

Rehabilitation after myocardial infarction by using of biofeedback training, controlled by capnometry

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The increasing activity of the sympathetic nervous system was shown during myocardial infarction (MI). There are data that bio management application increases the vagal influences on a heart rate for patients with chronic coronary artery disease.

The purpose of this study was the assessment of changes of vegetative regulation of heart rate in patients with MI, receiving along with standard methods of treatment and rehabilitation sessions of cardiorespiratory training (KRT).

48 patients with IM in an early period of disease at the age from 40 till 70 years were surveyed. The main group was created from 29 people by whom KRT (5–10 sessions) was carried out. The assessment of efficiency and safety of KRT was carried out on a clinical picture and parameters of heart rate variability (HRV) before, after, and during KRT. The Control group consisted of 19 patients receiving only standard treatment. To exclude hyperventilation syndrome, capnometry was performed before the start of the KRT session to determine the $P_{et}CO_2$ individual norm for the certain patient to control the training process in a particular session. After each active sample, the concentration of carbon dioxide in the air exhaled by the patient was measured, and when it decreased below 95% of the initial value, the depth of breathing was adjusted. The use of capnometry in the study avoided adverse events during the sessions.

During carrying out of KRT, and after KRT worsening of the clinical picture at patients of the main group was not observed. HRV analysis at patients of the main group showed that after the end of KRT decrease in an index of tension ($p < 0,05$), an increase in an indicator of the general dispersion of heart rate ($p < 0,05$), and also a tendency to increase of vagal part of total power during spectral analysis ($p=0,05$) was observed. Normalization of heart rate and arterial pressure, growth of cardiorespiratory index, and index of a variation took place, cardiorespiratory synchronization was restored. Persons from the control group had no such changes.

Thus, the application of KRT realizing a mode of functional bio management of heart rate, as the instrument of psychophysiological support of standard medicament therapy showed the efficiency of its use in the program of rehabilitation of patients with myocardial infarction. The result of a comprehensive approach is the reduction of sympathetic and increase of vagal influences on heart rate, normalization of the main indicators of the cardiovascular system.