Dual left anterior descending artery circulation: a rare anomaly of the coronary arteries

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DESCRIPTION

In normal participants, the left anterior descending (LAD) artery arises from the left coronary artery (LCA) and courses along the anterior interventricular sulcus (AIVS) until it reaches the apex. Dual LAD circulation is an uncommon coronary anomaly in which there are two LAD arteries. A type 4 dual LAD circulation is an extremely rare variant of a dual LAD in which one of the LAD arteries arises from the right coronary artery (RCA).

A 75-year-old man presented to us with angina on exertion of recent onset. The resting ECG was normal and echocardiogram showed normal left ventricular function. He underwent a coronary angiogram which revealed a rare coronary anomaly. There were two LAD arteries. One LAD artery originated from the LCA and coursed along the proximal part of the AIVS and ended well short of the apex ('short LAD') (figures 1 and 2). Another LAD originated from the RCA and coursed along the distal part of the AIVS ('long LAD'; figure 3 and video 1). This pattern was consistent with type 4 dual LAD. The 'short LAD' gave rise to a major septal branch and a diagonal branch. A significant stenotic lesion was noted in the 'short LAD' (figure 2).

Dual LAD is a rare coronary anomaly (with a reported incidence of 1%) in which there are two LAD arteries.¹ One artery travels along the proximal part of the AIVS but stops well short of the

Figure 2 The right anterior oblique cranial view of the left coronary angiogram showing the 'short left anterior descending (LAD)' giving rise to a septal branch and a diagonal branch. The 'short LAD' has an 80% stenosis.

apex ('short LAD') while the second artery joins the AIVS distally and reaches the apex after originating elsewhere ('long LAD').¹ Spindola-Franco *et al*¹ described four types of dual LAD. In the first three types, the 'short' and 'long' LAD arise from the LCA. However, the rarest and most interesting variant is type 4 in which the 'short LAD' arises from the LCA while the 'long LAD' arises from the RCA.¹ In our case, the patient also had significant

Figure 1 Left anterior oblique caudal view of the left coronary angiogram showing the 'short left anterior descending (LAD)' arising from the left coronary artery. The 'short LAD' gives rise to a septal branch and a diagonal branch.

Figure 3 Left anterior oblique cranial view of the right coronary angiogram showing the 'long left anterior descending (LAD)' arising from the right coronary artery (RCA).

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Video 1 LAO cranial view of the right coronary angiogram showing the "long LAD" arising from the Right Coronary Artery (RCA)

stenosis of the short LAD, which was responsible for his symptoms. He was advised to undergo percutaneous coronary angioplasty to the short LAD.

It is important to know about this anomaly since it can potentially present with unusual clinical features and can also lead to confusion on the angiogram where a 'short LAD' may be misdiagnosed as a total occlusion.² Also, the anomaly is of great importance to surgeons while planning coronary artery bypass graft surgery.³

Learning points

- ▶ Dual left anterior descending (LAD) is an uncommon coronary anomaly in which there are two LAD arteries.
- ▶ In type 4 dual LAD, one of the LAD arteries arises from the right coronary artery and the other from the left coronary artery.
- ▶ This unusual anatomical variation can lead to unusual ECG findings and clinical manifestations and is extremely important while planning cardiac surgeries.

Competing interests None.

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