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FEATURES OF THE COURSE OF ISCHEMIC STROKE IN CORONAVIRUS INFECTION

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Abstract: The aim of the study was to characterize and compare patients with ischemic stroke associated with COVID-19 and not associated with COVID-19. We analyzed 209 cases of hemispheric ischemic stroke (IS). The patients were divided into two groups. The main group consisted of 83 patients with hemispheric IS and laboratory-confirmed SARS-CoV-2 coronavirus infection. The average time from the onset of IS to laboratory confirmation of COVID-19 was 5.7 days. The control group consisted of 126 patients with hemispheric IS who did not have a history of COVID-19. When analyzing stroke subtypes by groups, it was found that patients with unspecified 51.4% and cardioembolic subtypes - 29.2%, respectively, prevailed in the main group. Atherothrombotic and lacunar subtypes of ischemic stroke in the main group were confirmed in 12.5% and 6.9%, respectively. In the control group, the distribution of patients with variants of stroke subtypes differed and was as follows: the proportion of cases of atherothrombotic stroke - 75.0%, cardioembolic - 16.3%, unspecified subtype - 6.8%. Lacunar variants in the control group amounted to 1.9%. When IS occurs in patients caused by COVID-19 infection, age and gender characteristics have not been established, and the clinical features of the course of stroke on the background of COVID-19 are characterized by the predominance of ischemic manifestations in unspecified and cardioembolic stroke subtypes.

Keywords: ischemic stroke, coronavirus infection, COVID-19, acute respiratory distress syndrome, SARS-CoV-2.

The published data provide information that the entire group of viruses under consideration is characterized by neurotropism, and direct exposure to the SARS-CoV-2 virus in severe forms of the disease is accompanied by neurological symptoms and syndromes in 36% of cases [1,3]. Thus, according to various authors, SARS-CoV-2, in addition to pneumonia and acute respiratory distress syndrome (ARDS), is the cause of complications such as encephalopathy, encephalitis and meningoencephalitis, acute demyelinating lesions, Guillain-Barr? syndrome, as well as acute cerebrovascular accidents. , among which ischemic strokes (IS) predominate [4,5].

According to a retrospective analysis conducted at the Union Hospital (Wuhan, China) and including 221 patients with a confirmed diagnosis of COVID-19, the incidence of IS was 5% (11 patients), venous sinus thrombosis was 0.5% (1 patient), cerebral hemorrhages - 0.5% (1 patient) [6]. And according to the results of the New York study, which included 3556 patients hospitalized with a diagnosis of COVID-19, the number of cases of IS was 0.9% (32 patients) [10].

In addition, existing comorbid conditions in patients, such as arterial hypertension, diabetes mellitus, coronary heart disease, also increase the risk of developing IS. COVID-19 causes decompensation of these risk factors and exacerbates endothelial dysfunction, which is a common feature of these conditions, which also leads to hypercoagulation and thrombosis, significantly increasing the risk of IS [3,11].

Thus, the clinical features of the combination of a new coronavirus infection and cerebrovascular pathology are an important aspect in practice and require further study.

Objective: To characterize and compare patients with ischemic stroke associated with COVID-19 and not associated with COVID-19.

Methods: We analyzed 209 cases of hemispheric IS. The patients were divided into two groups. The main group consisted of 83 patients with hemispheric IS and laboratory-confirmed SARS-CoV-2 coronavirus infection. Their mean age was 68.4±1.7 years. Among them, female patients accounted for 45.8%, male patients - 54.2%. The time from the onset of IS to laboratory confirmation of COVID-19 averaged 5.7 days. The control group consisted of 104 patients with hemispheric IS who did not have a history of COVID-19. The average age of patients in the control group was 71.9±1.1 years.

Results of the study: We analyzed 209 cases of hemispheric IS. Patients were divided into two groups. The main group consisted of 83 patients with hemispheric IS and laboratory-confirmed SARS-CoV-2 coronavirus infection. Their mean age was 68.4±1.7 years (minimum 44 years, maximum 82 years). Among them, female patients accounted for 45.8% (n=33), male patients - 54.2% (n=39). The distribution of observed patients by age and sex is shown in Table 1.

Table 1
Distribution of patients by age and gender in the studied groups

№.	Group	Age	Sex				*P*
			Male		Female		
			abs	%	Abs	%	
1	Main (n =83)	68,4±1.7	45	54,2	38	45,8	*0.037*
2	Control (n=126)	71,9±1.1	85	67,5	41	32,5	
	Total		130		79		

When analyzing stroke subtypes by groups, it was found that patients with unspecified 51.8% and cardioembolic subtypes - 29%, respectively, prevailed in the main group. Atherothrombotic and lacunar subtypes of ischemic stroke in the main group were confirmed in 12% and 7.2%, respectively. In the control group, the distribution of patients with variants of stroke subtypes differed and was as follows: the proportion of cases of atherothrombotic stroke - 71.4%, cardioembolic - 15.9%, unspecified subtype - 10.3%. Lacunar variants in the control group amounted to 2.4%.

Table 2
Features of ischemic stroke subtypes in both groups

№	Ischemic stroke subtype	Group				*p*
		Main (n=83)		Control (n=126)		
		abs	%	abs	%	
1	Atherothrombotic	10	12%	90	71,4%	*0.45*
2	Cardioembological	24	29%	20	15,9%	*0.62*
3	Lacunar	6	7,2%	3	2,4%	*0.16*
4	Unspecified	43	51,8%	13	10,3%	*0.018*
5	Total	83	100%	126	100%	-

When comparing the results of the NIHSS scales, Glasgow, Rankin and Rivermead coma at admission, no statistically significant differences were found (Fig. 1).

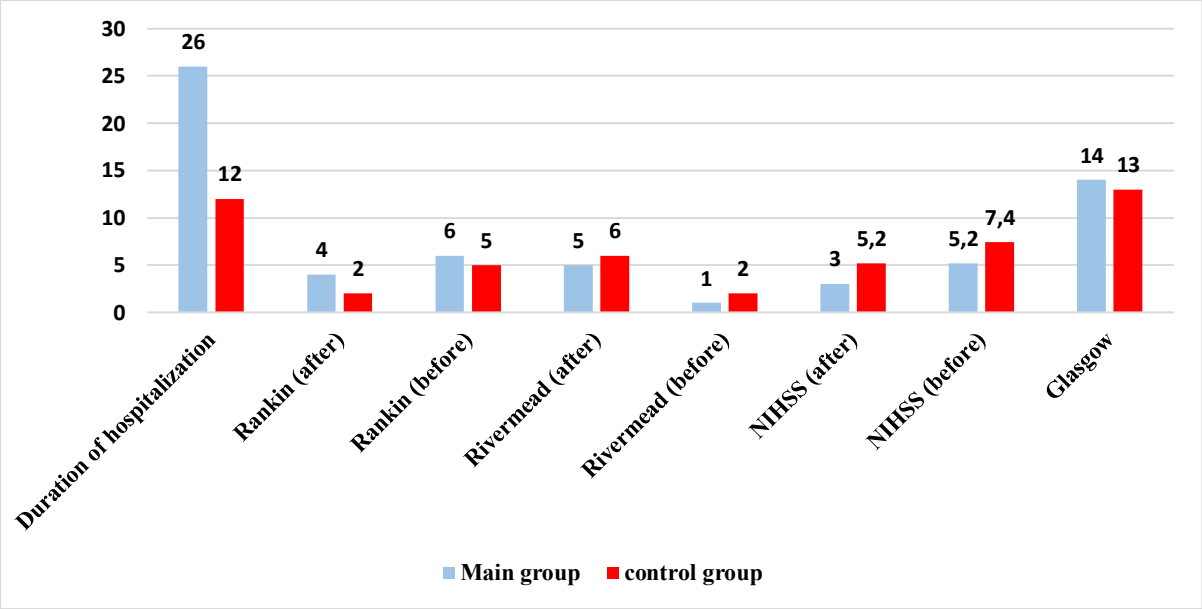

Fig.1. The value of quantitative scales in the main and control groups

Mortality was higher in patients with IS with confirmed SARS-CoV-2 infection and amounted to 37.3% (n=31), in the control group of patients with stroke, mortality was recorded at 15.9% (n=20). Among the deceased patients in the main group, the causes of death were as follows: in 50.6% of cases, pulmonary embolism (PE), in 25.3% of cases of ARDS and pneumothorax, in 14.4% of cases from complications of diabetes mellitus such as ketoacidosis, only 9.6% of cases died from cerebral coma. In the control group, deaths occurred in patients with atherothrombotic subtype of IS (64.4%) from myocardial infarction (24.1%).

Conclusions:

1.When IS occurs in patients caused by COVID-19 infection, age and gender characteristics have not been established, as well as the clinical features of the course of stroke on the background of COVID-19 are characterized by the predominance of ischemic manifestations in unspecified and cardioembolic stroke subtypes.

2. Patients in the acute period of stroke and COVID-19 died more often (40.3%) than patients with stroke and without this infection (18.3%). It should be noted that this figure practically coincides with the number of severe forms of COVID-19 (44.4%).

3.Thus, the present study confirms the data that the combination of stroke and COVID-19 is associated with a higher percentage of deaths.

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