Title

Cardiac transplant vasculopathy

Journal

Catheterization and Cardiovascular Interventions, 90(1)

ISSN

1522-1946

Author

Tobis, Jonathan M

Publication Date

2017-07-01

DOI

10.1002/ccd.27164

Received: 30 May 2017 | Accepted: 4 June 2017
DOI: 10.1002/ccd.27164

EDITORIAL COMMENT

WILEY

Cardiac transplant vasculopathy

Jonathan M. Tobis, MD, MSCAI

Department of Medicine, Division of Cardiology, David Geffen School of Medicine at UCLA, BL-394 CHS UCLA, Los Angeles, California 90095

Correspondence
Jonathan Tobis, BL-394 CHS UCLA, Box 951717, Los Angeles, California 90095, United States
Email: jtobis@mednet.ucla.edu

Key Points

- Transplant vasculopathy is a form of slowly progressive rejection.
- The interventional cardiologist plays an important role in maintaining survival of this precious commodity by performing PCI.
- Everolimus drug eluting stents are highly effective and have relatively low occurrence of in-stent restenosis, but transplant vasculopathy continues to progress in a diffuse pattern.

The accompanying article by Azarbal et al. describes the clinical and angiographic results of performing coronary artery angioplasty with the latest generation of everolimus eluting stents in patients who have coronary artery vasculopathy associated with cardiac transplantation. (Long-Term Clinical and Angiographic Outcomes of Percutanenous Coronary Intervention with Everolimus-Eluting Stents for the Treatment of Cardiac Allograft Vasculopathy). This is a very important topic for those centers who have large cardiac transplant programs. Cardiac vasculopathy is a form of chronic rejection with inflammation and lymphocyte accumulation in the epicardial surface that infiltrate the coronary arteries and veins. The inflammation leads to progressive production of fibrous tissue, which occurs in a diffuse pattern and ultimately chokes off the blood supply to the transplanted organ. If left untreated, this arterial disease leads to multiple myocardial infarctions with progressive impairment of left ventricular function resulting in the demise of the patient or requirement for having a second transplant. Medical therapy with drugs to inhibit the rejection process are only of limited value.

Approximately 50% of people who have a cardiac transplant develop some regrowth of the sensory nerves to the heart and may present with warning signs of angina pectoris. The unlucky ones will present with an acute myocardial infarction or heart failure. The interventional cardiologist thus plays an important role in trying to maintain transplanted hearts, which are in high demand and limited supply. The ultimate therapy of CAV will require greater knowledge of molecular biology of vascular structures and control of the rejection process of transplanted organs. However, our ability to stabilize the patient is still an important function. The use of drug eluting stents has improved the survival of patients with transplant vasculopathy. As documented in this accompanying paper, the restenosis rate is relatively low with everolimus drug eluting stents and is significantly improved compared with earlier years when we had balloon angioplasty alone or bare metal stents [1,2].

PCI is not a complete solution, but it often will permit several years of freedom from arterial occlusion or need for repeat transplantation. On occasion, with diffuse transplant vasculopathy, a patient can be stabilized with PCI at least for a few weeks until another donor organ becomes available.

One of the important factors in this disease process is the presence of atherosclerosis in the arteries of the donor heart [3]. Appreciation of the extent of early atherosclerosis even in donors who are in their early 20s, was identified by the use of intravascular ultrasound imaging within the first 6 weeks after a cardiac transplantation. In addition, intravascular ultrasound imaging at one year is useful to determine the rate of growth of intimal hyperplasia, which is the initial sign of the development of transplant vasculopathy [4]. If the intimal thickness is >0.5 mm at one year, it predicts a worse five-year organ and patient survival due to the progression of transplant vasculopathy [5]. This leads to the issue of what is the best method for screening for transplant vasculopathy. Because the patients are unlikely to develop typical symptoms of angina pectoris, yearly surveillance angiography has been the preferred method for identifying patients at risk and treating them if necessary with drug eluting stents. A less invasive method would be preferable, such as magnetic resonance imaging, which will be used when the resolution of MRA improves to the point where coronary anatomy is reliably discernible.

Dr. Azarbal and his group deserve our gratitude in further understanding the role of percutaneous coronary angioplasty for the treatment of transplant vasculopathy.

REFERENCES

[1] Takano Y, Currier JW, Yeatman LA, Kobashigawa JA, Rogers AD, Cianfichi LJ, Fishbein MC, Tobis JM. Cutting balloon angioplasty for cardiac transplant vasculopathy. J Heart Lung Transplant 2002; 21:910–913.

[2] Tanaka K, Li H, Curran PJ, Takano Y, Arbit B, Currier JW, Yeatman LA, Kobashigawa JA, Tobis JM. Usefulness and safety of percutaneous coronary interventions for cardiac transplant vasculopathy. Am J Cardiol 2006;97:1192–1197.

[3] Li H, Tanaka K, Anzai H, Oeser B, Lai D, Kobashigawa JA, Tobis JM. Influence of pre-existing donor atherosclerosis on the development of cardiac allograft vasculopathy and outcomes in heart transplant recipients. J Am Coll Cardiol 2006;47:2470–2476.

[4] Kobashigawa J, Wener L, Johnson J, Currier JW, Yeatman L, Cassem J, Tobis J. Longitudinal study of vascular remodeling in coronary arteries after heart transplantation. J Heart Lung Transplant 2000;19: 546–550.

[5] Li H, Tanaka K, Chhabra A, Oeser B, Kobashigawa JA, Tobis JM. Vascular remodeling 1 year after cardiac transplantation. J Heart Lung Transplant 2007;26:56–62.