Abstract: 1340

New approaches for the respiratory muscle trainings based on morphological features of the diaphragm

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Background: Respiratory muscle trainings (RMT) is an essential part of physical rehabilitation in patients with severe heart failure. The studying of the morphological features of diaphragm and its role in ventilation disorders in patients with HF allowed proposing a new way of RMT prescription for severe HF pats.

The purpose: To study the effectiveness of RMT, prescribed based on morphological and functional status of diaphragm.

Materials: 1 Stage: 32 diaphragm autoptat (14 male, 16 female) with different lethal outcomes (8 myocardial infarction, 9 stroke, 5 pulmonary embolism, 10 pneumonia) were taken in 1 hour after death. Pats were selected from research data base of patients with NYHA I-IV class HF. The percentage composition of muscle, connective, adipose tissue was compared with the results of maximal inspiratory pressure (MIP) provided no longer then 90 days before the lethal outcome. Patients with 79-73% of muscle tissue had 43±9 mmH2O MIP, 58-55% - 21±4 mmH2O MIP. 2 Stage: 67 pats (35 men and 32 women) 64,6±7,2 years old with NYHA III-IV HF were divided into 3 groups: Group 1 with MIP = 20mmH2O, Group 2 - 20 < MIP = 40 mmH2O, Group 3 - MIP > 40 mmH2O. Pats in each group were randomized to either 1 of 4 ways of RMT: with gradual increase of inspire resistance (IRG) or with prolonged inspire at maximum resistance (MRG), their combination of IRMRG or to a control group (CG) with inspire without resistance. Trainings were held for 16 minutes twice a day for 12 months with Threshold IMT. VO2peak, MIP heath related quality of life by SF-36 and compliance in training participation by patients diary were measured at baseline and 3, 6, 12 months.

Results: In 12 months pats from Group 3 demonstrated better increase in physical capacity (PC) according to base line (?VO256% vs 37 % in Group 2, no statistically significant change in VO2in Group 1). There was less hospitalization in period 6-12 month due to HF progression and pneumonia in pats from Group 3 (11,3 vs 17,9 vs 21,5%). There were less lethal outcomes in Group 3 (9,5 vs 14,7 vs 19,1). In Group 3 IRG and MRG and IRMRG patients demonstrated statistically significant increase in PC and less hospitalizations due to pneumonia over CG, with statistically better results in IRMRG. In Group 2 statistically significant best results showed IRG and IRMRG patients, with no big difference between them. In Group 3 no statistically significant difference in PC and pneumonia frequency was found. But CG patients showed better compliance and SF-36 results.

Conclusion: Morphological structure of diaphragm directly correlates with respiratory functional disorders and influence on the way of RMT with best benefits from combination of static and dynamic exercises with the over 70% of muscle tissue, dynamic exercises for 60-70% of muscle tissue and deep breathing without resistance for less than 60 % of muscle tissue.