



Figure 2. a-c. (a) Transthoracic echocardiography reveals an embolized TVAD from the right atrium into the right ventricle and a nodular mass in the right atrium. (b) Diameter of the nodular mass is measured to be 1.4×1.7 cm before the antibiotics therapy. (c) Diameter of the nodular mass reduced to 1.0×1.3 cm 10 days after the antibiotics therapy and retrieval of embolized TVAD

Video 1. Fluoroscopy showed a TVAD, which was fractured, and approximately 20 cm of it was embolized from the right atrium to the pulmonary artery

Video 2. Tip of the free fragment of TVAD was captured with the micro-snare catheter in the pulmonary artery under fluoroscopy guidance and retrieved from the femoral vein

Video 3. Transthoracic echocardiography demonstrated an embolized TVAD from the right atrium into the right ventricle and a nodular mass in the right atrium related to TVAD with irregularity on the surface of the device

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DOI:10.5152/akd.2015.6298



Coil embolization of iatrogenic coronary-pulmonary arterial fistula after heart transplantation

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Introduction

Coronary arteriovenous fistula (CAVF) is defined as direct connections between the coronary artery and one of cardiac cavities. It is generally derived from right coronary artery (RCA). Fistulas may be congenital or acquired (1). Coronary-pulmonary arterial fistulas (CPAF) constitute 15%-20% of all fistulas. They are mostly small, determined co-incidentally during coronary angiography (CAG), and have no clinical importance. However, in some cases, these fistulas may cause myocardial ischemia, angina pectoris, myocardial infarction, syncope, arrhythmias, congestive heart failure, and sudden death. Beside medical and surgical methods, coilisation and stent implantation are also performed. We report a case with an iatrogenic CPAF after heart transplantation.

Case Report

We present an 18-year-old male patient. The patient underwent heart transplantation for dilated cardiomyopathy at the age of 12 years. The laboratory findings, vital signs, and physical examination were

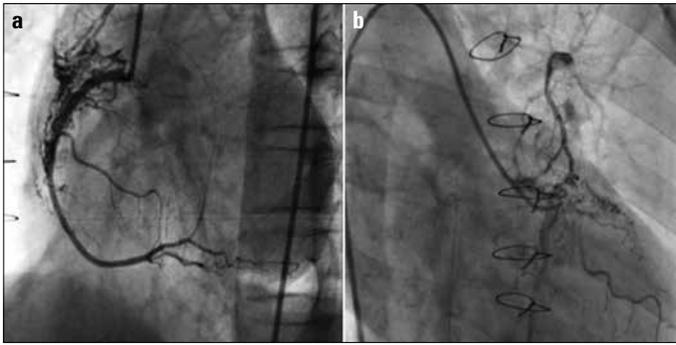


Figure 1. a, b. (a) Angiography of Fistula between the right coronary artery and the pulmonary artery. (b) Selective angiography of the fistula between the right coronary artery and the pulmonary artery

normal. The electrocardiogram (ECG) was in sinus rhythm with a heart rate of 82 beats per minute and left axis deviation. The patient had no cardiac complaints and was hospitalized for routine endomyocardial biopsy and CAG. Fistula between RCA and pulmonary artery was detected by CAG (Fig. 1a, b). There were no symptoms. The left ventricular ejection fraction (LVEF) was 55% and right ventricular (RV) systolic function was normal on echocardiography (ECHO). Mild hypokinesis of inferior and anterior septum and inferior wall were also detected. Systolic pulmonary artery pressure was 46 mm Hg. Myocardial perfusion scintigraphy (MPS) showed ischemia (reversible defect) at the apex, apicomediastinal region of the inferior and the anterolateral walls. Under temporary pacemaker support, two graft stent implantations to the RCA proximal segment and coil embolization for the distal fistula were performed (Fig. 2a, b). Six months after the procedure, ECHO showed normal LVEF without regional wall motion defect. No ischemia was present on MPS.

Discussion

The definition of CAVF was first reported in 1865 (1). The fistulas between the coronary arteries and pulmonary artery may be congenital or iatrogenic. CAVF, as well as CPAF, was rarely reported in heart-transplanted patients in the literature (2-6). However, it is a frequent complication of transplantation; CAVF was reported in 37.7% of 432 heart-transplanted patients in a study (6). Patients with CPAF may be symptomatic or asymptomatic. The clinical importance of asymptomatic CPAF diagnosed co-incidentally during CAG is not known. Symptomatic patients generally consult with symptoms of myocardial ischemia because of coronary steal. A pulmonary fistula with a wide shunt may also produce a cardiac volume load as a result of increased pulmonary perfusion. In addition to symptomatic patients, asymptomatic patients with apparent clinical, electrocardiographic, and radiological findings should also be treated. For asymptomatic patients, treatment indication is present because of the presence and risk of possible complications, particularly cardiac and pulmonary failure caused by an increased volume load. However, a conservative follow up of asymptomatic patients is also acceptable (7). The current treatment strategies are medical treatment, coilisation, surgery, and stent implantation. Surgical closure is a safe and effective procedure. In selected cases, transcatheter embolization can be used instead of surgery. This procedure is preferred especially if the coronary artery branch supplying the fistula can be safely cannulized, when there are no multiple fistulas, and when there is no great branch that can be misembolized. By transcatheterization, effectivity, mortality, and morbidity ratios are similar to surgical procedures. Unsuccessful intervention ratios were also reported because of the risk of residual shunt forma-

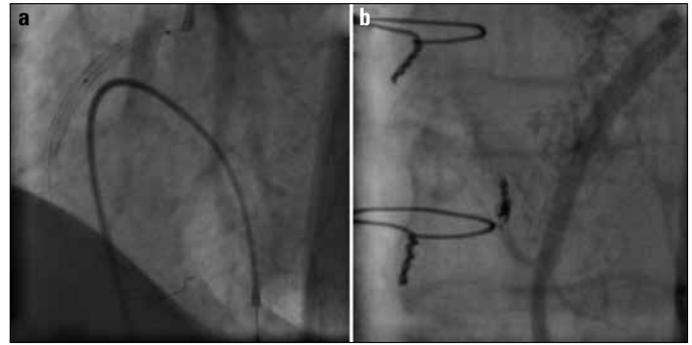


Figure 2. a, b. (a) Two graft stents implanted in the proximal segment of the right coronary artery under temporary pacemaker support. (b) Coil embolization of coronary-pulmonary artery fistula

tion and partial occlusion (8). Although there is no exact agreement about treatment approaches, it can be said that asymptomatic, small fistulas are benign and can be medically followed up, whereas in patients who are symptomatic and show fistula-associated complications, the fistula closure approach is appropriate. The transcatheter closure approach seems to be equivalent to the surgical approach for the fistula that needs to be closed.

Conclusion

In conclusion, although our patient was asymptomatic, because of apparent echocardiographic and scintigraphic findings, treatment was performed to prevent possible complications and to treat present complications.

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