Simultaneous single-vessel plaque rupture causing acute coronary syndrome detected by optical coherence tomography

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A 67-year-old male presented with non-ST segment elevation myocardial infarction accompanied by inferior electrocardiogram (ECG) changes. Coronary angiography demonstrated a dominant right coronary artery (RCA) with two discrete regions of angiographic haziness, suggesting possible plaque ulceration and the presence of thrombus (Panel A). Prior studies have demonstrated non-culprit plaque rupture in acute myocardial infarction patients; however, it was difficult to elicit the culprit lesion in this particular situation given the findings in the same vessel with associated ECG changes, and the potential to impact on management strategies.

Optical coherence tomography (OCT) was performed at both sites to assess the culprit lesion for these purposes. The ruptured plaque cavities were well visualized at both the distal and proximal segments (Panels C and D), demonstrating a large lipid pool and ruptured thin fibrous cap with small amounts of thrombus (Panel B), findings consistent with acute plaque rupture.

To our knowledge, this is the first case demonstrating simultaneous plaque rupture with two thrombotic culprit lesions in the same vessel showing the hallmark pathological features of a large lipid pool and thin fibrous cap, in the settings of acute coronary syndrome (ACS). This case supports the generalized plaque destabilization hypothesis in ACS and also supports the role of OCT in facilitating a diagnosis treatment.

(Panel A) Angiographic image of RCA with two lesions (proximal and distal). (Panel B) Thrombus visualized during OCT (arrows) in the distal vessel just distal to the plaque rupture site. (Panel C) OCT image of plaque rupture in the distal vessel (arrow). (Panel D) OCT image of plaque rupture in the proximal vessel (arrows).

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

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