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Impact of Resistance Training in Cardiac Rehabilitation for Patients with Heart Failure with Preserved Ejection Fraction (HFpEF)

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Introduction

Heart failure with preserved ejection fraction (HFpEF) is a common and increasingly prevalent form of heart failure, particularly among older adults and those with comorbidities such as hypertension, diabetes, and obesity. HFpEF is characterized by impaired ventricular relaxation and filling, leading to symptoms such as dyspnea, fatigue, and exercise intolerance [1-5]. While traditionally less emphasized in clinical practice compared to heart failure with reduced ejection fraction (HFrEF), HFpEF has significant clinical burden, and treatment strategies often focus on symptom management rather than improving functional outcomes. Cardiac rehabilitation (CR) has been well established as a therapeutic strategy for improving exercise capacity, quality of life, and overall cardiovascular health in heart failure patients. However, the specific role of resistance training (RT) within CR for patients with HFpEF remains less clear. While aerobic exercise has been the focus of most CR programs, resistance training has gained attention due to its potential benefits in improving muscle strength, functional capacity, and metabolic health, particularly for those with HFpEF, who often experience muscle wasting and deconditioning. This study investigates the impact of resistance training as part of a cardiac rehabilitation program on exercise tolerance, muscle strength, and overall health outcomes in patients with HFpEF. We aim to explore how resistance training can improve functional capacity and quality of life in this challenging population [6-10].

Discussion

The results of this study highlight the potential benefits of incorporating resistance training into cardiac rehabilitation for patients with HFpEF. Participants who engaged in resistance training demonstrated significant improvements in muscle strength, measured by handgrip and lower limb strength assessments, compared to those who only participated in aerobic exercise-based rehabilitation. These gains in muscular strength are particularly important for HFpEF patients, who often exhibit sarcopenia and muscle dysfunction, which can exacerbate physical limitations and impact daily activities. Additionally, resistance training contributed to improvements in functional capacity, as evidenced by increases in the six-minute walk distance (6MWD) and peak oxygen consumption (VO_2peak). These improvements are critical in HFpEF, where patients frequently experience exercise intolerance and reduced functional mobility due to both cardiovascular and skeletal muscle dysfunction. The combination of aerobic and resistance exercises may offer a more comprehensive approach by targeting both the cardiovascular system and muscle function. Moreover, resistance training was associated with enhanced quality of life scores, with patients reporting reductions in fatigue, better mobility, and improved mood. Psychological benefits, including reductions in anxiety and depression, were also noted, likely resulting from both the physical improvements and the empowerment associated with increased strength and fitness. While resistance training was generally well-tolerated, some challenges were noted, particularly in terms of adherence and safety. Resistance exercises were customized to the individual's capacity, and close monitoring was required to avoid injury, especially in older patients with comorbid conditions. Importantly, this study showed no adverse events related to resistance training, reinforcing its safety when appropriately tailored and supervised. These findings suggest that resistance training could be an effective and safe addition to cardiac rehabilitation programs for patients with HFpEF, offering a potential strategy to improve both cardiovascular and musculoskeletal health. Further studies are needed to determine the optimal frequency, intensity, and duration of resistance training for this patient population, as well as its long-term effects on hospitalization rates and mortality.

Conclusion

Resistance training is a promising adjunct to cardiac rehabilitation for patients with heart failure with preserved ejection fraction (HFpEF), offering significant improvements in muscle strength, functional capacity, and quality of life. The findings from this study demonstrate that resistance training can enhance exercise tolerance, reduce fatigue, and improve physical and psychological well-being in patients with HFpEF, who often experience muscle deconditioning and exercise intolerance. Integrating resistance training into the standard cardiac rehabilitation program may help address the multifactorial challenges of HFpEF, particularly by improving both cardiovascular function and skeletal muscle health. Future research should explore standardized resistance training protocols for HFpEF patients, including its long-term impact on hospital readmissions, mortality, and overall healthcare utilization. Ultimately, the inclusion of resistance training in cardiac rehabilitation may offer a more comprehensive, holistic approach to managing HFpEF, empowering patients to improve their physical function and overall quality of life.

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