

Left Internal Thoracic Artery to Left Pulmonary Artery Fistula after Coronary Artery Bypass Graft Surgery. A Rare Cause of Myocardial Ischemia

Gustavo Luiz Gouvêa de Almeida Júnior, José Kezen Camilo Jorge, Augusto César de Araújo Neno, Fernanda Beloni dos Santos Nogueira, Bruno Hellmuth, Roberto Hugo da Costa Lins, Renato Vilella, Valdo José Carreira, Ivo Thadeu, José Pedro da Silva
Casa de Saúde São José - Rio de Janeiro, RJ - Brazil

We report a patient who developed dyspnea on mild exertion six years after coronary artery bypass graft surgery (CABG). Myocardial ischemia was documented by radionuclide imaging, and coronary angiography showed

patency of all grafts and a large fistula between the left internal thoracic artery (LITA) and the left pulmonary artery (LPA). The patient was submitted to surgical closure of the fistula and made an excellent recovery.

Left internal thoracic artery fistula draining to left pulmonary artery is an extremely rare complication following myocardial revascularization. It may cause recurrent angina, dyspnea, heart failure, endocarditis, among other conditions. It should always be considered in the absence of a clear cause for the onset of these symptoms after myocardial revascularization. The diagnosis is made by coronary angiography, and most patients are treated by surgical or percutaneous closure of the fistula.

CASE REPORT

A 73-year-old white male patient with a history of systemic arterial hypertension and coronary artery bypass grafting six years ago using the following grafts: left internal thoracic (mammary) artery to anterior descending artery, sequential saphenous vein to the 1st and 2nd left marginal arteries and saphenous vein to the 1st diagonal artery. The patient presented with asthenia and progressive exertional dyspnea, which has been getting worse over the last few months even on mild exertion. He had been taking captopril 150 mg/d, hydrochlorothiazide 25 mg/d, and acetylsa-

licylic acid 200 mg/d. The cardiovascular physical examination was normal, except for a fourth heart sound (S4). His lungs were found to be clean. First-degree atrioventricular block and left anterior hemiblock was seen on ECG. The echocardiogram revealed only left ventricular hypertrophy and diastolic dysfunction. Myocardial ischemia investigation was performed through stress/rest myocardial perfusion scintigraphy. The scan (fig.1) showed low uptake of the radiopharmaceutical (Tc-99 sestamibi) in the anteroseptal region on stress, which returned to normal at rest, a finding consistent with anteroseptal ischemia. Coronary angiography and left ventriculography were thus performed, showing patency of all grafts and a 70% obstruction of the right coronary artery. However, a large fistula arising at the initial portion of the left mammary artery draining to the left pulmonary artery was detected (fig. 2 e 3). This fistula resulted in a significant steal of flow from the anterior descending artery, thought to be the cause of the anteroseptal ischemia. A surgical ligation of the fistula was performed, and the patient was discharged from the hospital. During the one-year follow-up period, the patient was free of the symptoms which led to his hospitalization.

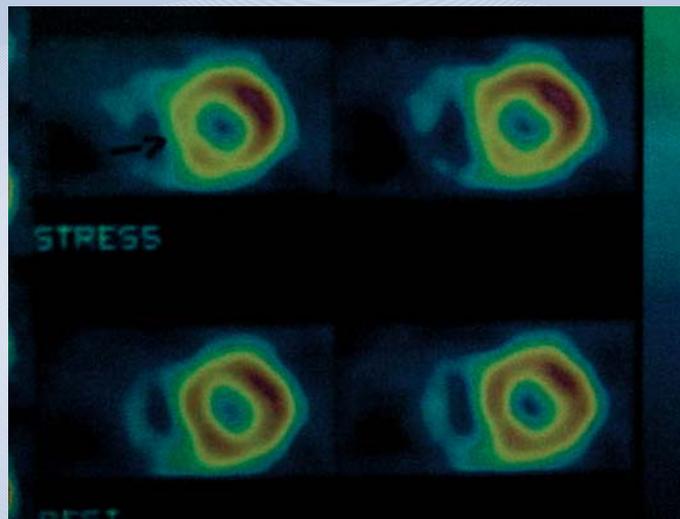


Fig. 1 - Stress (top row) and rest (bottom row) myocardial scintigraphy (Tc-99 sestamibi) showing anteroseptal ischemia

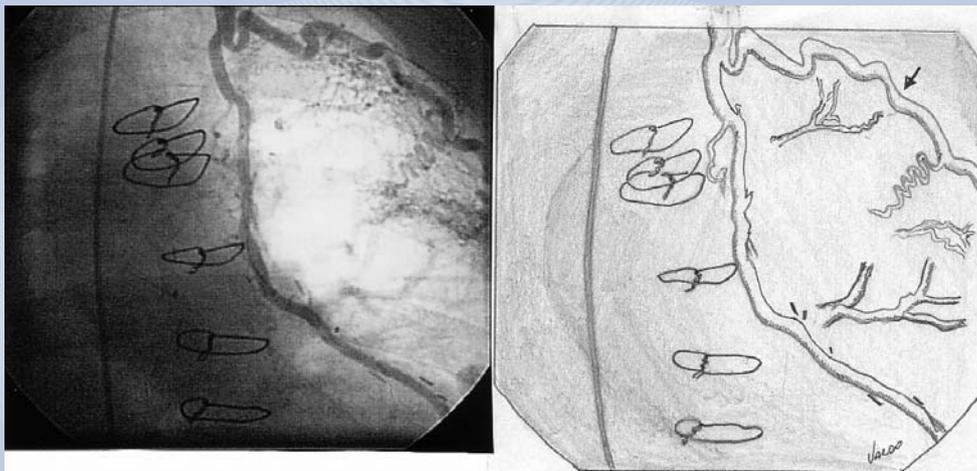


Fig. 2 - Coronary angiography showing the unligated first branch of internal thoracic artery (arrow in the right figure) producing a fistula to pulmonary artery

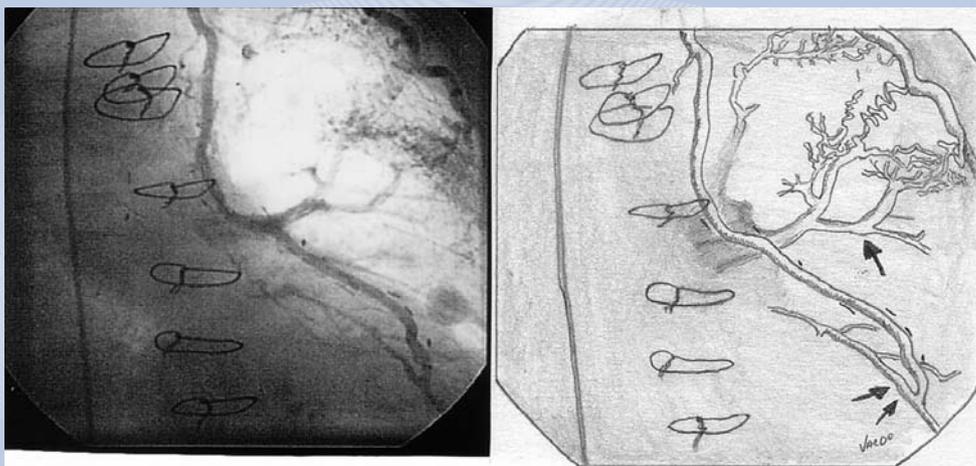


Fig 3 - Coronary angiography showing a fistula filling the left pulmonary artery through many branches (single arrow, right figure) and a distal anastomosis of the mammary artery in the anterior descending artery (double arrow)

DISCUSSION

Fistulas involving internal thoracic artery are rare. They have multiple causes, and diagnosis is often difficult to make due to the variable clinical presentation. They may evolve into a severe condition or even cause death. The predisposing factors for the onset of fistula include incomplete ligation of the intercostal branches of the internal thoracic artery, injury to the pulmonary parenchyma, infection, and electrocoagulation, instead of ligation of the intercostal branches, among others^{1,2}. Fistula of the internal thoracic artery to pulmonary artery is a rare complication following CABG. Around 20 or more cases were reported in the medical literature³. The most common symptoms are those related to the onset of myocardial ischemia, such as angina pectoris and dyspnea,⁴ and occasionally heart failure, endarteritis or a continuous murmur heard at the left sternal border.⁵ As the fistula continues to develop, a coronary steal of flow to the pulmonary artery occurs, resulting in myocardial ischemia. In the present case, the myocardial ischemia was documented by myocardial scintigraphy, and the anatomical study of the coronary vessels showed no other explanation for the ischemia but the presence of the fistula.

The only existent coronary obstruction (right coronary artery) was evaluated as moderate, and did not correspond to the ischemia territory shown on the scintigraphic study.

As the patient was symptomatic with exertional dyspnea growing worse, and nuclear medicine techniques attested to the presence of ischemia, closure of the fistula was indicated. Despite the possibility of percutaneous closure with covered stents or devices like Amplatzer and coils, only recently these strategies have been reported,^{3,6} and by a few medical centers. Considering this and the large experience of the surgery team, the closure of the fistula through minithoracotomy was successfully performed, and the patient had a rapid postoperative recovery.

The presence of recurrent angina or an equivalent condition after myocardial revascularization requires differential diagnosis from mammary fistula, in case a clear cause for the symptoms is not found, because it is potentially serious and requires specific treatment. The definitive diagnosis is made angiographically with selective injection in the internal thoracic artery and surgical ligation being the standard treatment for fistula. Alternatively, it can be done through percutaneous techniques, providing the hemodynamic team is familiar with the procedure.

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