Title: Effect of Diabetes Mellitus on Coronary Plaque Characteristics and Progression by Serial Computed Tomography Angiography (CCTA)

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Background: Diabetes Mellitus (DM) is a major risk factor for coronary artery disease and associated events. Coronary plaque characteristics measured by CCTA are correlated with adverse cardiovascular (CV) outcomes. We sought to evaluate coronary plaque characteristics and rates of progression by serial CCTA in patients with DM and without DM.

Methods: The study included 403 (212 with DM) participants (mean age 61.4+/-11.4 years, 53% men) who were prospectively enrolled in serial CCTA trials. Coronary Plaque was characterized as low attenuation plaque (LAP), total non-calcified plaque (TNCP) and total plaque (TP) using semi-automated software (Qangio medis).

Results: Patients with DM had greater rates of progression of normalized TP volume (median change in annualized plaque (IQR): 39.1 (9.9 – 114.4) vs 23.5 (4.1 – 63.8) mm3, p = 0.001), TNCP (21.6 (3.3 – 60.8) vs 8.7 (0.1 – 35.6) mm3, p=0.003) and LAP (0.7 (-0.6 – 7.8) vs 0.1 (-0.4 – 1.9) mm3, p=0.04). After adjusting for risk factors and baseline plaque, the annualized rates of progression were higher in patients with DM by 28% for TP (p=0.004), 27% for TNCP (p=0.011), 23% for fibrous plaque (p=0.026) and by 34% for LAP (p=0.050), compared to those without DM.

Conclusion: Patients with DM have significantly higher rates of coronary plaque progression, including vulnerable LAP. These results provide mechanistic understanding of natural history of coronary atherosclerosis in this high-risk population, and could explain the increased risk of CV events in DM.

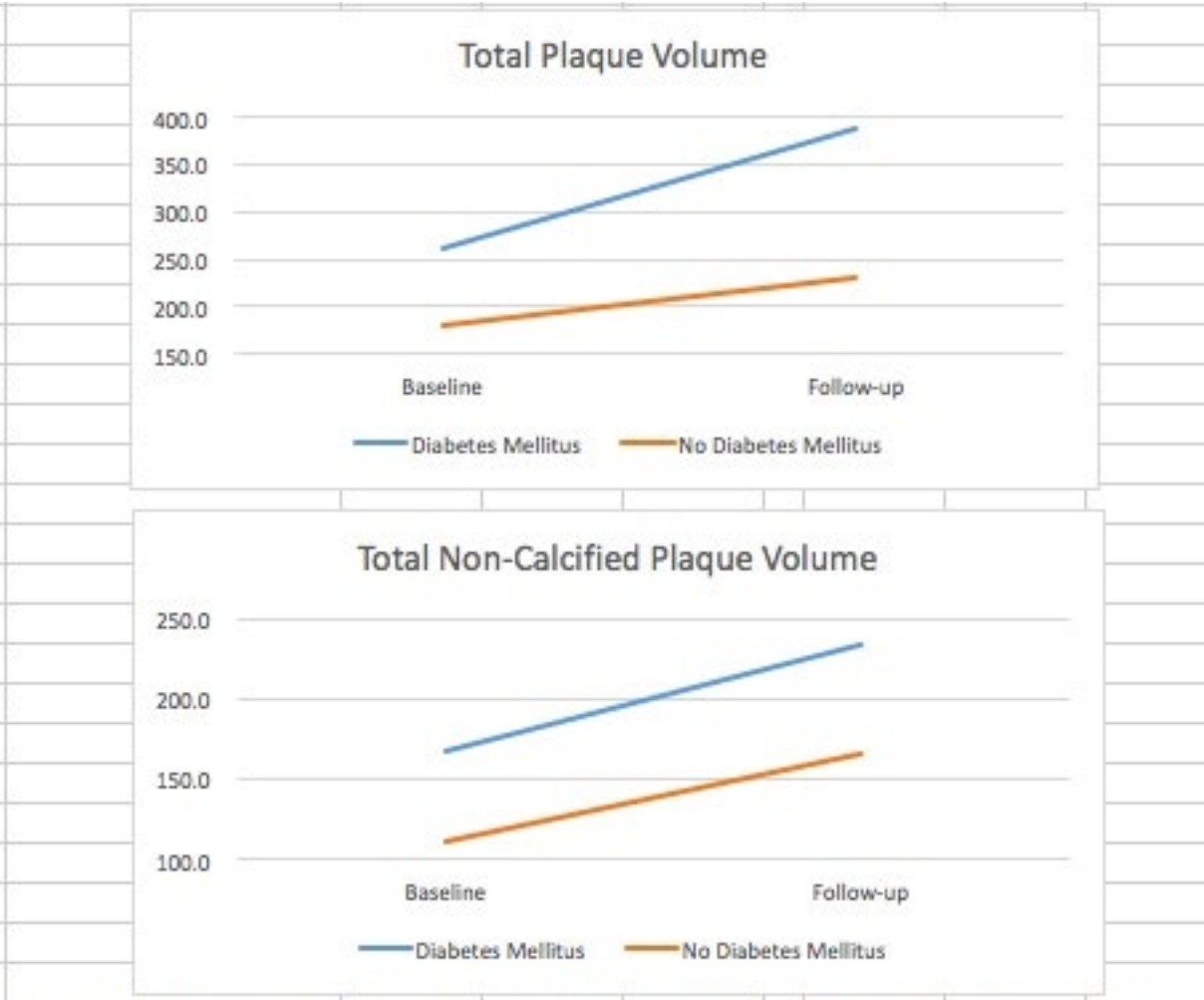

Fig 1. Rates of Progression of Normalized Coronary Plaque Volumes in Diabetics vs Non-diabetics