COMPUTED TOMOGRAPHY ANGIOGRAPHY-DERIVED CORONARY PLAQUE ARC CALCIFICATION IS ASSOCIATED WITH CULPRIT LESION STATUS IN ACUTE CORONARY SYNDROMES

ACC Oral Contributions
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Background: Recent studies have demonstrated that multidetector computed tomography angiography (CTA) can accurately detect the presence of obstructive CAD in symptomatic patients. CTA can also characterize atherosclerotic plaque morphology, which may help improve CAD risk prediction and management. Specifically, the extent of plaque arc calcification may predict coronary lesions that are likely to cause ACS.

Methods: We evaluated data from 371 patients who underwent CTA prior to invasive angiography (ICA) in the CORE64 study. Using centralized blinded analysis, 4,638 coronary segments were quantitatively analyzed for stenosis severity and extent of arc calcification: non-calcified, mildly calcified (arc < 90°), moderately calcified (arc 90-180°), and severely calcified (arc > 180°). Plaque arc calcification was compared between ACS and non-ACS patients, as well as between culprit lesions (defined as the highest-grade stenosis by ICA) and non-culprit lesions in both patient groups.

Results: ACS (n = 94) and non-ACS patients (n = 277) were demographically similar (53 vs. 55 years of age, p = 0.51; 71% vs. 77% male, p = 0.30; 68% vs. 71% hypertensive, p = 0.62; and 30% vs. 25% diabetic, p = 0.35). Smoking was more common among ACS patients (27% vs. 15%, p=0.01) while hypercholesterolemia was less common (50% vs. 68%, p = 0.002). Patients with ACS had more non-calcified plaques (60% vs. 55%, p = 0.003), while non-ACS patients had more severely calcified plaques (9% vs. 6%, p = 0.001). Culprit lesions among ACS patients were more commonly non-calcified (45% vs. 28%, p = 0.006) versus non-ACS patients. Overall, culprit lesions among ACS patients exhibited significantly lower degrees of arc calcification versus non-ACS patients (p = 0.006). Lower arc calcification was associated with ACS after adjustment for important covariates, including total coronary calcium score.

Conclusion: Patients with ACS had a higher proportion of culprit lesions with lower degrees of arc calcification compared to non-ACS patients, and arc calcification was independently associated with ACS. These data support the hypothesis that CTA-derived plaque characteristics may provide independent prognostic information for ACS.