DIFFERENTIAL IMPACT OF BLOOD PRESSURE ON LEFT VENTRICULAR GEOMETRY IN BLACK AND WHITE YOUNG ADULTS: THE BOGALUSA HEART STUDY

Jian Wang1,2, Wei Chen1, Litao Ruan1,3, Ahmet Toprak1, Sathanur R. Srinivasan1, Gerald S. Berenson1
1 Center for Cardiovascular Health, Tulane University, New Orleans, LA, 2 Department of Ultrasound, The First Affiliated Hospital, Shanxi Medical University, Taiyuan, China, and 3 Department of Ultrasound Diagnostics, the First Affiliated Hospital, School of Medicine, Xi’an Jiaotong University, Xi’an, China

Introduction: Left ventricular (LV) hypertrophy is more prevalent in blacks; hypertension and obesity are more common in blacks than in whites and strongly associated with LV hypertrophy. This study assessed the hypothesis that blood pressure (BP) and obesity measures have a differential impact on LV geometry in black and white young adults.

Methods: The study cohort consisted of 1123 subjects (780 whites and 343 blacks; 42% males; age=24-47 years) enrolled in the Bogalusa Heart Study. LV structure was measured by a two-dimensional guided M-mode echocardiography. Normal geometry, concentric remodeling, eccentric and concentric hypertrophy were defined by LV relative wall thickness and LV mass indexed to height (gram/height in m^{2.7}). The predictive values of BP and body mass index (BMI) were compared by receiver operating characteristic (ROC) curves.

Results: Blacks versus whites and males versus females showed significantly greater LV mass index. Blacks versus whites had higher prevalence of both eccentric (15.7% vs 9.1%, p<0.001) and concentric hypertrophy (9.3% vs 4.1%, p<0.001). In separate multivariable logistic regression analysis models, adjusting for age, sex, glucose, triglycerides, HDL and LDL cholesterol, BMI was associated with eccentric hypertrophy (odds ratio (OR)=1.2, p<0.001) and with concentric hypertrophy (OR=1.1, p<0.01) in both races. Systolic BP was associated with eccentric hypertrophy (OR=1.2 p=0.002) in blacks only and with concentric hypertrophy in both races (OR=1.03, p=0.042 in whites; OR=1.1, p<0.001 in blacks); diastolic BP showed similar trends. Data on the area under the ROC curve, measured by c statistic, showed that systolic BP had a significantly greater predictive value in blacks versus whites for eccentric hypertrophy (c=0.601 vs 0.501, p=0.008) and concentric hypertrophy (c=0.719 vs 0.594, p<0.001). However BMI did not show such a race difference in the predictive values.

Conclusions: These findings indicate that BP levels have a differential impact on the LV geometric changes in black and white young adults, suggesting a potential divergence in mechanisms underlying the target organ damage in the black and white populations.

Key words: left ventricular geometry; blood pressure; obesity; black-white