Anomalous origin of the left anterior descending coronary artery from the right coronary artery

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Abstract

Dual left anterior descending coronary artery (LAD) originating from the left main stem and the right coronary artery (RCA) (Type IV dual LAD) is a very rare coronary artery anomaly. In this report, we describe a 49 year old woman presenting with unstable angina and positive for myocardial ischemia exercise tolerance test who subsequently was found to have this coronary anomaly. The diagnosis was made with coronary angiography. This anomaly has been reported to occur in 0.01 – 0.7% of patients under going cardiac catheterization. To our knowledge, only a few such cases have been published in the literature so far.

Key words: Coronary artery anomaly, double left anterior descending artery, cardiac catheterization, exercise tolerance test, unstable angina

Introduction

We report a case of a left anterior descending artery originating from both right and left sinus of valsava, which is classified among rare coronary anomalies. The anomaly was discovered incidentally during cardiac catheterization.

Case Report

A 49 years old woman was admitted to the Cardiology Department of Nicosia General Hospital for scheduled cardiac catheterization because of angina on exertion and positive for myocardial ischemia exercise tolerance test (Treadmill Stress Test).

Arterial hypertension and diabetes mellitus were present as risk factors for coronary atherosclerosis. Physical examination and laboratory tests revealed no significant pathology.

Coronary angiography was performed via the radial approach. Initially the right coronary angiography revealed additional longer artery originating from the conus branch of the right coronary artery (RCA) (figure 1).

Contrast injection in the left coronary artery showed a small left circumflex without significant stenosis and the short left anterior descending artery (LAD) originating from the left coronary sinus, and terminating in the proximal interventricular groove, giving off two diagonal branches (figure 2).

Figure 1: Selective coronary angiography of RCA (RAO 30°) demonstrating that the LAD arose aberrantly from the right sinus of valsava and the proximal part of RCA (conus branch) supplying the area abandoned by the main LAD.

Figure 2: Left coronary angiography (RAO, Cranial) showing the LAD ending at mid segment without reaching the apex of the heart.
We realized that this coronary anomaly was a rare IV type double LAD coronary artery.

Discussion

The incidence of coronary artery anomalies ranges from 0.6 – 1.3 % of patients undergoing coronary angiography (2). The double LAD is a rare form of coronary artery anomaly.

Spindola – Franco described four types of double LAD (1,3):
Type I – III arises from the left side and the last type (type IV) emerges from the right coronary sinus.
Our case resembles type IV of dual LAD.

This anomaly has been reported to occur in 0.01 – 0.7% of patients under going cardiac catheterization and is occasionally seen in the tetralogy of Fallot (4).

There are three variations in the initial course of LAD (4):
1. Anterior to the right ventricular infundibulum (anterior type)
2. Between the aorta and the pulmonary trunk (intra-arterial type)
3. Within the ventricular septum beneath the right ventricular infundibulum (septal type)

According to this classification, our case is consistent with septal type. Systolic compression of the intraseptal segment that could account for our patient’s symptoms and abnormal exercise stress test was not evident.

Multidetector row CT allows 3D comprehension of the coronary artery system and it is extremely useful to identify congenital coronary artery anomalies, regarding both their origins, courses and also relationships with other cardiac structures.

Consequently, we arranged a CT-angiography in order to have a more accurate view of the course of the coronaries and their relationship with other structures.

Beside the clinical consequences of anomalous vessels, knowing the anatomical variation is crucial at the time of surgery. Grave surgical complications may occur by causing a trauma on the aberrant vessel (5).

In conclusion we presented a rare coronary anomaly known as double LAD type IV. The LAD arose aberrantly from the conus branch of RCA and supplied the area abandoned by the main LAD.

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References