

THE PECULIARITIES OF THE CHANGE OF THE ENDOTHELIAL FUNCTION IN THE PATIENTS WITH CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN CONDITIONS OF ITS COMORBIDITY WITH ESSENTIAL HYPERTENSION

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In the light of modern ideas, the comorbid pathology of a patient is determined as a combination of two and/or more chronic diseases which are interconnected pathogenically and contemporaneously regardless of activity of each of them [5, 12]. From the clinical point of view, comorbidity leads to the change of a regular clinical picture of diseases, aggravates their course, contributes to development of complications and is an independent risk factor of the lethal outcome [13]. Chronic obstructive pulmonary disease (COPD) and cardiovascular diseases, first of all, essential hypertension (EHT) are leaders both in the structure of morbidity and mortality among pathology of internal organs [2, 4, 6], especially in cases of their combination [9]. Nowadays, the change of the functional state of endothelium in the patients with COPD and EHT is considered as one of the key mechanisms in pathogenesis of these diseases [7, 11, 8, 10] and is a possible connecting link between bronchopulmonary pathology and cardiovascular diseases [3]. The foregoing and also a frequent combination of COPD and EHT in the clinic of internal diseases [1] were a precondition for carrying out this study. The aim of the research was to study the peculiarities and the possible changes of the functional state of endothelium in the patients with COPD in conditions of its comorbidity with EHT.

Materials and Methods. The group of the examined individuals included 64 patients with COPD of the II stage (females – 22, males – 44, mean age – $54,8 \pm 2,5$ years), among whom 32 patients had the comorbid EHT of the II degree; the patients' status was the medicamentous compensation. All the patients were divided into 2 groups: the main group (COPD combined with EHT) and the comparative group (COPD). The control group included 15 practically healthy individuals. They and the examined patients were of the same sex and age. The diameter of the right brachial artery (D_{RBA} , mm) in transverse and longitudinal planes (ultrasound scanner «Aloka 5000» Pro Sound (Japan)) was taken into account for analysis of the endothelium's vasoregulating function. Endothelium-dependent vasodilatation (EDVD) was determined within 90 sec after a 5-minute compression of a shoulder by pressure 300 mm Hg by means of calculating the percentage of the change of an arterial diameter in comparison with the initial one. Endothelium-independent vasodilatation (EIVD) was determined as a maximal value of the percentage of arterial dilatation during 5 minutes after a sublingual intake of 0.5 mg of nitroglycerin at once-a-minute registration. The total content of the stable metabolites of nitrogen oxide (NO_x) was determined in blood serum by the spectrophotometric method by means of the assay kit «Total NO» («RL-system», USA) in accordance with the kit instructions; the determination of a level of endothelin-1 (ET-1) was carried out by the immunoenzymatic method by means of the assay kit BIG Endothelin-1 (HUMAN), Peninsula Laboratories inc., Division of Bachem. Mathematical processing of the results was carried out by means of variation statistics methods using application programs package Statistica 6.0.

Results. An increase of D_{RBA} in the patients of the main group in comparison with the healthy individuals (in 1.53 times; $p < 0.001$) and the increasing tendency in comparison with the comparative group was revealed. The indices of EDVD and EIVD were $10.2 \pm 0.4\%$ and $7.0 \pm 0.2\%$, respectively. They were significantly low among all the

examined ($p < 0.001$). Besides, they were, respectively, 1.34 and 1.29 times lower than among the patients of the comparative group. At the same time, the NO_x index in the patients of the main group (16.2 ± 1.3 $\mu\text{mol/l}$) was 2.24 times lower than among the patients of the control group and 1.64 times lower than among the patients of the comparative group ($p < 0.001$ in both cases). The ET-1 level was the highest among the patients of the main group (5.2 ± 0.1 pmol/l); it was 1.63 times higher than among the patients of the control group and 1.3 times higher than among the patients of the comparative group ($p < 0.001$ in both cases). The correlation relationship between EDVD, EIVD and NO_x was established in the patients with COPD and EHT (accordingly, $r = 0.36$ and $r = 0.44$; $p < 0.05$). A negative correlation relationship between indices NO_x and D_{RBA} ($r = -0.49$; $p < 0.05$) was established too.

Conclusion. The change of the endothelial function, diagnosed in the patients with COPD, is the most significant one in case of its combination with EHT. A decrease of vasorelaxation indices in such patients is accompanied by an increase of ET-1 content and caused by the decrease of the NO_x content. It is reflected by the presence of the correlation relationship between D_{RBA} , EDVD, EIVD and NO_x .

Prospects for the further research. The established peculiarities of the change of the endothelial function in the patients with COPD and comorbid EHT are a prerequisite for the study of their possible interconnection with hemostasis factors and for the specification of their role in genesis of atherothrombosis.

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