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Research Article

THE SEVERITY OF NEUROLOGICAL DEFICIT IN PATIENTS WITH ISCHEMIC STROKE ON THE NIHSS SCALE DEPENDING ON THE STATUS OF COVID-19

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ABSTRACT

This article discusses the severity of neurological deficit in patients with ischemic stroke on the NIHSS scale depending on the status of COVID-19. Based on the current situation, the need for a full-fledged dynamic study of the state of cerebral hemodynamics in terms of the relationship of these indicators with the results of neuro-immunological examinations and neuroimaging data, as well as determining the effect of cerebral blood flow reserves, as a parameter of functional plasticity of cerebral hemodynamics in patients with stroke against the background of COVID-19 is undeniable and unequivocally relevant from the point of view of practical neurology.

KEYWORDS

Severity of neurological deficit, ischemic stroke, full-fledged dynamic study, cerebral hemodynamics.

INTRODUCTION

The pathogenesis of stroke in COVID-19 is complex and includes a number of pathophysiological mechanisms: coagulopathy, thromboembolism, vasculitis, direct neuronal damage (3,4). Many of the pathophysiological mechanisms of COVID-19 stroke have yet to be identified, necessitating further research. Strokes in patients with COVID-19 are often more severe, with high mortality (5,6).

Based on the current situation, the need for a full-fledged dynamic study of the state of cerebral hemodynamics in terms of the relationship of these indicators with the results of neuro-immunological examinations and neuroimaging data, as well as determining the effect of cerebral blood flow reserves, as a parameter of functional plasticity of cerebral hemodynamics in patients with stroke against the

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background of COVID-19 is undeniable and unequivocally relevant from the point of view of practical neurology.

Purpose of the study. To assess neurological deficit in patients with ischemic stroke using the NIHSS scale depending on the status of COVID-19.

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" [1].

Using the modified TOAST classification [1], a sample of patients with 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 [2]. This paper indicates that the World Health Organization (WHO) in January 2020 updated the ICD-10 section "Codes for use in emergencies" by adding a special code for COVID-19 - U07.1 [2].

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).

Concomitant and comorbid diseases were assessed by us using the Charlson IC and the CIRS scale. The severity of IS was assessed using the NIHSS stroke scale, according to which up to 8 points - mild IS, 9-12 points - moderate, 13-15 points - severe, 16-34 points - extremely severe IS.

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%

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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.

We assessed the outcomes of IS according to the Rankin scale (SR): 0-3 points were received by patients with the ability to move independently, 4-5 points - without the ability to move independently, 6 points - death.

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.

We divided all the studied patients into 4 categories of the NIHSS scale, depending on the severity of IS, according to which up to 8 points - mild IS, 9-12 points - moderate, 13-15 points - severe, 16-34 points - extremely severe course of IS (Table 2).

Table 2. Severity of neurological deficit in patients with different subtypes of IS, NIHSS scale

IS subtypes	n	NIHSS scale							
		light		average		heavy		extreme severity	
AT	67	4	6,0%	16	23,9%	30	44,8%	17	25,4%
CE	55	2	3,6%	10	18,2%	23	41,8%	20	36,4%
LI	58	46	100,0%	12	26,1%	0	0,0%	0	0,0%
HD	19	5	26,3%	9	47,4%	2	10,5%	3	15,8%
NP	51	10	19,6%	14	27,5%	20	39,2%	7	13,7%
TOTAL	250	67	26,8%	61	24,4%	75	30,0%	47	18,8%

Table 2 shows that severe and extreme severity of IS at admission was significantly more common in atherothrombotic (AT) and cardioembolic (CE) subtypes of IS.

Severe severity according to the NIHSS scale was detected in 43.3% of patients with AT and 40.0% with CE, extreme severity was observed in 25.4% with AT and 36.4% with CE. Thus, severe IS at admission was detected in 36.6% of all examined patients and in 73.8% of patients with AT and CE subtypes of IS. In this connection, only these two subtypes of IS were taken for further research in order to predict the severity of IS (Table 3).

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Table 4 shows that severe forms of IS were significantly more common in the MG. So, in AT, severe and extreme severity according to the NIHSS scale occurred in 47.6% and 26.2% of cases, respectively, and in CE, these forms of IS severity occurred in 41.7% and 38.9% of cases.

It should be noted that in MG, a severe degree was more common in patients with AT subtype IS, and extremely severe in patients with CE subtype IS (47.6% versus 41.7% and 26.2% versus 38.9%, respectively).

In MG, severe and extremely severe degrees of IS were more often observed in patients with CE subtype IS - 42.1% and 31.6%, respectively, with AT subtype IS, these degrees of severity were less common (significance was detected at extreme severity ($p<0.005$) - 40.0% and 24.0%, respectively (Table 3).

Table 3. Severity of neurological deficit in patients with AT and CE subtypes of NIHSS IS depending on COVID-19 status

groups	IS subtypes	n	NIHSS scale							
			light		average		heavy		extreme severity	
MG, n=78	AT	42	1	2,4%	10	23,8%	20	47,6%	11	26,2%
	CE	36	1	2,8%	6	16,7%	15	41,7%	14	38,9%
CG, n=44	AT	25	3	12,0%	6	24,0%	10	40,0%	6	24,0%
	CE	19	1	5,3%	4	21,1%	8	42,1%	6	31,6%
total, n=122	AT	67	4	6,0%	16	23,9%	30	44,8%	17	25,4%
	CE	55	2	3,6%	10	18,2%	23	41,8%	20	36,4%

The state of moderate severity was observed more often in TE subtype IS in both groups compared with the same indicators in AT subtype IS - 24.0% (CG) and 23.8% (MG), 21.1% (CG) and 16.7 % (MG), respectively (Table 3).

Due to the fact that AT and (CE) subtypes of IS had a high score on the NIHSS scale (Table 3), patients with these subtypes of IS were included in the sample at a later stage of the study and were divided by us into 3 categories depending on the outcome of the stroke, which was assessed on the Rankin scale in points on the 21st day:

Category 1, which received a score from 0 to 3 on the Rankin scale, they could already move independently and serve themselves, only 13.1% of patients, and in group I this indicator was significantly lower compared to group II - 11.5 % and 15.9%, respectively (Table 4).

Category 2 (56.6%) - patients who scored 4-5 points on the Rankin scale (could not move independently and needed care), in group I there were 56.4% of such patients, in group II - 56.8% ,

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Category 3 - patients who died in the acute period of IS (Rankin - 6 points) significantly prevailed in group I - 32.1%, while in group II - 27.3% ($p < 0.05$).

Table 4. Outcomes of IS in groups according to the Rankin scale (points)

Groups	Rankin scale (points)						p<		
	0-3 (1)		4--5 (2)		6 (3)				
	n	%	n	%	N	%	1--2	2--3	1--3
MG, n=78	9	11,5%	44	56,4%	25	32,1%	0,005	0,005	0,05
CG, n=44	7	15,9%	25	56,8%	12	27,3%	0,005	0,005	0,05
total, n=122	16	13,1%	69	56,6%	37	30,3%	0,005	0,005	0,005

Note: * - significance of differences p<0.005 between MG and CG.

We stated a statistically significant difference ($p<0.05$) according to Charlson IC and CIRS, VPC and NIHSS scale with Rankin scale scores in the most acute period (day 1 of IS) (Table 1).

Table 6 shows the dynamics of the studied parameters by categories of patients with IS on the 7th and 14th day of the acute period.

The conducted ROC analysis demonstrated sufficient specificity and sensitivity of such variables as age, CI according to Charlson, scores according to the NIHSS scale and subtype of IS with respect to the correlated scores of HR:

- age, years;
- stroke severity in NIHSS scores;
- Charlson IR and CIRS scores;
- AT and CE subtypes of IS;
- c.u. military-industrial complex;
- History of COVID-19.

On the basis of the calculations, we formed the Scale for assessing the severity of IS (Table 5), from which it can be seen that the only indicator that can be changed is the TPC, and this will make it possible to prevent severe outcomes of IS.

Table 7. Scale for assessing the severity of IS

Sign	units	balls
age, years	>70	0
	<70	1
stroke severity in points, measured by the United States National Institutes of Health Scale (NIHSS)	5--11	1
	12--23	2

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	>24	3
Charlson Comorbidity Index	<5	1
	6<12	2
	13<23	3
Vegetative indicator of blood circulation VPC	>1,56	1
Subtypes of IS (Atherothrombotic and Cardioembolic)		1
History of COVID-19		1

Low risk	**1--4**
Medium risk	**5--10**
High risk	**11--16**

CONCLUSION

Conclusion, according to the study data, a direct correlation was established between the severity of IS according to NIHSS and its outcome according to SR with the severity of comorbid diseases according to the Charlson IC and the CIRS scale. Statistical analysis of multiple regression with the gradual removal of predictor variables that affect the outcome of IS stated the correlation of scores according to the Charlson IC, according to the NIHSS scale (r=0.7221, r=0.5214, respectively; p=0.0031).

REFERENCES

1. Starodubtseva O.S., Begicheva S.V. Analysis of the incidence of stroke using information technology // Fundamental research. 2012. No. 8 (part 2). pp. 424–427.
2. 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
3. Bekelis K, Missios S, Ahmad J, Labropoulos N, Schirmer CM, Calnan DR, Skinner J, MacKenzie. Ischemic Stroke Occurs Less Frequently in Patients With COVID-19: A Multicenter Cross-Sectional Study. // TA Stroke. 2020;51(12):3570. Epub 2020 Oct 27.
4. Bridwell R., Long B., Gottlieb M. Neurologic complications of COVID-19. // Am J Emerg Med. 2020;38(7):1549. E3-1549.E7.
5. Chang De, Xu Huiwen, Rebaza Andre, Sharma Lokesh, Dela Cruz Charles S. Protecting health-care workers from subclinical coronavirus infection. The Lancet Respiratory Medicine. 2020;8(3):e13. doi: 10.1016/S2213-2600(20)30066-7
6. Helms J., Tacquard C., Severac F., et al. High risk of thrombosis in patients with severe SARSCoV- 2 infection: a multicenter prospective cohort study. Intensive Care Med. 2020 Jun;46(6):1089- 1098.