Case Report

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Complex Coronary Artery Fistula Causing Angina is Resolved Through Coil Embolization

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Coronary artery fistulas (CAFs) are rare, mostly congenital cardiac anomalies. Most are asymptomatic and do not require treatment, but some can cause angina or exertional dyspnea. Symptomatic or hemodynamically significant fistulae can be treated with transcatheter or surgical methods of closure, with the former being a less invasive alternative while showing similar effectiveness and morbidity. We present a 52-year-old man with a complex coronary artery to pulmonary artery fistula causing angina, successfully treated by transcatheter coil embolization. Even without complete closure, this patient showed improvement of symptoms and objective indices of myocardial ischemia.

Key Words: Coronary artery fistula, Coronary artery to pulmonary artery fistula, Transcatheter coil embolization

INTRODUCTION

Coronary artery fistulae (CAFs) are rare, mostly congenital anomalies, and are usually asymptomatic and do not require treatment. However, some CAFs can cause symptoms, usually atypical chest pain or exertional dyspnea, depending on the severity of the left to right shunt. In the case of symptomatic or hemodynamically significant coronary artery fistulae, closure is recommended, and this can be done surgically or through a transcatheter technique. Here, we report a case of a 52-year-old man who presented with angina, and was found to have a hemodynamically significant coronary artery to pulmonary artery fistula.

CASE REPORT

A 52-year-old man presented with chest tightness and dyspnea during uphill walking from two weeks ago. No predisposing risk factors for ischemic heart disease such as hypertension or smoking were identified.

Initial chest X-ray, electrocardiography (ECG), and echocardiography were within normal limits. Treadmill test (TMT) was positive with ST depression at inferolateral leads on exercise and a Duke score of -16.5, showing high risk findings for myocardial ischemia (Fig. 3). The next step was a coronary computed tomographic (CT) angiography, which revealed fistulae originating from 1) the proximal right coronary artery (RCA), 2) left main coronary artery (LMCA), and 3) ascending aorta near the LMCA, draining into the left side of the main pulmonary trunk (Fig. 1). An aneurysmal dilatation up to 1 cm, connected to the

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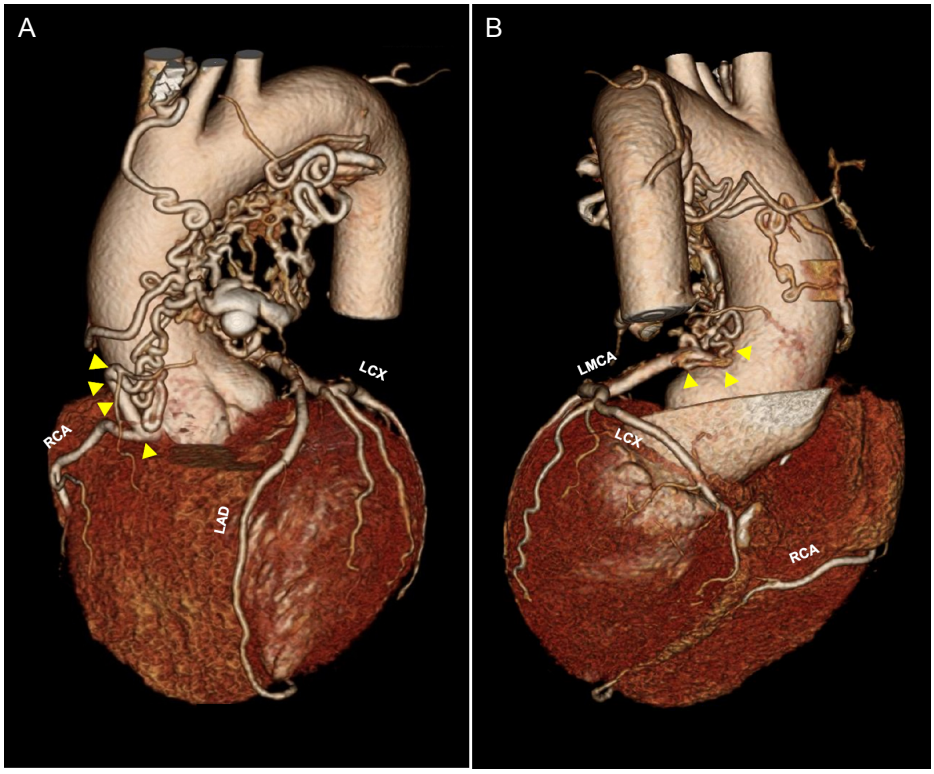

Fig. 1. Coronary CT angiography shows fistulae originating from (A) the proximal right coronary artery (RCA), (B) left main coronary artery (LMCA), and ascending aorta near the LMCA. The fistulae drain into the left side of the main pulmonary trunk.

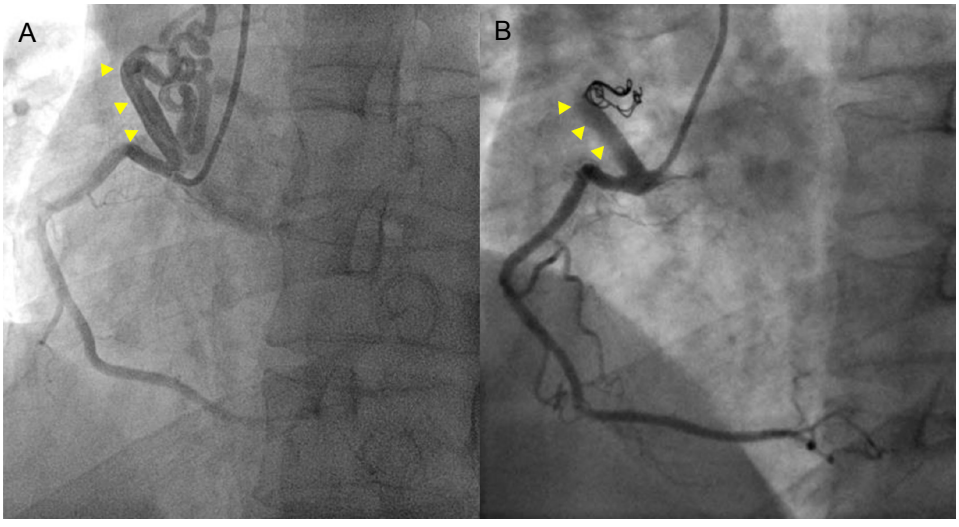

Fig. 2. Coronary angiography shows (A) the right coronary- to-pulmonary artery fistula, (B) Selective embolization with coiling was performed.

right coronary-to-pulmonary artery fistula, was observed in front of the pulmonary artery. There was no evidence of atherosclerosis or other stenosis in the coronary arteries.

Coronary angiography was done via right radial approach, which revealed the three fistulae in line with the previous coronary CT angiography. The right coronary-

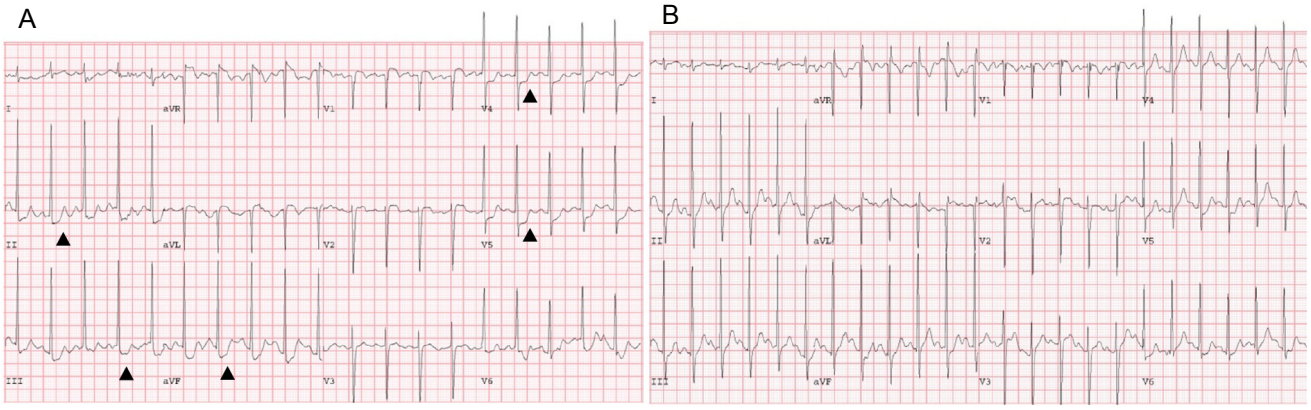

Fig. 3. (A) Pre-procedural treadmill test (TMT) shows ST depression at leads II, III, aVF, V4, V5 (black arrows), suggesting myocardial ischemia, (B) TMT six months later shows no signs of myocardial ischemia.

to-pulmonary artery fistula was the largest and showed coronary steal resulting in sluggish flow to the RCA. The coronary fistula from proximal RCA was chosen for intervention because only the RCA showed sluggish blood flow compared to the other main coronary arteries. Selective embolization with coiling was done to the right coronary-to-pulmonary artery fistula, and post-procedural angiography showed successful occlusion (Fig. 2). After coil embolization, blood flow was restored to RCA, and as the other coronary arteries showed intact blood flow, further intervention was judged to be unnecessary.

After the procedure, the patient's angina symptoms improved, and TMT at six months later showed no significant abnormality (Fig. 3).

DISCUSSION

A coronary artery fistula is an abnormal connection between a coronary artery and any of the 4 chambers of the heart or any of the great vessels. These fistulae are a rare clinical situation, present in 0.002% of the general population,[1] and are most often congenital, though sometimes acquired from trauma, infection, or iatrogenic injury. Fistulae originate from the right coronary artery in 50 to 60% of cases, from the left anterior descending artery in 25 to 42%, from the circumflex artery in 18.3%, from the diagonal branch in 1.9%, and from the left main coronary artery or circumflex-marginal branch in 0.7%.[1] Single fistula is the most common, ranging from 74% to 90%, multiple fistulae occur in 10.7% to 16% of all CAFs, and both coronary arteries are involved in 5%.[2,3]

Most CAFs are asymptomatic and do not require treatment,[4] but some larger fistulae may cause hemodynamic compromise, including myocardial ischemia due to coronary steal, volume overload, and rupture. Symptomatic or hemodynamically significant fistulae can be treated with transcatheter or surgical methods of closure. Transcatheter closure of CAF is now widely available and is being recognized as a safe, effective and less invasive alternative to surgical ligation. Results from the transcatheter and surgical literature indicate that both approaches have comparable early effectiveness, morbidity and mortality.[5,6] Prognosis after successful closure is excellent, even in the absence of complete closure.[7] In this case, a complex CAF causing angina was treated by occluding the most important branch with transcatheter coil embolization, and even with incomplete closure, was able to improve symptoms and objective indices of myocardial ischemia.

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