

EVALUATION OF THE RESULTS OF NEUROIMAGING (MAGNETIC RESONANCE) STUDIES IN PATIENTS WITH POST-COVID SYNDROME

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Abstract: This article discusses the evaluation of the results of neuroimaging (magnetic resonance) studies in patients with post-COVID syndrome. Statistical significance of the results was assessed using Student's test of significance (t) for parametric distribution and Fisher's test (F) for nonparametric data distribution. Differences were considered significant at 95% confidence interval ($P \leq 0.05$).

Keywords: magnetic resonance, results of neuroimaging, post-COVID syndrome, parametric distribution.

Introduction

Manifestations of post-covid syndrome (PCS) are diverse, characterized by symptoms from various body systems, but neurological (neuropsychic) disorders are especially important: cognitive impairment, asthenic, vegetative, and anxiety disorders, leading to a decrease in the quality of life of patients and a slowdown in recovery [1,3]. Various manifestations of PCS occur in the majority of patients who have undergone COVID-19: a third of patients have increased fatigue, and a fifth have cognitive impairment [2,4]. These disorders can be observed in patients with varying severity of the underlying disease.

Purpose of the study. Evaluate the results of magnetic resonance imaging in patients with post-COVID syndrome.

Material and research methods. The study included 87 young patients aged 18 to 44 years (mean age 31.9 ± 12.1 years) with post-COVID syndrome (PCS). The patients were divided into two groups: group I consisted of 36 women (41.4%), group II - 51 men (58.6%), gender index was 1.4:1.0.

The diagnosis of post-COVID syndrome was included in the International Classification of Diseases (ICD-10), heading code U09.9 "Post-COVID-19 condition, unspecified", which also includes post-COVID state (5). Patients were observed in the conditions of the neurological and therapeutic departments in the regional hospital of the city of Andijan.

In a comprehensive clinical examination of patients, the generally accepted clinical examination of the somatic status, laboratory research methods, instrumental research methods (MRI of the brain) were used.

Statistical significance of the results was assessed using Student's test of significance (t) for parametric distribution and Fisher's test (F) for nonparametric data



distribution. Differences were considered significant at 95% confidence interval ($P \leq 0.05$).

Research results. In addition to the study of complaints, anamnesis, neurological examination, all patients underwent MRI of the head to exclude the "non-vascular" genesis of cerebral disorders and to clarify the nature and severity of focal and diffuse changes in the brain substance.

In general, in one third of the studied patients (33.3%), MRI of the head revealed expansion of the ventricular system and cerebrospinal fluid spaces of varying severity: mild - in 26.6% of patients, moderate - in 59.1%, severe - in 19.0% of patients.

Focal changes in the substance of the brain during MRI were detected in 49.4% of patients. Most patients have focal changes in the form of small deep infarcts, which are localized in the area of the white matter of the semioval centers, in the area of the subcortical ganglia, the internal capsule, as well as in the trunk structures - in the thalamus, cerebellum, pons, in the hippocampus. In 21 patients, small-focal changes were combined with a focal lesion of medium size, and in 5 patients - with the presence of lacunar foci, which corresponded to the transferred VCC. In 32 patients, small-focal damage to the brain substance was in the form of small foci of vascular demyelination of cortical-subcortical localization in the gray and white matter of the frontal, parietal, temporal, occipital lobes, as well as the hippo- and paracampal region. The number of foci also varied - from 1-2 (18 patients) to multiple (46 patients).

A decrease in the density of white matter (leukoareosis) was detected in 29.5% of patients. Focal changes in the periventricular white matter region were defined as limited leukoaraiosis in 8.9% of patients, moderate diffuse changes in the periventricular white matter were present in 14.8% of patients, pronounced diffuse changes in the white matter of the subcortical region of the centers were found in 6.7% of patients.

Changes in the brain revealed by us during the MRI study included: expansion of the perivascular Virchow-Robin spaces, lesions in the white matter of the cerebral hemispheres, expansion of the subarachnoid spaces, expansion of the ventricles of the brain (Table 1). Single (< 3 mm) foci in PCS were observed in 7 patients (19.7%) in the group of women, in the group of male patients there were significantly more of them - in 11 (21.6%). Multiple foci of damage to the white matter in the cerebral hemispheres were significantly more often detected in males (29 people, 56.9%) than in the group of female patients (17 people, 47.2%).

Table 1.



MRI parameters in patients with PCS

MRI study indicators	I group women, n=36		II group, men, n=51	
	Abc	%	abc	%
Solitary foci of vascular demyelination	7	19,4%	11	21,6%
Multiple foci of vascular demyelination	17	47,2%	29	56,9%
Expansion of the perivascular Virchow-Robin spaces	15	41,7%	24	47,1%
Expansion of the subarachnoid spaces	8	22,2%	13	25,5%
Expansion of the lateral ventricles of the brain	6	16,7%	9	17,6%

The expansion of the perivascular spaces was detected in 24 patients (47.1%) in males, which is significantly higher than the same indicator in female patients - in 15 (41.7%) people. The pathogenesis of the expansion of the perivascular Virchow-Robin spaces in patients with PCS can be explained by a massive process of vascular demyelination followed by white matter atrophy (3).

The expansion of the subarachnoid spaces was also significantly higher in male patients - 13 (25.5%) patients, compared with the group of female patients 8 (22.% 2) people, expansion of the cerebral ventricles in HM was observed in 9 (16.7%) patients, in the group of patients with MBA - in 6 (16.7%), no significant differences were found.

Conclusion

A decrease in the density of white matter (leukoareosis) was detected in 29.5% of patients. Focal changes in the periventricular white matter region were defined as limited leukoaraiosis in 8.9% of patients, moderate diffuse changes in the periventricular white matter were present in 14.8% of patients, pronounced diffuse changes in the white matter of the subcortical region of the centers were found in 6.7% of patients.

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