CASE REPORT

Atila Iyisoy · Hurkan Kursaklioglu · Cem Barcin
Nadir Barindik · Sedat Kose · Ertan Demirtas

Single coronary artery with anomalous origin of the right coronary artery as a branch from the left anterior descending artery: a very rare coronary anomaly

Abstract Anomalous origin of the right coronary artery arising from the left anterior descending artery (LAD) is a very rare coronary anomaly. It has previously been reported in only six adult cases. In this report, we present a patient with an anomalous origin of the right coronary artery from the LAD. The patient had anginal symptoms with exercise. Myocardial perfusion imaging with thallium-201 revealed a reversible inferior perfusion defect. We suggest that this could cause myocardial ischemia.

Key words Coronary artery anomaly · Right coronary artery

Introduction

Congenital coronary artery anomalies are usually an incidental finding (with a rare incidence) during conventional coronary angiography to assess the possibility of coronary artery disease, and most of these anomalies have been accepted as anatomic variations of no clinical significance. However, some patterns of congenital coronary artery anomalies can cause clinical manifestations of myocardial ischemia, reducing myocardial perfusion. We present a patient in whom the right coronary artery originated as a separate branch from the left anterior descending artery (LAD). The patient had a reversible perfusion defect in the inferior segments of the left ventricle shown by myocardial perfusion imaging. This pattern of coronary anomalies is very infrequent and has previously been detected in only six cases.1–5

Case report

A 53-year-old man presented at our unit with exertional chest pain. He had no family history or other risk factors associated with coronary heart disease. The patient, who had previously been free of anginal symptoms, started complaining of a retrosternal pressure-like chest pain during heavy exercise which was relieved at rest. Physical examination and resting ECG were normal. Because of the typical chest pain, myocardial perfusion imaging with thallium-201 was performed. We decided to perform coronary angiography to evaluate the reason for a reversible inferior perfusion defect shown by perfusion imaging.

Coronary angiography and left ventriculography were performed through the right femoral artery using Judkin's technique. Left ventriculograms obtained in the right anterior and left anterior oblique projections showed a normal left ventricle with good contractility. The left ventricular end-diastolic pressure was 8 mmHg. Aortography obtained in left anterior-oblique projection revealed absence of the ostium of the right coronary artery in the right sinus of Valsalva, as expected (Fig. 1). The left coronary ostium was seen to be normal in the left sinus of Valsalva. Selective coronary angiography of the left coronary artery displayed normal origin and course of the left main and left circumflex artery, and the LAD. The right coronary artery was visualized as a separate branch arising from the midportion of the LAD artery, especially in the left anterior-oblique view with cranial angulation (Figs. 2 and 3). The anomalous right coronary artery was seen as a separate branch from the LAD distal to the first septal perforating branch and to the first diagonal branch, and perfused to the typical area of the right coronary artery, coursing posterior to the aorta. None of the coronary arteries showed atherosclerotic changes.
Discussion

Although the incidence of congenital coronary artery anomalies was reported as various percentages in many angiographic series, in the largest angiographic review by Yamanaka and Hobbs, the incidence was reported to be 1.3% among 126,595 cases. Most coronary anomalies remain asymptomatic and are found incidentally during coronary angiography. However, myocardial perfusion can be affected in the very uncommon subtypes of these anomalies. Rare coronary artery anomalies showing clinical significance include one of the coronary arteries arising from the pulmonary artery and single coronary artery from either the right or left sinus of Valsalva. Moreover, compression of the coronary artery with an anomalous course between the aorta and the pulmonary artery can cause a wide clinical spectrum, from exertional angina to myocardial infarction and sudden death, especially while exercising.

The right coronary artery arising as a branch from the midportion of the LAD is a very rare anomaly. Only six adult cases have been reported in the literature, and no patient had underlying congenital heart disease. In all of the patients reported in the literature, the right coronary artery with anomalous origin arose from the LAD distally to the first septal perforating branch. Also, in our patient, the right coronary artery originated from the LAD distally to the first septal perforating branch, and no congenital heart disease was found. In three of the six cases reported previously, there was total occlusion and significant stenosis on the LAD, proximally to anomalous origin of right coronary artery. In one of the patients, luminal irregularities were found only in the anomalous right coronary artery close to its origin from the LAD. In this patient, the coronary steal mechanism, which was defined as the decrease on the flow to the LAD but the increase to the anomalous coronary artery, could have been caused from a gradual decrease in left ventricular compliance with age, and was considered as