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FUNCTIONAL HEART DISORDER IN PATIENTS WITH BRONCHIAL ASTHMA

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Abstract
Despite the success achieved in the treatment of AD, the disease tends to progress, being one of the causes of the development of pulmonary hypertension (PH) and chronic cor pulmonale (CPS). Mortality in AD reaches 250000 people per year. One of the main causes of disability and mortality is the involvement of the heart and blood vessels, which often determines the severity and prognosis of AD.

Keywords: bronchial asthma, disability, functional changes in the heart, complications, spirometry, peak flow metry.

Introduction

One of the most common comorbidities is a combination of obstructive respiratory diseases and diseases of the cardiovascular system. Thus, in the structure of the comorbid background in patients with chronic obstructive pulmonary disease (COPD), hypertension (HA) with damage to the target organs is recorded in 85% of cases, and pronounced coronary atherosclerosis is recorded in 64% of cases [2]. But if the structure of cardiovascular comorbidity in patients with COPD has been studied and described quite well, then the combination of bronchial asthma (BA) with diseases of the cardiovascular system is currently being actively studied

Purpose

The purpose of this study was to conduct a comparative comprehensive assessment of the clinical and functional state of the cardiovascular system in patients with AD and to determine their differences in myocardial parameters depending on the severity of AD.
The subject of the study is the features of functional changes in the heart in patients of different age categories with different degrees of severity of bronchial asthma.

Objectives of the Study

1. To carry out an instrumental study of the functional state of the cardiovascular system in patients with AD (X-ray, ECG, spirometry, peak flowmetry).
2. Analysis of instrumental research data depending on the severity of AD.

Research Materials

An open clinical study of the functional state of the heart in patients with AD was carried out, lasting 90 days. It was carried out on the basis of the regional multidisciplinary medical center in

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the department of allergology and pulmonology. A total of 47 people were monitored, 40 patients with AD and 7 healthy individuals who made up the control group. Patients with severe and moderate severe AD were aged 15 to 55 years (mean age 36.5 years). The duration of the disease varied from 2 to 20 years.

Clinical examination of the external respiration function revealed a decrease in VC (vital capacity of the lungs), an increase in MOD (minute volume of breathing), and a decrease in FJL. The bronchial lability index (BL) is the ratio of one-second FJL (L) to the proper FJL, expressed as a percentage. All patients with moderate severity of AD were divided into 3 groups: 1st – with 5-20% PLD, 2nd – 21-30%, 3rd – 31-70%. PLD indicates increased reactivity of the neuromuscular apparatus of the bronchi. With low PLB values, bronchial disorders are either absent or there is swelling and mucus in them. Among those observed in group 1 – 22 patients (50%), group 2 – 9 patients (37.5%), group 3 patients (12.5%).

Analyzing spirometry and peak flow indicators by severity,

Step 2. FEV1 80% of normal, fluctuation 20-30%. 24 patients (60%) (out of total 51.1%)

Stage 3 FEV1 60% of normal, fluctuation up to 30%. 13 patients (32.5%) (of total 27.6%)

Step 4. FEV1 59% or less of normal, fluctuation of 31% or more. 3 patients (7.5%) (of total 6.4%)

In the control group. FEV1 is more than 90%, fluctuations are less than 10% (out of a total of 14.9%).

ELECTROCARDIOGRAM:

With a mild course without changes, with a long course of the disease, signs of pancreatic overload and hypertension of the pulmonary circulation were noted; Common ECG changes included a deviation of the electrical axis to the right, R > S in V1; S, Q, T and peak waves P. In systolic overload of the pancreas:

high RV1,V2 (RV1 ≥ SV1), high late R wave in the aVR lead is often observed; (20% in 8 patients of stage 2, 22.5% in 9 patients of stage 3, and 7.5% in 3 patients of stage 4).

the STV1,V2 segment is located below the contour, the T wave is negative (similar changes in the ST segment and the T wave are often observed in leads II, III, aVF); (2 patients of stage 2 – 5% and 7 patients of stage 3 – 17.5%, all patients of stage 4 – 7.5%).

deflection of the electrical axis of the heart to the right; (15% in 6 stage 3 patients and 7.5% in all stage 4 patients)

the time of activation of the left ventricle in leads V1, V2 was increased and exceeded 0.03 s (in 3 patients of stage 3 and in all patients of stage 4, 7.5%, respectively).

RADIOLOGICALLY:

There are no changes outside of the attack. In the prolonged course of the disease, signs of pulmonary emphysema, moderate enlargement of the heart to the right and left (in 17% - 7 patients), low standing of the diaphragm - in 17%, increased pattern of hilar vessels - in 20% - 8 patients were observed; X-ray findings in pulmonary hypertension were dilation of the lung roots with a pronounced narrowing to the periphery ("chopped off") in 5% to 2 patients.

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Results of the Study

1. Sinus tachycardia is the most common heart rhythm disorder (up to 98%) in patients with bronchial asthma. The frequency, severity, severity, and duration of sinus tachycardia increase with increasing severity of the disease.

Step 2. It was observed in 23 patients. (up to 100 bp per minute)

Stage 3 Observed in all 13 patients. (from 100 to 120 bpm)

Step 4. It was observed in all 3 patients. (from 120 to 135 bpm)

In the control group. Not observed.

The leading pathogenetic factors of sinus tachycardia are bronchial obstruction, a decrease in the parasympathetic component of heart rhythm regulation, and the side effect of extended-release beta-2 agonists.

2. Heterotopic heart rhythm disorders are recorded mainly in severe bronchial asthma. Frequent supraventricular extrasystole was recorded in 15.4% (2 patients out of 13) of patients with moderate bronchial asthma and 33% (1 out of 3) in patients with severe disease; frequent ventricular extrasystoles were observed in 3.2% and 15.6% of patients, respectively.

3. Functional and morphostructural changes in the cardiovascular system in patients with bronchial asthma are manifested by the formation of pulmonary hypertension (53.2%), as well as signs of hypertrophy (43.7%) and dilatation of the right parts of the heart, more often of the right atrium (67.8%) than of the right ventricle (23.2%). The greatest changes are noted in a severe form of the disease. There are relationships between changes in pulmonary hemodynamics, structural changes in the right parts of the myocardium, and heart rhythm disorders in bronchial asthma.

4. A decrease in heart rate variability due to a decrease in the parasympathetic component of regulation is observed mainly in patients with severe bronchial asthma and is associated with bronchial obstruction, the formation of pulmonary hypertension and damage to the right parts of the heart, as well as bronchodilator therapy.

Thus, the development of structural changes in the right chambers of the heart, an increase in the pancreatic cavity, a change in its shape (an increase in the ratio of transverse dimensions to longitudinal dimensions), and an increase in the acoustic density of the myocardium are combined with the development of systolic and diastolic dysfunction of the pancreas. These disorders reflect a single process of structural and functional remodeling of the right chambers of the heart, which plays a major role in the formation of chronic heart failure. The structural and functional state of the pancreas is considered as an important predictor of mortality and has a great impact on the clinical state, course, and prognosis in patients with AD. The determination of early subclinical markers of disruption of global and regional contractility and relaxation of the pancreas is of great prognostic value. Adequate basic therapy helps to improve the structural and functional characteristics of the right parts of the heart.

Findings

The results of the study make it possible to provide additional diagnostic criteria for the severity of AD, reflecting the state of the cardiovascular system at different stages of the disease, to show the stages of changes in the functional state of the myocardium in a modern pulmonary patient, which can undoubtedly affect the choice of basic therapy for these diseases. We assume that the

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results of the study will allow us to develop therapeutic tactics for myocardial dysfunction and ischemia at various stages of AD, to determine the criteria for the timely initiation of such therapy.

Practical recommendations:

1. Patients with moderate and severe AD are indicated for daily ECG monitoring, echo-DCG in order to timely detect cardiac arrhythmias and structural and functional changes in the cardiovascular system.
2. AD patients receiving therapy with extended-acting beta2agonists need systematic monitoring of the state of the heart rhythm and correction of the detected disorders.
3. Patients with bronchial asthma need a differentiated approach to the treatment of heart rhythm disorders.

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