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Abstract 33: Increased Pericoronary Adipose Tissue Attenuation Is Related To Progression Of Coronary Plaque Burden Quantified From Coronary Ct Angiography

Markus Goeller (MD)[1], Balaji Tamarappoo (MD, PhD)[2], Alan Kwan (MD)[2],
Sebastian Cadet (MSc)[2], Frederic Commandeur (PhD)[3], Aryabod Razipour (MD)[3],
Piotr Slomka (PhD)[2], Heidi Gransar (MSc)[2], Xi Chen (BSc)[2], Jane Cao (MD)[4],
Moritz Albrecht (MD)[5], Daniel Bittner (MD)[1], Mohamed Marwan (MD)[1], Daniel Berman (MD)[2],
Stephan Achenbach (MD)[1], Damini Dey (PhD)[3]

[1] Friedrich-Alexander-University Erlangen-Nürnberg (FAU), Faculty of Medicine, Department of Cardiology, Erlangen, Germany
[2] Department of Imaging and Medicine and the Heart Institute, Cedars-Sinai Medical Center, Los Angeles, CA, USA
[3] Biomedical Imaging Research Institute, Cedars-Sinai Medical Center, Los Angeles, CA, USA
[4] Department of Cardiology, St Francis Hospital, New York, NY, USA
[5] Department of Diagnostic and Interventional Radiology, University Hospital Frankfurt, Frankfurt, Germany

Introduction: Increased attenuation of pericoronary adipose tissue (PCAT) around the proximal right coronary artery (RCA) from coronary CT angiography (CTA) has been shown to be associated with coronary inflammation and to add to plaque assessment for prediction of cardiac death. Our aim was to investigate whether baseline PCAT CT attenuation surrounding the proximal RCA predicts the progression of coronary plaque burden and whether changes in PCAT CT attenuation are associated with changes in plaque burden.

Methods: We analyzed CTA studies of 111 stable patients (age 59.2 ± 9.8 years, 77% male) who underwent sequential CTA (3.4 ± 1.6 years between scans) with identical acquisition protocols. The burden of total (TP), calcified (CP), non-calcified (NCP) and low-density non-calcified (LD-NCP) plaque as well as PCAT CT attenuation (HU) around the proximal RCA (taken from 10 to 50 mm from RCA ostium, according to the most standardized model for PCAT analysis) were quantified using semi- automated software (Figure 1).

Results: Patients with an increase in NCP burden ($n = 51$) showed an increase in PCAT attenuation, whereas patients with a decrease in NCP burden ($n = 60$) showed a decrease [4.4 HU (95%CI: 2.6 to 6.2) vs. -2.78 HU (95% CI: -4.6 to -1.0), $p < 0.0001$]. Changes in PCAT attenuation correlated with changes in the burden of NCP ($r = 0.55$, $p < 0.001$) and LD-NCP ($r = 0.24$, $p = 0.01$); but not CP ($p = 0.3$). Increased baseline PCAT attenuation $\geq$ -75 HU was independently associated with an increase in NCP burden (OR 3.07, 95%CI: 1.4-7.0; $p < 0.008$) and TP burden on follow-up CTA. Patients with statin therapy started after baseline CTA showed a trend towards reduction of PCAT CT attenuation compared to patients without statins (-1.61 vs. 1.39 HU, $p = 0.065$).

Conclusions: An increase in NCP burden in the RCA is associated with an increase in PCAT attenuation surrounding the RCA and increased baseline PCAT attenuation around the proximal RCA is a predictor of NCP and TP progression within the vessel. PCAT analysis may be useful for monitoring anti-inflammatory therapy.
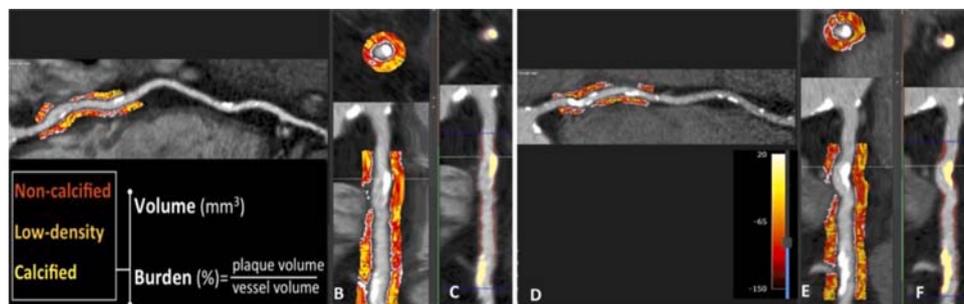
Fig. 1. Case example of PCAT and plaque analysis of the proximal RCA in baseline and follow-up CTA: **baseline (Panels A-C), follow-up (Panels D-f)**; PCAT is visualized with adipose tissue color map in curved mutiplanar view (A + D) and in straightened views (B + E). C and F show coronary plaque analysis in the proximal RCA, NCP in red overlay and CP in yellow overly.