Editorial Commentary

Left Ventricular Hypertrophy Is More Common in Black than White Hypertensives: Is This News?

Mark H. Drazner

It is often stated that left ventricular hypertrophy (LVH) is more common in blacks than in whites. Given that hypertension and hypertensive complications such as stroke and end-stage renal disease are more common in blacks than whites, it would be surprising if LVH was also not more common in blacks. Why then is the study by Kizer in this issue of Hypertension newsworthy?

First, it is important to recognize that LVH is an important cardiovascular phenotype. It has been shown to be associated with an increased risk for a number of adverse clinical outcomes including heart failure, incident coronary artery disease, stroke, arrhythmia, and mortality. Thus, understanding whether ethnic disparities in LVH do exist has clear public health implications, especially as vigorous attempts are made to understand and eliminate the increased cardiovascular mortality endured by black men and women as compared with their white counterparts.

Next, it is important to critically assess the data which support the claim that LVH is known to be more common in blacks than whites. In 1998, Deveraux and colleagues in a meta-analysis of the 9 prior echocardiographic studies that addressed black-white disparities in LVH do exist concluded that left ventricular wall thickness but not left ventricular mass was consistently increased in blacks as compared with whites. In addition, the individual studies on which the meta-analysis was based were often small convenience samples and thus were likely not to be representative of the general population.

Since then, several studies have again addressed the issue of ethnic disparity in LVH. For example, a study of 408 subjects recruited from a hypertensive clinic found that LVH was more common in blacks (50%) than in whites (33%). In 687 children followed longitudinally with echocardiography, blacks had higher left ventricular mass than whites in early adulthood. In contrast, in 332 white and 112 black participants of the Hypertension Optimal Treatment study, there were no significant ethnic differences in left ventricular mass indexed to body surface area.

Two other studies merit special attention. The Coronary Artery Disease Risk Development in Young Adults (CARDIA) Study, a National Heart, Lung, and Blood Institute-sponsored prospective epidemiological study of black and white young adults, found increased left ventricular mass in blacks as compared with whites in a cohort of approximately 4000 subjects. Additionally, the CARDIA year 10 follow-up study of 669 blacks and 949 whites found a higher prevalence of LVH among blacks than whites, but there were only ~30 total cases of LVH in both groups, which questions the strength of that conclusion. The Atherosclerosis Risk in Communities (ARIC) Study also recently reported their findings based on M-mode echocardiographic examinations of 1730 subjects performed in Jackson, Mississippi, between 1993 and 1996. LVH was extremely common in their cohort of middle-aged blacks, with estimates ranging in male hypertensives from 35% (LVH defined by indexation to body surface area) to 56% (LVH defined by indexation to height). The comparable estimates of LVH prevalence were even higher in hypertensive women, ranging from 64% to 79%. However, because this study cohort was entirely black, it was not possible to determine whether there was an ethnic disparity in LVH in this community. Thus, despite increasingly suggestive data, the question as to whether LVH is more common in blacks than whites remains open.

The present study by Kizer and colleagues, an analysis of the Hypertension Genetic Epidemiology Network (HyperGEN) Study, is therefore of interest. In previous HyperGEN analyses, black race was reported to be associated with increased left ventricular mass and prevalent LVH but those studies focused on other risk factors for increased left ventricular mass and did not address the association of ethnicity and LVH in detail. In contrast, the present report now focuses directly on this issue. Kizer and colleagues find substantial differences between blacks and whites in cardiac structure including blacks having increased left ventricular mass, posterior and septal wall thickness, and relative wall thickness. The differences in left ventricular mass and relative wall thickness persisted in multivariable models that adjusted for important confounders. Although the crude prevalence of LVH in each ethnic group was not reported, the adjusted odds ratio for LVH associated with black race was 1.8 (LVH as defined by indexation to height) to 2.5 (LVH as defined by indexation to body surface area). Additionally, the multivariable-adjusted left ventricular internal dimension was smaller in blacks than whites, confirming the predominance of concentric and not eccentric LVH, a pattern that would be expected if LVH was a consequence of hypertension. In total,

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From the Heart Failure Research Unit, Donald W. Reynolds Cardiovascular Clinical Research Center, Division of Cardiology, Department of Internal Medicine, University of Texas Southwestern Medical Center, Dallas.

Correspondence to Dr Mark Drazner, University of Texas Southwestern Medical Center, Dallas, TX 75390-9047. E-mail Mark.Drazner@utsouthwestern.edu

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these data provide important support to the contention that hypertensive blacks have increased left ventricular mass and more prevalent LVH than white hypertensives.

There are some caveats to the conclusions of this study. First, there is a concern regarding the generalizability of its findings given the patient population studied. Specifically, HyperGEN used a sib-pair design that required 2 or more siblings to have hypertension of onset by the age of 60. If such criteria identified hypertensives uniquely susceptible to LVH and had this unintended effect disproportionately in blacks, then the estimate of the comparative prevalence of LVH in blacks to whites in this study may be biased as compared with the general population. It is also difficult to discern how often LVH was present in both members of the black sibships and the white sibships, data which may have provided insights into the potential bias introduced by the study design. Although the investigators adjusted for relatedness using statistical methodology, it is not clear whether this approach is sufficiently robust to yield estimates that are reflective of the general hypertensive population. Another concern is whether the adjustment for socioeconomic status was performed. The single measure adjusted for in multivariable models was attainment of at least 4 years of college, which may not be sufficient to address differences between the 2 ethnic groups at the lower end of the socioeconomic spectrum.

Despite these concerns, the study by Kizer et al contributes important information as to whether LVH is more common in black than white hypertensives. In this particular case, it appears that a widely held perception based on limited data will in the end prove correct. Two recently completed studies that performed cardiac MRI in large numbers of blacks and whites, the Dallas Heart Study15 and the Multi-Ethnic Study of Atherosclerosis,16 should provide additional data to answer this important question in the near future.

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