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Title: Cerebral vascular reactivity in duplex scanning in patients with COPD

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Body: The study involved 34 patients with COPD mean age 54,3 years. Smoking duration was 35,6 years and the smoking index was 311,2. Intima-media thickness (IMT) of the carotid artery (CA) and the average flow velocity in the middle cerebral artery (MCA) were evaluated by transcranial duplex sonography, exercise stress tests were conducted to assess the mechanisms of autoregulatory of cerebral vessels. Patients were divided into 3 groups. The first group included 26.7% of patients with COPD stage I-II, in which the CA IMT was 1.05 mm, but without plaques. The second group consisted of 66.6% of patients with COPD stage I-III, in which IMT of CA was 1.22 mm and plaques with stenosis <70% were found. The third group is formed 6.6% of patients with stage III, in which IMT of CA was 1.5 mm and plaques with stenosis >70% were found. In assessing blood flow in the first and in the second groups, it was showed reduction in speed performance in the MCA (68.0 and 74.9 while the norm is 88-96 cm /s, $p>0.5$). Optimal activity autoregulatory mechanisms are registered during the vasodilatory function tests in these groups (reactivity index 1.13 and 1.07). It was showed increase in speed performance in MCA to 180 cm/s in third group. Reactivity index was 1.1. So, atherosclerosis CA were revealed in patients with COPD, which progressing to the stage of the disease and leading to hemodynamically significant stenoses in stage III. In case of COPD I and II stages, mean blood flow velocity in the MCA at normal reactivity index decreased. In COPD stage III, it was showed an increase in speed performance in the MCA as a consequence of compensation for the lack of cerebral flow, which is indicated by normal index of reactivity.