Bad Heart Luck: Myocardial Infarction Related To iatrogenic Coronary Cameral Fistula In A Heart Transplant Patient

Badre El Boussaadani
Zakaria Raiss
Amine Qat
Pascal Goube

Follow this and additional works at: https://www.j-saudi-heart.com/jsha

Part of the Cardiology Commons

This work is licensed under a Creative Commons Attribution-Noncommercial-No Derivative Works 4.0 License.
Bad Heart Luck: Myocardial Infarction Related to Iatrogenic Coronary Cameral Fistula in a Heart Transplant Patient

Badre El Boussaadani, Zakaria Raissa, Amine Qata, Pascal Goubeb

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...
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
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
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.

Funding
The author(s) received no financial support for the research, authorship, and/or publication of this article.

Author contribution
Conception and design of Study: Badre El Boussaadani, 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.

References
[1] Henzlova MJ, Nath H, Bucy RP, et al. Coronary artery to right ventricle fistula in heart transplant recipients: a complication of endomyocardial biopsy. J Am Coll Cardiol 1989;14:258–61. https://doi.org/10.1016/0735-1097(89)90083-1.
[2] Lazar JM, Uretsky BF. Coronary artery fistula after heart transplantation: a disappearing entity? Cathet Cardiovasc Diagn 1996;37:10–3. https://doi.org/10.1002/(SICI)1097-0304(199601)37:<10::AID-CCD4>3.0.CO;2-7.
[3] Costanzo MR, Dipchand A, Starling R, et al. The international society of heart and lung transplantation guidelines for the care of heart transplant recipients. J Heart Lung Transplant 2010;29:914–56. https://doi.org/10.1016/j.healun.2010.05.034.
[4] Acharya D, et al. Coronary artery fistula after cardiac transplantation. Circulation 2012;126:2144–5. https://doi.org/10.1161/CIRCULATIONAHA.112.115519.
[5] Yip AMC, et al. Treatment of coronary artery fistula post-cardiac transplantation with covered stent: a case study and review of literature. Int J Transplant Res Med Literat Rev 2017;3(2). https://doi.org/10.23937/2572-4045.1510032.
[6] Wallner M, et al. Lewinski1 Massive fistulization into the left ventricle of a transplanted heart. Herz 2015 Mar;40(Suppl 1):56–8. https://doi.org/10.1007/s00059-014-4077-2.
[7] Gowda RM, Vasavada BC, Khan IA. Coronary artery fistulas: clinical and therapeutic considerations. Int J Cardiol 2006;107:7–10. https://doi.org/10.1016/j.ijcard.2005.01.067.
[8] Drobinski, et al. Myocardial infarction after endomyocardial biopsy in a heart transplant patient. J Intervent Cardiol 2002;15(5). https://doi.org/10.1111/j.1540-8183.2002.tb01075.x.
[9] Lee CH, Lemos PA, Serruys PW. Acquired coronary artery fistula leading to acute myocardial infarction after endomyocardial biopsy. Heart 2003;89:495. https://doi.org/10.1136/heart.89.5.495.
[10] Muhammad I, et al. Native T1 Mapping in the diagnosis of cardiac allograft rejection, a prospective histologically validated study. JACC Imag August 2019;11(8). Part 2. https://doi.org/10.1016/j.jcmg.2018.10.027.