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Assessment of the interaction of heritability of volume load and left ventricular mass: the HyperGEN offspring study.

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Abstract

BACKGROUND: Left ventricular mass (LVM) is more closely associated with volume load than pressure load. We assessed whether part of the genetic heritability of LVM can be explained by stroke volume (SV) inheritance.

METHODS: Echocardiographic LVM, SV and peripheral resistance were measured in 527 families with at least two relatives from the HyperGEN study (51% African-American, 43% men, 44% obese, 53% hypertensive). Included were 1792 subjects without prevalent cardiovascular disease, diabetes and renal failure. Ethnic-specific genetic correlations were estimated using a variance components procedure (SOLAR).

RESULTS: Significant genetic correlations existed between LVM and SV after adjusting for age, sex, race, field center, systolic blood pressure, number of antihypertensive medications, and body mass index ($r_{\text{hog}} = 0.93$ in African-Americans and 0.70 in Caucasians; both $P < 0.0001$). Urinary Na excretion or serum creatinine did not influence these correlations. After adjusting for covariates, heritability of LVM was greater ($h = 0.46$ in African-Americans and 0.47 in Caucasians; both $P < 0.0001$) than that for SV ($h = 0.18$ in African-Americans and 0.29 in Caucasians; both $P < 0.02$). Heritability of LVM slightly decreased in African-Americans ($h = 0.34$), but not in Caucasians ($h = 0.45$; both $P < 0.0001$) when SV was added to covariates. Heritability of SV almost disappeared by addition of LVM into the model in African-Americans ($h = 0.04$, $P =$ not significant), whereas it was slightly reduced in Caucasians ($h = 0.20$, $P < 0.005$).

CONCLUSION: LVM and SV share a common genetic profile, but with only a modest reciprocal influence. Variability of LVM has some effect on calculated heritability of SV, especially in African-Americans, whereas the role of heritable volume load in determining the variability of LVM was modest only in African-Americans.

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