

Ambiguous lesion on coronary angiography diagnosed as a calcified plaque using optical coherence tomography

An 87-year-old man with a history of atrial fibrillation presented with sudden onset of chest pain and shortness of breath. Atrial fibrillation with rapid ventricular response and 2-mm ST segment elevation in the aVR and diffuse ST segment depression in the inferior and anterolateral leads (Fig. 1a) were shown in the initial electrocardiogram. Urgent coronary angiography was planned because the severe left main disease was suspected. Significant

stenosis of the left main stem was not observed on angiography; however, intermediate stenosis, with a linear filling defect in the mid-left anterior descending artery (LAD) without flow limitation (Fig. 2a and Video 1), was observed. The non-flow-limiting of the lesion led to an assessment with optical coherence tomography (OCT). Protruding calcific nodules and disruption of the fibrous cap with an underlying diffuse calcified plaque (Fig. 2b–2g and Video 2) was revealed by OCT. Therefore, pharmacological treatment for the mid LAD lesion was decided based on the OCT findings. The patient's symptoms were relieved after conversion to the normal sinus rhythm (Fig. 1b).

Lesions that appear ambiguous on angiography are visualized with intravascular imaging modalities (1). The axial resolution of OCT is 10 times higher than that of intravascular ultrasound (IVUS). Plaque characteristics can be identified with OCT because of su-

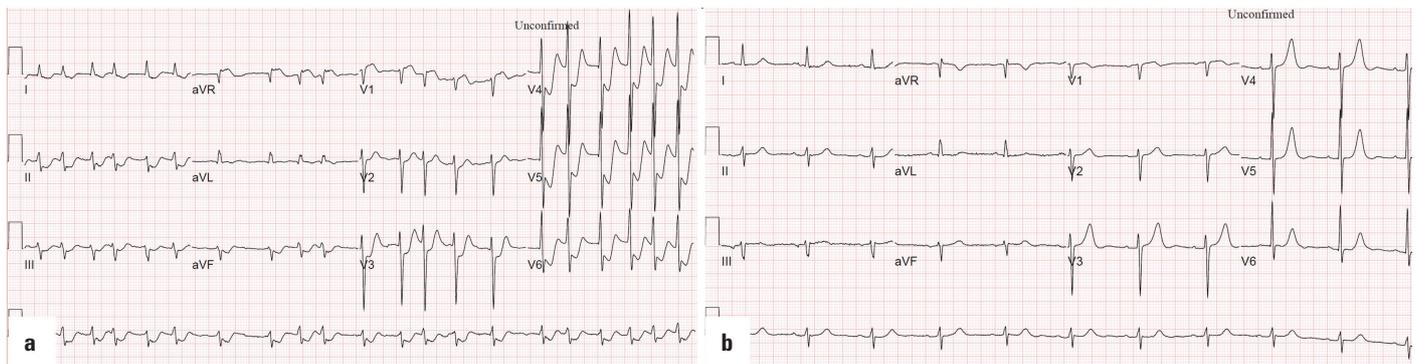


Figure 1. (a) Initial electrocardiogram obtained in the emergency room. (b) Follow-up electrocardiogram after conversion to the normal sinus rhythm

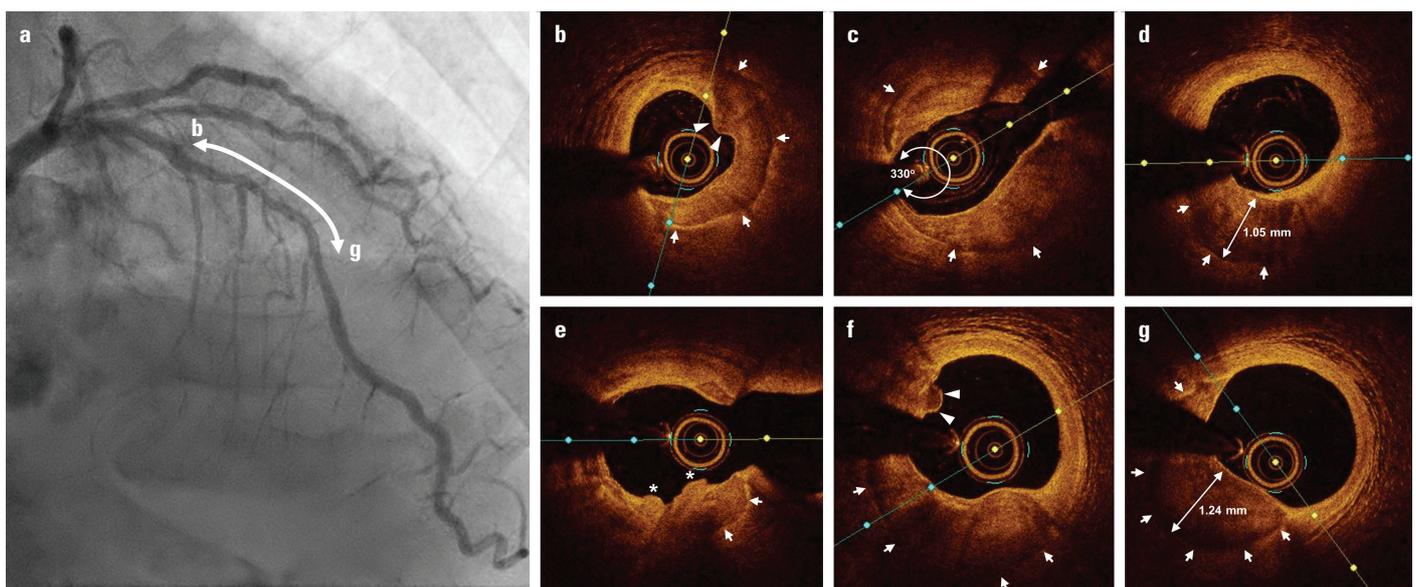


Figure 2. (a) Angiography image showing the linear filling defect in the mid LAD. (b–g) Cross-sectional OCT images showing protruding calcific nodules and disruption of the fibrous cap over a diffuse calcified plaque (maximum calcium arc, 330°; maximal calcium thickness, 1.24 mm; arrows, deep calcium boundary; arrowheads, calcified nodule; asterisk, disruption of the fibrous cap with the underlying calcified nodule)

LAD - left anterior descending artery, OCT - optical coherence tomography

perior resolution (10 μm). Moreover, OCT can measure the thickness and arc of the calcifications; however, IVUS cannot evaluate calcification thickness because the ultrasound waves are reflected by calcium (2). This case highlights that high OCT resolution aids in identifying the characteristics of a calcified plaque.

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Video 1. Initial angiography in the mid-left anterior descending artery

Video 2. Optical coherence tomography in the mid-left anterior descending artery

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