This VE-VCO2 slope rises in parallel with the severity of heart failure. Usually, this slope becomes steeper just before peak exercise probably because of the respiratory compensation for lactic acidosis, and this point is called RC point. However, the RC point may not be identified in some patients. We evaluated whether the respiratory compensation during exercise testing has clinical significance in cardiac patients.

METHODS In total, 152 cardiac patients (66.7±5.4 years) whose gas exchange ratio (R) at peak exercise ranges from 1.10 to 1.20 were enrolled. We compared cardiopulmonary function between patients who showed RC point (n=118) and those without it (n=34).

RESULTS The R at peak exercise did not significantly differ between patients with RC point (1.15±0.03) and those without it (1.14±0.03). However, as compared to the patients without RC point, those with RC point had higher peak VO2 (20.2±5.3 vs 13.6±3.4 ml/min/kg, p<0.001), higher anaerobic threshold (12.4±3.2 vs 9.2±2.3 ml/min/kg, p<0.001), and lower VE-VCO2 slope (31.7±5.8 vs 37.8±9.6, p=0.001). BNP also tended to be lower in the patients with RC point (175.4±364.7 vs 327.9±381.1pg/ml, p = 0.077).

CONCLUSIONS The present findings suggest that the phenomenon of respiratory compensation during heavy exercise indicates better cardiopulmonary function in cardiac patients.

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VO2/kg peak, Lowest VE/VCO2 and OUES of Cardiopulmonary Exercise Testing in Patients With Severe Pulmonary Hypertension

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OBJECTIVES To investigate the degree of decline in exercise capacity and ventilatory efficiency in patients with severe pulmonary hypertension (PH) and to aid in developing more effective rehabilitation programs.

METHODS This study was carried out in a cross-sectional observational way. From August 1st, 2014 to March 31st, 2016, this study recruited 15 patients with severe PH as the PH group, including 7 patients with idiopathic pulmonary arterial hypertension(IPAH), 6 PH patients associated with congenital heart disease (PH-CHD), 1 patients with chronic thromboembolic pulmonary hypertension(CTEPH) and 1 PH patients associated with rheumatic disease (PH-RHD). After consent and clearance of contraindications, PH group underwent right-heart catheterization, pulmonary function test (PFT) and performed the 6-min walk test and symptom-limited cardiopulmonary exercise testing (symptom-limited CPET). Twenty-three healthy subjects, matched by age, sex, and body size were used as controls, also had CPET and PFT measurements. Variables, including peak oxygen uptake per kilogram (peak VO2/kg), oxygen uptake efficiency slope (OUES) and percentages of their predicted values (peak VO2/kg of pred%,OUES %), end-tidal carbon dioxide partial pressure at anaerobic threshold (PETCO2@AT), lowest ventilation to carbon dioxide ratio (lowest VE/VCO2) were obtained. All data were computed with SPSS windows 13.0. Differences between two groups were compared using two independent samples t-test, with p less than 0.05 considered significant.

RESULTS No adverse events occurred during this study. Only one PH patient failed to reach anaerobic threshold. Exercise capacity, as measured by peak VO2/kg and peak VO2/kg of pred% (16.12±2.96 ml·kg-1·min-1 vs 29.03±6.26 ml·kg-1·min-1; 44.2±13.3% vs 87.1±21.1%, respectively, both p < 0.001) was markedly lower in PH group. Additionally, PH group had lower OUES, OUES%, PETCO2@AT and higher lowest VE/VCO2 (901.6±306.6 ml/min/L/min vs 2085.0±454.4 ml/min/L/min; 40.7±16.5% vs 95.3±22.4%; 26.5±4.2 mmHg vs 41.5±3.2 mmHg; 45.20±9.78 vs 27.15±3.31,respectively, all p < 0.001). No significant difference was found in breath reserve (BR%,42.1±13.1% vs 44.3±11.3%, p = 0.592).

CONCLUSIONS This study suggests that exercise capacity of patients with severe PH is severely impaired, and they have a high V/Q mismatch response during exercise which indicates their reduced ventilatory efficiency. Furthermore, from this study we learn that CPET as a common exercise function assessment tool, can offer a comprehensive evaluation for PH patients and may help us establish scientific rehabilitation programs.

Key words: Pulmonary Hypertension; Exercise capacity; ventilatory efficiency; Cardiopulmonary Exercise Testing

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Effects of Pulmonary Arterial Pressure on Exercise Capacity and Ventilatory Efficiency in Patients with Pulmonary Hypertension

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OBJECTIVES To compare the characteristics of exercise capacity and ventilatory efficiency between patients with severe pulmonary hypertension (SPH group) and with mild-moderate pulmonary hypertension (MMPH group), and to aid in providing the evidence for clinical diagnosis.

METHODS We retrospectively investigated the symptom-limited cardiopulmonary exercise test (CPET) with gas exchange measurements in totally 23 patients with confirmed PH. According to the results of right-heart catheterization, we divided patients into SPH group (n=15) and MMPH group (n=8). All subjects had also performed the 6-min walk test and the pulmonary function test (PFT). All data were computed with SPSS windows 13.0. Differences between two groups were compared using two independent samples t-test, with p less than 0.05 considered significant.

RESULTS The two groups had similar demographics and pulmonary function at baseline. No adverse cardiac event occurred during the study. Only one patient with SPH failed to reach anaerobic threshold (AT). Exercise capacity was lower in SPH group than in MMPH group with a significant difference when measured by peak oxygen uptake per kilogram (peak VO2/kg, 16.12±2.96 ml·kg-1·min-1 vs 20.76±4.16 ml·kg-1·min-1, p=0.005), peak VO2/kg of pred %(44.2±13.3% vs 56.9±9.0%, p=0.026), VO2 @AT/kg (12.49±2.24 ml·kg-1·min-1 vs 15.86±2.74 ml·kg-1·min-1, p=0.005) and VO2 @AT/kg of pred% (34.7±10.8% vs 43.4±3.9%, p=0.014). But no significant difference was found in 6-minute walk distance (6MWD, 491.2±63.3m vs 532.9±77.5m, p = 0.178). Although being statistically insignificant, the lowest VE/VCO2 and VE/VCO2 slope (45.2±9.8 vs 40.0±13.0, 48.9±12.4 vs 39.0±17.0, respectively, both p > 0.1) in SPH group were slightly higher than those in MMPH group. In addition, Statistically significant differences between SPH group and MMPH group were observed in oxygen uptake efficiency slope (OUES), OUES of pred% and end-tidal carbon dioxide partial pressure at anaerobic threshold-PETCO2@AT(901.6±;306.6 ml/min/L/min vs 1304.1±356.47ml/min/L/min, p=0.01; 40.7±16.5% vs 62.6±16.8%, p=0.007; 26.5±4.2 mmHg vs 31.8±7.5 mmHg, p=0.047, respectively).

CONCLUSIONS This study suggests that exercise capacity and ventilatory efficiency of patients with severe PH were more impaired than those of patients with mild-moderate pulmonary hypertension, approximately 50% of predicted normal. It is concluded that OUES and percentages of its predicted values are better physiological parameters in evaluating the gas exchange abnormality of patients with PH.

Key words: Pulmonary Hypertension; Exercise capacity; Ventilatory efficiency; Cardiopulmonary Exercise Testing

MEDICAL REHABILITATION OF CARDIOVASCULAR DISEASE

GW27-e0162

The survey Quality of life in cardiovascular patients after heart surgery

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OBJECTIVES It is predicted that 44/8% of deaths in 2030 from cardiovascular disease will be in Iran; Coronary artery bypass surgery is one of the most common surgical procedures for the treatment of heart disease that can improve cardiovascular symptoms, improve performance, reduce mortality and improve quality of life for patients. The aim of the present study was to determine the quality of life and factors related to it in cardiovascular patients after heart surgery.

METHODS This study was a descriptive cross-sectional one in which. 230 cardiovascular patients from Shiraz City hospitals randomly participated after heart surgery. The necessary data was collected through interview and SF-36 quality of life questionnaire, patients self-report, and referring to their own hospital records. The obtained data was analyzed by means of kolmogrov smirnov test, ANOVA and