PURPOSE: To characterize resting and exertional right ventricular (RV) function during exercise among patients with heart failure with reduced ejection fraction (HFrEF).

METHODS: Six patients (five males, 60±9yrs) completed invasive cardiopulmonary exercise testing (CPET) on upright cycle ergometry with conductance catheters for real-time RV pressure-volume (PV) analysis, as well as radial arterial catheterization for blood pressure monitoring. Data were collected at rest, two submaximal levels of exercise (Steady-States 1, 2) below ventilatory threshold, and peak effort. Breath-by-breath gas-exchange parameters were determined by indirect calorimetry. Cardiac output (Qc) was determined by direct Fick.

RESULTS: Cohort characteristics are displayed in Table 1. VO2Max was severely reduced (11.8±5.0) and ventilatory efficiency was severely abnormal (46±15). Exercise Qc increased from rest to Steady-State 1, but there were no increases thereafter at higher workloads or at peak effort. Exercise myocardial energetics (stroke work) were also blunted with a modest increase from rest to Steady-State 2. Diastolic reserve (dpdtmin) increased modestly from rest to Steady-State 1 only. Table 2 displays exercise hemodynamics and gas-exchange parameters. An example figure of hemodynamics and RV PV loops during exercise is displayed in Figure 1.

CONCLUSION: HFrEF patients experience impairments in RV contractile and lusitropic reserve, and energy utilization during exercise. These findings demonstrate how exertional RV dysfunction contributes to impairments in functional capacity."