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Modern Principles of the Course of Coronavirus Infection in Patients with Arterial Hypertension

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Abstract: Taking into account the number of victims of a new coronavirus infection caused by the SARS-CoV-2 virus (COVID-19), on March 11, 2020, the World Health Organization declared a pandemic. Since December 2019, when the first case of SARS was detected in China, the first data have appeared on the characteristics of the course of infection in patients with various diseases. In particular, there have been reports of a greater susceptibility to infection in persons with cardiovascular diseases and, in particular, with arterial hypertension, and a significantly higher risk of adverse outcomes in this group of patients. [Konradi A.O., 2020] We provide an analysis of the available to date, publications relating to people with arterial hypertension who have had a coronavirus infection. Reviews, clinical guidelines and original articles published from 2010 to 2020 were analyzed.

Key words: coronavirus infection, arterial hypertension, cardiovascular risk.

Relevance. Arterial hypertension (AH) is a syndrome of increased systolic blood pressure (hereinafter referred to as SBP) ≥140 mm Hg. Art. and / or diastolic blood pressure (hereinafter - DBP) ≥90 mm Hg.

Hypertension (hereinafter referred to as AH) is a chronic a disease, the main manifestation of which is an increase in blood pressure, not associated with the identification of obvious causes leading to the development of secondary forms of hypertension (symptomatic hypertension). The term "hypertension", proposed by G. F. Lang in 1948, corresponds to the terms "essential hypertension" and "arterial hypertension" used abroad. GB prevails among all forms of AH, its prevalence exceeds 90%.

Secondary (symptomatic) hypertension is hypertension due to a known cause that can be corrected with appropriate intervention. A hypertensive crisis is a condition caused by a significant increase in blood pressure, associated with acute damage to target organs, often life-threatening, requiring immediate qualified action aimed at lowering blood pressure, usually with the help of intravenous therapy.

Elevated blood pressure is the main factor in the development of premature death and the cause of almost 10 million deaths and more than 200 million cases of disability in the world [Podzolkov V.I., 2021]. SBP level ≥140 mm Hg. Art. is associated with an increased risk of mortality and disability in 70% of cases, while the largest number of deaths during the year associated with the SBP level occur due to coronary artery disease, ischemic and hemorrhagic strokes [Balykova L.A., 2021]. There is a direct relationship between blood pressure levels and the risk of cardiovascular disease (CVD). This connection begins with relatively low values - 110-115 mm Hg. Art. for CAD and 70–75 mmHg. Art. for DBP [2].

Post-COVID syndrome, also known as Long COVID, is a consequence of the COVID-19 coronavirus infection, in which up to 30% of people who have had a coronavirus infection suffer from long-term symptoms lasting up to 12 weeks or longer.

More than 30% of patients who have had COVID-19 begin to experience shortness of breath, heart rhythm disturbances, increased blood pressure up to a hypertensive crisis, fatigue and decreased performance within one to two weeks after recovery. All these symptoms are a manifestation of the post-COVID syndrome, the duration of which can be up to six months.

Postcovid syndrome manifests itself in a whole range of various symptoms and malfunctions of the cardiovascular, autonomic, nervous systems, and is also expressed in violation of the functions of the gastrointestinal tract. When it enters the body, the COVID-19 virus negatively affects certain receptors that are most present in the vessels of the lungs, heart, kidneys, and intestines, thereby compromising the work of all these organs. As a rule, patients who have undergone COVID-19 complain of high blood pressure, tachycardia, weakness, muscle and joint pain, anxiety, fatigue and irritability. All these symptoms indicate the presence of a post-covid syndrome, which manifests itself already 1-2 weeks after an infectious disease, and by the 30th day, every second patient discovers its symptoms, not seeing improvements until the 110th day after recovery. The severity and duration of the post-COVID syndrome depends on the degree of intoxication of the body, the severity of the course of the disease, the level of involvement of the nervous system, age, the presence of complications and concomitant diseases. [Ebzeeva E.Yu., 2021]

As recent studies have shown, a lack of potassium and magic in the blood, trace elements that are excreted from the body during a coronavirus infection, can provoke the development of post-covid syndrome. In 20% of patients who underwent COVID-19 and were treated in a hospital, potassium deficiency is detected - hypokalemia2. As a rule, a slight decrease in the level of potassium in the blood does not cause acute symptoms, however, if the level of potassium in the blood plasma is <3.5 mmol / l, the patient may experience serious problems in the functioning of the cardiovascular system.

Patients suffering from arterial hypertension are at particular risk for coronavirus, and there are about 45% of such patients in our country4. At the same time, more than 30% of patients who have undergone COVID-19 may experience disturbances in the regulation of blood pressure up to the development of a hypertensive crisis, the manifestations of which can be a sharp increase in blood pressure, dizziness, headache)5. The main risk factors for high blood pressure in post-COVID syndrome are older age, overweight, and concomitant chronic diseases, such as diabetes mellitus.

The data of foreign and Russian studies indicate a higher mortality in patients with concomitant cardiovascular diseases due to the new coronavirus infection COVID-19. It has been proven that arterial hypertension, as one of the significant risk factors for the development of cardiovascular diseases, is associated with a more severe prognosis of COVID-19.

COVID-19 is not a respiratory infection, but a systemic inflammatory disease with significant involvement of the cardiovascular system. It is now known that many patients with COVID-19 (up to 42%) already had CHF prior to SARS-CoV-2 infection. Myocardial injury and heart failure are the cause of death during the acute infectious period in 7-33% of patients [9]. In this regard, the European Society of Cardiology has developed recommendations for the diagnosis and treatment of patients with cardiovascular disease (CVD) during a pandemic. With regard to heart failure, a paper entitled “Clinical practice update on heart failure 2019: pharmacotherapy, procedures, device sand patient management. An expert consensus meeting

report of the Heart Failure Association of the European Society of Cardiology). The latest changes were made in 2021 [6]. The analysis of the data of the ACTIV registry, which included more than 7500 patients, was carried out. The average age of patients is 63.4 years, the majority of patients are female - 54%. Among hospitalized patients, the incidence of CHD was 23.1%, which is more than 4 times higher than the prevalence of CHD in Russia as a whole. The obtained data are comparable with those in the USA and China (Fig. 3) [11]. Among the deceased, 50.5% of patients had a history of coronary artery disease. The fact of having coronary artery disease increased the risk of death by 3.8 times (odds ratio 3.829, 95% confidence interval 3.032-4.836). In turn, the presence of a history of myocardial infarction in patients with COVID-19 contributed to a 3-fold increase in the risk of death (odds ratio 3.005, 95% confidence interval 2.165-4.170). Characteristics of deceased patients depending on comorbidities is shown in Figure 4 [15]. According to the Eurasian ACTIV registry sample, regular intake of recommended drugs (HMG-CoA reductase inhibitors (statins), angiotensin-converting enzyme (ACE) inhibitors, angiotensin-II receptor blockers (ARBs), beta-blockers (β-blockers), antiplatelet agents (except acetylsalicylic acid) acid)) in patients with CAD prior to the onset of COVID-19 was associated with a reduced risk of death during hospitalization. After 3 months after undergoing COVID-19 in the observed patient population, the mortality rate was 1.5%. Of the 30 patients who died, in 15 cases the cause of death was not established. Of the 15 patients with a known cause of death, death from cardiovascular pathology was recorded in 12 people (Fig. 5). After 3 months after undergoing COVID-19, 5.2% of patients complained of chest pain, 28% of patients complained of shortness of breath, 11.4% of patients noted a feeling of palpitations, and 20.1% of patients developed uncontrolled hypertension. After 6 months after undergoing COVID-19, 2.1% of patients complained of chest pain, 8.3% of patients complained of shortness of breath, 3.1% of patients noted a feeling of palpitations, and 9% of patients developed uncontrolled hypertension (Fig. 6). After 3 and 6 months. New CVDs were registered in 5.9% of patients after COVID-19: CHD — in 1.3%, AH — in 4.0%, CVA — in 0.2%, atrial fibrillation — in 0.4% of cases (Fig. 7). As is known, in patients with coronary artery disease and elevated levels of highly sensitive troponin T during and after COVID-19, mortality is higher than with normal values of this indicator [5]. This should be taken into account when determining the risk of adverse outcome and management of such patients.

Despite the fact that the post-COVID syndrome can drag on for several months, bringing real discomfort to a person, there are a number of preventive measures that will help the body recover faster and reduce the risk of cardiovascular complications. [Napalkov D. A., 2021]

What is important to remember about post-COVID syndrome:

- Main symptoms: weakness, shortness of breath, high blood pressure, tachycardia, fatigue, memory impairment, irritability, sleep problems, constipation, diarrhea, muscle and joint pain.

Every second patient who has had a coronavirus infection suffers from post-covid syndrome. It develops within 1-2 weeks and can last up to six months.

- Every fifth patient who has had COVID-19 and was treated in a hospital has a lack of potassium. A biochemical blood test should be done and, if low levels of potassium (<3.5 mmol / l) and magnesium (<0.65 mmol / l) are detected, start taking drugs that restore the deficiency of these trace elements (for example, Panangin).
- People suffering from arterial hypertension, consult a specialist to select drugs to normalize blood pressure. If it is impossible or unwilling to take several drugs per day, discuss with a specialist the appointment of fixed combination drugs (double or triple combination): instead of 3-4 tablets per day, you will need to take 1-2 capsules.

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