Measurement of arterial distensibility in the Atherosclerosis Risk in Communities (ARIC) Cohort

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Ultrasonic measurements of carotid artery distensibility are being performed during a six-year period on a geographically diverse cohort of 16,000 men and women between the ages of 45 and 64 as part of the multi-center cardiovascular epidemiological Atherosclerosis Risk in Communities (ARIC) Study. Arterial wall echoes from the diametrically opposite media-adventitis interfaces of the left common carotid artery are electronically tracked for up to 10 consecutive cardiac cycles to provide mean values of systolic and diastolic diameters at a site located 1 cm proximal to the origin of the bifurcation. By combining these diameters with concurrent measurements of the systolic and diastolic blood pressures in the brachial artery, artery distensibility, compliance and the pressure-strain elastic modulus can be computed. A large variability in the stiffness of the carotid arteries should exist within the ARIC population of which only a small fraction should be attributable to measurement variability. This report describes the ARIC methodology and provides preliminary results which indicate the general characteristics of the distensibility data which will be available on the full cohort during the course of the study. Subsequent reports will investigate in detail associations between these stiffness parameters and the numerous traditional and non-traditional cardiovascular disease risk factors also being acquired on the ARIC cohort.

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