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Evaluation of respiratory parameters in patients with chronic heart failure during physical exercises

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The determination of the exercise tolerance of patients with CHF is of great diagnostic and prognostic significance. For an objective assessment of the level of physical performance, it is recommended to use the test with a 6-minute walk test (6MWT). The use of devices that allow monitoring the indicators ?ETCO2 and Sp?2 during the whole study with the function of memory of results significantly increases the diagnostic value of the test.

Purpose: to study the relationship between dynamic capnography and pulse oximetry with a 6MWT in patients with CHF.

Materials and methods: 73 patients of both sexes were examined. 48 patients with CHF (mean age 47.6±3.46 years), 25 healthy volunteers (mean age 47.60 ± 3.46 years). The study of the functional capabilities of the patient’s respiratory system was carried out before, during and after the standard 6MWD on the LifeSense LS1-9R capnograph-pulse oximeter equipment (MedAir AB).

Results: A significant decrease in the rate of PETCO2 was observed in all patients with CHF during 6MWD. When analyzing the trend of PETCO2, these patients showed signs of periodic breathing, in contrast to the control group. When analyzing the SpO2 index during 6MWD. We found that ?SpO2 during 6MWT 38,4% in group CHF (p< 0.05).

When analyzing the CO2 trend graphs, a wave-like increase in indicators was revealed during the performance of the load test - the so-called periodic breathing (PD).

In the group of patients with CHF, signs of PD trend CO2 were significantly more likely to occur (p?0.05).

Survival analysis was carried out on the basis of dynamic observation of patients for 60 months. A regression analysis of the proportional Cox risks of mortality in patients with CHF revealed the prognostic value of a comprehensive assessment of patient parameters: LVEF, BMI, mMRS, Borg, signs of PH, distance of 6MWT, signs of PD and desaturation during 6MWT (reliability of model coefficients p<0.0001).

Conclusions: signs of PD during 6MWT have an important prognostic value. The analysis of the correlation dependence revealed that the presence of PD was a prognostically unfavorable sign in patients with CHF. From a prognostic point of view, the predictors of adverse CHF were LVEF, BMI, mMRS, Borg, , signs of PH, distance of 6MWT, signs of PD and desaturation during 6MWT (reliability of model coefficients p=0.0001).