

Detection of early cardiac allograft vasculopathy in a high-risk transplant patient using optical coherence tomography

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Introduction: Cardiac allograft vasculopathy (CAV) is a common cause of late graft failure and mortality in heart transplant recipients. Concentric intimal proliferation that reflects immune-mediated vascular damage in the early post-transplant years is difficult to recognize by conventional coronary angiography. Optical coherence tomography (OCT) is a high-resolution intravascular imaging technique that has the potential to identify subtle early vessel wall changes and shape the therapeutic approach that may improve patients' outcomes.¹

Case report: 68-year-old male patient underwent heart transplantation with positive lymphocyte crossmatch and Luminex that detected anti-HLA class I (A1, A25, B8, B57) donor-specific antibodies with MFI up to 2500. The patient was treated with steroid, antilymphocyte (rATG) induction, tacrolimus, and mycophenolate mofetil, in combination with IVIG and plasmapheresis. Graft function was preserved, biopsies showed no or mild cellular-mediated rejection (1R) with no signs of antibody-mediated rejection (AMR) with negativization of anti-A1 and -A25 antibodies. However, control biopsy after 6 months became positive for AMR. The patient was treated with steroid pulse, IVIG, plasmapheresis, and rituximab. The following biopsies were negative for AMR and the patient remained with preserved graft function. One year after transplantation we performed control coronary angiography with OCT. While coronary angiography was interpreted as normal, control OCT showed significant diffuse intimal thickening with maximal intimal thickness up to 920 μ m and intima/media cross-sectional media of ≥ 1 (Figure 1). This finding prompted a change in therapy with the maximization of statin dose and introduction of everolimus in the maintenance immunosuppressive regimen.

Conclusion: This case report indicates the limitation of conventional coronary angiography in the early detection of transplant vasculopathy. OCT is able to establish the diagnosis and trigger specific therapeutic interventions like the introduction of everolimus before vascular changes become visible on conventional coronary angiography and resistant to treatment. Unfortunately, we still lack clearly defined OCT criteria for both diagnosis and treatment, but the progress in this field of transplant cardiology is promising.

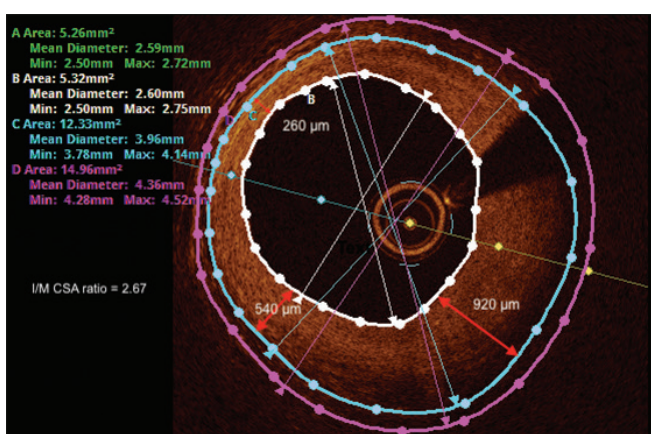


FIGURE 1. Control OCT cross-sectional frame of a left anterior descending artery 12 months after heart transplantation.

OCT = optical coherence tomography; I/M CSA = intima/media cross-sectional area.

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LITERATURE

1. McGovern E, Hosking MCK, Balbacid E, Voss C, Berger F, Schubert S, et al. Optical Coherence Tomography for the Early Detection of Coronary Vascular Changes in Children and Adolescents After Cardiac Transplantation: Findings From the International Pediatric OCT Registry. *JACC Cardiovasc Imaging.* 2019 Dec;12(12):2492-2501. <https://doi.org/10.1016/j.jcmg.2018.04.025>