TEMPORAL CHANGES IN CORONARY 18F-FLUORIDE PLAQUE UPTAKE IN PATIENTS WITH CORONARY ATHEROSCLEROSIS

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Objective To determine the natural history of coronary 18F-fluoride uptake over 12 months in patients with either advanced stable coronary artery disease or a recent myocardial infarction.

Methods Patients with established multivessel coronary artery disease and either stable disease or a recent acute myocardial infarction underwent coronary 18F-fluoride positron emission tomography and computed tomography angiography which was repeated at either 3, 6 or 12 months. Coronary 18F-fluoride uptake was assessed in each vessel by measuring the coronary microcalcification activity (CMA). Coronary calcification was quantified by measuring calcium score, mass, and volume.

Results Fifty-nine patients had stable coronary artery disease (median age 68 years, 93% male) and fifty-two patients had a recent myocardial infarction (median age 65 years, 83% male). Reflecting the greater burden of coronary artery disease, baseline CMA values were higher in those with stable coronary artery disease. Coronary 18F-fluoride uptake (CMA>0) was associated with higher baseline calcium scores (294 [116–483] versus 72 [8–222] AU; P<0.001), and more rapid progression of coronary calcification scores (39 [10–82] versus 12 [1–36] AU/year; P<0.001), compared to the absence of uptake (CMA=0). Coronary 18F-fluoride uptake did not markedly alter over the course of 3, 6 or 12 months in patients with either stable coronary artery disease or a recent myocardial infarction.

Conclusion Coronary 18F-fluoride uptake is associated with the severity and progression of coronary artery disease but does not undergo rapid dynamic change in patients with stable or unstable coronary artery disease.

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Objective We aimed to assess the impact of diabetes mellitus on quantitatively assessed plaque burden in patients with and without diabetes mellitus in the Scottish COnputed Tomography of the HEART (SCOT-HEART) trial.

Methods Coronary artery calcium (CAC) score was assessed on non-contrast computed tomography (CT). Coronary stenoses, visually assessed high-risk plaque and quantitative plaque burdens (Autoplaque, V2.5) were assessed on coronary CT angiography (CCTA). Multivariable analyses were performed to assess the impact of diabetes mellitus and cardiovascular risk score on quantitatively assessed plaque, and survival analysis was performed.

Results Images of 1769 patients were assessed (56% male, 58 ± 9 years). Diabetes mellitus was present in 196 (11%) of patients, with Type 1 in 14 (0.8%) and Type 2 in 169 (9.6%). Patients with diabetes mellitus had higher 10-year cardiovascular risk score (29 [interquartile range 21, 40] versus 15 [9, 21], p<0.001) and CAC score (71 [1, 447] versus 17 [0, 209] Agatston units; p<0.001), but were not more likely to have obstructive disease or high-risk plaques. Patients with diabetes mellitus had higher burdens of all plaque types. Diabetes mellitus was an independent predictor of total (p=0.002), non-calcified (p=0.002) and low attenuation plaque burden (p=0.03), but not of calcified plaque burden. During the 4.7 years follow-up, diabetes mellitus was not associated with fatal or non-fatal myocardial infarction (hazard ratio: 1.37, 95% confidence interval 0.72 to 1.37; p=0.474).

Conclusion Diabetes mellitus was an independent predictor of quantitatively assessed plaque burden, including low attenuation plaque, but not of myocardial infarction.