Large Right Coronary Artery to Left Ventricle Fistula

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Abstract
Coronary artery fistulas are uncommon entities with communication between the coronary artery and cardiac structure. We encountered a 70-year-old, asymptomatic woman with a large right coronary artery to left ventricle fistula. Non-invasive echocardiogram was helpful in detecting an enlarged right coronary that drained from the aorta into the left ventricle. Clinical importance of coronary artery fistula is due to an increased risk of heart failure, myocardial ischemia, and rupture. Treatment of asymptomatic patients without significant shunting is controversial. We decided to follow-up on her medically without surgical closure of the fistula because her hemodynamics are stable.

Echocardiogram is very useful to diagnose and evaluate these diseases.

Key words: right coronary artery to left ventricular fistula

Case Report

A 70-year-old, asymptomatic woman was referred to our department for further evaluation of a grade three diastolic murmur at the right sternal border in the third intercostal space and slight cardiac enlargement on chest X-ray. The electrocardiogram showed slightly high voltages. We could detect the whole length of an enlarged right coronary artery draining from the aorta into the posterior wall of her left ventricle, with blood flow detected mainly in diastolic color flow image component by echocardiogram (Figure 1). A calculated ejection fraction was 65% with a left ventricle diameter of 53mm in diastole and 37mm in systole. We diagnosed her as having coronary artery fistula. Multidetection computed tomography (MDCT) and coronary angiogram supported the diagnosis (Figure 2). Aortogram showed that shunt flow had the same

Fig. 1. Echocardiogram
A. short axis view of aortic valve. The arrow shows large right coronary artery drain from aorta. B. The arrow shows that max major axis of fistula is 2.4 cm. C, D 3-chamber view of diastolic phase. The blood flow is mainly displayed as diastolic color flow image component.
hemodynamics of grade two aortic regurgitation. Tl-201 perfusion scintigram did not show any myocardial ischemia.

Surgical or transcatheter closure of the coronary fistula was not selected as she had no sign of heart failure and myocardial ischemia.

**Discussion**

Coronary anomalies are found in 1.3% of adult patients undergoing coronary angiogram. Eighty seven percent had anomalies of origin and distribution, and 13% had coronary artery fistula. Coronary artery fistulas are uncommon entities defined as a communication between coronary artery and a cardiac chamber or another vascular structure. Congenital fistulas appear to represent persistence of embryonic intertrabecular spaces and sinusoids. Acquired fistulas are caused by atherosclerosis, arteritis, and trauma[1]. The right coronary artery fistula is 55% of cases; the left coronary artery fistula is 35%; both coronary artery fistula is 5%. Drainage site of fistulas occurs into the right ventricle in 41% of cases, right atrium in 26%, pulmonary artery in 17%[2], coronary sinus in 7%, the left atrium in 5%, and the left ventricle only in 3%[3].

Congestive heart failure is most likely to occur in infancy or in old age. Also because myocardial perfusion of other coronary areas decreases, myocardial ischemia or hemodynamic steal phenomenon may occur.

The main indications for closure of coronary artery fistula depend on whether the patient has heart failure and myocardial ischemia. In adults, the treatment of asymptomatic patients with significant shunting is still controversial[4,5].
In this case, the patient’s shunt flow streams from the aorta to left ventricle in diastolic phase; her hemodynamics appeared similar to that of grade-two aortic regurgitation. Surgical or transcatheter therapy was not considered because she had no sign of volume overload. Follow-up by checking left ventricular end-diastolic diameter and ventricular function using echocardiography should be performed. A recent report from the Mayo Clinic[6], that shows asymptomatic patients with an ejection fraction >55% and end-systolic diameter normalized to body surface area <25mm/m² incurred a 10-year mortality rate between 14% and 17% (not significantly different from expected), may be useful for deciding surgical intervention.

Echocardiogram is very useful to diagnose non-invasively these diseases by determining coronary conformation and coronary traveling. We can evaluate the change of coronary conformation and cardiac function with time to determine indication of operation by echocardiogram.

References