

Severe Coronary Stenosis with no Evidence of Plaques

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History

A 56-year-old female patient, complaining of exertional dyspnea, was referred for an outpatient coronary CT angiography. Her medical history was unremarkable, apart from a positive treadmill stress ECG test. She had neither known risk factors, nor family history of coronary artery disease (CAD). A coronary CT angiography (cCTA) was performed for evaluation.

Diagnosis

cCTA images revealed a severe stenosis at the ostium of the left circumflex artery (LCX) with no evidence of any atherosclerotic plaque. No stenoses were found in the rest of the coronary arteries and their branches. The patient

underwent invasive coronary angiography (ICA), which confirmed the diagnosis. However, due to the difficult anatomy which was not suitable for interventional treatment, the patient was referred for bypass surgery.

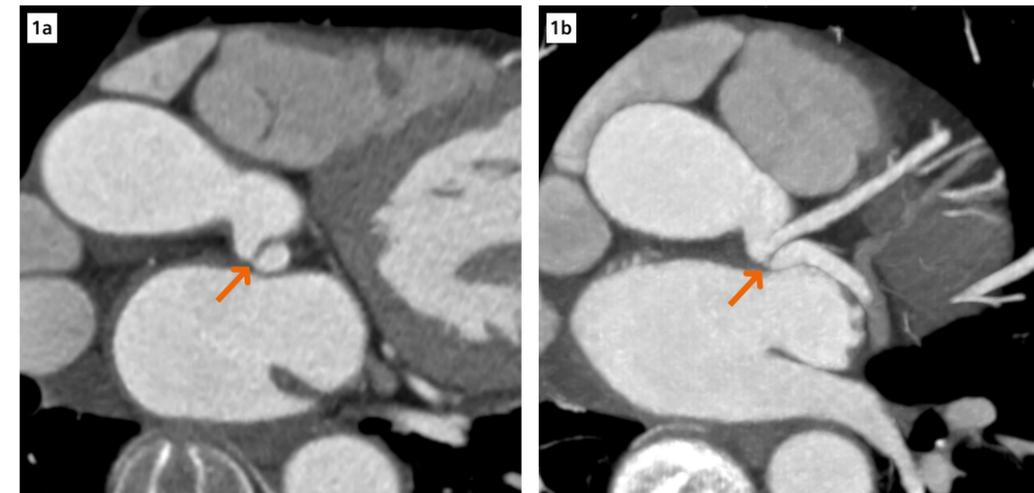
Comments

cCTA is an established non-invasive imaging modality that provides robust assessment of CAD, owing to the continuous evolution of CT technologies, especially since the introduction of dual source CT (DSCT). This technology uses two X-ray tubes and two detectors arranged at 90° angles, allowing reconstruction of cross-sectional images at one quarter of the gantry rotation

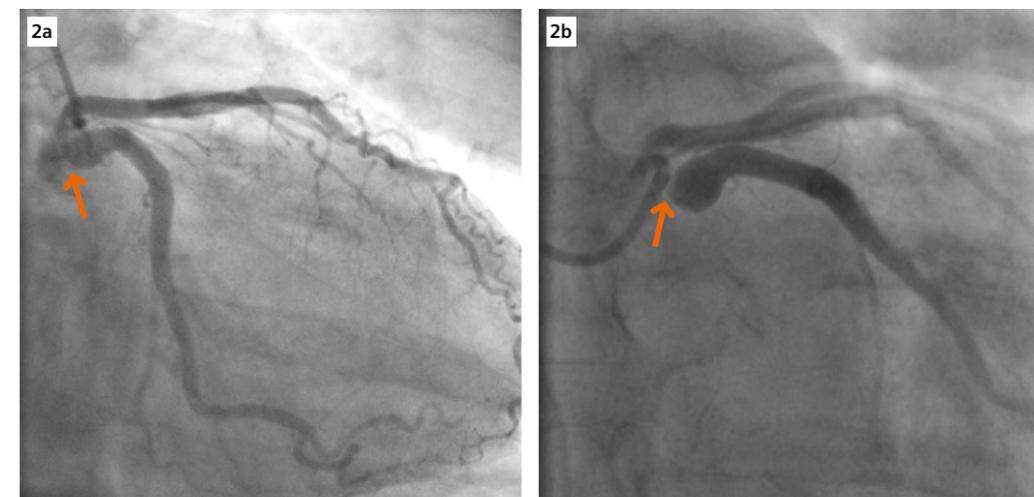
time, thus significantly improving the temporal resolution. This case was acquired with the very first dual source CT scanner clinically available – SOMATOM Definition. A severe stenosis at the ostium of the LCX was clearly depicted and freely demonstrated in three dimensions. While in ICA, it could have been challenging to project this lesion and potentially miss it especially if prior knowledge from CT was not available. Coronary stenosis is normally associated with the presence of plaques – either calcified or non-calcified. Coronary stenosis without evidence of plaques, such as this case, is rarely seen. The underlying cause of such a stenosis is unknown and yet to be investigated. ●

Examination Protocol

Scanner	SOMATOM Definition	
Scan area	Heart	Pitch 0.22
Scan mode	Retrospective ECG-gated spiral scan	Slice collimation 64 × 0.6 mm
Scan length	123.3 mm	Slice width 0.6 mm
Scan direction	Cranio-caudal	Reconstruction increment 0.3 mm
Scan time	10.3 s	Reconstruction kernel B26f
Tube voltage	120 kV	Heart rate 51–54 bpm
Effective mAs	157 mAs	Contrast 350 mg/mL
Dose modulation	CARE Dose4D	Volume 60 mL + 50 mL saline
CTDI _{vol}	41.3 mGy	Flow rate 6 mL/s
DLP	508 mGy cm	Start delay Test Bolus
Rotation time	0.33 s	



1 MPR (Fig. 1a), MIP (Fig. 1b) and cVRT (Figs. 1c and 1d) images show a severe stenosis (arrows) at proximal LCX, without any evidence of plaque.



2 Angiographic images show a severe stenosis (arrows) at the ostium of the LCX, which is challenging to project and could potentially be missed without the prior knowledge from CT.

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