THE PROGNOSTIC ABILITY OF PULMONARY ARTERIAL CAPACITANCE EXCEEDS THAT OF PULMONARY VASCULAR RESISTANCE IN ADVANCED LEFT SIDED HEART FAILURE

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Background: Right ventricular (RV) failure frequently occurs in left-sided heart failure (HF) and independently prognosticates. We investigated the determinants and prognostic role of the RV afterload measure pulmonary arterial capacitance (PAC), defined as the quotient of stroke volume and pulmonary arterial pulse pressure.

Methods: We reviewed 724 advanced HF patients who underwent right heart catheterization between 2000 and 2005. Survival was defined as freedom from all-cause mortality and transplantation.

Results: In our patient cohort (age 55 ± 11 years, EF 19 ± 9 %), median PAC was 2.5 [1.60 - 3.96] mL/mmHg. PAC showed an inverse relation with pulmonary vascular resistance (PVR), that best fitted a hyperbola. Increasing wedge pressure lowered PAC at similar PVR values [figure1]. RV failure, defined as grade 3 or 4 hypokinetic motion, was better explained by PAC than PVR (AUC ROC 0.74 vs 0.67, p = 0.003). During 3.2 ± 2.2 years of follow-up, 224 deaths (31%) and 163 transplants (23%) occurred. In univariate analysis, both lower PAC (p<0.0001) and higher PVR (p<0.0001) predicted adverse events but PAC was stronger (C-statistic 69 vs 64, p = 0.02). In multivariate analysis, PAC but not PVR remained an independent predictor (Hazard ratio = 0.92 [0.84 - 1.0], p=0.04).

Conclusions: Pulmonary arterial capacitance bundles the effects of PVR and wedge pressure on RV afterload, explaining its superior prognostic ability in HF.