High Intensity Exercises in Heart Failure with Preserved Ejection Fraction

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Short Editorial related to the article: Vasodilation and Reduction of Systolic Blood Pressure after One Session of High-Intensity Interval Training in Patients With Heart Failure with Preserved Ejection Fraction

Introduction

Heart failure with preserved ejection fraction (HFpEF) comprises several pathologies that present with variable degrees of dyspnea, high filling pressures, structural or diastolic alterations and great limitation to exercise.[1] HFpEF can represent up to 50% of cases of hospital admissions due to decompensated heart failure (HF).[2]

Hypertension and obesity are conditions frequently associated with HFpEF and the adequate management of these two pathologies are essential for the treatment of this syndrome. One of the main characteristics of patients with HFpEF is the intolerance to exercise at different degrees and through diverse mechanisms.[3]

Exercises are among the main therapeutic strategies for the treatment of heart failure with reduced ejection fraction (HFrEF) and HFpEF, being important agents in decreasing the morbidity and mortality of these patients.[4-6]

Among the benefits of aerobic training in patients with HFpEF, we can highlight the improvement in endothelial function and arterial stiffness, contributing to the improvement of cardiovascular dynamics and symptoms.[7] The physical training programs offered to patients with HF in cardiac rehabilitation services involve primarily aerobic exercises supplemented by resistant exercises, stretching and, in some cases, respiratory exercises.[1]

Aerobic exercises can be continuous, of moderate intensity or intercalating high and low-intensity efforts. High-intensity interval training (HIIT) is currently one of the most effective methods for improving cardiorespiratory and metabolic function. HIIT involves repeated activities, from short to long ones, of high-intensity exercises combined with periods of active or passive recovery.[8] Kiviniemi et al. have recently reported that HIIT is superior to traditional continuous aerobic training in improving cardiac autonomic function and suggested that the effect verified on post-HIIT autonomic function was related to improved baroreflex modulation and vagal control.[9]

Keywords

Heart Failure; Stroke Volume; Obesity; Exercise; Exercise Therapy; Breating Exercises.

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There are several potential adaptations that explain the positive changes induced by HIIT on the autonomic cardiac function. One of the potential mechanisms related to HIIT-induced improvement in cardiac vagal tone may be angiotensin II, which inhibits cardiac vagal activity. Sedentary or physically inactive individuals have higher plasma renin activity when compared to those who are physically active. Exercise causes angiotensin II suppression, which can, to some extent, mediate the improvement in cardiac vagal tone.[10] Studies have also suggested that HIIT induces increased baroreflex sensitivity and reduces arterial stiffness.[11]

Comments about the current study

In this interesting study, designed for the assessment of the acute effects of a single session of high-intensity interval training, Lima et al.[12] studied post-training changes in blood pressure (BP) and endothelial function in 16 patients with HFpEF. As main results, it was possible to demonstrate a significant increase in the brachial artery diameter with a corresponding reduction in systolic BP. These findings indicate the potential benefit of this type of training for patients with HFpEF, with an improvement in blood pressure levels and, possibly, a beneficial effect on ventricular function.

Although the authors did not find any significant changes in the flow-mediated dilation index, questions have been raised about the real importance and interpretation of this measurement.[13] The BP reduction after the exercise sessions tends to last for hours, acting as powerful adjuvants to the vasodilation effects of antihypertensive drugs, which are commonly used in HFpEF. BP control is among the main goals for symptom improvement in HFpEF, and exercises are crucial to attain this goal and improve diastolic function.[14]

Limitations and conclusions

This experiment used a single training group, without a control group for better definition of the effects and lower chance of bias when assessing the results. Although the number of patients was small, the positive results encourage better designed future researches, with a larger number of individuals to define the role of this training modality in HFpEF. These patients have an expressive limitation to exercises and strategies that improve BP and diastolic function show great potential for benefits in functional class improvement and, likely, in morbimortality reduction.

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