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Annotation

Assessment of the level of PaO₂ in patients with COPD (chronic obstructive pulmonary disease) makes it possible to diagnose manifestations of chronic respiratory failure (CRF), depending on the severity. The results of the clinical study noted that in COPD patients with worsening of the course of the disease, the degree of cardiorespiratory disorders increases, which is characterized by rhythm disturbances (76.6%) and hypertrophy of the right heart (23.4%) and the presence of P-pulmonale (55.3%), and with the severity of hypoxemic manifestations.

Keywords: chronic obstructive pulmonary disease, cardiac arrhythmia, hypoxemia.

Relevance

In medicine, there have always been diseases that most of all reduce the level of general health, performance and life expectancy of the patient. Along with oncological diseases and myocardial infarction, COPD are, according to academician. RAMS A.G. Chuchalina, "hot spots of clinical medicine" (2).

According to WHO forecasts, by 2025 COPD will be the third leading cause of high mortality in the world (EPO, 2001). Moreover, over the last decade of the twentieth century, mortality in COPD has increased by 28% (3).

With COPD, emotional disorders are often noted: patients experience pessimism, hopelessness, depression, the prevalence of which occurs in 42-74% of the number of patients surveyed. There are different opinions about the causes of depression in patients with COPD: on the one hand, these are social problems generated by the disease - loss of interest and the inability to perform their usual work, financial problems associated with disability, adaptive difficulties in the family and the team, etc., on the other hand, physiological factors such as chronic cerebral hypoxia (2). Hypoxemia leads to physiological consequences: dyspnea, decreased exercise tolerance, impaired psychoemotional sphere, pulmonary hypertension, cor pulmonale, cardiac arrhythmias, secondary erythrocytosis, impaired patient quality of life (4).

COPD is characterized by steady progression of bronchial obstruction, which leads to a gradual loss of the reversible component of bronchial obstruction, an increase in the symptoms of the disease and a decrease in the quality of life of patients (5,6,8,9).

ECG changes in chronic obstructive pulmonary disease: sinus tachycardia was determined in 42.8% of patients with a combination of COPD and coronary artery disease, a permanent form of atrial fibrillation - in 19.0%, polytope atrial tachycardia - in 14.3% and pacemaker migration in the atria - in 4.7%. With isolated AH and IHD, sinus tachycardia was observed statistically significantly less frequently than with their combination with COPD: in 4.0% and 18.8% of cases, respectively (1).

Despite the fact that the pathophysiological feature of COPD is an increase in the work of breathing due to bronchial obstruction and hyperinflation of the lungs, shortness of breath in such patients also depends on emotional and situational factors. Therefore, it can be affected by anxiety, depression, grief, fear, etc. (10). Thus, dyspnea on exertion may also be partly due to anxiety and fatigue (7). At the same time, the relationship between the subjective feelings of the patient and objective data characterizing the severity of the course of chronic obstructive pulmonary disease has not been sufficiently studied.

Aim of the Study

The present work was to study the relationship between electrocardiographic changes and the level of hypoxemia on the severity in patients with chronic obstructive pulmonary disease.

Material and Methods

46 patients with chronic obstructive pulmonary disease aged 17 to 72 years (mean age 48.6 years) were examined in the hospital. The duration of the disease with chronic obstructive pulmonary disease was, on average, 15.4 years. To assess the oxygen-transport system of the blood and indicators of acid-base balance: blood pH, buffer bases (BB, mol/l), buffer base shift (BE), standard bicarbonate (SB) in 96 COPD patients and 107 BA patients included in the study the Astrup micromethod in arterialized blood was used to study oxygen tension (pO₂ mm Hg), carbon dioxide tension (pCO₂ mm Hg), blood oxygen saturation (O₂, %).

Results and Discussion

It was noted that with the aggravation of the severity from II to IV in patients with COPD, there are diagnosed more often 1.6 times (from 47.2± 8.3 to 76.6± 6.2%, p<0.01) heart rhythm disturbances, more often 2.8 times right heart axis deviation (from 8.3±4.6 to 23.4±6.2%, p<0.05), there are detected more often 10 times (from 5.5±3.8 to 55.3±7.2%, p<0.001) P-pulmonale and more often 4.4 times (from 8.3±4.6 to 36.2±7.0%, p<0.001) hypertrophy of the right ventricle (S-type).

Table 1. Characteristic electrocardiographic change from severity in patients with COPD (%)

Severity of the disease	Heart rhythm disturbances	Right heart axis deviation	Left heart axis deviation	P-pulmonale	HRV S-type	HRV R-type	RBBH (incomplete)	HLV	Dystrophic changes in myocardium
II-st. n=36	<u>17</u> 47,2±8,3	<u>3</u> 8,3±4,6	<u>9</u> 25,0±7,2	<u>2</u> 5,5±3,8	<u>3</u> 8,3±4,6	–	<u>5</u> 13,9±5,8	<u>5</u> 13,9±5,8	<u>34</u> 94,4±3,8
III-st. n=19	<u>13</u> 68,4±10,8	<u>3</u> 15,8±8,4	<u>3</u> 15,8±8,4	<u>2</u> 10,5±7,0	<u>3</u> 15,8±8,4	–	<u>1</u> 5,3±5,1	<u>3</u> 15,8±8,4	<u>15</u> 78,9±9,4
IV-st. n=47	<u>36</u> 76,6±6,2	<u>11</u> 23,4±6,2	<u>2</u> 4,2±2,9	<u>26</u> 55,3±7,2	<u>17</u> 36,2±7,0	–	<u>5</u> 10,6±4,5	<u>5</u> 10,6±4,5	<u>39</u> 83,0±5,5
P1-2	<0,2	>0,2	>0,2	>0,5	>0,2	–	>0,2	>0,5	<0,2
P1-3	<0,01	<0,05	<0,05	<0,001	<0,001	–	>0,5	>0,5	<0,05
P2-3	>0,5	>0,2	<0,2	<0,001	<0,05	–	>0,2	>0,5	>0,5

Assessment of the level of PaO₂ in patients with COPD makes it possible to diagnose manifestations of chronic respiratory failure (CRF) (Table 2) depending on the severity. The results of the study noted that in patients with COPD of the II degree, 1.6 times less often diagnosed with chronic respiratory failure of the I degree with a level of hypoxemia from 60 to 79 mm Hg. In patients with COPD grade IV, only 25.0% are not diagnosed with manifestations of CRF and the level of PaO₂ exceeds 80 mmHg. 50.0% of patients are diagnosed with I degree CRF, 15.0% - II degree CRI (PaO₂ from 40 to 59 mmHg) and 10.0% - III degree CRI (PaO₂ less than 40 mmHg).

Table 2 Characteristics of the level of hypoxemia in patients with COPD depending on the severity

Severity of the disease	PaO ₂ mmHg			
	≥ 80	≥ 60 < 79	≥ 40 < 59	< 40
II-st. n=35	<u>20</u> 57,1±8,4	<u>11</u> 31,4±7,8	<u>4</u> 11,4±5,4	–
III-st. n=20	<u>6</u> 30,0±10,5	<u>10</u> 50,0±11,4	<u>3</u> 15,0±8,2	<u>1</u> 5,0±5,0
IV-st. n=40	<u>10</u> 25,0±6,8	<u>20</u> 50,0±7,9	<u>6</u> 15,0±5,6	<u>4</u> 10,0±4,7
P1-2	<0,05	<0,2	>0,5	<0,001
P1-3	<0,01	<0,1	>0,5	<0,001
P2-3	>0,5	>0,5	–	<0,5

In the numerator - absolute values, in the denominator – percentages

Conclusions

Analysis of the clinical course of COPD showed that with the aggravation of the degree of cardiorespiratory disorders, which is characterized by rhythm disturbances (76.6%) and hypertrophy of the right heart (23.4%) and the presence of P-pulmonale (55.3%), of varying degrees hypoxemia and with the severity of hypoxemic manifestations, there is a more pronounced decrease with the severity of the disease.

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