Anomalous Origin of the Right Coronary Artery From the Main Pulmonary Artery Presenting as Angina Pectoris in an Adult

Chung Su Park, MD1, Weon Kim, MD1, Sung Bum Hong, MD1, Sun Ho Hwang, MD1, Wan Kim, MD1 and Byung Hee An, MD2
1The CardioVascular Center of Gwangju Veterans Hospital, Gwangju, 2Cardiac Surgery of Chonnam National University Hospital, Gwangju, Korea

ABSTRACT

The anomalous origin of the right coronary artery from the main pulmonary artery has been rarely reported. We report a 63-year-old male with angina pectoris who was shown to have an anomalous origin of the right coronary artery from the main pulmonary artery. The abnormal origin was identified by conventional coronary angiography, but the abnormal course of the artery was precisely delineated by high resolution multi-slice computerized tomography. The patient underwent successful surgical correction of the anomalous vessel with complete resolution of symptoms. (Korean Circ J 2008;38:627-629)

KEY WORDS: Coronary vessel anomalies; Coronary artery disease.

Introduction

High resolution multi-detector computerized tomography (MDCT) is a non-invasive diagnostic modality which has been shown to be useful for patients with a suspected anomaly of a coronary artery. Cases involving anomalous origins of coronary arteries from the pulmonary artery have rarely been reported.1) We report herein a patient with an anomalous origin of the right coronary artery (RCA) from the main pulmonary artery (MPA) who underwent successful corrective surgery.

Case

The patient was a 63-year-old male with exertional dyspnea and effort-induced angina for 6 months. The pain was relieved with rest. The risk factors for coronary artery disease included hypertension and a 50-pack-year smoking history. He did not show specific abnormalities on physical examination. Biochemical test results, including cardiac enzymes, were within normal ranges. A chest X-ray showed mild cardiomegaly. An electrocardiogram showed a normal sinus rhythm. Two-dimen-

sional echocardiography showed normal left ventricular size and preserved systolic function. A treadmill test showed marked ischemic ST-segment depression in II, III, aVF, and V5-6. Coronary angiography demonstrated retrograde filling of the RCA from the left coronary artery during the venous drainage phase, and did not show significant stenosis in the coronary arteries (Fig. 1A). An aortogram showed flow into the left coronary artery, but did not show a RCA ostium. The MDCT showed that the RCA originated from the MPA and the left coronary artery originated from the aortic root (Fig. 1B). The RCA ostium was not detected by MDCT. We performed a myocardial thallium scan (M-SPECT) to ascertain the relationship between the symptoms and the coronary anomaly. The M-SPECT showed myocardial ischemia and infarction in the RCA territory (Fig. 1C). The patient underwent bypass surgery from the right internal mammary artery to the RCA after closure of the RCA originated in the main pulmonary artery. A cardiac computerized tomography obtained postoperatively showed a successful result (Fig. 1D). The patient was discharged and did not complain of any cardiac symptoms for 3 months of follow-up.

Discussion

In a large series of 126,595 coronary angiograms, anomalous right coronary arteries were reported in 0.26%.2) An anomalous origin of the left coronary artery from the pulmonary artery (ALCAPA) syndrome
Anomalous Origin of RCA From Pulmonary Artery is a more common anomaly than an anomalous origin from the right coronary artery. Most patients with ALCAPA syndrome die from severe congestive heart failure due to chronic mitral regurgitation and global ischemic cardiomyopathy. An anomalous right coronary artery usually originates from the left sinus valsalva, the left main coronary artery, the thoracic aorta, and the pulmonary artery. An anomalous origin of the right coronary artery from the pulmonary artery in the adult has been rarely reported because most of the patients remain asymptomatic and are found incidentally in adulthood. Symptoms of myocardial ischemia seldom develop in patients with this anomaly in the absence of additional atherosclerotic or other disease processes. These symptoms have included acute myocardial infarction, angina pectoris, syncope, non-fatal ventricular fibrillation, and sudden death. We have demonstrated an anomalous origin of the right coronary artery from the pulmonary artery to be the cause of myocardial ischemic symptoms through several tests, including MDCT and M-SPECT. Although coronary artery anomalies are usually diagnosed during coronary angiograms, MDCT

---

Fig. 1. Imaging studies of the patient. A: coronary angiography demonstrated retrograde filling of the right coronary artery from the left coronary artery during the venous drainage phase. B: a cardiac computerized tomogram showed that the right coronary artery originated from the main pulmonary artery and the left coronary artery originated from the aortic root. The RCA ostium was not detected by MDCT. C: a myocardial thallium scan showed mixed myocardial ischemia and infarction in the RCA territory. D: cardiac computerized tomogram checked after the operation showed a patent bypass graft vessel and closure of the RCA originated in the main pulmonary artery. RCA: right coronary artery, MDCT: multi-detector computed tomography.
may be beneficial in many clinical situations. MDCT coronary angiography currently appears to fulfill the requirements of a non-invasive morphologic assessment of the coronary arteries, as a result of its combination of rapid acquisition speed, spatial resolution, and robustness of use. It is an effective and non-invasive method to identify coronary artery anomalies in clinical practice when the patient has chest pain. Operative correction is the proper treatment for the anomalous coronary artery arising from the pulmonary artery. In our case, surgical correction was achieved by bypass surgery from the right internal mammary artery to RCA.

REFERENCES