological signs, but not having episodes of acute brain catastrophes), on the right CCA 81.0±7 cm/s, on the left CCA 86.0±10 cm/s. In group I , the right ICA was 66.0 ±0 cm/s, and the left ICA was 70.0±0 cm/s. In group II , the right ICA was 73.0 ±9 cm/s, and the left ICA was 80.0±7 cm/s.

Bioelectrical activity according to EEG data in both groups had a difference, as in the case of the examination of the linear velocity of blood flow. In group I , patients had an α-rhythm frequency of 10.0±2 Hz, and an α-rhythm amplitude of 23.0±3 μV. In group II , the frequency of the α -rhythm is 9.5 ± 2 Hz, and the amplitude of the α-rhythm is 24.2 ± 3 μV. As for the activity from the slow-wave profile in all patients, it took place, but in the first group it was 20 % more common. Paroxysmal activity was noted in 13 % of cases in group I , in group II it was not observed. The overall high indicator for both groups was the violation of nonspecific structures on the EEG in 80%, and in group II it was less.

The most interesting and revealing, especially for group II, were neuroimaging changes. To recognize the specificity and determine the markers of neuroimaging, patients underwent, in addition to the standard MRI study, CT angiography of the brain. Assessing the analysis of the state of the arteries of the brain, a decrease in blood flow was noted in patients of both groups. The most significant were changes in the posterior cerebral artery by 75 % on the left, the right internal carotid artery was changed up to 75%, in 72% there was a decrease in blood flow in the middle cerebral artery, the same indicators were seen from the anterior cerebral artery on the left side. That is, changes in the form of a decrease in blood flow in the brain in patients with SLE are clearly defined on CT angiography. Accordingly, it can be seen how much the indicators have changed in patients, where clinical syndromes manifest themselves insignificantly, even in some cases they are regarded as indirect (Group II). Structural changes differed during MRI of the brain in all patients.

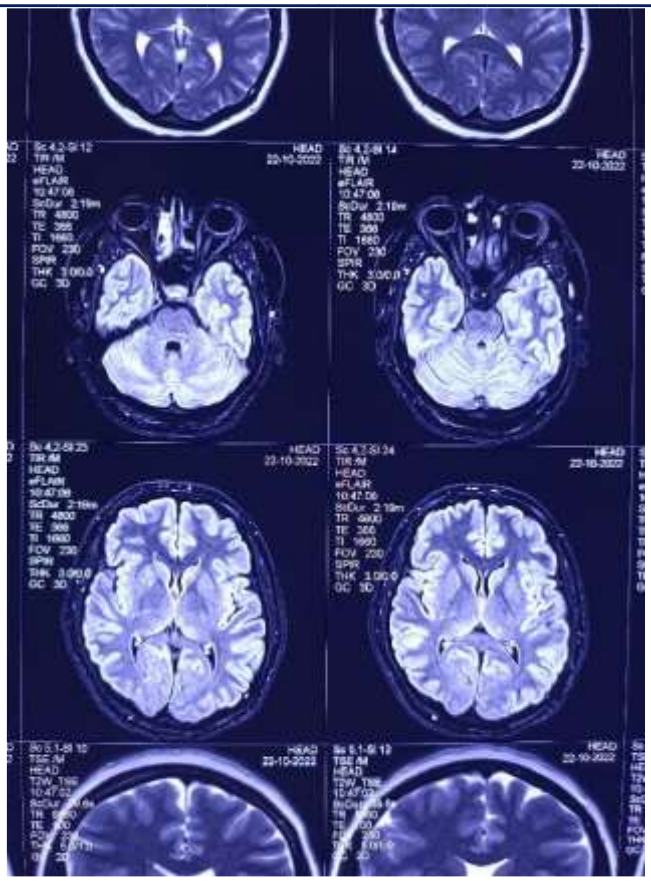

Fig 1. **Patient A., 29 years old.**

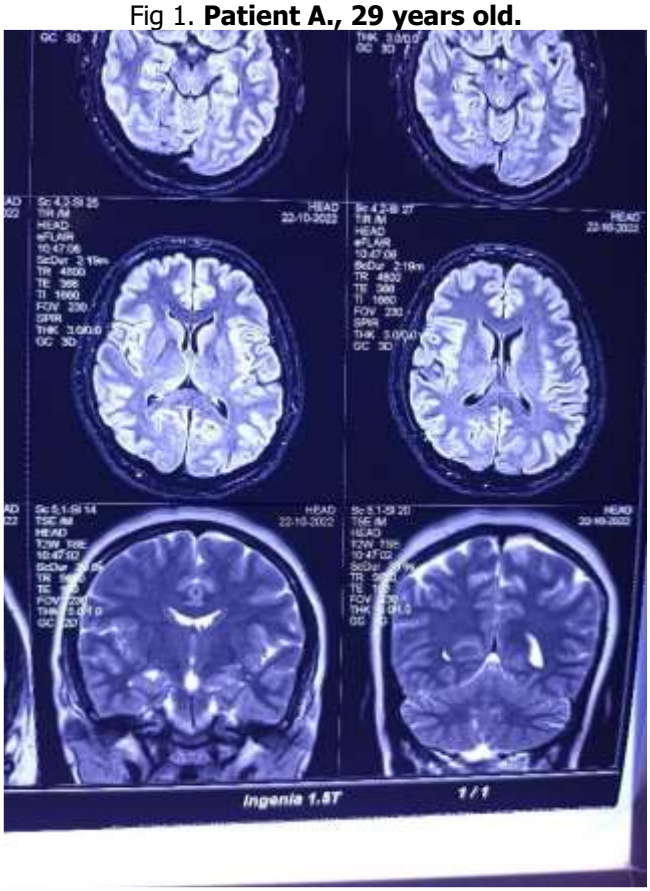

Fig. 2. Patient K. , 32 years old.

The pattern of neuroimaging parameters included expansion of the ventricular and subarachnoid spaces, signs of gliosis changes, leucomolation , scattered focal lesions of the brain substance. Again, there is a difference between clinical scores and neuroimaging examination. Where the bright manifestations of a violation of the brain structure in the MRI image do not coincide with the clinical and neurological signs during the examination. Which indicates the need for MRI , CT angiography in all patients with SLE. Without stopping there, patients with SLE were consulted by an ophthalmologist with an examination of the fundus (ophthalmoscopy). Definitely, the highest percentage of change was

retinal vasculopathy in 95.5 % of cases. The second symptom was the definition of arterio-spasm in 63.3 % of cases, while angiopathy was present in 94.6% of cases. Only in 9 % of cases stagnation of the optic disc was noted.

Thus, even if there are initial signs of SLE disease, patients need a mandatory examination by a neurologist, require the use of neuroimaging research methods (MRI, CT angiography), in parallel with laboratory tests confirming the disease; instrumental methods in the form of studying the bioelectric activity of the brain, and in addition ophthalmoscopic examination. Indicators of vascular changes in the form of a decrease in volumetric blood flow, pathological signs according to MRI studies, especially focal manifestations that are not combined with the clinic, can be considered as a sign of the activity of the pathological and immunopathological process and used as a marker for correcting therapy and preventing acute cerebral accidents.

CONCLUSION.

1. Clinical and neurological signs in SLE are manifested by a wide polymorphic spectrum, where subjective changes prevail over objective ones.
2. To identify changes in the pathological and immune pathological process in patients with SLE, it requires the use of neuroimaging research methods in the form of MRI and CT angiography, which can be considered a marker for determining the severity of chronic cerebrovascular accident, and an in-depth study in dynamics makes it possible to exclude or confirm small vessel disease
3. Identification of specific changes in cerebral vessels is necessary for the correction of adequate therapy and prevention of acute disorders of cerebral circulation.

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