

A case report of multiple left anterior descending coronary artery-left ventricular microfistulae

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Abstract. Coronary arterial microfistulae are abnormal connections between one or multiple coronary arteries and any cardiac chamber. The frequency of this rare congenital anomaly is not known exactly, because at least 75% of cases may be asymptomatic. The diagnosis of the microfistulae is based on coronary angiography.

Key words: Coronary angiography, coronary arterial microfistulae

1. Introduction

Coronary artery fistula (CAF) is defined as a direct communication of a coronary artery with a cardiac chamber, great vessel or another vascular structure, bypassing the myocardial capillary bed (1). The majority of CAF is single and drains into the right heart, and only 3.5% drains into the left ventricle (2). Among CAF, multiple coronary artery fistulae between coronary arteries and left ventricle are very rare and known little about anatomic, hemodynamic and clinical features. Although most patients are asymptomatic, some of them may present with angina pectoris or congestive heart failure (3). We report a case with multiple coronary artery to left ventricular microfistulae, presenting as chest pain and shortness of breath, which was diagnosed by coronary angiography.

2. Case report

A 55 year-old man complained of chest pain and shortness of breath on exertion for six months was admitted to our hospital.

He also had a 10-year history of hypertension. On his physical examination blood pressure was 140/80 mmHg and heart rate was 80 bpm, regularly. A 12-lead resting electrocardiogram and standard biochemical tests were within normal limits. On two-dimensional echocardiography, there was not any regional wall motion abnormality and left ventricular ejection fraction was normal with 66%. A treadmill exercise test was performed. During treadmill exercise test, 2 mm downsloping ST segment depression in leads V5 and V6 was observed at the stage-4. Subsequently, the patient were underwent selective coronary angiography. Coronary angiography showed no stenotic lesion of epicardial coronary arteries, but multiple coronary artery-left ventricular microfistulae arising from the left coronary artery were noticed (Figure 1A and B). There was no clear indication for surgical and/or percutaneous closure of microfistulae. Then, the patient was discharged with proper medical treatment of oral isosorbide mononitrate, beta-blocker, aspirin and angiotensin converting enzyme inhibitor.

3. Discussion

A coronary artery-left ventricular microfistula is rare, and the clinical and hemodynamic consequences are still incompletely understood. Its relationship with atherosclerosis has not been established. The clinical diagnosis of coronary artery-left ventricular microfistulae is difficult because the clinical presentation, laboratory and ECG findings are non-specific. In most cases, the diagnosis of the microfistulae is based on

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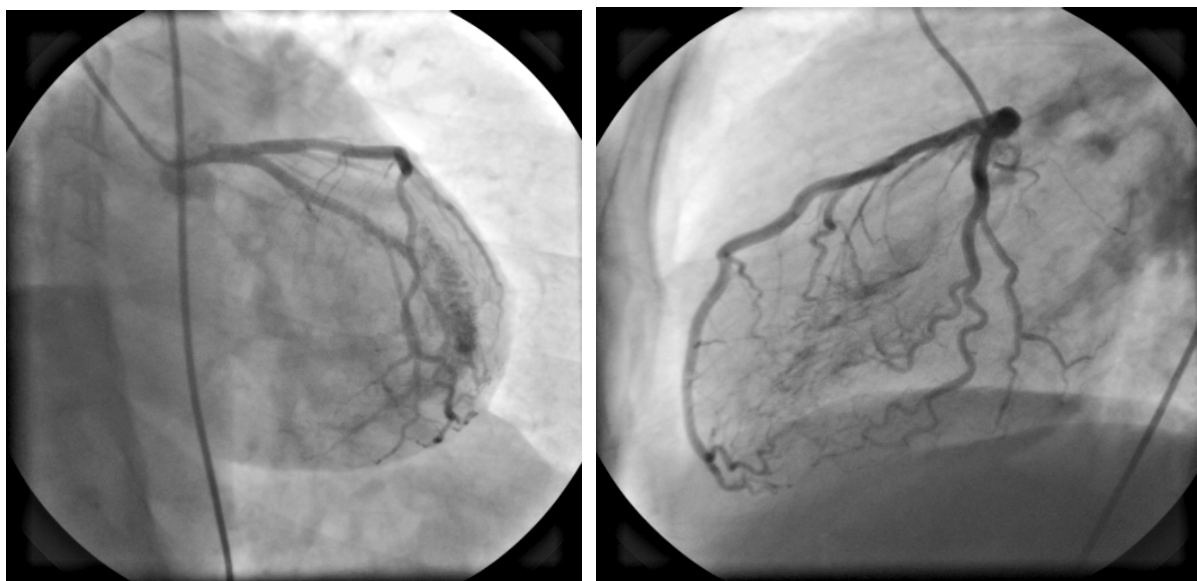


Fig. 1A and B. Selective left coronary angiography shows opacification of the left ventricular cavity through a network of microfistulae originating from the left anterior descending artery at 16° in the RAO and 30° caudal projection (A), and at 90° in the LAO projection (B). LAO: left anterior oblique, RAO: right anterior oblique.

coronary angiography. Also, echocardiography, magnetic resonance imaging and single-photon emission computed tomography can be beneficial in the diagnosis (4). Here, we presented a case of coronary artery-left ventricular microfistulae from LAD and draining into the left ventricle.

Clinical symptoms related to coronary artery-left ventricular microfistulae are highly variable. Myocardial ischemia and diastolic volume overload of the left ventricle are the most commonly reported hemodynamic consequences of coronary artery-left ventricular fistulae. CAF with large shunt can cause heart failure, myocardial ischemia, arrhythmia, infective endocarditis, progressive enlargement and rupture (5). However, CAF with small shunt is not clinically detectable and not clearly associated with significant long term complications. Interestingly, according to the literature, most patients were diagnosed with typical or atypical angina pectoris during advanced adulthood (older than 40 years) despite the assumed congenital origin of this malformation (6).

The main mechanism of myocardial ischemia seems to be related to the coronary steal phenomenon, but other hypotheses have been evoked. Coronary steal is particularly evident during the times of stress. Symptoms of congestive heart failure are rarely reported in these patients. Nevertheless, the togetherness of left ventricular apical hypertrophy and coronary artery-left ventricular microfistulae has been reported in the literature. However, it is not clear whether the apical hypertrophy is a reactive

change to chronic volume overload of the left ventricle through the coronary artery-left ventricular microfistulae or whether it results in multiple coronary microfistulae (7). There is no ventricular enlargement or apical hypertrophy in our case, and we indirectly suggest a small shunt volume.

The management of patients with CAF remains controversial. Treatment is essentially medical. Nitrates in conjunction with beta-blockers or calcium-antagonists have been proven to be efficient (6,8). Surgical and transcatheter closure of CAF are exceptional. Clear indications for surgical intervention include, the presence of larger shunts, other major cardiac lesions, concomitant atherosclerotic coronary artery disease, angina refractory to maximal medical treatment, symptoms or complications including progressive enlargement, bacterial endocarditis, rupture, pulmonary hypertension and thromboembolism (9). Catheter embolization is also an effective and safe treatment for CAF in the strictly selected cases. Coils, detachable balloons, polyvinyl alcohol foam and occlusive devices have been successfully used in the closure of CAF (10-13). Multiple CAF might result in longer operation time and greater contrast volume (14). Nevertheless, the long term outcomes after closure of coronary artery microfistulae is not well defined and deserves further studies. There is no clear indication for closure of coronary artery microfistulae in our patient, so the patient was treated with medical treatment consisting of beta-blocker, isosorbide

mononitrate and angiotensin converting enzyme inhibitor, and was advised to take infective endocarditis prophylaxis.

In conclusion, coronary artery-left ventricular microfistulae is a rare congenital coronary artery anomaly and interventional cardiologists should be aware of the presence of this rare anomaly during their workings. Also, it should be known clearly which CAF is proper for closure and which is not.

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