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Features of the Course of Covid-19 in Patients with Cardiovascular Pathology

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Abstract:
The interest of the world community today is drawnto one global problem - the new coronavirus infection COVID-19 (Coronavirus Disease 2019) caused by the SARS-CoV-2 virus [1,2]. It should be noted that among all comorbid conditions, cardiovascular diseases (CVD) are a significant medical and social problem, regardless of the pandemic [5]. Therefore, it is hardly surprising that patients with concomitant CVD make up a significant proportion of patients infected with the SARS-CoV-2 virus.

Introduction

Cardiovascular disease (CVD) remains a major contributor to early death and disability among people. The incidence rate of the population is growing every day. The underlying pathogenesis and progression associated with almost all CVDs is atherosclerotic in origin, leading to coronary heart disease (CHD), cerebrovascular disease, venous thromboembolism, and peripheral vascular disease, subsequently causing myocardial infarction, cardiac arrhythmias, or stroke.

Scientists have identified a relationship between a new COVID-19 infection and the severity of the pathology of the cardiovascular system (CVS). An infected patient with cardiovascular diseases gets sick much more severely and is more often complicated by acute respiratory distress syndrome, which can lead to death [3,4,5]. The most common comorbidities for predicting mortality in patients with coronavirus infection are hypertension (AH) and other cardiovascular diseases (CVD), diabetes mellitus (DM), obesity, chronic kidney and lung diseases [6]. According to the European Society of Cardiology, COVID-19, caused by the SARS-CoV-2 virus, often occurs in patients with various CVD and cardiovascular risk factors (male gender, older age; history of hypertension, diabetes, obesity), which affect both the course of the main infectious process and the development of an unfavorable clinical outcome (development of complications, severe course of the disease, death) in patients with COVID-19 [1,2]. Therefore, these patients constitute a special risk group.

The aim of the study is to study the features of the course of COVID-19 in patients with cardiovascular pathology.

Materials and methods of research

The study included 115 patients diagnosed with COVID-19 and concomitant pathology of the cardiovascular system. The age of the patients ranged from 55 to 78 years ± 6 years, of which 61 were women, which accounted for 53% of the total number, men - 54, 47%, respectively. For the period from January to December 2021, all patients included in this study were monitored. We also selected 53 patients with COVID-19 without changes in the cardiovascular system, included in the comparison group. The average age of this group ranged from 41 to 75 years, the female sex predominated. The severity of the course of coronavirus infection was assessed according to the "Temporary guidelines. Prevention, diagnosis and treatment of a new coronavirus infection (COVID-19) of the Ministry of Health of the Russian Federation. Version 8 dated 09/03/2020". All patients with COVID-19 for the first time underwent: general blood and urine analysis,

Statistical data processing was carried out in Excel and Statistica 10.0. Intergroup differences were analyzed depending on the properties of the distribution based on Student's parametric test or non-parametric Money-Whitney test at a significance level of $p \leq 0.05$.

Results of the study and their discussion

The main group had the following concomitant CVS pathology: IHD and cardiosclerosis were diagnosed in all patients 115 (100%), atrial fibrillation - in 25 (22%), angina pectoris - in 19 (16%) people. More than half of patients 65 (57%) had a high risk of developing cardiovascular complications. 73 (63%) patients had grade 2 FC. Hypertension (AH) was registered in almost all patients - 102 (89%), and in a third of patients 44 (39%) - 3rd degree. Chronic heart failure was detected in all patients.

Analyzing the parameters of the biochemical blood test, we can say that the patients showed a significant decrease in total protein and an increase in ferritin, LDH, creatinine, ALAT and lactate. Significant increase in comparison with the control group of indicators such as urea, CRP and ALAT. CRP is a non-specific acute phase protein induced by IL-6 in the liver and is a sensitive biomarker for inflammation, infection, and tissue damage. The level of CRP expression is usually low, but increases rapidly and significantly during acute inflammatory reactions. An increase in this protein alone or in combination with other markers may indicate bacterial or viral infections. In a study of CRP levels in patients with COVID-19, it was found that patients with high levels of CRP are more likely to develop severe disease. Often a number of authors note the presence of severe hyperferritinemia. One of the causes of hyperferritinemia, most pronounced in the group of deceased patients with COVID-19, may be iron overload, both heme and free. Since it is known that during systemic inflammation, the effect of iron sequestration in macrophages occurs, followed by hyperactivation and the development of a cytokine storm.

BIt was found that in the presence of a history of myocardial infarction, patients with coronavirus infection were statistically significantly longer in the hospital, and in the presence of a history of hypertension in this category of patients, arrhythmias by the type of atrial fibrillation (except for the first time) and chronic heart failure the duration of hospitalization was reduced. This result is explained by the fact that patients were older and had a higher comorbidity index, and this fact was the reason for the significant decrease in hospital stay of patients with COVID-19.

Conclusions

FursThe low development of adverse outcomes in patients with COVID-19 and concomitant CVD may be due to a functional impairment of the immune system, an increased level of ACE2 receptors, an imbalance between increased metabolic requirements against the background of viral load and a decrease in cardiac reserve, and activation of pro-inflammatory markers ("cytokine storm") with the development of multiple organ failure, dysregulation of the processes of hemostasis and thrombosis (procoagulant and prothrombogenic effects of systemic inflammation), the development of respiratory dysfunction and hypoxia (oxidative stress, intracellular acidosis, damage to mitochondria), which leads to myocardial damage.

PAt the same time, it must be remembered that CVD has been and remains not only the main cause of mortality in patients with COVID-19, but is also associated with the duration of hospitalization in the ICU and in the hospital. Based on the results of a multivariate analysis (correction for sex and age), among CVD in patients with COVID-19, an independent predictor of the length of hospital stay (13 days or more) was a history of MI in the ICU (5 or more days) - a history of AF .

Literature

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