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V Subban, B Jeyaram and M Ajit Sankardas

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Anomalous origin of the left anterior descending artery from the pulmonary artery

The origin of the left anterior descending coronary artery (LAD) from the pulmonary artery is a rare cause of myocardial ischaemia in adults. A 26-year-old man who presented with anterior wall myocardial infarction underwent coronary angiogram, which showed a large right coronary artery (RCA) arising from the right sinus of Valsalva (RSV) and retrogradely filling the LAD that drained into the main pulmonary artery (MPA) (panels A and B, movie 1, available online only). The left circumflex coronary artery (LCX) originated from the RSV and followed a retroaortic course into the left atrioventricular groove. The LCX also provided extensive collateral circulation to the LAD (panel C). The above findings were elegantly demonstrated by computed tomographic coronary angiography (panels D and E). The patient underwent surgical closure of the anomalous origin in the MPA and coronary artery bypass grafting with anastomosis of the left internal mammary artery (LIMA) to the LAD. A graft angiogram 3 months after surgery revealed a patent graft to the LAD (panel F).

This anomaly differs from anomalous origin of left coronary artery from pulmonary artery (ALCAPA) in two respects. First, the area of myocardium supplied by the LAD is less than that in ALCAPA. Second, the presence of dual coronary arterial supply (RCA and LCX) with two aortic sources provides more collaterals to the LAD. Patients with anomalous LAD from the pulmonary artery thus have better survival than patients with ALCAPA.

Surgical correction is indicated for symptomatic patients. As with ALCAPA, three types of surgical correction have been described. Ligation of the pulmonary arterial end of the LAD is the simplest of the surgical procedures, but results reported with this procedure are poor and it is no longer considered ideal. Surgical transfer of this vessel to the aorta is the best possible treatment available. If this is not an option, combined ligation of the pulmonary end and coronary artery bypass with either LIMA graft or a venous graft is also an alternative.

V Subban, B Jeyaram, M Ajit Sankadas

dhvjay1977@yahoo.com

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Panels A and B. Selective right coronary artery (RCA) angiogram in right anterior oblique and left anterior oblique (LAO) views: RCA is arising from the right sinus of Valsalva (RSV) and retrogradely filling the left anterior descending coronary artery (LAD), which drains into the main pulmonary artery (MPA); (C) Selective left circumflex coronary artery (LCX) angiogram in LAO view—LCX is seen arising anomalously from the RSV and also giving collaterals to the LAD; (D) Three-dimensional (3D) volume rendered technique (VRT) image showing anomalous LAD from the MPA and LCX from the RSV; (E) 3D VRT image demonstrating anomalous LAD from posterior pulmonary sinus; (F) 3D VRT image revealing patent left internal mammary artery (LIMA) graft to the LAD. AO, aorta; RV, right ventricle.