

Multidetector CT angiography characterisation of Type 4 dual left anterior descending coronary artery

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Abstract: Duplication of the left anterior descending (LAD) coronary artery is a rare anomaly (incidence 1%) characterized by a short LAD that terminates high in the anterior interventricular groove and a long LAD that has a proximal course outside the anterior interventricular groove and returns to the groove in its distal course. The Type 4 variant of this anomaly is extremely rare whereby a long LAD arises from the right coronary sinus with a short LAD arising from the left mainstem. We present a case of Type 4 dual LAD which was characterised with multi-detector computed tomography (CT).

Keywords: Computed tomography (CT); angiography; coronary arteries

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Case report

A 55-year-old man with a past history of right coronary artery (RCA) stenting presented with worsening anginal symptoms. Coronary catheter angiography demonstrated an unobstructed RCA, including a patent stent in its mid-portion. The circumflex had an anomalous origin from the RCA and was heavily diseased. The left mainstem was normal and supplied a small calibre left anterior descending (LAD) artery. Multidetector computed tomography (CT) angiography was performed to further evaluate the anomalous circumflex prior to consideration of percutaneous intervention. CT confirmed anomalous origin of the circumflex from RCA which followed a retro-aortic course and occluded proximally (*Figure 1A*). The LAD was short, disease free and occupied the proximal interventricular groove giving a single diagonal branch (*Figure 1B*). A second anomalous vessel, which was not apparent on the catheter study, was seen arising from the right coronary sinus separate to the RCA (*Figure 1B,C*). It coursed anterior to the right ventricular outflow tract reaching the distal interventricular groove and giving a

single diagonal branch supplying the apico-lateral wall (*Figure 1C,D*). Based on these findings conservative management was decided upon.

Discussion

Duplication of the LAD is a rare anomaly (incidence 1%) first described by Spindola-Franco *et al.* (1). It is characterized by a “short LAD” that terminates high in the anterior interventricular groove and a “long LAD” that has a proximal course outside the anterior interventricular groove and returns to the groove in its distal course (1-4). Types 1-3 are commonest and describe early bifurcation of the proximal LAD into two vessels. Type 4 is extremely rare whereby a “long LAD” arises from the right coronary sinus (as in this case) or RCA with a “short LAD” arising from the left mainstem. Awareness and recognition of dual LAD is important for diagnosis and therapeutic planning (4). Catheter angiography may fail to demonstrate the “long LAD” and the “short LAD” may be misinterpreted as a total occlusion (1-4). If surgical revascularization is planned awareness that supply to the septum and anterior wall originates from two separate vessels

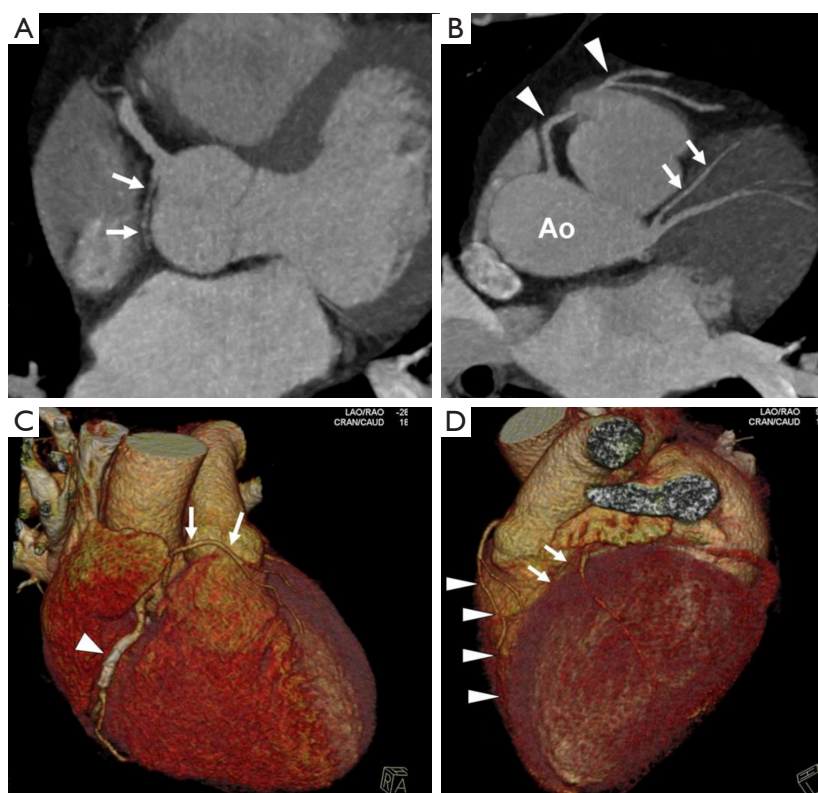


Figure 1 (A) Axial CT image at the level of the RCA origin. The circumflex coronary artery (arrows) has an anomalous origin from the RCA, follows a retro-aortic course and occludes proximally; (B) axial oblique CT maximal intensity projection (6 mm thick) image. The LAD (arrows) is short, disease free, occupies the proximal interventricular groove and gives a single diagonal branch. An anomalous vessel is seen arising from the right coronary sinus separate to the RCA and coursing anterior to the right ventricular outflow tract; (C) volume rendered CT image showing the origin of the “long LAD” (arrows) from the right coronary sinus separate to the RCA; (D) volume rendered CT image showing the “short LAD” (arrows) in the proximal interventricular groove and the long LAD (arrowheads) which occupies the distal interventricular groove. Note the stent in the mid portion of the RCA (arrowhead). RCA, right coronary artery; LAD, left anterior descending; CT, computed tomography.

is important. MDCT angiography is well suited to defining coronary artery anomalies due to its multi-planar capability and is able to accurately characterise dual-LAD lesions (4).

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