DOES NONCALCIFIED PLAQUE IMPROVE THE DIAGNOSTIC AND PROGNOSTIC UTILITY OF CORONARY CT ANGIOGRAPHY? A STUDY OF PROPENSITY-MATCHED INDIVIDUALS WITH SIMILAR CORONARY CALCIUM SCORES FROM THE PROSPECTIVE MULTICENTER INTERNATIONAL CONFIRM REGISTRY

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Background: Calcified plaque (CP) on non-contrast coronary calcium scoring (CCS) robustly predicts future major adverse cardiac events (MACE). Noncalcified plaques (NCP) are detectable by contrast-enhanced coronary CT angiography (CCTA), but whether NCP improves diagnostic and prognostic utility beyond CCS remains inadequately examined.

Methods: From 27125 subjects enrolled in a multinational CCTA registry, we identified subjects without known coronary artery disease (CAD) who underwent CCS scanning and ≥64-slice CCTA. The presence and number of segments with NCP was quantified. Propensity-matching was performed--accounting for age, gender, CCS and CAD stenosis severity (1, 2, 3-vessel or left main disease at >50% stenosis)--to identify subjects with NCP (NCP+ group) who were comparable to subjects without NCP (NCP- group). Matching resulted in 1952 NCP+ and 1952 NCP- subjects. Presence, extent and severity of NCP were investigated in relation to risk of MACE [death, acute myocardial infarction (AMI) or acute coronary syndrome (ACS)] using Cox Proportional hazards models, adjusting for age, gender CAD risk factors and log CCS.

Results: Among the 3804 matched subjects, 64% were men (mean age 60±11 years). In risk-adjusted multivariate analyses, presence of NCP was associated with higher incident MACE (Hazard Ratio [HR] 1.4, 95% CI 1.0-2.1, p=0.04). Compared to the NCP- individuals, individuals with obstructive NCP (≥50% stenosis) experienced higher MACE risk (HR 1.9, 95% CI 1.3-2.9, P=0.002), but those with nonobstructive NCP did not (HR 1.2, 95% CI 0.8-1.8, p=0.44). In risk-adjusted multivariate analyses, individuals with increasing numbers of both nonobstructive and obstructive NCPs experienced higher rates of MACE, with a risk threshold of >2 coronary segments with NCP conferring higher risk (HR 1.6, 95% CI 1.0-2.4, p=0.04).

Conclusions: In propensity-matched individuals with similar baseline CCS and CAD stenosis, the presence, extent and severity of NCP by CCTA are independent predictors of future MACE.