

Off-Pump Coronary Artery Bypass Grafting for a Patient with Anomalous Origin of the Right Coronary Artery from the Pulmonary Artery

Masanori Ogiwara, MD,¹ Hiroshi Hojo, MD,¹ Masahiko Ozaki, MD,¹
and Shunei Kyo, MD²

We report on a case of a 70-year-old chronic hemodialysis patient. He presented with anomalous origin of the right coronary artery from the pulmonary artery (ARCAPA) and severe left anterior descending coronary artery (LAD) stenosis, which supplied collateral flow to the right coronary artery (RCA). The patient complained of myocardial ischemic symptoms during routine hemodialysis. We performed off-pump coronary artery bypass grafting (OPCABG) surgery and ligation of the origin of the ARCAPA. Previous reports described that the myocardial ischemia was a rare complication with the ARCAPA patients. However, this case required coronary revascularization because of the atherosclerotic LAD stenosis as a collateral source of the RCA. (Ann Thorac Cardiovasc Surg 2006; 12: 432–4)

Key words: anomalous origin of the right coronary artery, off-pump coronary artery bypass grafting

Introduction

Anomalous origin of the right coronary artery from the pulmonary artery (ARCAPA) is a rare congenital anomaly.¹⁾ Comparing the left coronary artery (LCA) from the pulmonary artery (PA), a hemodynamical crisis is not a usual event even in neonates.²⁾ We described a case of ischemic coronary artery disease combined with this anomaly in an elder male with chronic hemodialysis treated with off-pump coronary artery bypass grafting (OPCABG).

Case Report

We report on a case of a 70-year-old male who underwent chronic hemodialysis for seven years and on whom coronary angiography (CAG) was carried out as he was experiencing chest pain and bradycardiac paroxysmal

atrial fibrillation during his routine dialysis. The CAG revealed the diffuse diseased LCAs with severe dilatation and significant calcification. The proximal end of the left anterior descending coronary artery (LAD) indicated 90% stenosis (Fig. 1). In the late phase of the LCA angiogram, distal of the right coronary artery (RCA) flowed from the LAD and the main pulmonary trunk revealed retrograde blood flow via the RCA (Fig. 2). The ARCAPA and myocardial ischemia for both the LAD and RCA were diagnosed. PA angiography was also performed; however the orifice of the RCA was just identified. Echocardiography showed normal left ventricular function and mild hypertrophy. Computer tomography (CT) revealed severe calcification of the ascending aorta and LCAs. No other congenital malformation was detected. The patient was referred to our division for surgical coronary revascularization.

After median sternotomy, OPCABG was performed due to indications for coronary surgery; presence of severe calcification of the ascending aorta and preferable diameter of the target coronary artery. The auto saphenous vein (SV) was harvested and anastomosed to the proximal of the RCA. Anastomosis of the SV graft to the ascending aorta was performed using a HEARTSTRING® system (Guidant Corp., Santa Clare, CA). The left internal tho-

From ¹Division of Cardiovascular Surgery, Showa General Hospital, Tokyo, and ²Division of Cardiovascular Surgery, Saitama Medical School, Saitama, Japan

Received March 10, 2006; accepted for publication April 21, 2006. Address reprint requests to Masanori Ogiwara, MD: Division of Cardiovascular Surgery, Showa General Hospital, 2–450 Tenjincho, Kodaira, Tokyo 187–8510, Japan.

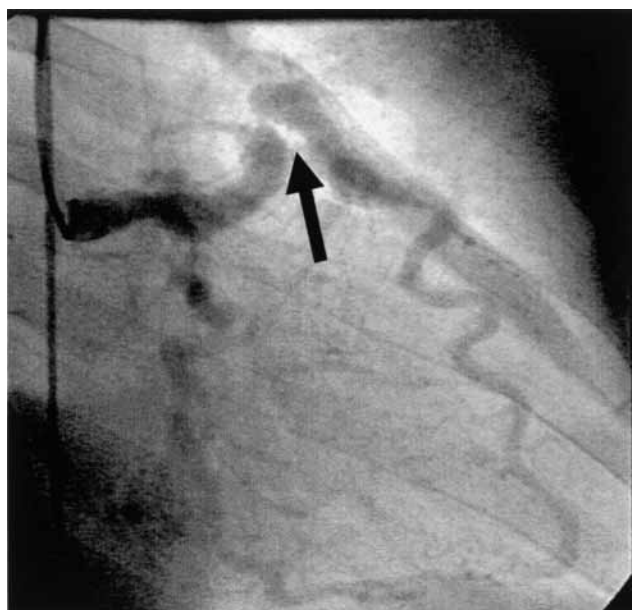


Fig. 1. Early phase of the left coronary arteriogram showing the diffuse dilatation.
Arrow, severe stenosis of the left anterior descending coronary artery.

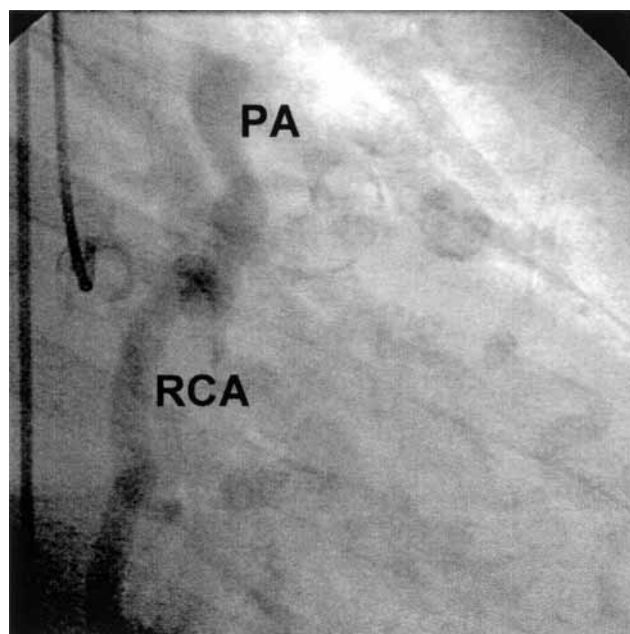


Fig. 2. Late phase of the left coronary arteriogram showing right coronary artery retrograding blood flow to the pulmonary artery.
RCA, right coronary artery; PA, pulmonary artery.

racic artery was anastomosed to distal of the LAD. The LAD wall had severe atherosclerotic calcification, however the RCA wall was markedly thin and fragile. After the revascularization, the anterior of the right ventricle out-flow was dissected to expose the RCA. The RCA rose from the right side of the pulmonary trunk approximately 2 cm above the pulmonary valve, the RCA was ligated just distal of the origin to avoid arteriovenous shunt.

The postoperative course was uneventful except for asymptomatic paroxysmal bradycardia during sleeping; temporary epicardial cardiac pacing was used to back up the heart rhythm. He returned to regular dialysis immediately and hemodynamical disorder was not observed at all through the dialysis. On the 13th day of post operation, he transferred to the division of cardiology for treatment of the asymptomatic paroxysmal bradycardia including a pacemaker implantation.

Discussion

The ARCAPA is a rare congenital heart anomaly and generally associated with other congenital malformations.¹⁾ Patients with anomalous origin of the LCA from the PA present with severe myocardial ischemia, so the surgical repair has to be performed in early infancy.²⁾ In

contrast, patients with ARCAPA present usually asymptotically. Radke et al. reviewed literatures and summarized 57 cases of this anomaly; it is typically observed in children revealed in examination for other congenital heart anomalies, therefore few cases of ARCAPA with myocardial ischemic symptoms underwent surgery by a re-implantation procedure or CABG using the cardiopulmonary bypass.^{1,3-6)}

Our patient had no other congenital anomaly but developed symptomatic myocardial ischemia because of atherosclerotic stenosis of the LAD which was a collateral source of the RCA, thus he required surgical revascularization. Azakie et al. described the excellent result of anatomical repair for the LCAPA in neonates.²⁾ However, we elected the OPCABG procedure without an aortic clamp to avoid peri-operative cerebral complication, because this patient was an elderly-hemodialysis patient with a severe atherosclerotic calcified aorta. No OPCABG for patients associated with ARCAPA has been previously reported.

In summary, we report on a rare case of an elderly male patient with ARCAPA and severe LAD stenosis, which supplied collateral flow to the RCA. Due to myocardial ischemia during routine hemodialysis, we performed OPCABG and ligation of the origin of an ARCAPA.

Myocardial ischemia is rare complication with an ARCAPA patient. However, this case required coronary revascularization because of the atherosclerotic LAD stenosis as a collateral source of the RCA.

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