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Zakaria Raiss

Amine Qat

Pascal Goube

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Bad Heart Luck: Myocardial Infarction Related to Iatrogenic Coronary Cameral Fistula in a Heart Transplant Patient

Badre El Boussaadani ^{a,*}, Zakaria Raiss ^a, Amine Qat ^a, Pascal Goube ^b

^a CHU Ibn Sina, Faculty of Medicine and Pharmacy, University Mohammed V Souissi, Rabat, Morocco

^b Hopital Sud Francilien, Paris, France

Abstract

Endomyocardial biopsy (EMB) remains the gold standard method for diagnosis of cardiac allograft rejection. Complications following EMB rarely occur, however, it can lead to coronary cameral fistulae (CCF). We describe the case of a 65-year-old patient admitted for lateral STEMI related to a fistula communicating the distal part of the left anterior descending artery (LAD) with the right ventricle after EMB biopsy, which was incompletely closed with a covered stent.

1. Introduction

Coronary cameral fistulae (CCF), which drains directly into the right ventricle are recognized as a complication of endomyocardial biopsy (EMB) [1,2], which is considered as the gold standard method for screening rejections in orthotopic heart transplant recipients [3]. Fistula can progress to spontaneous closure or become larger and lead to myocardial ischemia. We report a case of myocardial infarction related coronary cameral fistula after right ventricular EMB in a heart transplant patient. A covered stent was inserted percutaneously, thus partially sealing off the fistula.

2. Case Report

A 65-year-old patient; with a history of ischemic cardiomyopathy since 2007 complicated by refractory heart failure despite medical optimization; underwent orthotopic heart transplantation in 2018. One month later, a post-operative complete heart

block justified a double chamber pacemaker implantation.

Three months after the transplantation, the patient was admitted for a checkup EMB. During his cardiac rehabilitation, 3 days after the procedure, he suffered from atypical chest pain. A 12 lead ECG showed new onset ST segment elevation of 2 mm over the lateral precordial leads, compatible with lateral myocardial infarction. Initial troponin I was negative but eventually peaked at 50 ng/mL. A coronary angiogram showed a large fistula draining from the distal part of the LAD to the right ventricle (Fig. 1).

Trans-thoracic echocardiography (Fig. 2) showed apical akinesia associated with an abnormal diastolic flow into the RV apex/apical septum, very suggestive of a CCF.

Percutaneous closure was attempted, due to the hemodynamically significant fistula, and the procedure was performed using the right femoral approach with a 7-F3,5. Extra Back up guiding catheter was positioned with microcatheter in distal LAD, predilatation by balloon 1.5 mm then 2.5 mm, verification of the occlusion of the fistula (Fig. 3) and a 2.5 × 16mm covered stent type BeGraft was

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* Corresponding author: CHU Ibn Sina, Faculty of Medicine and Pharmacy, University Mohammed V Souissi, Rabat, Morocco.
E-mail address: badreelboussaani1989@gmail.com (B. El Boussaadani).





Fig. 1. Right anterior oblique coronary angiogram (RAO) showing a fistula connecting distal LAD to the right ventricle.

deployed. The result was the reappearance of a small shunt after disinflation of the balloon (Fig. 4).

3. Discussion

Cardiac transplantation is an effective therapy for many patients with end-stage heart failure. Rejection is a serious problem after transplant, thus most patients undergo repeated EMB in order to detect

early rejection [4]. But since the development of calcineurin inhibitors in the 1980s, rejection can be managed very well .

Coronary artery fistulae can be congenital or acquired. Acquired CAF happen after trauma or may also be iatrogenic, related to EMB in less degree, and sometimes by accidental procedural bypass of the vein instead of the artery. In this case, the location of the fistula from the distal left anterior

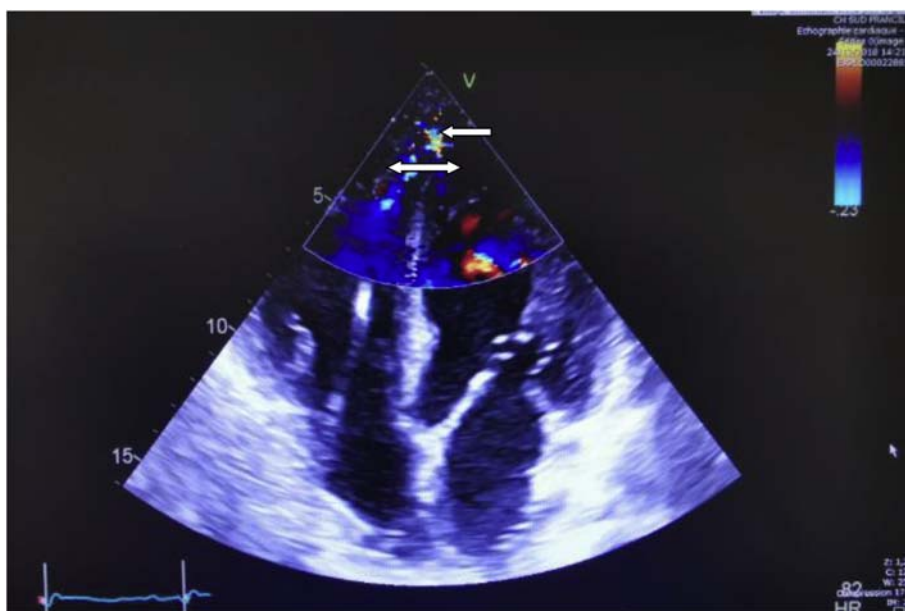


Fig. 2. Apical 4-chamber view 2D image (left) and color doppler (right) demonstrating fistula (single arrow) and diastolic flow (double arrow) into the Right Ventricle (RV) with Q_p/Q_s ratio > 1 . (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)

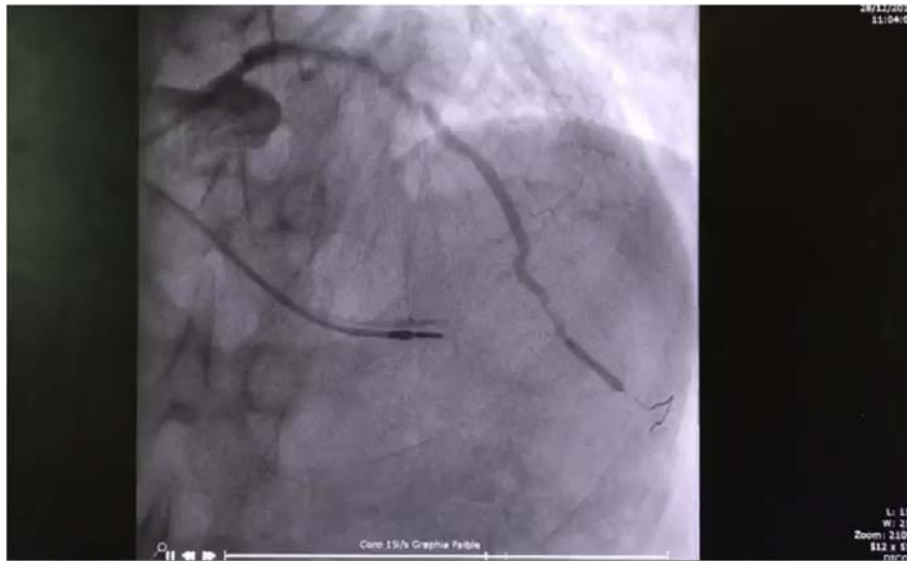


Fig. 3. Occlusion of distal Left Anterior Descending Artery (LAD) at fistula, Improved flow in distal LAD after deployment of stent.

descending artery to the right ventricle is very suggestive of an acquired etiology, which may be explained by multiples traumatic biopsies of the heart, during check-ups.

Case series report up to a 21% incidence of acquired CAF in heart transplant patients [5].

The majority of the fistulas are linked to either the RCA or LAD artery, the latter being the case in our patient. Additionally, the circumflex coronary artery (CX) is sometimes also affected (RCA in approximately 55% of cases, LCA in 35%, and both in 5%) [6]. In most cases, it drains to the right ventricle.

The natural history of coronary fistulas due to EMB in heart transplant patients is usually benign [7], and conservative management approach is common. Different outcomes have been reported where some fistulas increase in size, while others remain unchanged, and better, some even resolving spontaneously. Moreover, despite the above-mentioned theoretical complications of CAFs, few were reported in literature [5].

Yip et Al have summarized published outcomes of interventions for post-cardiac transplant CAF [5]. The decision to act was based on



Fig. 4. Reappearance of a small shunt after disinflation of the balloon.

the development of symptoms for the majority of patients.

To our knowledge, our case is the third report of a myocardial biopsy causing myocardial infarction worldwide. The first case report was a heart transplant patient who had undergone several EMB, and whom its TTE revealed severe left ventricular dysfunction after a stroke. Coronary angiography showed distal LAD fistula to the right ventricle. Left ventricular angiogram showed apical dyskinesia. Electrocardiogram and angiographic changes were thought to be due to a myocardial infarction secondary to a post-EMB hematoma [8].

The second case was reported in a patient presenting with acute myocardial infarction immediately post-EMB. A PTFE covered stent 3.0 × 12 mm (Jostent Coronary Stent Graft, Jomed, Germany) was percutaneously deployed, thus completely sealing off the fistula [9].

Cardiac MRI displays excellent negative predictive capacity for diagnosis of cardiac allograft rejection and holds promise to reduce the EMB requirement in cardiac transplant rejection surveillance [10].

4. Conclusion

Post-transplant CAF are more common in EMB than it is recognized, which is why routine screening should be considered. Our case shows that an acute myocardial infarction caused by coronary steal phenomenon resulting from a coronary fistula constitutes a potentially life-threatening complication of EMB. Percutaneous implantation of a covered stent was an effective therapy in this case.

Disclosure of Interest

The authors declare that they have no competing interest.

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Author contribution

Conception and design of Study: Badre El Bousaadani, Zakaria Raiss, Amine Qat, Pascal Goube.

Literature review: Badre El Boussaadani, Zakaria Raiss, Amine Qat, Pascal Goube.

Acquisition of data: Badre El Boussaadani, Zakaria Raiss.

Research investigation and analysis: Pascal Goube.

Revising and editing the manuscript critically for important intellectual contents: Badre El Boussaadani, Zakaria Raiss.

Supervision of the research: Pascal Goube.

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