

IMAGE FOCUS

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Advanced anatomical and functional imaging guides management of coronary artery ulcerated plaque

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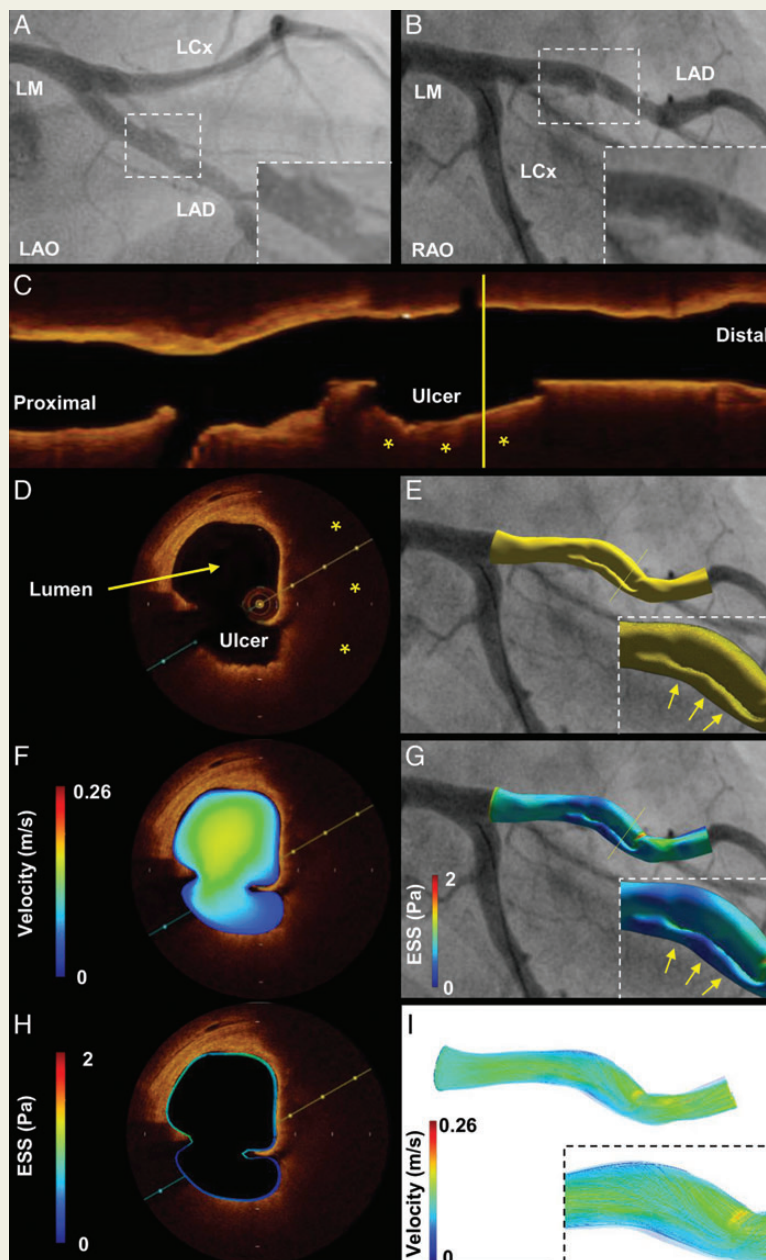
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A 57-year-old man with family history of coronary artery disease who suffered an aborted anterior ST-elevation myocardial infarction 3 months ago that was treated conservatively was referred for an elective coronary angiogram due to post-infarction angina with low-level exercise despite the maximal medical therapy.

Coronary angiography showed a focal aneurysm-like area in the proximal left anterior descending artery (Panels A and B). Optical coherence tomography (OCT) imaging in longitudinal (Panel C) and cross-sectional planes (Panel D corresponds to yellow line in Panel C) demonstrated an ulcerated thin-capped fibroatheroma with a large lipid pool (yellow asterisks; Panels C and D). The plaque was haemodynamically insignificant by fractional flow reserve (0.85). Using 3D OCT, we reconstructed in space the arterial segment containing the ulcer (Panel E; yellow arrows denote ulcer), calculated the inflow conditions and applied computational fluid dynamics to calculate the local endothelial shear stress (ESS) within the ulcerated plaque (Panels F–I). An area of flow perturbation was found within the ulcer, resulting in blood flow stagnation (Panels F and I, Supplementary data online, Video S1) and low ESS (denoted by yellow arrows in Panel G; Panel H corresponds to yellow line in Panel G). Due to the non-obstructive nature of the plaque, we followed medical management maximizing the dose of statin (atorvastatin 80 mg) and using a more potent double antiplatelet therapy regimen with aspirin and prasugrel.

The management of non-obstructive ulcerated plaques in coronary arteries remains unclear, and clinical practice guidelines are not available. Advanced intracoronary anatomical and functional imaging might guide the management of ulcerated plaques. Low local ESS within the ulcer sustains a highly inflammatory and thrombogenic environment, likely increasing the likelihood of future adverse events. Intensive anti-inflammatory and antiplatelet therapy in those patients might be beneficial.



Supplementary data are available at *European Heart Journal – Cardiovascular Imaging* online.

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