

Anomalous origin of left main coronary artery: the value of myocardial scintigraphic and spiral computed tomography scans

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Abstract

Anomalous origin of the left main coronary artery (LMCA) from the right sinus of the Valsalva or the proximal right coronary artery (RCA) is one of the most clinically important anomalies of coronary circulation. We report the case of a patient with chest pain and abnormal thallium myocardial perfusion scan in whom the anomaly was first detected on invasive coronary arteriography. The exact anatomic course of anomalous LMCA was confirmed using contrast enhanced computed tomography.

Key words: left main coronary, thallium myocardial perfusion, computed tomography

Introduction

Anomalous origin of the left main coronary artery (LMCA) from the right sinus of Valsalva or the proximal right coronary artery (RCA) is one of the most clinically important anomalies of coro-

nary circulation. The incidence of the anomaly is 0.01–0.07% in patients undergoing cardiac catheterization, and 1.2–6.1% in those with an isolated coronary artery anomaly [1, 2]. The course of anomalous coronary artery determines its hemodynamic significance and operative treatment. We report the case of a patient with chest pain and positive thallium myocardial perfusion scan in whom the anomaly was first detected on invasive coronary arteriography. The exact anatomic course of anomalous LMCA was confirmed using contrast enhanced computed tomography.

Case report

A 44-year-old woman with no significant medical history came to the emergency department due to recurrent episodes of chest pain mostly during exercise but also when resting. Results of the physical examination were normal and no signs of ischemia were found on rest ECG while chest X-ray findings and cardiac troponin I were normal. A diagnosis of unstable angina was suspected. The patient was hospitalized in the internal medicine department. Treatment with acetylsalicylic acid, subcutaneous enoxaparin and atenolol was started and the patient became asymptomatic. No dynamic ECG changes were revealed during hospitalization and subsequent blood tests for cardiac enzymes were normal. An exercise test was performed and was stopped at 3:13 min due to chest pain when a heart rate of 120 bpm (68% of target rate) was achieved, while no ST segment displacement was demonstrated. Two days later stress and rest Tl-201 cardiac perfusion studies were performed which showed reversible myocardial ischemia of the anterior and inferolateral walls (Figure 1); subsequently a coronary angiography was performed. No atherosclerotic lesions were found in the coronary arteries but anomalous origin of LMCA from the RCA was demonstrated (Figure 2). A contrast enhanced CT scan was performed with Multislice CT (MX-8000, Phillips, Eindhoven, The Netherlands) with slice thickness 1.3 mm and 0.8 mm increment (1.5 pitch). One hundred ml of non-ionic contrast me-

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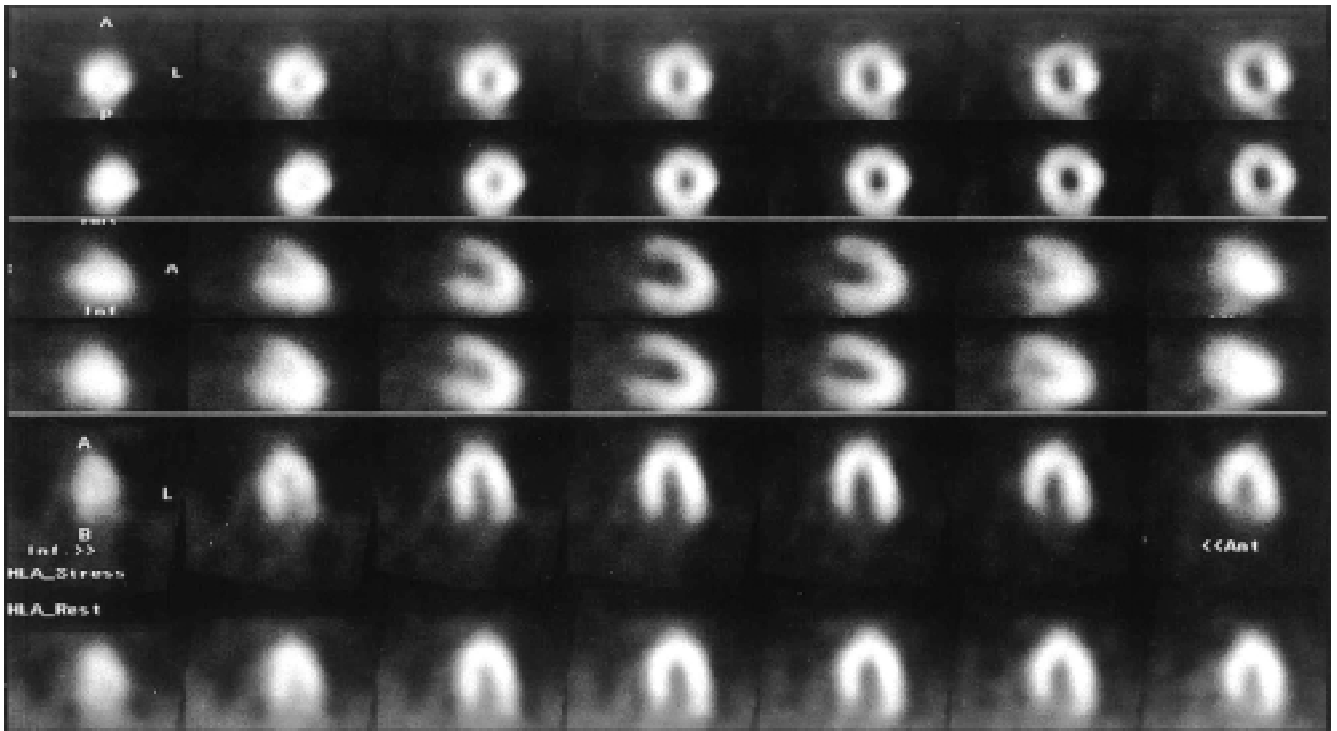


Figure 1. Thallium stress and rest SPECT images show reversible anterior and inferolateral perfusion defects compatible with ischemia in the territory of left anterior descending and left circumflex coronary arteries.

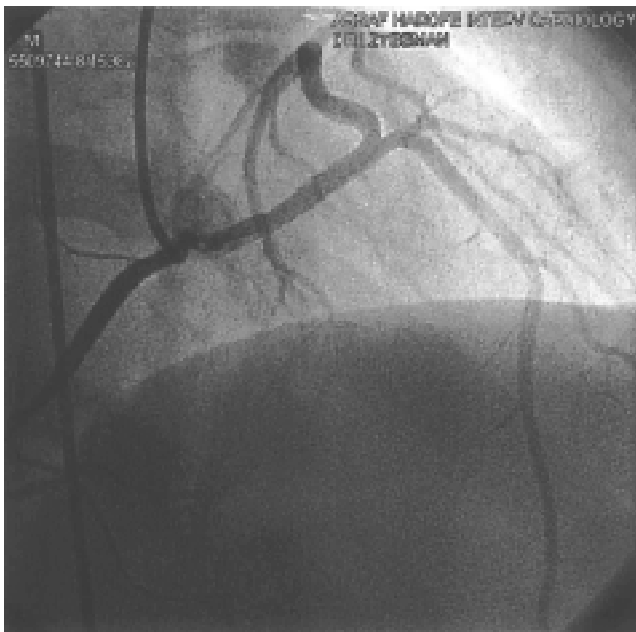


Figure 2. Coronary artery catheterization RAO 20° combined with cranial angulation 30° demonstrates anomalous origin of LMCA from right coronary sinus without evidence of coronary artery stenosis.

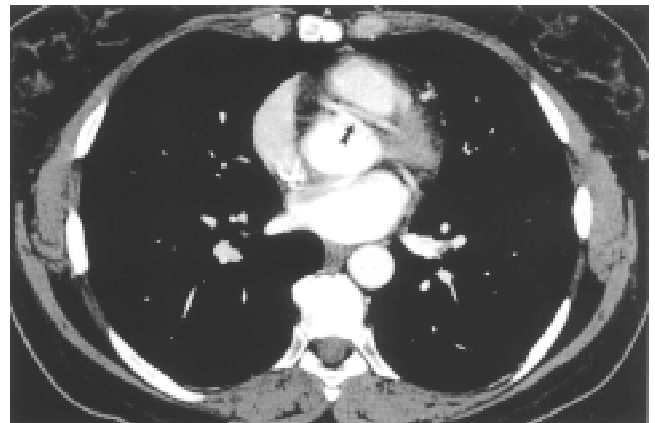


Figure 3. Spiral computed tomography shows anomalous origin of LMCA with interarterial course. The arrow indicates the left main coronary artery taking a path between the ascending aorta and pulmonary trunk.

dia (loperamide 370 Ultravist Schering, Germany) was injected via the right antecubital vein with an automated injector (Envision CT) at a rate of 3.5 ml/sec and 18 second delay time. Image anal-

ysis confirmed the anomalous origin and the interarterial course of LMCA (Figure 3). Thereafter, a successful surgical correction of the anomaly was performed.

Discussion

When the LMCA arises from the right coronary sinus or the proximal RCA it may follow one of four pathways: septal (subpulmonic) course, anterior free wall course, posterior (retroaortic)

course or interarterial course. The first three variants are considered benign and are usually not associated with myocardial ischemia. The interarterial course of LMCA between the aorta and pulmonary artery has been demonstrated to be associated with exertional angina, syncope and sudden death, probably caused by dynamic compression of LMCA between the aortic root and the root of the pulmonary trunk [3, 4]. Surgical treatment is indicated in this type of anomalous LMCA. The course of the anomalous coronary artery is usually assessed by angiography in a right anterior oblique (RAO) view. In the present case, according to the angiography, an anterior course of anomalous LMCA was initially suspected, but due to clear signs of myocardial exercise induced ischemia on TI-201 myocardial perfusion study, an additional examination was needed. In the recent years, other less invasive techniques such as contrast enhanced CT has been used for the diagnosis. This can be quite helpful in defining the actual course

of anomalous LMCA which may be classified by invasive coronary arteriography.

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