Successful Surgical Repair of a Bilateral Coronary-to-Pulmonary Artery Fistula

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A 58-year-old woman was admitted to our department for evaluating an abnormal blood flow in the main pulmonary artery by transthoracic echocardiography. Coronary angiography revealed the presence of fistulas originating from the left anterior descending artery and also the right coronary artery to the main pulmonary artery. Under cardiopulmonary bypass, both fistulas were ligated near the origin, and direct closure of drainage site in the main pulmonary artery was performed. The postoperative course was uneventful, and coronary angiography after surgery showed that the coronary-to-pulmonary artery fistulas (CPAFs) disappeared. We report a surgical repair of a bilateral CPAF because the cardiac anomaly is extremely rare. (Ann Thorac Cardiovasc Surg 2009; 15: 50–52)

Key words: coronary artery fistula, bilateral coronary-to-pulmonary artery fistula, surgical repair

Introduction

Coronary artery fistulas (CAFs) are rare anomalies, and the incidence is reported to be about 0.1%–0.2% in coronary angiography.1 Among them, coronary-to-pulmonary artery fistulas (CPAFs) range from 15% to 30% of all CAFs, whereas a bilateral CPAF is a very rare case.2 Some cases are symptomatic (angina pectoris, heart failure, endocarditis, aneurysmal formation), and others are asymptomatic, in which the fistulas are incidentally discovered during coronary angiography. We report a surgical repair of an asymptomatic bilateral CPAF using a cardiopulmonary bypass.

Case Report

This is the case of a 58-year-old woman who followed up for chronic hepatitis C and dilated cardiomyopathy at another hospital. She was referred to our hospital for follow-up. Physical examination was normal except for a soft continuous cardiac murmur heard at the right upper sternal border. Electrocardiography showed normal sinus rhythm without ST-T changes. A transthoracic echocardiography showed a dilated cardiomyopathy pattern and general hypokinesis of the left ventricle. Doppler analysis revealed a small jet flow in the main pulmonary trunk from the left anterior descending (LAD) artery; therefore CPAF was suspected, and coronary angiography was performed (Fig. 1). Bilateral CPAF originated from the proximal parts of the right coronary artery and LAD artery and drained into the main pulmonary trunk (Fig. 2). Pulmonary artery pressure was normal (17/7 mmHg), and the left-to-right shunt ratio was 22%.

An operation was performed through a median sternotomy. The right CPAF was visible on the surface of the right ventricle, but the left CPAF was not clearly identified at the exact origin because fistulous vessels...
were extremely dilated. The right CPAF was temporarily occluded with a vascular clip for 15 minutes and was ligated at the origin after a hemodynamic state and the ECG findings were unchanged. Although trying to identify the origin of the left CPAF, the fistula was delicate and easy to bleed; thus the origin could not be identified. These fistulas were then closed using three stitches of 5-0 polypropylene with a felt strip to avoid occlusion of the LAD. The main pulmonary artery was opened under cardiopulmonary bypass support and cardiac arrest with cardioplegia. A small orifice through which the CPAF seemed to drain into the main pulmonary artery was identified just above the right pulmonary cusp. The orifice was closed directly with a stitch of 5-0 polypropylene (Fig. 3).

Her postoperative course was uneventful, and the postoperative coronary angiography revealed no residual fistulas.

Discussion

CAFs are rare cardiac anomalies,1,3) and a bilateral CPAF is an especially rare lesion. Levin et al. reported that it accounted for only 5% of all 363 cases.4) Some patients had symptoms of congestive heart failure, endocarditis, angina pectoris, or myocardial infarction, whereas others were asymptomatic. In most of the latter cases, the diagnosis was made incidentally by coronary angiography at the time of the screening of other diseases. Okwuosa et al. reported that a CPAF was diagnosed by transesophageal echocardiography and that the procedure was useful as a complement to coronary angiography or magnetic resonance imaging.5)
Osawa et al.

Fig. 3. The main pulmonary trunk was opened longitudinally, and the drainage site was closed with a suture from inside the pulmonary trunk.

Our case, the patient was asymptomatic except for a subtle cardiac murmur; the initial examination was transthoracic echocardiography for screening, and it led to diagnosis.

Surgical indication is generally accepted in the symptomatic patient; however, it is controversial in asymptomatic patients. The patients who present ischemia, aneurismal formation, and cardiac failure are candidates for surgical intervention to close the coronary fistula.

Konno and Endo reported about surgical indications, such as a shunt ratio > 30%, symptoms of ischemia, pulmonary hypertension, congestive heart failure, aneurismal formation, and social reasons. The basic surgical technique is ligation of the fistulous vessels; however, complex fistulas require a cardiopulmonary bypass and cardioplegic arrest. Huang et al. recommended routine exploration of the pulmonary artery under cardiopulmonary bypass in complex cases, such as bilateral CPAF.

Although our patient was asymptomatic, the shunt ratio was relatively high, and the presence of a shunt flow might worsen cardiac function because of a prior dilated cardiomyopathy; therefore we decided to close the fistula. We also emphasize the importance of transthoracic echocardiography as an initial examination.

In summary, we reported a patient receiving successful surgical repair of bilateral CPAF. The procedure consisted of ligation of the CPAF’s origin and closure of the draining orifice in the main pulmonary artery under cardiopulmonary bypass with cardiac arrest.

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References