



DECREASED AORTIC INERTANCE IS INDEPENDENTLY ASSOCIATED WITH LEFT VENTRICULAR HYPERTROPHY: ROLE IN VENTRICULAR-ARTERIAL COUPLING

Poster Contributions
Poster Hall, Hall C
Saturday, March 18, 2017, 3:45 p.m.-4:30 p.m.

Session Title: Markers of Prognosis Associated With Elevated Blood Pressure
Abstract Category: 33. Prevention: Hypertension
Presentation Number: 1234-038

Authors: *Timothy S. Phan, Zeba Hashmath, Amer Ahmed Syed, Izzah Vasim, Uzma Kewan, Swapna Varakantam, Scott R. Akers, Julio A. Chirinos, University of Pennsylvania, Philadelphia, PA, USA*

Background: Considerable controversy exists regarding the role of aortic diameter in hypertension. The arterial tree functionally uncouples the left ventricle (LV) from the high peripheral resistance of the arterioles during ejection, thus reducing LV workload. Modeling/theoretical considerations indicate that independent of changes within the arterial wall, aortic dilation counters this favorable uncoupling during ejection by increasing wavelengths (λ) of traveling pulse waves. This may lead to increased sensitivity of the LV to arterial wave reflections and LV hypertrophy (LVH). We hypothesize that decreased aortic inertance from aortic dilation is associated with LVH.

Methods: We measured carotid-femoral pulse wave velocity (PWV) and LV mass (LVM) with SSFP MRI in 409 subjects (mean age = 61 yrs). Aortic geometry was measured with a novel 3D aortic analyzer (mia-Ilc, Iowa). We computed compliance (AC) and inertance (IA) from PWV and aortic geometry.

Results: After adjusting for age, height, weight, sex and thoracic aorta AC, decreased IA remained significantly associated with increased LVM (stand. β = -0.314; p < 0.001). IA was the strongest predictor of LVM in this model; AC was not predictive (β = 0.010; p = 0.827).

Conclusions: Reduced IA from aortic dilation is independently associated with LVH. This is consistent with the principle that reduced IA increases pulse λ , which unfavorably couples the LV to the stiffer peripheral circulation (rather than the more compliant aorta) during ejection.

Model R ² =0.27	Standardized β	p-value
(Constant)		0.04
Inertance	-0.314	<0.001
Area Compliance	0.01	0.827
Age	-0.161	0.005
Height	0.065	0.214
Weight	0.299	<0.001
Sex	0.0809	0.094