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FEATURES OF THE FUNCTIONAL STATE OF AUTONOMIC REGULATION IN PATIENTS WITH POSTCOVID SYNDROME

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Abstract

To identify autonomic dysfunction in postcovid syndrome, 100 young and middle-aged people from 30 to 55 years old with a verified diagnosis of the consequences of COVID-19 coronavirus infection were included in the study. All patients were diagnosed with vegetative disorders according to the Wayne table, in which the presence of more than 25 points indicates the presence of vegetative-vascular dystonia.

Key words: *autonomic dysfunction, heart rate variability, postcovid syndrome.*

The pandemic of the new coronavirus infection has been spreading all over the world since 2020, covering the entire world of people who have been ill with COVID-19, which requires the relevance of studying the health status of patients after the end of the acute period of infection. There is evidence of previous coronavirus epidemics that affect the nervous system. The virus is neurotropic, that is, entering the nervous system through olfactory receptors in the upper part of the nasal concha, can lead to damage to brain organs such as the limbic system, hypothalamus, cerebellum, respiratory center and others. Damage to such a large nerve as the vagus nerves causes a wide variety of symptoms, and also determines their undulating nature. This is due to a violation of the balancing of the two parasympathetic and sympathetic systems, with the dominance of the latter from here, problems with frequent heart contractions, orthostatic tachycardia, sleep problems, panic attacks, as well as anxiety disorders. In most patients with post-fluid-vegetative syndrome, complaints often arise due to the frequent occurrence, requiring special attention and concentration.

The purpose of the study is to reveal the features of the functional state of vegetative regulation in patients with postcovid syndrome

Materials and methods of research. To identify autonomic dysfunction in postcovid syndrome, an examination was conducted in 100 middle-aged and middle-aged people from 30 to 55 years old, with a verified diagnosis of the effects of COVID-19 coronavirus infection, confirmed by laboratory research methods and after receiving the results of the results (PCR, ELISA) on SARS-CoV-2, 15 to 35 weeks after the onset of diseases that make up the totality. The patients of the main group were divided into subgroup I – 70 people who underwent COVID-19 in a sequential form and subgroup II – 30 patients who underwent treatment in

moderate and complicated forms of pneumonia. The control group consisted of 20 healthy subjects of the appropriate gender and age composition who had not suffered from coronavirus infection or viral infection in the last 6 months and had not observed acute and decompensated chronic disease at the time of observation.

The results of the study.

All patients had vegetative assemblies according to the Wein table, which had more than 25 signs of vegetative vascular dystonia. Malfunction of the autonomic nervous system was detected in the majority of patients who underwent COVID-19 - 70%. in 78.6% of patients, asthenic symptoms were bothered in the form of decreased performance in 78.6%, lethargy and fatigue in 89.3%, sleep disorders -83%, a spectrum of vegetative individual presence in 71.4%, a tendency to redness of the face in 64.3%, sleep disorders in 57.1%, headaches 53.7%, impaired intestinal function 53.7%, numbness of cysts and feet 46.4%, palpitations, a feeling of sinking of the heart 46.4 % increased sweating in 42.9%, decreased discoloration of brushes and feet in 32.1%, a tendency to paleness of the face in 25 %,

As a result of the study of HRV in patients with postcovoid syndrome and the control group, data were found, the detection of which revealed all patients in four classes according to the predominance of the identified types of oscillations in the spectral analysis.

When evaluating the temporal and spectral characteristics of HRV, it was revealed that in patients with postcovid syndrome, a high degree of suppression of sympathetic-parasympathetic influences was revealed with simultaneous activation of cerebral ergotropic structures, as well as the transition of modulating regulation of heart rhythm to a humoral-metabolic level, which characterizes a lower level. a variant with homeostasis. In the control group, the activity of the sympathetic department prevails.

The spectral analysis of the HRV of the main group revealed low values of spectral power. In addition, this is a decrease in the level of vegetative vegetative influences: to a large extent, the level of the proportion of the VLF component is exceeded, which violates a large contribution to the regulation of humoral and metabolic parameters-cerebral sympathoadrenal activation and deficiency of the segmental link of autonomous regulation. The increase in the frequency of very low frequency radiation (VLF) increased with an active orthostatic test. The contribution to the power of adult delayed waves (LF) is also increased.

The insufficiency of the contribution of the parasympathetic department of the ANS to the modulation of the heart rate was reflected in the form of a slight violation of the parameters of the HF component at frequencies of 0.15 – 0.40 Hz compared with the frequency of control.

The HF high-frequency component plays an important role in the implementation of adaptation of the body's resources. Thus, data were obtained on a low risk of parasympathetic reserve in patients with postcovid syndrome.

Under the conditions of an orthostatic test, the K-30/15 index was estimated, characterizing the reactivity of the parasympathetic division of the autonomic nervous system. In patients with postcovid syndrome, the degree of tension of symptomadrenal phenomena increased and functional insufficiency of baroreflective mechanisms was revealed, most often a paradoxical reaction to an orthostatic test (less than 1.0) or a decrease (from 1.0 to 1.25) was noted, which also alarmed about a low level. the level of activity of the parasympathetic system of the ANS. In

the control group of the group, there was an adequate assessment of AOP (By 30:15 = 1.5 and higher) in the form of high reactivity of the parasympathetic department of the autonomic nervous system.

In the spectral analysis of HRV in the control group, moderate values of the overall severity of neurohumoral modulation were observed, while a predominant proportion of the LF component was observed, due to the presence of a sympathetic heart rate modulation indicator.

The role of modulation is expressed in the direction of increasing the activity of humoral and metabolic influences, the activity of the sympathetic department is high, the value of the parasympathetic department of the ANS is significantly reduced. After conducting AOP of vegetative activity, excessive activation of humoral and metabolic diseases occurs with a simultaneous decrease in the balance of the departments of the sympathetic department of arterial hypertension with stable activity of the parasympathetic, which is found with pronounced violations of the vegetative status and a decrease in the functional characteristics of diseases in the post-ovoid period.

The dynamics of the sympathetic-parasympathetic balance in patients who have suffered a moderate coronavirus infection complicated by pneumonia is shown in Figure 1,2.

The data of the spectral analysis of HRV were obtained in patients who had suffered a coronavirus infection in a moderate and appropriate form complicated by pneumonia, corresponding to the total power of aggressive neurohumoral modulation. In the balance of the departments of the ANS, there is a predominance of very low-frequency waves with a decrease in sympathetic-parasympathetic influences, which indicates a transitional regulation of the rhythm of cardiac activity to a lower humoral-metabolic level. After the AOP, the percentage contribution of the VLF wave component (range less than 0.04 Hz) is even more enhanced, vegetative activity support by sharply reduced activation of the sympathetic and especially parasympathetic parts of the ANS and excessive activation of humoral and metabolic influences.

The analysis of HRV in all observed patients with postcovid syndrome showed that initial disturbances in the oscillatory rhythm of the heart are detected in the form of manifestations of the symptomatic department and manifestations of cerebral ergotropic effects on the pulsation of the heart rhythm, accompanied by a breakdown in the frequencies of compensatory mechanisms.

Indicators of the spectral analysis of HRV in patients with postcovid syndrome who have suffered a coronovirus infection in the appropriate form and moderate severe form, complicated by pneumonia and high anxiety (n = 40).

The results of the spectral analysis of HRV in patients with a high level of anxiety indicate that the total power of the spectrum of neurohumoral modulation on background recording is significantly reduced. There is a low level of parasympathetic and humoral-metabolic (cerebral ergotropic) influences, and there is a pronounced predominance of sympathetic activity in the balance of vegetative regulation. With high anxiety, the determination of insufficiency of inhibitory fixation, which may have an independent pathogenetic significance. After AOP, the reactivity of the parasympathetic division of the ANS decreases even more (K30:15 = 1.0), which is associated with a deterioration in the functional state of the body.

Conclusion

Thus, the results of the study of the vegetative trait are manifested by the presence of pronounced signs of vegetative homeostasis in patients who have undergone coronavirus infection, as evidenced by low values of indicators in all manifestations of spectral analysis. There was also an increase in the activity of the sympatho-parasympathetic system, an increase in the role of humoral-metabolic and ergotropic studies, which is a sign of autonomic dysfunction and a pathogenetic prerequisite for the development of maladaptation processes in the occurrence. In patients with severe anxiety, there is a pronounced predominance of sympathetic activity in the balance of autonomic regulation, which corresponds to a state of psychoemotional tension.

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