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Visceral Adipose Tissue and Exercise Capacity in Heart Failure with preserved Ejection Fraction

Heart Failure trials

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TITLE
Visceral Adipose Tissue and Exercise Capacity in Heart Failure with Preserved Ejection Fraction

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PURPOSE
Obesity is a major risk factor for heart failure with preserved ejection fraction (HFpEF) and is characterized by marked reductions in aerobic capacity (VO₂ peak) and reduced quality of life (QOL). In people without HFpEF, central (visceral) adipose tissue (VAT) is associated with increased prevalence of cardiovascular disease and elevated biomarkers of chronic systemic inflammation. This may drive changes in cardiac, vascular and skeletal muscle function that contribute to the development of HFpEF. Little is known about the direct effect of VAT on the pathophysiology of HFpEF and, specifically, exercise capacity in this cohort. The purpose of this research is to develop a deeper understanding of the impact of central obesity, characterized by increased VAT, and the progression and severity of HFpEF.

METHOD
This research is an ancillary study to an ongoing NIH sponsored clinical trial: Inorganic Nitrate to Amplify the Benefits and tolerability of Exercise training in HFpEF. We are recruiting subjects with HFpEF (n=25) and age, sex, BMI matched healthy controls (n=25) to undergo cardiopulmonary exercise testing with open circuit acetylene to measure aerobic capacity (VO₂ peak) and determinants of O₂ transfer (cardiac output, arterial-venous O₂ content difference). Magnetic resonance imaging will quantify abdominal VAT; and dual x-ray absorptiometry will quantify total body composition (lean mass, total fat mass, and fat free mass). Chronic activity will be assessed using externally worn
accelerometry devices and QOL will be assessed using the Kansas City Cardiomyopathy Questionnaire (KCCQ).

RESULTS AND CONCLUSIONS

Upon completion of this research, we expect to observe increased VAT, reduced exercise capacity, lower chronic activity, and reduced QOL in HFpEF compared to healthy controls. Further, among all participants, we expect to observe an inverse relationship between VAT and exercise capacity, chronic activity, and QOL. Interaction analysis will be performed to determine whether the associations between VAT and disease severity are amplified in subjects with HFpEF.

If a relationship is observed between VAT and aerobic capacity, these data will establish a new role for adipose tissue in its contribution to the pathophysiology of HFpEF and exercise intolerance. This research, while pilot in nature, may help inform whether development of novel therapeutics targeting adipose and VAT may improve clinical status in patients with HFpEF.