IMPAIRED SYSTEMIC OXYGEN EXTRACTION IN HEART FAILURE WITH PRESERVED EJECTION FRACTION

ACC Moderated Poster Contributions
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Session Title: Delineating Exercise-related and Hemodynamic Abnormalities in Chronic Heart Failure
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Background: Exercise Capacity is similarly impaired in patients with heart failure with preserved LV ejection fraction (HFP EF) and HF with reduced LVEF (HFr EF). However, relative contributions of cardiac output (CO) and arterio-mixed venous oxygen content difference (C(a-v)O2) to VO2 during exercise in HFP EF vs. HFr EF are unknown. We hypothesized that HFP EF would be associated with impaired O2 extraction during exercise (i.e. C(a-v)O2<14ml/dL and CVO2>5ml/dL).

Methods: We studied consecutive heart failure patients referred for cardiopulmonary exercise testing (CPET) with invasive hemodynamic monitoring who had RER>1.05, and resting, supine pulmonary capillary wedge pressure (PCWP)>15mmHg with LVEF>0.50 (HFP EF, N=40) or LVEF<0.40 (HFr EF, N=56). Simultaneous Fick CO, arterial and mixed venous blood gases were measured every minute throughout incremental upright cycle-ergometry CPET.

Results: Despite no differences in age, BMI, hemoglobin level, or CaO2, and similar peak VO2, patients with HFP EF demonstrated higher CO and lower C(a-v)O2 throughout exercise compared to patients with HFr EF (Figure). At peak exercise, CVO2 fell normally in HFr EF (4.7±1.4 ml/dl) but not in HFP EF (6.7±1.9 ml/dl, P<0.0001).

Conclusions: Patients with HFP EF extract O2 less avidly during exercise than patients with HFr EF. Impaired O2 extraction in HFP EF may reflect intrinsic abnormalities in skeletal muscle or peripheral vascular function and represents a potential target for therapeutic intervention.

![Graphs showing CO and C(a-v)O2 changes during exercise for HFP EF and HFr EF patients.](image-url)