

Right Coronary Artery to Left Ventricular Fistula Associated with Infective Endocarditis of the Mitral Valve

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A 27-year-old man with bacterial endocarditis of the mitral valve and embolic episodes was found to have a large right coronary artery fistula communicating with the left ventricle, immediately inferior to the posterior mitral annulus. The perforation of the posterior leaflet and coronary arteriovenous fistula was identified using two-dimensional Doppler echocardiography. The diagnosis was confirmed by coronary angiography, and the patient underwent a successful operation. (**Korean Circ J 2013;43:281-283**)

KEY WORDS: Endocarditis, bacterial; Fistula; Coronary vessel anomalies.

Introduction

Congenital coronary arteriovenous fistulas are rare anomalies.^{1,2)} however, patients may sometimes present the disease with bacterial endocarditis.³⁾ We report a patient with congenital coronary arteriovenous fistula along with bacterial endocarditis of the mitral valve and embolism in the spleen and kidney.

Case

A 27-year-old man was referred to our hospital due to mitral valve repair for severe mitral insufficiency secondary to *Streptococcus viridians* infective endocarditis which was diagnosed 2 months ago. He had been treated with intravenous antibiotics for 6 weeks before the referral.

The patient was in New York Heart Association Class II. On examination, he had tachycardia of 120 beats/minute and blood pres-

sure of 110/70 mm Hg. He also had a grade 5/6 systolic murmur in the apex. The other findings were normal. Chest radiograph showed a cardiothoracic ratio of 60%. Laboratory investigations revealed mild anemia (hemoglobin level, 10.4 g/dL) and the erythrocyte sedimentation rate of 34 mm/h.

A standard two-dimensional Doppler echocardiography was performed using Acuson Sequia™ C256 (Siemens, PA, USA), which showed dilation of the left ventricle (left ventricular dimension in end-diastole/end-systole: 62/43 mm) and left atrium (left atrial diameter: 43 mm). It also revealed an echo free space beneath the posterior mitral annulus and aneurysmal dilatation of the proximal right coronary artery in the parasternal long axis view of the left ventricular inflow tract (Fig. 1). The large mid and distal right coronary artery with a tortuous course, a defect in the posterior mitral leaflet, and the site of drainage of the fistulous tract into the left ventricle were visualized in parasternal short axis view, respectively (Fig. 2). Color-Doppler examination showed high velocity turbulent flow striking the posterior mitral leaflet, and mitral regurgitant flow directing anteriorly into the left atrium through the defect of the posterior mitral leaflet, during isovolumetric ventricular contraction and diastole (Fig. 3). However, the major mitral regurgitant flow was found to occur during systole. Coronary angiography (Fig. 4) confirmed the presence of dilated and tortuous right coronary arteriovenous fistula drainage into the left ventricle. During the operation, the patient was found to have dilated and tortuous right coronary artery with a fistula tract of approximately 0.8 cm arising from the distal to posterior descending artery origin and opening into the left ventricle immediately inferior to the posterior mitral annulus. The defect (0.6 cm diameter) in the posterior leaflet was seen between the middle and medial scallops.

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No vegetation of fibrinoid materials was seen on the posterior leaflet surrounding the terminal portion of the fistula. The defect in the posterior leaflet was closed with a woven Dacron patch, and the fistula was sutured and closed inside the dilated distal right coronary artery. The patient's postoperative course was unremarkable. He was discharged on the tenth postoperative day.

Discussion

Coronary arteriovenous fistula is an asymptomatic and infre-

quent congenital anomaly.⁴⁾ However, a significant number of patients present complications including bacterial endocarditis, congestive heart failure, and angina. Bacterial endocarditis has been reported in 4% to 10% of patients with coronary arteriovenous fistula.¹⁾²⁾ Mitral valve perforation is an uncommon lesion that occurs in association with infective endocarditis of the aortic and mitral valves.⁵⁾ In our



Fig. 1. Parasternal long axis echocardiogram showing the echo free space beneath the posterior mitral annulus (large arrowheads) and aneurysmal dilation of the proximal right coronary artery (small arrowheads).

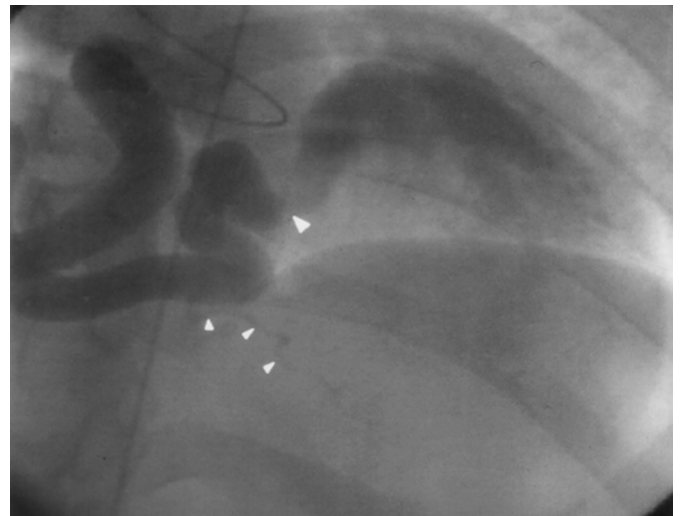


Fig. 4. Anteroposterior cranial view of the coronary angiogram showing a dilated and tortuous right coronary arteriovenous fistula drainage into the left ventricle (large arrowhead). One normal looking posterior descending artery is observed (small arrowheads).

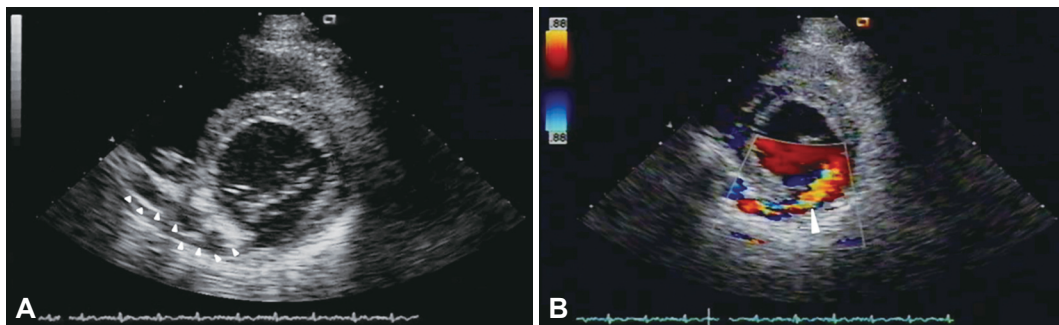


Fig. 2. A: parasternal short axis echocardiogram showing the site of drainage of the fistulous tract into the left ventricle (arrowheads). B: parasternal short axis echocardiogram with color Doppler showing blood flow from the fistula into the left ventricle (arrowhead).

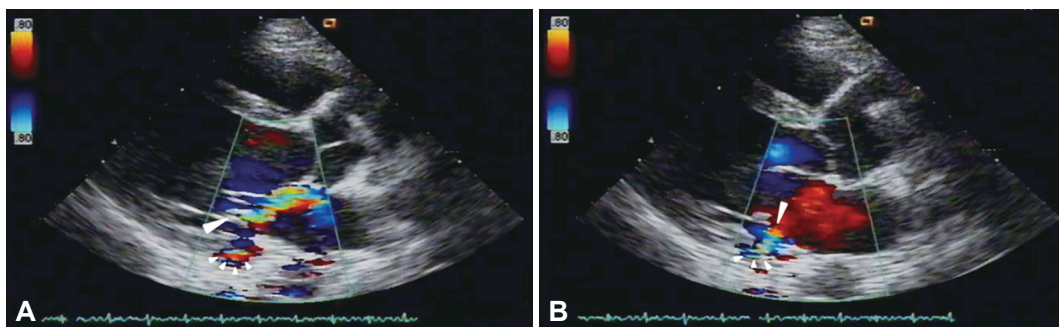


Fig. 3. A: parasternal long axis echocardiogram with color flow Doppler during isovolumetric ventricular contraction showing high velocity turbulent flow striking the posterior mitral leaflet (large arrowhead) near the drainage site of coronary arteriovenous fistula (small arrowheads). B: parasternal long axis echocardiogram with color flow Doppler during diastole showing laminar flow through the perforation of the posterior mitral leaflet (large arrowhead).

patient, the perforation of the posterior leaflet secondary to bacterial endocarditis was clearly identified near the drainage site of the coronary arteriovenous fistula. Turbulence over the posterior leaflet caused by the abnormal flow of coronary arteriovenous fistula could account for the site of perforation on the posterior leaflet. Thus, it seems clear that coronary arteriovenous fistula can cause endocarditis on the left side of the heart and must be considered in the differential diagnosis of patients with unusual perforation of the posterior mitral leaflet. The absence of vegetation at the time of referral was probably due to bacteriological cure or distal embolization.

Two dimensional echocardiography has its limitations in diagnosing coronary arteriovenous fistula but has been an important procedure in establishing the diagnosis in most cases.^{6,7)} In our case, the proximal portion, the drainage site of coronary arteriovenous fistula, and the perforation of the posterior mitral leaflet were clearly demonstrated by two dimensional echocardiography. Coronary angiography was performed only to identify the anatomical diagnosis.

In conclusion, coronary arteriovenous fistula could be considered in the differential diagnosis of patients with unusual perforation of the posterior mitral leaflet secondary to infective endocarditis. The ideal time for elective surgical closure would be prior to the development of fistula-related complications.

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