CALCULATED PLASMA VOLUME STATUS RELATES TO EXERCISE CAPACITY IN CHRONIC HEART FAILURE

Poster Contributions
Poster Sessions, Expo North
Sunday, March 10, 2013, 3:45 p.m.-4:30 p.m.

Session Title: New Paradigms in Prognostic Role of Biomarkers in Heart Failure
Abstract Category: 15. Heart Failure: Clinical
Presentation Number: 1265-305


Background: Plasma volume (PV) expansion drives systemic congestion in chronic heart failure (CHF) and is a plausible substrate for exercise limitation. Because no simply means of quantifying PV in CHF exists, we derived an index of relative PV status (PVS) and tested its relation to exercise performance in CHF patients (pts).

Methods: We analysed data from 123 systolic CHF pts (age 66±13yrs, 70% male, 32% NYHA class ≥ 3, PVO2 1438±703 mL/min, PVO2/kg 18±7 mL/kg/min). PVS was calculated by subtracting a validated equation for ideal PV (c x weight) from one for current PV ([1-hematocrit] x [a + (b x weight)]) with the results expressed as a % of ideal PV.

Results: Median PVS was - 9±13% with 15% of pts having PV expansion. Higher PVS correlated to lower absolute PVO2 (r = - 0.62, P<0.0001, Fig A), PVO2/kg (r = - 0.34, P>0.001), and oxygen uptake efficiency slopes (r = - 0.51, P<0.0001, Fig B). On simple regression, PVS, age, female gender, peak systolic BP, ischemic etiology, NYHA class, diuretic therapy, and β-blocker use related to PVO2. On multiple regression, only PVS (r= - 0.34), age (r= - 0.48), and peak systolic BP (r=0.17) independently predicted PVO2 (r2 = 0.66, P - 5% optimally forecasted severe exercise limitation as marked by a PVO2/kg ≤14 mL/kg/min (area under the curve 0.62, 95% CI 0.53-0.71, P=0.02).

Conclusions: Plasma volume expansion identified using simple clinical indices relates to exercise intolerance in CHF and titrating therapies to PVS might improve functional capacity.