

Cardiac Autonomic Responses to Combined Exercise Training are Associated with Central Obesity Changes in Obese Young Men

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Abstract

Although the influence of adiposity indices and cardiorespiratory fitness (CRF) on heart rate variability (HRV) has been demonstrated extensively, the casual link between the changes in adiposity as well as in CRF and the alterations in cardiac autonomic function is unclear. Thus, this study aimed to assess the correlation between the changes in adiposity and CRF and the alterations in HRV after 12 weeks of exercise training. Twenty obese sedentary men aged 20.5 ± 1.2 years were randomly assigned into 2 groups ($n = 10$ each): the control group (CG) and the exercise group (EG). The EG trained 60 minutes of combined aerobic, anaerobic and strengthening exercise, 4 sessions a week for 12 weeks, whilst the CG remained relatively inactive. Measurements of resting HRV, body composition and peak oxygen consumption ($\dot{V}O_{2peak}$) were obtained at baseline and after the 12-week training program. Compared with CG, the exercise training significantly reduced adiposity indices, and improved vagal-related HRV variables and $\dot{V}O_{2peak}$. Significant correlations were observed between changes of HRV variables and adiposity indices and $\dot{V}O_{2peak}$ changes. Stepwise regression analysis revealed that changes in the SD1/SD2 ratio predicted 32.4% of the variance in the relative $\dot{V}O_{2peak}$ changes. These findings suggested that obese sedentary young men achieved significant improvements in vagal activity, adiposity indices and aerobic fitness after the exercise training. The higher reduction in fat mass, especially central obesity, the greater alteration of vagal modulation. Moreover, the alteration in resting HRV is a possible predictor for adaptations to exercise training in obese sedentary young men.

Keywords: Exercise training, Central obesity, HRV, $\dot{V}O_{2peak}$