FUNCTIONAL STATE OF THE PSYCHOEMOTIONAL STATE IN PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE AFTER CORONAVIRUS INFECTION.

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Resume. To study the quality of life, the psychoemotional state and the effect of complex therapy on the parameters of the ventilation-perfusion function of the lang and the parameters of the diastolic function of the right ventricle of the heart in patients with chronic obstructive pulmonary disease after coronavirus infection.

Key words: chronic obstructive pulmonary disease, coronavirus infection, right ventricular hypertrophy, vascular endothelial function, diastolic dysfunction of the right ventricle

Relevance. Chronic obstructive pulmonary disease (COPD), as a cause of death, ranks 4th in the world in the age group over 45 years old and is the only disease in which mortality continues to increase. Due to the widespread prevalence of COPD, direct medical and indirect costs associated with morbidity and premature mortality pose a serious economic and social problem for society in general and health authorities in particular [1,2].

Obviously, only in-depth studying all aspects of this disease will help find a way out of the current impasse. Chronic obstructive pulmonary disease is one of the leading diseases leading to disability, and tends to a steady increase in primary cases in both industrialized and developing countries [3,8] . The risk of COPD varies from 1.85 to 2.88 per 1,000 population. According to the conclusion of the World Health Organization, in the last 10 years, COPD among the causes of death is in 4th place, being the cause of 4.9% of deaths of all diseases. According to experts' forecasts, by 2020, COPD will take 3rd place in the structure of total mortality [7,8,26]. The acute hypoxemic patients may experience dyspnoea that

may persist despite the administration of oxygen flows >10-15 L/min with a reservoir mask [3,15]. In these cases, other devices, such as High-Flow Nasal Oxygen (HFNO) or the application of Continuous Positive Airways Pressure (CPAP) or Non-Invasive Ventilation (NIV) may be useful. However, it is important to point out that these interventions have to be used only in appropriate hospital settings in order to be prepared for a more aggressive treatment. When indicated, the administration of CPAP/NIV can be carried out with various interfaces, depending on the availability and indications (oro-nasal mask, total face or helmet). When using CPAP/NIV, it is important to consider the potential environmental diffusion of aerosol particles of the virus [12]. In particular, one of the critical issues of the SARS-Cov-2 in the intermediate phase (between the onset of disease and potential critical evolution, also in relation to comorbidity) is represented by the selection of oxygen therapy and the level of care. Non-invasive supports (CPAP, NIV and HFNO) can correct hypoxemia and respiratory failure (even in the absence of clear evidence from proper randomized controlled studies), delaying or avoiding endotracheal intubation (and its potential complications and effects on the outcome) [14,20]. However, looking at SARS epidemic data, physiotherapists have to be careful when treating these patients because there is evidence that NIV may increase the risk of aerial spreading of the virus [11,16]. Thus, if a patient shows prognostic factors suggesting the need of invasive ventilation [17,16, 19], it is preferable to carry out elective intubation, rather than emergency intubation in critical conditions.

Along with smoking, industrial pollutants, such as dust, gases, smoke, toxic aerosols, are becoming an important risk factor for the development of COPD, which significantly increase the frequency and severity of the disease [9]. The data given in the literature by domestic and foreign authors indicate that about 15–20% of all cases of COPD are associated with professional activity [5,4,9].

Chronic obstructive pulmonary disease is essentially a disease with features of a destructive process, as a result of which damage to the entire respiratory

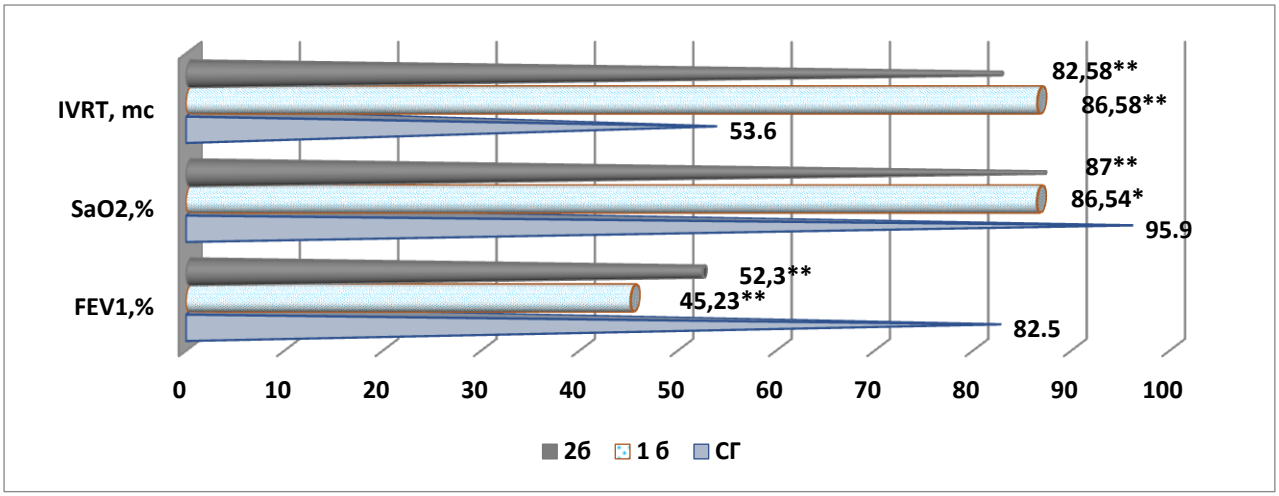
system develops, including the bronchi up to the terminal bronchioles, parenchyma and interstitium [1,10]. An important feature of the pathological process in COPD is its low reversibility [2]. The main method of treatment for such patients has long been the use of bronchodilators, starting with belladonna. However, as new knowledge about the essence of pathology was gained, new approaches to therapy were developed [8]. First of all, it became clear that COPD patients are not the same. They differ in the course of the disease, in symptomatology, in prognosis, in response to one or another therapy, which is defined as phenotypes [4,7,8].

The aim of the study was to study pulmonary hemodynamics and diastolic dysfunction of the right ventricle (RV) in patients with chronic obstructive pulmonary disease COPD in dynamics, combination therapy with calcium channel antagonists is recommended to improve pulmonary hemodynamics and bronchial patency[14,7,18].

Materials and methods. Thirty-five patients with COPD and 20 healthy individuals (AP) were examined. In patients, according to Doppler echocardiography parameters, PH (the level of mean pulmonary arterial pressure LAPav> 25 mm Hg) and the presence of RV without PH (thickness of the anterior wall of the RV according to EchoCG <5 mm, with anteroposterior size of the RV> 2.5 cm). Patients were divided into 2 groups and a, b subgroups: 1a - gr. control group (CG) 8 patients with COPD with PH; 1b - column 7 patients with COPD with PDG received basic therapy (BT, GINA 2006), 2a - gr. 10 patients with COPD with PH; 2b - column 8 patients with COPD with PDG received BT and a combination of calcium antagonist dihydropyridine series amlodipine (A). For 10 days, patients received against the background of BT received a combination of a calcium antagonist of the dihydropyridine series amlodipine (An) 2.5-5 mg / day. FVC), forced expiratory volume in 1 sec (FEV1) and Tiffeneau's index (FEV1 / FVC); the study of peripheral blood flow-endothelium-dependent vasodilation (EDVD) was carried out with an ultrasound device SonoScape SSI-8000 (China);

blood oxygen saturation (SaO2) was assessed using the pulse oximetric method "OXY" (Germany); Doppler echocardiography was evaluated using a Vivid S60 ultrasound machine (Sweden) and SonoScape SSI-8000 (China) in accordance with the recommendations of the American Society. The results were processed using the Excel software package using the Student's t-test. Differences between the studied parameters were considered significant at p <0.05.

Results and discussion. Before treatment in conditions of increased myocardial oxygen demand in patients, there was a violation of the parameters of endothelium-dependent vasodilation: a decrease in the maximum blood flow velocity in the brachial artery after a reactive test (Vmax) - by 18, 9 (1st group) versus 28.4% (2nd); an increase in the index of circulatory resistance (ICR) - by 18.2 and 29.1% (p <0.001 in relation to the control group). The data obtained correspond to the opinion of A.G. Chuchalin. [7] that the intensification of inflammatory phenomena leads not only to local changes, but also to significant systemic changes. Thus, disturbances in the peripheral mechanisms of regulation of vascular tone develop earlier and more significantly in patients with PH and COPD compared to COPD with PDG (p <0.05, in relation to indicators of PL) (figure).



Picture. Parameters of EDVP and FVD in patients with COPD in the dynamics of complex treatment.

According to FVD, there was a decrease in the ventilation state of the bronchopulmonary system in all patients with PH and PDG. Thus, the FEV1 index in all patients was -46.1 ± 1.6%, (p <0.005), SaO2, respectively, 89.6 ± 1.4% (p <0.05), which is typical for an increase in bronchial obstruction. The results obtained revealed the relationship between the clinical course, an increase in LAP avg. and ventilation and perfusion disorders in patients with COPD.

There was a tendency towards a more pronounced decrease in the atrial filling fraction (FPF,%) of the pancreas in patients with COPD 2 - gr. LH and RV of subgroups, respectively, by 1.05 and 1.08 times; and an increase in the time of deceleration of the maximum speed of early diastolic filling (VZ, m / s) by 1.07 and 1.15 times; a decrease in the ratio of early and late diastolic filling (E \ A) by 1.17 and 1.45 times, respectively (p <0.05), which indicates an increase in myocardial stiffness and impaired passive relaxation.

After the therapy, there is an improvement in the studied parameters. Positive correlations were revealed between SaO2: isovolumic relaxation time (VIR, m / s) and VZ, respectively, 0.40 and 0.35 (p <0.05). After treatment in 2-gr. LH and RVD subgroups, in patients, the blood SaO2 values increased to 89.8 ± 0.7 and 92.3 ± 0.6%, respectively, by 1.10 and 1.16 times lower than the LP indicators (p <0.05). In the dynamics of the complex treatment with Am E \ A, the indicators increased by 7.9 and 4.0%, respectively, and the mean pulmonary artery pressure (LAPav) by 1.20 and 1.16 times (p <0.01). The use of BT alone does not have a significant effect on the parameters of pulmonary hemodynamics, providing only a decrease in LADav.

Correlation analysis showed that the increase in obstruction and hypoxemia are closely associated with the development of diastolic dysfunction of the pancreas. At the same time, the severity of the increase in LADav. has a significant dependence on the severity of COPD.

In our study, the use of amlodipine 2.5-5 mg / day against the background of BT in patients with COPD with PH led not only to a decrease in PAP avg., but

was also accompanied by a positive shift in ventilation-perfusion lung capacity in group 2 of patients by 10.5% (p <0.01). LAD Wed after treatment in group 2 decreased by 15.7% (significance of the difference with the indicators before treatment p <0.05). It should be noted that in patients with COPD and PH with an increase in PAP avg. changes in the structure of filling the pancreas in diastole. The mutual aggravation of disorders in the combination of cardiorespiratory pathology is based on the commonality of some links of pathogenesis - disorders of pulmonary and cardiac microcirculation, the development of hypoxemia and pulmonary hypertension. It was found that in patients with COPD with PH receiving amlodipine against the background of BT, there is an improvement in the parameters of pulmonary hemodynamics and ventilation capacity and bronchial patency of the lungs.

Conclusions.1. Violations of the peripheral mechanisms of regulation of vascular tone develop earlier and more significantly in severe clinical course of COPD with an increase in PAP cf. (p <0.05).

2. Complex treatment of patients with COPD with pulmonary hypertension, including amlodipine, reduces the tone of pulmonary vessels and simultaneously improves endothelium-dependent vasodilation of peripheral vessels.

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