

Coronary-pulmonary artery fistula – multiple diagnostic imaging modalities

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Abstract: Coronary artery fistula is rare anomalies. Most adult patients are usually asymptomatic. A fistula is incidentally identified in the adult using echocardiography. Coronary angiography is considered the standard tool to confirm a coronary artery fistula. However, multidetector computed tomography (MDCT) angiography is considered a good alternative to coronary angiography.

Keywords: Coronary-pulmonary fistula; coronary angiography; echocardiography; multidetector computed tomography (MDCT)



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Introduction

Coronary artery fistula is a rare anomaly of the coronary artery. Most adult patients are usually asymptomatic. There are various imaging modalities to detect coronary artery anomaly such as echocardiography, coronary angiography and multidetector computed tomography (MDCT) angiography. Therefore, we present a case of a 53-year-old woman with coronary-pulmonary fistula, diagnosed by echocardiography, coronary angiography, MDCT angiography.

Case report

A 53-year-old woman was referred to our hospital for evaluation of increasing dyspnea on exertion. On physical examination, a continuous murmur was heard at the left mid sternal border. Electrocardiogram and chest X-ray were normal. Transthoracic echocardiography revealed a turbulent color flow signal during diastole along the antero-lateral wall of the pulmonary trunk (*Figure 1A* and *Video 1*). Pulsed-wave Doppler echocardiography revealed a diastolic signal imaging the main pulmonary artery through the fistula (*Figure 1B*). The direction and distribution of this abnormal

flow was different from that of patent ductus arteriosus. There were no atrial and ventricular dilations with normal systolic function. The coronary artery malformation was confirmed by coronary angiography. Coronary angiography demonstrated a coronary artery fistula in the proximal portion of the left anterior descending artery (LAD) which seemed to drain into the main pulmonary artery (*Figure 2* and *Video 2*). MDCT angiography showed a small, tortuous side artery from the LAD in cranial view; the exact termination could be seen in the main pulmonary artery (*Figure 3A*). The volume rendered image demonstrates the fistulous communication to the LAD and the main pulmonary artery just like coronary angiography (*Figure 3B*). Additionally, an exercise stress test was performed and was normal. Therefore, the patient was discharged and followed closely.

Discussion

Coronary artery fistula is a rare anomaly of the coronary artery. The overall population prevalence of coronary artery fistula is estimated at 0.002%. It occurs as an incidental finding in 0.1–0.2% of the coronary artery angiography (1,2). The majority of coronary artery fistulae are related

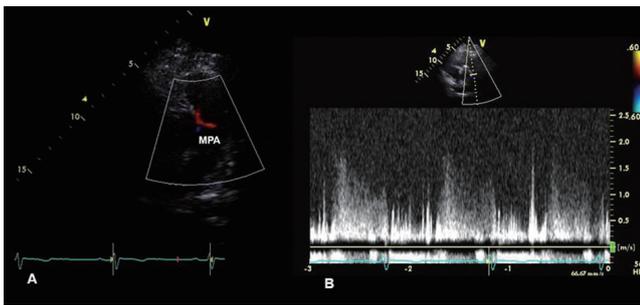
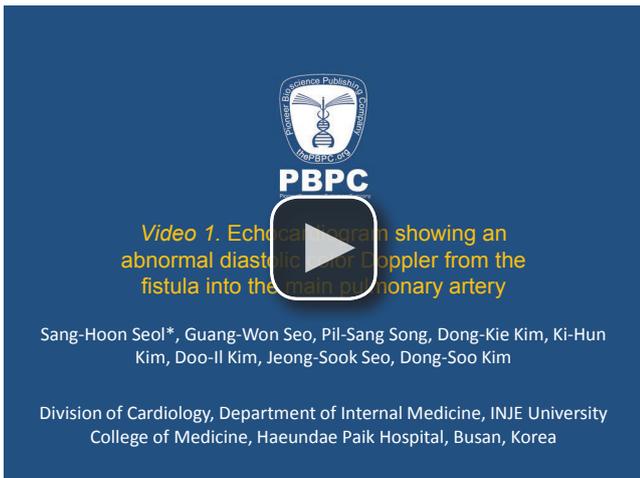


Figure 1 Transthoracic echocardiogram showing the parasternal short axis view an abnormal color Doppler imaging over the pulmonary valve (A), Pulsed-wave Doppler of diastolic flow from the fistula into the main pulmonary artery (B). MPA indicates main pulmonary artery.



Video 1 Echocardiogram showing an abnormal diastolic color Doppler from the fistula into the main pulmonary artery.

to right coronary artery (55%), while 35% arise from the LAD. The fistula communicated with the right side of the heart in 90% of the case (3). Low-pressure structures are the most common sites of drainage of the coronary artery fistula. Most adult patients are usually asymptomatic; a fistula is incidentally identified in the adult. Nowadays, different cardiac imaging modalities are utilized for diagnosis and optional management of coronary artery fistula. Transthoracic echocardiography showed continuous turbulent flow in the pulmonary artery during diastolic phase in short axis view. However, it is difficult to find the origin of the turbulent color flow (1). Coronary angiography remains the gold standard method for coronary fistulas. It can be used to evaluate the size, number of fistulas and anatomical features of the fistulous

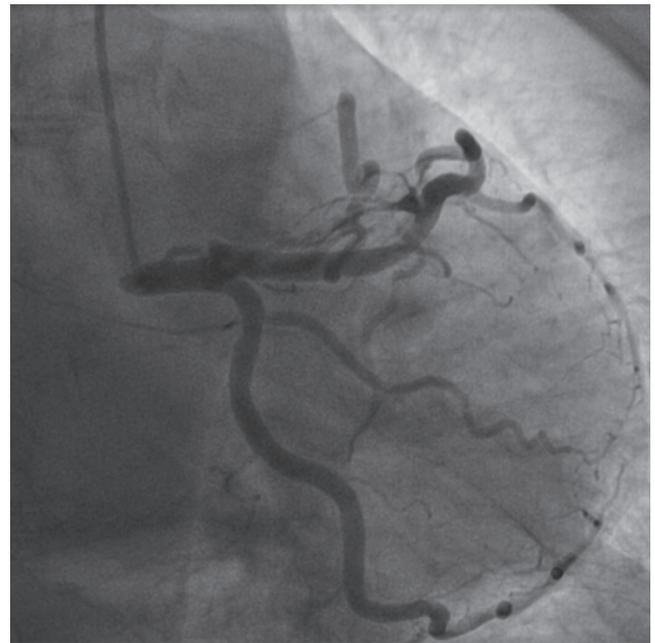


Figure 2 Coronary angiography demonstrating a coronary artery fistula between the left anterior descending artery and the main pulmonary artery.



Video 2 Coronary angiography demonstrating a fistula from the proximal left anterior descending artery into the main pulmonary artery.

tract, but it is expensive and invasive. We cannot find the apparent relation of coronary artery fistula and other structures. MDCT is a minimally invasive, accurate imaging tool for the detection of coronary anomaly (4). The 3D image enables determination of vessel origin and course. The major limitation of MDCT is radiation exposure,

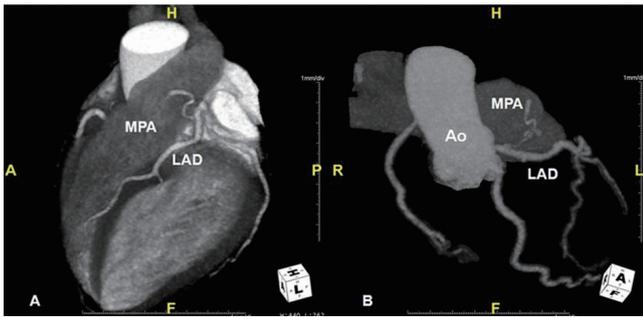


Figure 3 The VR image from MDCT angiography demonstrating the fistulous communication to the LAD and the pulmonary artery (A,B). Abbreviations: MDCT, multidetector computed tomography; VR, volume rendered; LAD, left anterior descending artery; MPA, main pulmonary artery; Ao, Aorta.

which can be substantially lowered by advanced technique. Therefore, MDCT is considered a good alternative to echocardiography and coronary angiography (5). The management of coronary artery fistula is controversial. There is no urgent treatment in asymptomatic cases like this patient. Patients treated conservatively should be followed closely for symptoms.

Conclusions

Coronary pulmonary fistula is a rare congenital disease. Nowadays, different cardiac imaging modalities help us

diagnose and optionally manage coronary artery fistula. MDCT should be considered as a non-invasive diagnostic modality to evaluate the localization, anatomy of coronary fistula.

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