The Heart Surgery Forum #2005-1112
8 (4), 2005 [Epub September 2005]
doi:10.1532/HSF98.20051112

Online address: http://cardenjennings.metapress.com/link.asp?id=112496

Dual Left Anterior Descending Coronary Artery from Right Aortic Sinus: Report of a Case of Recurrent Unstable Angina after CABG

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ABSTRACT

Anomalies of the left coronary artery are very rare, with an incidence range between .3% and 1.64%. The diagnosis is generally incidental during coronary angiogram, coronary artery bypass operation, or autopsy. However, sometimes this anomaly is not recognized during CABG operation and can be responsible for the recurrence of angina after CABG operation and even compromise the outcome. We presented a case in which the dual left anterior coronary artery from the right aortic sinus occasionally was shown in a coronary angiogram after CABG operation; the angiogram was performed because of the recurrence of angina.

INTRODUCTION

Coronary artery anomalies are rare and their incidence ranges between .3% and 1.64% [Yamanaka 1990, Topaz 1992] of coronary angiograms. Anomalies of the left anterior descending coronary artery (LAD) are less described because of its very rare presentation [Topaz 1999, Sajja 2000, Turhan 2004, Yoshikay 2004]. Spindola-Franco and colleagues [1983] described the dual LAD that consists of two LADs: a short LAD, whose course is in the anterior interventricular sulcus (AIVS), and a long LAD, which reaches the apex. The long LAD may origin either from the left main or from the right coronary artery (RCA).

Sometimes, because of its rarity, the dual LAD could not be recognized at the first angiogram or at the time of the operation. In this report, we present a case in which the dual LAD was recognized only in a coronary angiogram performed after the CABG operation and arising from the right aortic sinus. Actually, this rare congenital anomaly has clinical implications for CABG and other coronary procedures, and could sometimes compromise the early outcome.

Received March 6, 2005; accepted May 10, 2005.

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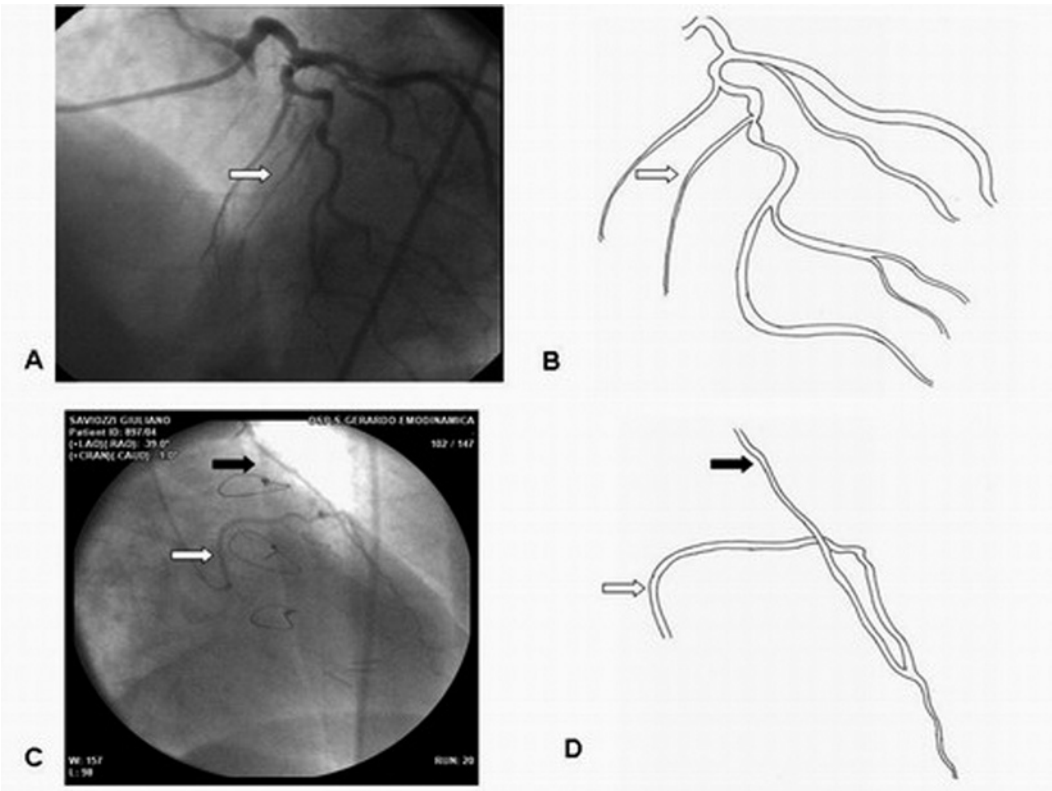
CASE REPORT

A 62-year-old man was admitted to our hospital with unstable angina. He had a history of hypertension, smoking, and dyslipidemic disorder. The patient was under continuous intravenous nitrate and heparin infusion. A coronary angiogram was performed. Selective injection into the left main coronary artery showed a normal left main, a short LAD with a proximal subocclusive stenosis, and a long first diagonal branch (D1) without critical stenosis; the circumflex artery was almost normal, but the first obtuse marginal branch (OM1) showed a proximal subocclusive stenosis. Selective injection into the RCA showed an 80% stenosis in the middle portion of the vessel. Actually, the short LAD was interpreted as the proper LAD because no accessory coronaries were shown at the angiogram.

The patient underwent total arterial CABG operation with the double internal thoracic artery (ITA) and the left radial artery. The left ITA was anastomized to the LAD—properly the LAD arising from the right aortic sinus—whose course and distribution were as a normal LAD. The postoperative course was uneventful and the patient was discharged on the sixth postoperative day. The exercise test performed two weeks later did not show signs of residual myocardial ischemia.

Three months later, the patient was readmitted to our hospital because of an acute coronary syndrome. A coronary angiogram was repeated. The injection into the coronary arteries did not show any change compared with the preoperative angiogram. During selective injection into the RCA, an accessory vessel without stenosis, arising from the right sinus, was incidentally shown. The vessel coursed through the right infundibulum and reached the apex of the left ventricle. The two ITAs were injected selectively and the anastomosis was patent; the left ITA was anastomized onto the accessory vessel, which was then recognized as the dual left anterior descending artery from the right aortic sinus.

Because of persistent angina and despite intravenous therapy, the patient underwent CABG re-operation. The left ITA was detached from the dual LAD. An anastomosis between the left ITA and the diagonal branch was performed. The short LAD was searched in the AIVS, but it was found to be very small. Cardiopulmonary bypass and aortic cross-clamping were adopted.



A, In LAO view, short LAD is indicated by white arrow; B, diagram of A; C, in RAO view (postoperative angiogram), long LAD from right aortic sinus is indicated by white arrow, black arrow shows left ITA. D, diagram of C. LAO indicates left anterior oblique; LAD, left anterior descending artery; RAO, right anterior oblique; ITA, internal thoracic artery.

The postoperative course was uncomplicated and the patient was discharged on the sixth postoperative day.

At four months follow-up, the patient was free of angina. An exercise test was negative for residual myocardial ischemia.

DISCUSSION

Anomalies of coronary arteries have been described in autopsies and these findings have become more evident since the application of coronary angiograms and CABG. Spindola-Franco described 23 cases of dual LAD that he grouped into four types with a total incidence of 1% [Spindola-Franco 1983].

Type I. The short LAD that runs in the AIVS. The long LAD descends on the left ventricle.

Type II. The long LAD runs on the right ventricular side before entering the distal AIVS.

Type III. The short LAD is as described for Types I and II. The long LAD descends deep within the AIVS and appears on the epicardial surface in the distal part of the AIVS.

Type IV. The long LAD arises from the right coronary artery. The short LAD runs within the higher portion of the AIVS.

We report a case in which the dual LAD is characterized by a proper short LAD arising from the left main and a long LAD arising from the right sinus of Valsalva. This case cannot be considered within one of the Spindola-Franco's type.

To the best of our knowledge, less than 10 cases of dual LAD from right aortic sinus have been described [Topaz 1999, Turhan 2004, Yoshikay 2004].

This anomaly can give problems during diagnosis or during operation. In our patient, the long LAD was not visualized in the preoperative angiogram. During the operation, the long LAD was considered a normal LAD because its course was usual and easily visible on the epicardial surface of the left ventricle. The reason the patient was later readmitted for acute coronary syndrome was probably due to the incomplete revascularization of the anterior wall of the left ventricle. Observing the preoperative angiogram more carefully, we noted a short proper LAD arising from the left main and coursing in the higher part of the AIVS with a critical proximal stenosis, and a large D1 branch arising from the proper LAD (Figure A, B). The long LAD was visualized only in the postoperative coronary angiogram as an incidental finding (Figure C, D).

The very low incidence of dual LAD could increase the frequency of incorrect diagnosis and management. There are few cases described in the literature similar to this case report. Oral reported a case of dual LAD, in which the corrected diagnosis was made only 6 months after the CABG operation [Oral 1996].

When a patient with coronary atherosclerosis has a short or hypoplastic LAD, the cardiac surgeon and the cardiologist should consider at least three hypotheses. First, a long parallel diagonal branch could function as a LAD; second, a long descending posterior branch could supply the apex and reach the AIVS; third, a search for the presence of a dual LAD should be conducted.

In conclusion, to avoid an incorrect diagnosis and treatment of the coronary atherosclerosis in cases with a short LAD, cardiologists and cardiac surgeons should be aware of the different anomalies of LAD, keeping in mind that although the incidence of an unknown dual LAD, such as a LAD arising from the right sinus, is very low, they could not ensure a successful myocardial revascularization.

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