OBSERVATIONS

Albuminuria Associates With Calcified Atherosclerotic Plaque in African Americans With Diabetes

Relative to individuals with European ancestry, presence and severity of calcified atherosclerotic plaque (CP) are markedly lower in individuals with African ancestry (1,2). Factors potentially contributing to the ethnic variation in susceptibility to atherosclerosis include different relationships between CP and serum 25 hydroxyvitamin D concentrations and pericardial adipose tissue volumes in African Americans (AAs) relative to European Americans (EAs) (3,4). In addition, significant positive associations have been observed between CP and albuminuria in EAs with type 2 diabetes (5) but not AAs (419 subjects from 297 African American Diabetes Heart Study [AA-DHS] families) (6). Therefore, it remains unclear whether ethnic differences exist in the effect of albuminuria on risk for development and progression of CP.

To improve power for detecting associations between albuminuria and CP in AAs, we retested relationships between urine albumin:creatinine ratio (UACR) and CP in the full AA-DHS sample containing 597 unrelated participants. Generalized linear models were fitted to test for associations between UACR and CP in the coronary arteries, carotid arteries, and infrarenal aorta. The effect sizes for the UACR versus CP associations in the new analysis are shown in Table 1 and did not change markedly from our initial report (6). Significant positive associations were now observed in all three vascular beds adjusting for age, sex, BMI, and estimated glomerular filtration rate. In a full model that adjusted for age, sex, BMI, diastolic blood pressure, and systolic blood pressure, use of ACE inhibitors and angiotensin receptor blockers, LDL cholesterol, HDL cholesterol, HbA_{1c}, and smoking in 491 unrelated individuals, the effect remained significant for coronary and aorta CP but not carotid CP; carotid vascular beds typically have lower CP scores than coronary arteries and aorta.

The difference in significance between the albuminuria and CP relationship in these analyses and our initial report (6) appears to be the result of an increased sample size. After adjustment, the initial analyses included only 283 samples with some related individuals. The current analysis used data from nearly twice as many subjects. In addition, differences between the final numbers of samples in both analyses are due to missing data; SAS excludes samples if missing data exists for one covariate in the model. We now conclude that albuminuria is positively associated with CP in the large vessels of individuals with type 2 diabetes of African and European ancestry. Observed ethnic differences in susceptibility to CP appear more likely to relate to nonconventional cardiovascular disease risk factors and gene polymorphisms with different distributions across population groups, not the effects of albuminuria (7).

Table 1—*Relationships between albuminuria and calcified atherosclerotic plaque*

Vascular bed	Adjustment	Estimate	*P* value
Coronary CP	None	0.1733	0.0067
	Age and sex	0.1753	0.0024
	Age, sex, BMI, and eGFR	0.1764	0.0024
	Full	0.1399	0.0300
Carotid CP	None	0.1074	0.0270
	Age and sex	0.1139	0.0110
	Age, sex, BMI, and eGFR	0.1113	0.0129
	Full	0.0596	0.2287
Infrarenal aorta CP	None	0.1958	0.0105
	Age and sex	0.2154	0.0011
	Age, sex, BMI, and eGFR	0.2080	0.0016
	Full	0.1731	0.0120

eGFR, estimated glomerular filtration rate.

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J.D. researched the data and wrote the manuscript. L.E.W., J.X., and C.D.L. researched the data and reviewed and edited the manuscript. D.W.B. assisted in participant recruitment and reviewed and edited the manuscript. J.J.C., R.C.H., and S.C.S. performed clinical phenotyping and reviewed and edited the manuscript. B.I.F. recruited and phenotyped study subjects, researched the data, and wrote the manuscript. B.I.F. is the guarantor of this work and, as such, had full access to all the data in the study and takes

responsibility for the integrity of the data and the accuracy of the data analysis.

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