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FEATURES OF COGNITIVE DYSFUNCTION IN PATIENTS WITH ISCHEMIC STROKE DEPENDING ON COVID-19 STATUS

Submission Date: July 20, 2023, Accepted Date: July 25, 2023,

Published Date: July 30, 2023

Crossref doi: <https://doi.org/10.37547/ijmscr/Volume03Issue07-10>

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ABSTRACT

This article discusses the features of cognitive dysfunction in patients with ischemic stroke depending on Covid-19 status. Using the modified TOAST classification, a sample of patients with only ischemic stroke (IS) against the background of previous COVID-19 was made. We were guided by the fact that there are a significant number of multidirectional publications in the literature regarding views on the pathogenesis and clinic of neurological complications in COVID-19, and in order to concretize the study, we analyzed only cases with ischemic stroke in our work.

KEYWORDS

Features of cognitive dysfunction, ischemic stroke, Covid-19 status.

INTRODUCTION

COVID-19 increases the likelihood of developing ischemic stroke (IS), increasing the rates of disability and mortality in the population. It was revealed that COVID-19 provokes a stroke even in healthy young people, it is more severe and 5-10 times more likely to lead to death. Thus, the average mortality from stroke is usually 5-10%. In patients with COVID-19, it was at the

level of 42% (8.9). Observations show that SARS-CoV and SARS-CoV-2, which leads to the frequent development of strokes with a certain change in the levels of neurotrophic markers, in particular BDNF, is also characterized by the expression of certain molecular sequences that act as ACTH mimics. Thus, a patient's antibodies to SARS-CoV and SARS-CoV-2 can

destroy ACTH, decreasing its levels and increasing cortisol levels (7,10).

That is why the problem of studying the dynamics of neurological deficit and cognitive functions in the early recovery period in post-COVID patients with IS and optimizing therapy becomes of national importance and urgent need.

THE PURPOSE OF THE STUDY

Assess cognitive deficits in patients with ischemic stroke depending on COVID-19 status.

MATERIAL AND RESEARCH METHODS

The presented research work was carried out at the Department of Nervous Diseases of the Regional Vascular Center at the Federal State Budgetary Institution NSO City Clinical Hospital No. 1 in the period from 2020 to 2022. Based on international criteria, we diagnosed CVA as “focal or diffuse impairment of brain function of cerebrovascular origin lasting at least 24 hours or leading to death in a shorter period of time” [3].

Using the modified TOAST classification [3], a sample of patients with only ischemic stroke (IS) against the background of previous COVID-19 was made. We were

guided by the fact that there are a significant number of multidirectional publications in the literature regarding views on the pathogenesis and clinic of neurological complications in COVID-19, and in order to concretize the study, we analyzed only cases with ischemic stroke in our work.

The diagnosis of COVID-19 was made according to the “Temporary recommendations for the management of patients infected with a new coronavirus infection COVID-19” of the Ministry of Health of the Republic of Uzbekistan, version 8 [1]. This paper indicates that the World Health Organization (WHO) in January 2020 updated the section of ICD-10 “Codes for use in emergencies”, adding a special code for COVID-19 - U07.1 [1].

The main group (MG) consisted of 165 patients with ischemic stroke against the background of previous COVID-19 (IS + COVID-19) (98 men and 67 women), mean age 52.4 ± 10.9 years. The comparison group (CG) consisted of 85 patients with ischemic stroke without IS and no history of COVID-19 (46 men and 39 women), mean age 65.9 ± 4.8 years. The control group (CG) included relatively healthy individuals ($n=20$; mean age 52.4 ± 6.5 years; gender index 1.0:1.0) (Table 1).

Table 1. Distribution of subjects by groups

groups	Gender index	men		women		total	
		n	%	n	%	n	%
main group (MG)	1,46*	98	59,4%*	67	40,6%*	165	61,1%
comparison group (GS)	1,18	46	54,1%	39	45,9%	85	31,5%
control group (CG)	1,00	10	50,0%	10	50,0%	20	7,4%
Total	1,33	154	57,0%	116	43,0%	270	100,0%

Note: *- reliability $p > 0.05$ between MG and CG.

To study auditory-speech memory, the Luria test “10 words” was used, the Schulte method was used to assess the stability of attention and performance, and the MMSE scale was used to determine cognitive deficit.

Statistical processing of clinical and instrumental materials in accordance with the recommendations for processing the results of biomedical research at a significance level of $p < 0.05$ was carried out using the practical statistical package STATISTICA.

Research results. Complaints about memory disorder in the form of forgetfulness were presented by 58.0% of patients, while an objective study revealed memory

loss in 84.8% of cases. Memory impairments were predominantly modal-nonspecific in nature and were primarily due to pathological inhibition of traces by interfering influences. The degree of impairment varied from mild (71.6%) to moderate (20.0%) severity.

Mild disturbances were found only with the use of sensitized samples. The absence of mnestic disorders was recorded in 8.4% of cases.

In the study of memory according to the Luria test “10 words”, a significant difference was revealed between the number of reproduced words between groups - CG, OG and GS in the time period of 10 and 20 minutes (Table 2).

Table 2

The average number of words on the test for memorization is 10 words (according to Luria A.R.)

Test "10 words" Luria	MG			CG			CG
	AT	CE	LI	AT	CE	LI	
1 st attempt	4,9±2,1	5,0±1,0	5,1±1,0	5,2±0,3	5,4±1,0	5,8±1,25	6,2±0,25
2 nd attempt	5,0±1,8	6,5±0,6	7,0±0,9	4,7±0,29	7,1±1,9	7,2±0,8	7,5±0,9
3 rd attempt	6,1±1,3	7,1±0,8	8,4±0,5	4,0±0,29	7,4±0,5	8,0±0,5	6,3±0,24
4 th attempt	5,7±1,5	7,5±1,4	8,2±0,4	6,1±0,21	8,2±0,4	8,0±0,7	8,1±0,8
5 th attempt	5,2±1,1	6,3±2,2	7,1±1,7	5,1±0,26	7,1±1,7	7,6±0,8	7,1±1,2
Delayed playback	4,0±1,3	6,0±1,5	6,8±1,3	4,3±0,28	6,8±1,3	7,0±0,5	6,7±1,8

When conducting a test for memorization of 10 words, a slight decrease in memorization productivity was noted compared to the control, the patients reach the maximum results after 5-6 repetitions, while the persons of the control group - after 3-4 repetitions (Table 2).

In 98.0% of cases, modal-nonspecific disorders of voluntary attention were also detected. The memorization curve in the 10-word test reflected the insufficiency of activation support, a decrease in the concentration of voluntary attention, and its increased exhaustion.

Noteworthy is the relative preservation of the volume of short-term memory in the GS with a slight decrease

in long-term memory, which indicates the absence of pronounced disturbances in the phase of direct reproduction. The number of errors is comparable to the control group.

The reproduction of numerical series in the control group was better compared to patients who underwent COVID-19, this difference was significantly significant ($p=0.04$). Reproduction of numerical series in direct order in patients with CG and MG was impaired to a greater extent than in CG, these differences were more pronounced in patients with AT subtype IS. The revealed changes in patients with different groups had a statistically significant difference when comparing some indicators.

Table 3

Test results according to the Schulte method

Schulte table	MG			CG			CG
	AT	CE	LI	AT	CE	LI	
1	67±11,8	63±8,7	42,6±5,3	56,8±1,6	57,8±2,3	41,6±9,0	42±5,7
2	66±8,5	71±9,0	46,8±2,7	52,7±2,3	53,7±1,8	40,0±6,4	45±2,4
3	68±10,3	76±9,3	49,3±3,8	51,6±2,8	56,9±2,3	48±10	47±3,5
4	73±12,5	75±16,4	54,2±2,1	50,0±1,9	58,1±1,6	55±5,7	52±2,8
5	70±7,9	79±10,8	53,5±2,7	58,1±1,3	62,7±2,4	48±4,5	50±2,2

After analyzing the assessment of the stability of attention and performance according to the Schulte method (Table 3), we found a fairly large variability in the data. The studied groups of patients who underwent COVID-19 significantly differed in the efficiency of work with the control group ($p = 0.001$). The scatter in the time of passing the Schulte tables in patients of the MG and CG increased with the increase in the complexity of the task.

Table 4. MMSE results, %

IO degrees		Lungs IO		Moderate IO		total
MG	AT	22	52,4%	20	47,6%	42
	CE	24	66,7%	12	33,3%	36
	LI	35	77,8%	10	22,2%	45
Total MG		81	65,9%	42	34,1%	123
CG	AT	17	68,0%	8	32,0%	25
	CE	13	68,4%	6	31,6%	19
	LI	10	76,9%	3	23,1%	13
Total CG		40	70,2%	17	29,8%	57

Note: hereinafter * - significant differences between the CG and groups.

- difference between MG and CG groups.

The exhaustion of attention according to the method of Schulte's tables in LI in MG and CG and in healthy people fluctuated in the same ranges, while in patients with AT of both groups, a dependence was observed, in which exhaustion increased as the test was performed. Patients with AT MG also had a tendency to exhaustion of attention during the test, but not as

pronounced as in AT MG. The work efficiency of patients with HC was 57.3%, MG - 49.5%.

The severity of IO on the MMSE scale in patients was studied depending on the subtype of IS. As can be seen from Table 4.10, in the MG and CG of patients with moderate IO, it was significantly higher compared to

the CG. Also, significant differences in the score severity of MCI according to the MMSE scale was significantly higher in patients with MG compared with CG (Table 4).

According to the results of other researchers, moderate cognitive impairment (MCI) was more common in patients with MG compared with CG - 34.1% and 29.8%, respectively ($p < 0.05$). Patients with AT of both groups had MCI more often in comparison with CE and LI (v.4.10). Distinctive characteristics of MCI in different subtypes of IS can be explained by damage to different areas of the cerebral cortex [2,4,5].

When conducting a correlation analysis, the following was revealed - the severity of the severity of COVID-19 correlated with more pronounced cognitive impairment. The results of neuropsychological testing of patients who underwent COVID-19 were compared with modern criteria for pre-dementia disorders [6,7,8]. The structure of cognitive disorders (CG) in patients with COVID-19 was significantly dominated by MCI, which, according to the study with changes in severity, were more pronounced ($p < 0.05$).

CONCLUSION

According to the results of neuropsychological testing, the overall severity of CR in COVID-19 (according to the MMSE scales and the 10-word test according to Luria) was significantly higher in groups II and III. Moreover,

in patients with AT, MCI was detected more often than in patients with CE or LI ($p < 0.05$).

From the foregoing, it follows that the identified intergroup differences are statistically significant. Recovery of long-term memory is more intense with mild COVID-19.

Changes in the cognitive status were of a wave-like nature: improvement - worsening - improvement with an increase in positive dynamics, which subsequently consolidated and acquired a stable character. Given that the process of transferring information from short-term memory to long-term memory is accompanied by functional and structural changes supported by the acetylcholinergic system. When conducting a correlation analysis, the following was revealed - the severity of the severity of COVID-19 correlated with more pronounced cognitive impairment. The results of neuropsychological testing of patients who underwent COVID-19 were compared with modern criteria for pre-dementia disorders [9,10]. The structure of cognitive disorders (CD) in patients with COVID-19 was significantly dominated by MCI, which, according to the study with changes in severity, were more pronounced ($p < 0.05$).

In conclusion, we can confidently say that neuropsychological examinations are important methods for assessing the state of higher mental functions in patients who have undergone COVID-19

and allow assessing the degree of involvement of the affected parts of the brain in the pathological process, as well as the functional state of the brain as a whole. The study showed differences in neuropsychological parameters depending on the subtypes of IS; significantly more pronounced SI was observed in AT, in contrast to patients with CE and LI. Moreover, the indicators on the MMSE scale in AT were also significantly lower than the corresponding indicators of those examined with CE and LI. It should be assumed that patients with atherosclerosis are at risk for developing CR with COVID-19.

REFERENCES

1. Akilov H. et al. Interim guidelines for the management of patients infected with COVID-19 (Version 10). Ministry of Health of the Republic of Uzbekistan and the National Chamber of Health of the Republic of Uzbekistan, January 2022.
2. Vakhnina N.V. Prevention and treatment of post-stroke cognitive impairment. Effective Pharmacotherapy, 2014. 42. Neurology and Psychiatry 4: 32-39.
3. Vilensky, B. S. Stroke - the current state of the problem / B. S. Vilensky // Neurological journal. - 2008. - No. 2. - P. 4-10.
4. Zakharov V.V., Vakhnina N.V. Stroke and cognitive impairment. Neurology, neuropsychiatry and psychosomatics, 2011. 2: 8-16.
5. Levin O.S., Usoltseva N.I., Dudarova M.A. Cognitive impairment in the early recovery period of ischemic stroke. Russian Medical Journal, 2009. 4: 20-24.
6. Kalaria RN, Akinyemi R, Ihara M. Stroke injury, cognitive impairment and vascular dementia. Biochim Biophys Acta. 2016;1862(5):915-925. <https://doi.org/10.1016/j.bbadis.2016.01.015>.
7. Hampshire A., Trender W., Chamberlain S. et al. Cognitive deficits in people who have recovered from COVID-19 relative to controls: An N=84,285 online study. E Clinical Medicine. 2021;39:101044. DOI: 10.1016/j.eclinm.2021.101044.
8. Ellul M.A., Benjamin L., Singh B. et al. Neurological associations of COVID-19. Lancet Neurol. 2020;19(9):767-783. DOI: 10.1016/S1474-4422(20)30221-0.
9. Rasquin SM, Verhey FR, van Oostenbrugge RJ, et al. Demographic and CT scan features related to cognitive impairment in the first year after stroke. J Neurol Neurosurg Psychiatry, 2004. 75: 1562-1567.
10. Zhou L., Zhang M., Wang J., Gao J. SARS-CoV-2: underestimated damage to nervous system. Travel Med Infect Dis. 2020;1:101642. DOI: 10.1016/j.tmaid.2020.101642