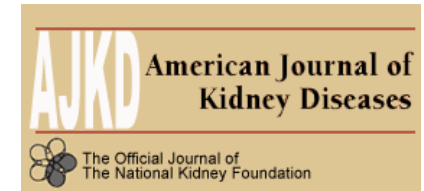


# Association of kidney function and hemoglobin with left ventricular morphology among African Americans: the Atherosclerosis Risk in Communities (ARIC) study



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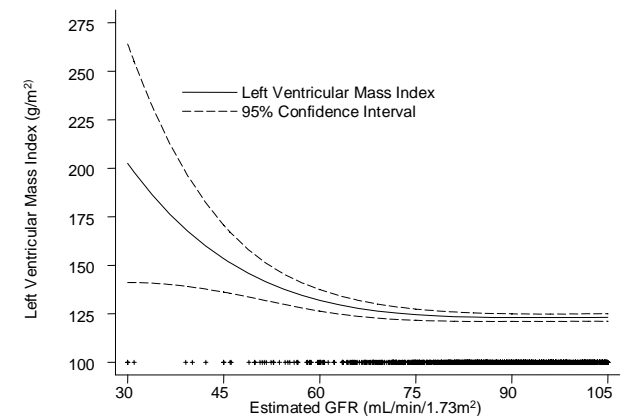


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THE RISK FOR cardiovascular mortality among patients with kidney failure is 10 to 20 times that of the general population. Much of this burden may be explained by the high prevalence of cardiovascular risk factors in this population. Left ventricular (LV) hypertrophy (LVH) is present in more than 70% of individuals initiating long-term dialysis therapy, and the presence of LVH is associated with increased risk for heart failure and mortality in this population. The high prevalence of LVH among patients initiating long-term dialysis therapy suggests that changes in LV morphological characteristics occur early in the progression of chronic kidney disease. *Am J Kidney Dis.* 2004; 43(5): 836-45

**BACKGROUND:** Left ventricular (LV) hypertrophy (LVH) is present in more than 70% of patients with kidney failure. Hypertension and anemia, 2 strong risk factors for LVH, are common in patients with moderate kidney dysfunction. It is unknown whether kidney function and lower hemoglobin levels are associated with LV morphological characteristics among African Americans with moderate kidney dysfunction, independent of blood pressure. **METHODS:** As part of the Atherosclerosis Risk in Communities Study, 1,968 African Americans aged 50 to 75 years underwent an echocardiogram after 6 to 9 years of follow-up. LV mass was indexed (LVMI) to body surface area. Glomerular filtration rate (GFR) was estimated from calibrated serum creatinine levels measured at baseline and after 3 years (<30 mL/min/1.73 m<sup>2</sup> excluded). Hemoglobin was measured at baseline and after 3 years. Blood pressure was measured every 3 years. **RESULTS:** A mean GFR of 30 to 59 mL/min/1.73 m<sup>2</sup> was associated with a 15.3 g/m<sup>2</sup> greater LVMI, 0.9 mm greater posterior wall thickness, and 1.0 mm greater interventricular septal thickness compared with a GFR of 90 mL/min/1.73 m<sup>2</sup> or greater. These associations remained after adjustment for age, sex, hemoglobin level, blood pressure, and other covariates. Wall thickness and LVMI increased with lower GFR less than 75 mL/min/1.73 m<sup>2</sup> (5.5 g/m<sup>2</sup> greater LVMI [95% confidence interval (CI), 0.9 to 10.1] per 10 mL/min/1.73 m<sup>2</sup> lower GFR). A lower hemoglobin level was associated with greater LV diameter (0.5 mm [95% CI, 0.2 to 0.7] per 1 g/dL [10 g/L]), but not wall thickness, after adjustment.

**CONCLUSION:** These results in a general population sample of middle-aged African Americans suggest that moderately decreased kidney function independently predicts greater LV wall thickness, and lower hemoglobin level independently predicts greater LV diameter. These findings may explain, in part, the high risk for cardiovascular disease observed among individuals with kidney disease.



LVMI among 1,968 African Americans according to estimated GFR adjusted for age, sex, systolic and diastolic blood pressure at each visit, use of antihypertensive medication, hemoglobin level, body mass index, diabetes mellitus, and smoking status by using a polynomial regression.