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Morphological Carotid Plaque Area Is Associated With Glomerular Filtration Rate: A Study of South Asian Indian Patients With Diabetes and Chronic Kidney Disease

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Abstract

We evaluated the association between automatically measured carotid total plaque area (TPA) and the estimated glomerular filtration rate (eGFR), a biomarker of chronic kidney disease (CKD). Automated average carotid intima-media thickness (cIMTave) and TPA measurements in carotid ultrasound (CUS) were performed using AtheroEdge (AtheroPoint). Pearson correlation coefficient (CC) was then computed between the TPA and eGFR for (1) males versus females, (2) diabetic versus nondiabetic patients, and (3) between the left and right carotid artery. Overall, 339 South Asian Indian patients with either type 2 diabetes mellitus (T2DM) or CKD, or hypertension (stage 1 or stage 2) were retrospectively analyzed by acquiring cIMTave and TPA measurements of their left and right common carotid arteries (CCA; total CUS: 678, mean age: 54.2 ± 9.8 years; 75.2% males; 93.5% with T2DM). The CC between TPA and eGFR for different scenarios were (1) for males and females -0.25 ($P < .001$) and -0.35 ($P < .001$), respectively; (2) for T2DM and non-T2DM -0.26 ($P < .001$) and -0.49 ($P = .02$), respectively, and (3) for left and right CCA -0.25 ($P < .001$) and -0.23 ($P < .001$), respectively. Automated TPA is an equally reliable biomarker compared with cIMTave for patients with CKD (with or without T2DM) with subclinical atherosclerosis.

Keywords: atherosclerosis; cardiovascular disease; carotid intima-media thickness; chronic kidney disease; estimated glomerular filtration rate; morphological total plaque area; risk assessment.

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