Case Report

Multiple coronary microfistulas between left anterior descending artery and left ventricle following myocardial infarction

ABSTRACT

We report a case of acquired multiple coronary microfistulas between left anterior descending coronary artery and left ventricle following myocardial infarction (MI), revealed after coronary angioplasty. Acquired coronary cameral fistulas have been described following a variety of interventions including coronary artery bypass surgery, valve replacement, cardiac transplantation, endomyocardial biopsy, septal myectomy, and coronary angioplasty. In addition, prior MI and severe atherosclerosis can also open up the vessels of Wearn and establish a direct communication with the cardiac chambers. The fistulas appeared in our case were small, multiple, and distal and did not produce any symptoms. Immediate appearance of these fistulas following percutaneous revascularization might be alarming. Awareness of this delayed consequence of myocardial ischemia aids in appropriate management. Relevant reports in the literature are briefly discussed.

Keywords: Coronary cameral fistula, coronary fistula, coronary microfistulas, left anterior descending to left ventricular fistula, multiple coronary fistula, postmyocardial infarction

INTRODUCTION

Coronary cameral fistula refers to abnormal communication between the coronary arteries and any of the cardiac chambers or major thoracic vessels. Although majority of such fistulas are congenital, they have also been reported to occur following various exogenous or endogenous injury. Apart from iatrogenic coronary cameral fistulas following various interventions, they may also develop as a response to severe myocardial ischemia as in severe atherosclerosis or following myocardial infarction (MI) (in the nonrevascularized areas).

CASE REPORT

A 63-year-old man presented with symptoms of exertional angina and dyspnea of New York Heart Association Class II of 4 months duration. The patient had an anterior wall MI 4 months before and had not received revascularization therapy. On evaluation, his electrocardiogram (ECG) showed QS complexes in precordial leads v1–v4 with T-inversion in leads v5, v6, lead I, and lead aVL. His echocardiography revealed akinesia of basal, mid, and apical anterior and anterolateral wall with mild thinning of myocardium in the left anterior descending (LAD) territory. His ejection fraction was 38%. In view of his ischemic symptoms and left ventricular (LV) dysfunction, elective coronary angioplasty was planned. Coronary angiogram (CAG) showed significant obstructive lesion in the mid-segment of left LAD with retrograde filling of LAD through heterocollaterals from the right coronary artery (RCA) [Figure 1]. The lesion was stented with 3.0 mm × 40 mm drug-eluting stent (Biomime Aura, Meril Life Sciences, India) attaining a final diameter of

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DOI: 10.4103/heartindia.heartindia_59_16	

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How to cite this article: Sulaiman S, Rajesh GN, Vellani H. Multiple coronary microfistulas between left anterior descending artery and left ventricle following myocardial infarction. Heart India 2017;5:99-101.

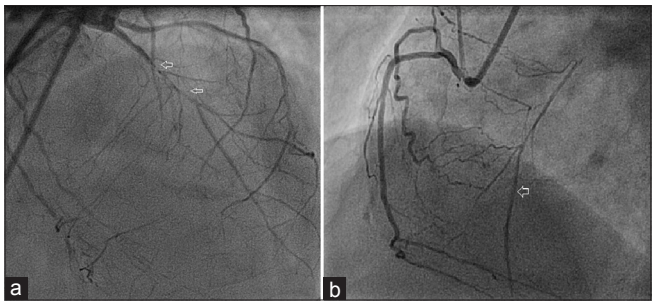

Figure 1: Coronary angiogram showing near-total lesion in the mid-segment of the left anterior descending artery (a) and retrograde filling of left anterior descending from selective right coronary injection (b)

3.14 mm. Contrast injection following stenting showed good thrombolysis in MI III flow. Interestingly, there were multiple distal arterial systemic fistulas between LAD and LV [Figure 2 and Video 1]. These microfistulas were located in the previously infarcted segments. The procedure was uneventful and the patient is on follow-up and is free of angina.

DISCUSSION

Coronary artery fistulas are rare, identified incidentally in about 0.05%–0.25% of patients undergoing CAG.[1] The most common site of origin is RCA draining into the right ventricle. Coronary cameral fistulas whether congenital or acquired are usually asymptomatic but may cause symptoms depending on the degree of hemodynamic alterations. The various manifestations include heart failure, MI secondary to myocardial steal, atherosclerosis, and infective endocarditis among others.[2] The etiology of coronary fistulas in our case deserves special mention since such fistulas have been reported to occur following MI and also postangioplasty. Our patient had both these factors. In almost all the reported cases of postpercutaneous transluminal coronary angioplasty (PTCA) fistulas, the site of origin of the fistula is the site of balloon dilatation either as a result of aneurysm formation and subsequent rupture into a cardiac chamber or as a result of coronary perforation or at sites of coronary dissection.[3] The fistulas in our case were not related to PTCA as they were multiple and found at the distal most part of LAD, remote from the site of angioplasty. MI as an etiology of coronary fistula has been suggested. Fistulas might develop following MI due to ruptures of localized micronecrosis of the subendocardium due to destruction of the microvasculature. In a report by Barbero, the patient was found to have developed fistula from LAD to LV 7 years after MI.[4] Severe atherosclerosis, as a result of new angiogenesis stimuli, may lead to opening up of the vessels of Wearn directly into the LV.[5] The other possibility is a coexistent congenital coronary artery-ventricular multiple microfistulas (MMFs). The prevalence of congenital MMFs is low (15%). They are less likely in our case as the fistulas are localized to the infarcted areas. The contrast injection before stenting did not show the fistulas [Video 2]. This needs explanation. It is possible that the significantly reduced anterograde flow in LAD would have essentially masked these fistulas. This could have happened as a result of combination of two factors: (i) significantly reduced perfusion pressure in LAD distal to the stenosis and (ii) elevated LV end-diastolic pressure as a result of severe LV dysfunction.

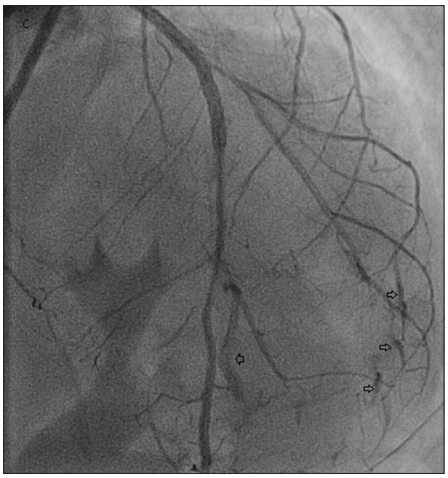

Figure 2: Coronary angiogram postleft anterior descending stenting showing multiple distal microfistulas (arrows)

In a review by Xie *et al*., the prevalence of LAD to LV fistulas were rare (<6%) and multi-orificial opening of the fistula was found only in 3%.[6] This case seems important because PTCA has commonly been performed for persistent ischemic symptoms in patients with prior MI, who had not received revascularization therapy, especially in developing countries. In such cases, the ischemic segments might harbor coronary microfistulas. Immediate appearance of these microfistulas following PTCA might be alarming. Careful evaluation of their site of origin, area of distribution, relationship to the stented vessel segment, relationship to the infarcted segment might reveal the etiology behind them. And finally, such localized microfistulas usually do not cause hemodynamic alterations and are well tolerated by the patient, as in our case, without need for any intervention.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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