

# Aberrant Origin of the Left Main Coronary Artery Arising from the Right Coronary Artery Associated with Coronary Artery Disease: A Case Report



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## ABSTRACT

Coronary artery anomalies are not frequent, nevertheless they are associated with increased and potentially lethal cardiac events. Recognition of these anomalies is fundamental in patients undergoing diagnostic or interventional coronary angiography. Most patients presenting with coronary anomalies are asymptomatic, but the risk of myocardial ischemia and sudden death requires the treatment of those patients. Different therapeutic options have been discussed, including surgery, conservative therapy, and interventional approaches. In this report, an aberrant origin of the left main coronary artery arising from the right coronary artery associated with coronary artery atherosclerosis and its surgical correction is described.

## INTRODUCTION

Coronary artery anomalies may present as a part of complex congenital malformations of the heart or as isolated defects and are detected in a range from 0.46% to 1.3% of routine cardiac catheterizations. Coronary artery anomalies can be associated with myocardial ischemia, although they do not appear to be associated with an increased risk for development of coronary atherosclerosis [Gowda 2003; Amasyali 2004]. The clinical and prognostic implications depend not only on the coronary artery affected, but also on the origin, course, and termination of this vessel. Certain coronary vessel abnormalities may be related to sudden death, syncope, and congenital or ischemia-related syndromes or may be incidental findings without clinical implications or adverse prognosis. We report the case of a patient admitted to our department who presented with an anomalous origin of the left main coronary artery (LMCA) arising

from the right coronary artery (RCA) combined with coronary artery disease.

## CASE REPORT

A 70-year-old man with a history of chest discomfort and angina symptomatic for 1 year was referred to our department for coronary bypass surgery. His chest discomfort and angina episodes had increased in spite of therapeutical dosages of B-blockers, aspirin, and nitroglycerin. The vital signs included a blood pressure of 130/80 and a heart rate of 45 beats/min. Physical examination revealed no remarkable findings. Echocardiography showed no particular hypokinesis and a slightly decreased ejection fraction. An electrocardiogram showed a sinus bradycardia with 50 beats/min with a right hemi-block as well as Q waves in leads II, III, and aVF. A specific coronary diagnostic was performed by means of cardiac catheterization and 16-slice multidetector computerized tomography (MDCT).

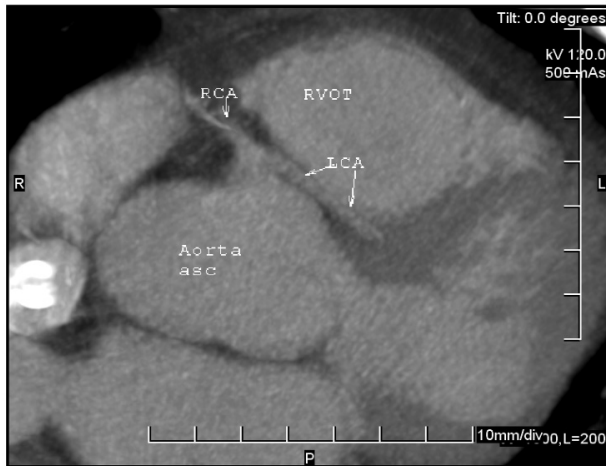
Cardiac catheterization from the standard right femoral Judkins approach showed a normal-sized left ventricle with good global and segmental contractility. The left ventricular end-diastolic pressure was within normal range. Left anterior oblique projection revealed the absence of the left coronary ostium in the left sinus of Valsalva. The right coronary ostium was cannulated uneventfully. Injection of contrast revealed not only a medially closed RCA but also the left coronary system adjacent to the RCA. The LMCA arose from the RCA and divided into left anterior descending and left circumflex coronary arteries. The left system vessels showed no remarkable focal stenoses and presented a normal branching pattern.

To evaluate the origin and course of the anomalous left coronary system, a MDCT scan was performed. As observed in the Figure, the LMCA arose from the right coronary sinus, ran between the right ventricular outflow tract and the aorta ascendens, and then took a course in the anterior interventricular sulcus.

The patient underwent conventional coronary artery bypass grafting by using the left internal thoracic artery to the left anterior descending artery and a single saphenous vein graft to the medial portion of the RCA. Both the operative and postoperative courses were uneventful, and the patient was discharged after 11 days.

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Sixteen-channel multidetector computed tomography image showing the origin of the left coronary artery (LCA) from the right coronary artery (RCA) and its course between the aorta and the right ventricular outflow tract (RVOT).

## DISCUSSION

The incidence of anomalous origin of the LMCA arising from the RCA has been reported to be 0.01% to 0.07% in patients undergoing cardiac catheterization and 1.2% to 6.1% in patients presenting with an isolated coronary anomaly [Donaldson 1983; Yamanaka 1990]. Barth et al described 3 anatomical variations in the initial course of LMCA originated in the RCA or right sinus of Valsalva: anterior to the right ventricular infundibulum or anterior type, between the pulmonary trunk and the aorta or interarterial type, and in the ventricular septum beneath the right ventricular infundibulum or septal type [Barth 1986]. An anomalous origin of the LMCA from the RCA that presents a course between the aorta and pulmonary trunk has been considered of no clinical significance as the majority of the patients are asymptomatic. However, it is possible that this anomaly provokes angina-like symptoms due to compression of the LMCA between the aorta and pulmonary trunk. Association with conventional atherosclerotic coronary disease can worsen the prognosis as well as increase the risk of both surgical and percutaneous intervention. Medical therapy in asymptomatic patients, interventional angiography by means of angioplasty, or stenting of the affected vessel and coronary bypass surgery are the alternatives proposed to treat patients presenting coronary anomalies associated or not with coronary disease [Grey 1984; Rossi 1988; Ozdil 1995].

The development of new imaging techniques such as MDCT has permitted better definition of the coronary vessels, especially the evaluation of the precise course of

anomalous coronary arteries. Duran et al stated that MDCT, especially volume-rendering and maximum-intensity projection techniques, may be useful for the assessment of complex variations when conventional angiography may not be sufficient [Duran 2006]. Accurate depiction of the origin and course of anomalous coronary vessels may influence the therapeutical choice, and Reul et al recommended coronary bypass surgery in patients presenting a LMCA course between the aorta and the pulmonary trunk [Reul 2002].

In our patient, coronary bypass surgery was decided on after considering the existing coronary disease that affected the RCA and the course of the LMCA between the aorta and right ventricular outflow tract. Our treatment proved effective and we recommend such an approach in patients presenting with coronary anomalies and associated atherosclerotic heart disease.

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