Coronary artery echo-attenuated plaques in acute coronary syndromes: a serial intravascular ultrasound imaging study

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Background: Echo attenuation of atherosclerotic plaque (EAP) identified with intravascular ultrasound (IVUS) has been shown to correlate with vulnerable plaque morphologies and their presence is predictive of future cardiovascular events. EAP have predominantly been assessed at a single time point and their natural history in the immediate post acute coronary syndrome (ACS) period remains unknown. We aimed to assess this and whether their presence correlated with a more modifiable plaque composition in the immediate post-ACS setting.

Methods: Serial IVUS imaging was performed in non-culprit vessels of 270 patients undergoing angiogram for ACS and at 3 month follow up. IVUS analysis of plaque burden and EAP was performed.

Results: Baseline characteristics are described in Table 1. EAP were present at baseline in 62 patients (23%) with these patients more likely to be male (89.1% vs. 76.7%, p=0.03) but no differences in other atherosclerotic risk factors. There was no difference in baseline plaque burden between patients with EAP and those without (Percent atheroma volume [PAV] 38.9% vs. 37.8%, p=0.32). At follow up IVUS change in PAV was not statistically significantly different between patients with baseline EAP and those without (ΔPAV 0.09% vs. –0.36%, p=0.43), and neither was there a difference in the frequency of plaque regressors (42.7% vs 50%, p=0.31). EAP had resolved in 25 patients (40%) within 3 months at the follow up IVUS. Despite contemporary post-ACS therapy 18 patients who had not had EAP present at baseline (9%) developed new EAP at the follow up IVUS.

Conclusion: EAP were present in a quarter of ACS patients and were not associated with baseline plaque burden or a more modifiable plaque phenotype. In the setting of contemporary ACS treatments the natural history of high risk IVUS plaque characteristics such as EAP is dynamic with significant change even over a 3 month period in the post ACS setting.

Baseline characteristics

Variables	EAP (n=62)	No EAP (n=208)	p
Age	60.8±8.2	59.5±9.8	0.34
Male (%)	89.1	76.7	0.03
Caucasian (%)	96.9	95.6	1
Hypertension (%)	71.9	64.6	0.29
Hypercholesterolaemia (%)	46.9	41.7	0.47
Diabetes (%)	14.1	21.4	0.28
Smoker (%)	31.3	37.9	0.61
Prior statin use (%)	22.6	29.8	0.33