

High-resolution B-mode ultrasound reading methods in the Atherosclerosis Risk in Communities (ARIC) Cohort

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To measure the association of cardiovascular disease risk factors with carotid artery diameter and thickness of the intima and media in the general population, standardized ultrasound scanning and reading protocols were performed on 15,800 individuals in the multicenter Atherosclerosis Risk in Communities (ARIC) Study. In a randomly selected subset of 855 participants, the mean artery diameter, minimum lumen diameter, and maximum near- and far-wall thicknesses were measured at a core laboratory from B-mode image recordings of the common carotid, bifurcation, and internal carotid arteries to determine both within-reader and between-reader variability. Measurements associated with the wall thickness are sensitive indicators of reader reproducibility, with between-reader reliability coefficients ranging from 0.78 to 0.93 and coefficients of variation ranging from 13.1 to 18.3%. The percent of paired readings in the three carotid segments for which the absolute difference of the far-wall thickness measured by different readers was no greater than one image pixel (0.067 mm) was 58% (common carotid), 53% (internal carotid), and 42% (bifurcation). Highly reproducible measurements of carotid artery dimensions can be achieved with standardized training and performance of ultrasound scanning and reading protocols.

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