

## ASSESSMENT OF COGNITIVE FUNCTIONS IN PATIENTS WITH POST-COVIDAL CEREBROASTENIC SYNDROME

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### ABSTRACT

**Aim of the study:** We aimed to study the occurrence of cognitive impairment in post-covidal cerebroastenic syndrome in patients with various degrees of severity of COVID-19, to assess the severity of the asthenic syndrome, and develop optimal diagnostic approaches. **Materials and methods:** The presence of cognitive impairments was assessed based on the clinical symptom questionnaire, the MMSE scale (Mini Mental State Exam, Folstein, et al., 1975), and the MoCA test (The Montreal Cognitive Assessment, MoCa, 2005). The severity of asthenic manifestations was determined by ASS (Asthenic State Scale modified by L. D. Malkova and T. G. Chertova, 2014). **Conclusions:** In patients with post-covidal cerebroastenic syndrome, cognitive impairment was assessed using the MMSE scale. In the main group, 21 people had moderate dementia, 27 people had mild dementia, and 20 people had moderate cognitive impairment. In the control group, positive results were recorded within the standard values. The MoCA test revealed a decrease in cognitive functions in the form of moderate dementia in 23, mild dementia in 26 and moderate cognitive impairment in 19 in the main group. Whereas in the comparison group on the first day of admission to the hospital against the background of intoxication.

**Key words:** COVID-19, asthenic syndrome, cognitive functions, post-covidal cerebroastenic syndrome, dementia, cognitive impairment.

### INTRODUCTION

The COVID-19 pandemic originated in our society as a severe unemployment crisis, a financial crisis in the healthcare system, and in many other areas. Numerous studies have shown that situations such as the death of family members and many physical consequences after COVID-19 caused psychological distress in

survivors of COVID-19 infection (Rogertz et al., 2020; Taquet et al., 2021), such as fatigue. (Garg et al., 2021; Stavem) (Townsend et al., 2020), impairment of cognitive disorders (Rakhimbaeva G.S., 2021), cognitive changes, or "slowing down of consciousness" / "areas of thinking" sometimes led to the development of a number of additional pathologies such as depressive conditions (Landau, 2021; Zhou et al., 2020). Based on the above data, we can say that this is clear evidence that the virus and psychosocial factors have a direct effect on the nervous system. SARS-CoV-2 causes neuropsychiatric effects on the human central nervous system, such as mood swings, psychosis, and neuromuscular dysfunctions during the acute and recovery periods.

Among the physical consequences of COVID-19, feeling tired is the most common complication. Available data indicate that fatigue ranges from 46 to 53% (Litas, Kee et al. 2020). The likelihood of fatigue and other complications depends on a number of factors and can occur independently (Townsend et al., 2020). In most cases, the onset of fatigue is also associated with factors such as anemia and vitamin B12 deficiency, female gender (Garg et al., 2021; Townsend et al., 2020). In addition, patients recovering from COVID-19 infection experience pathological processes such as cognitive impairment and dementia (Beaud et al. 2020; Zhou et al. 2020). Some studies point to mild to moderate cognitive impairment up to severe dementia (Di Pietro 2021; Vanderlind et al. 2021).

An asthenic syndrome is diverse clinical symptomatology, which includes a decrease in physical activity (endurance, performance), cognitive functions (memory, attention, perception of new information, speed of decision-making), rapidly increasing fatigue, and a persistent feeling of weakness. Asthenia is manifested by various psycho-emotional disorders (increased anxiety, irritability, mood swings, decreased motivational activity and interest in what is happening, fear of the future). Various diseases can be accompanied by asthenic symptoms, which indicates a significant decrease in the psychoemotional resources of the body.

**Objective:** To study the incidence of cognitive impairment in post-covidal cerebroasthenic syndrome in patients with varying degrees of severity of COVID-19, to assess the severity of the asthenic syndrome, and to develop optimal diagnostic approaches.

**Research materials:** in the COVID-specialized center "Geologist" in the Karshi branch of the RSCEMA, 98 patients were treated, followed up for 120 days. All patients in the acute phase of the disease underwent clinical and neurological examination; among comorbid conditions, diabetes mellitus was noted - 26 (26.5%), arterial hypertension - 7 (7.1%), cerebral atherosclerosis - 5 (5.1%),

pneumonia - 42 (42.9%). All patients were divided into two groups. The main group included 77.5% (68) of patients who developed post-covidal cerebroastenic syndrome and other neurological complications after suffering from COVID-19. The control group included 22.5% (21) of patients with COVID-19 infection, but without functional or organic complications from the nervous system during the entire observation period. The patients underwent the following studies: COVID-19 was confirmed by polymer chain reaction analyzes and MSCT chest examination and other analyzes. The presence of cognitive impairments was assessed based on the clinical symptom questionnaire, the MMSE scale (Mini Mental State Exam, Folstein, et al., 1975), and the MoCA test (The Montreal Cognitive Assessment, MoCa, 2005). The severity of asthenic manifestations was determined by ASS (Asthenic State Scale modified by L. D. Malkova and T. G. Chertova, 2014). The patients were followed up for 14 days.

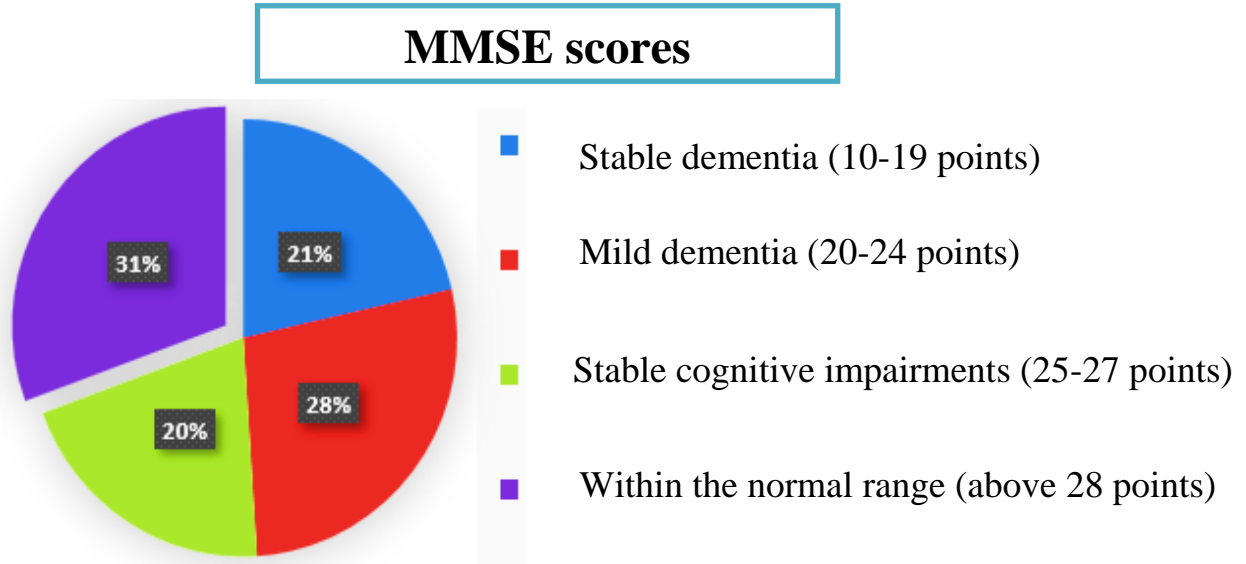
**Research results:** When analyzing the results obtained, the average age of patients in the main group was determined as  $51.4 \pm 3.1$  years, and in the control group -  $47.4 \pm 2.5$  years. In patients with post-covidal cerebroastenic syndrome, cognitive impairment was assessed using the MMSE scale. In the main group, 21 people (10-19 points) had moderate dementia, 27 people (20-24 points) had mild dementia, and 20 people (25-27 points) had moderate cognitive impairment. In the control group (above 28 points), positive results were recorded within the standard values. (Table 1).

**Table 1.**

**Indicators of the MMSE scale in the study cohort of patients 1 day of admission to the covid hospital.**

<b>Indicators of the MMSE scale</b>	<b>Main results</b>
Moderate dementia (10-19 points)	21/98
Mild dementia (20-24 points)	27/98
Moderate cognitive impairment (25-27 points)	20/98
Within normal limits (above 28 points)	30/98

The percentage of patients according to the MMSE scale criteria in the studied cohort of patients on the 1st day of admission to the covid hospital was shown in Diagram 1. As can be seen from the presented results on the 1st day of illness, only in 30.61% of patients, the indicators of cognitive functions according to the MMSE scale in the studied cohort corresponded to the parameters norms, while 60.39% of those examined against the background of acute coronavirus infection showed a slight and moderate decrease, sometimes approaching the indicators of dementia.

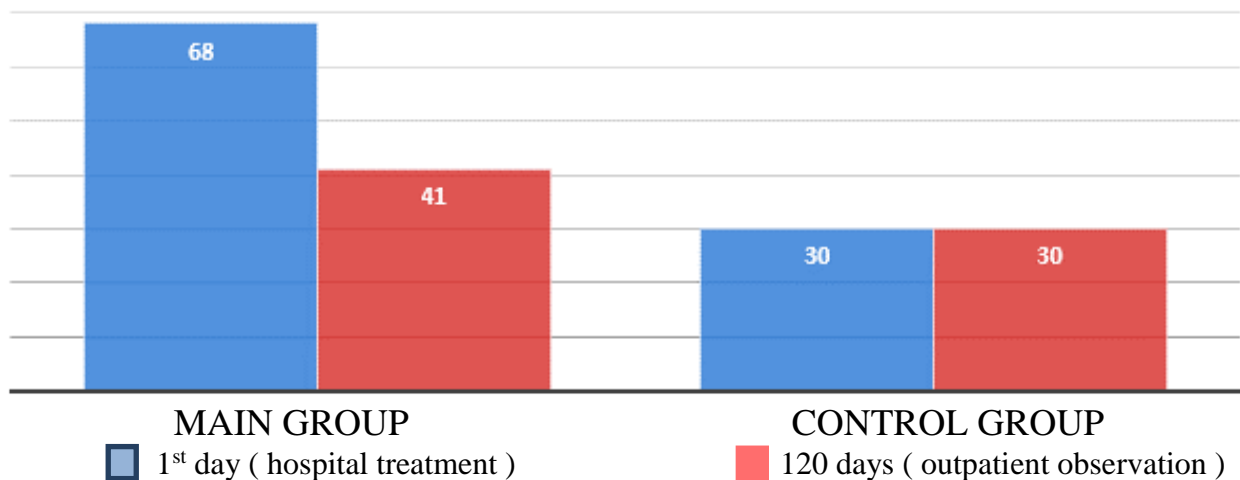


**Fig. 1. Indicators of the percentage of cognitive impairment according to the MMSE scale in the studied cohort of patients.**

Nervousness, fatigue and cognitive impairment were observed at the beginning of the observation in the main group, and these changes persisted in 41 (60%) patients during 120 days of observation. In the control group, no signs of neurological symptoms and asthenia were observed in patients even after 3 months from the onset of the disease (Table 2).

**Table 2. The ratio of patients in the study cohort on the 120th day of observation in relation to the formation of postcoid cerebro-asthenic syndrome.**

Study cohort	1 day (inpatient treatment)	120 days (outpatient observation)
Main group	68/98	41/98
Control group	30	30

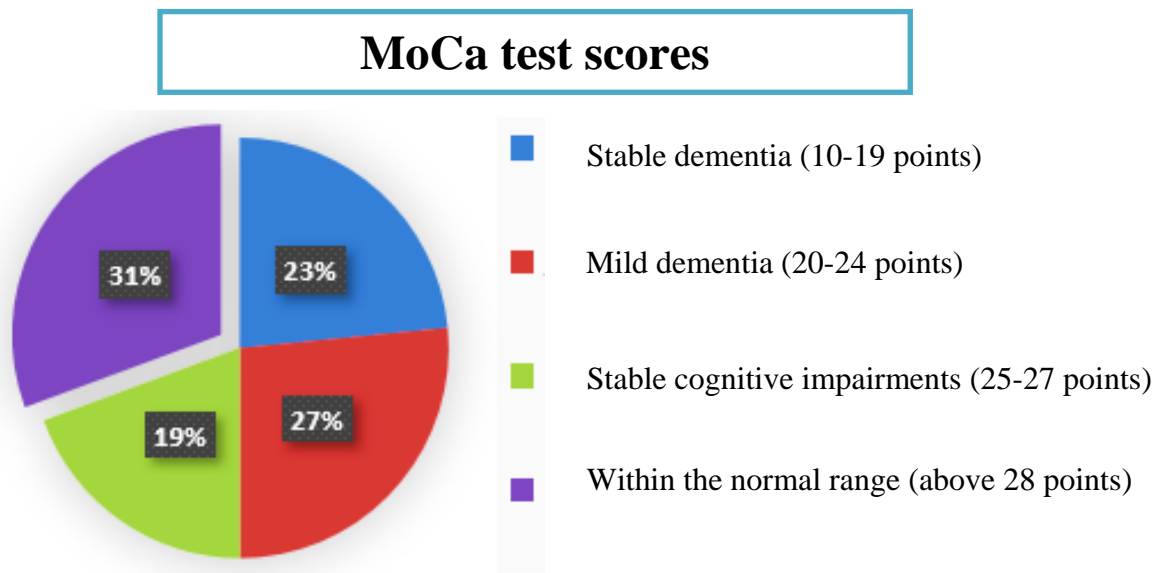


**Fig. 2. Indicators of regression of cognitive impairments in the studied cohort of patients according to the MMSE scale on the 120th day of observation.**

The MoCA test revealed a decrease in cognitive functions in the form of moderate dementia in 23 (20-17 points), mild dementia in 26 (24-21 points) and moderate cognitive impairment in 19 (27-24 points) in the main group. Whereas in the comparison group on the first day of admission to the hospital against the background of intoxication (table 3.).

**Table 3.**  
**Cognitive indices according to the Montreal scale MoCA test in the study cohort on the 1st day of admission to the covid hospital.**

<b>Graduation of points MoCA test</b>	<b>results</b>
Moderate dementia (20-17 points)	23/98
Mild dementia (24-21 points)	26/98
Moderate cognitive impairments (27-24 points)	19/98
Within normal limits (30-28 points)	30/98

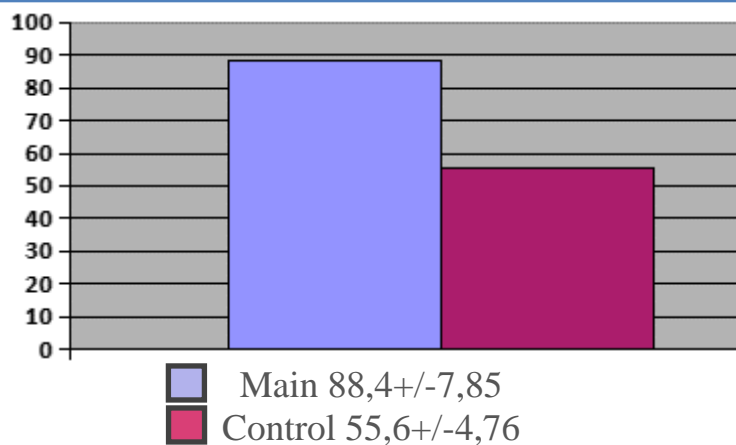


**Fig. 3. Percentage of the Montreal MoCA test scores in the study cohort of patients upon admission to the hospital.**

We also conducted a survey to determine how our patients assess their condition according to the ASS (asthenic state scale, Malkova L.D.).

Survey participants (n = 98).

The severity of asthenic manifestations in patients of the study and control groups varied from moderate to severe. (Fig. 4)



**Fig 4. Dynamics of indicators of the asthenic state scale on the 1st and 120th day of observation of the studied cohort of patients with COVID - 19.**

As can be seen from the figure, on the first day of admission to the hospital, patients were tested according to the ASS scale questionnaire, consisting of 30 items, 88.4% of patients in the first group noted increased fatigue, decreased mood, sleep disturbance, intolerance to loud sounds and bright light, and no desire to communicate with others, a sharply reduced mood background, in the comparison group in patients with mild and asymptomatic COVID-19, mild symptoms of asthenia were observed approaching the norm, which quickly returned to normal and were in the range for 120 days of observation in all the subjects. In the main group, the indicators of the ASS scale by the 120th day of the study also somewhat regressed from the indicators of severe to moderate asthenia. But only in 18 patients (15%) they corresponded to the norm.

**Conclusion:** Thus, the results of our study showed that coronavirus infection is accompanied from the very first day of the disease by a state of pronounced general weakness and the formation of post-covidal cerebroasthenic syndrome in a significant part of patients with moderate and severe course of the disease, which is expressed not only by high indices of the ASS scale, but and a decrease in cognitive functions according to the MMSE and MoCa test scales, in severe cases of the disease bordering on dementia disorders. Our data are consistent with the results published by Qi, R. Et al. 2020, Townsend L. et al. 2020, which noted the phenomena of pronounced loss of strength and unusual asthenia in patients in the acute period of SARS-COVID - 19. The opinion that correction of asthenic and cognitive impairments, obligatory for patients with moderate and severe course of the disease, is emphasized by many practical researchers of the problem of post-covidal syndrome, noting not only neurological, but also a complex of neuropsychiatric syndromes in SARS-COVID-19 (Di Pietro, DA et al, 2021). Consequently, efforts carried out in this direction will help to reduce asthenic

phenomena and improve the quality of life in patients with post-covidal cerebroasthenic syndrome.

The results of a 120-day open-label cohort comparative study allowed us to draw the following conclusions:

1) Test studies (ASS scale) have demonstrated a long-lasting cerebro-asthenic syndrome, the signs of which, without appropriate therapy, persist for 120 days or more of observation in patients who have undergone severe and moderately severe forms of COVID.

2) Studies of cognitive function according to the MMSE and MoCa test showed in the acute period moderate cognitive decline and mild dementia, developing against the background of acute intoxication in 60.39% of patients, regressing in the postcoid period and by the 120th day of observation are observed only in 23.5% requiring medical correction.

3) Assessment of the cognitive state of patients during 120 days of observation, early diagnosis of cerebro-asthenic syndrome and its timely correction will help prevent further possible consequences and aggravation of the process.

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