

Poster presentation

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Utility of CMR in monitoring of lung transplant recipients

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Introduction

Lung transplant recipients require frequent monitoring for post-operative complications by multiple noninvasive and invasive diagnostic tests. They frequently undergo echocardiography, chest computed tomographic angiography (CTA), nuclear medicine lung perfusion imaging (LPI) and right heart catheterization (RHC).

Purpose

Evaluation of a single comprehensive CMR examination for identification of post-operative complications.

Methods

We enrolled 16 consecutive lung transplant recipients who were referred for CMR evaluation at The Methodist DeBakey Heart & Vascular Center (The Methodist Hospital, Houston, TX). Eight subjects were men and eight women; mean age 59.1 ± 9.2 years, 12 Caucasians, 2 Hispanic, 1 African American and 1 Asian. Six subjects had underlying restrictive (IPF), five had obstructive (COPD/Emphysema/Cystic fibrosis), and three had other (BOOP/hypersensitivity pneumonitis) disorders. Nine subjects had undergone double lung transplant while 7 subjects had single lung transplant, a mean of 17.9 ± 18.8 months prior to undergoing CMR imaging. The CMR protocol included complete short and long axis cine imaging using SSFP pulse sequences, spin echo imaging to assess pericardial thickness, contrast enhanced MRA of the pulmonary arterial and venous systems, phase contrast velocity flow mapping [for main, right and left pulmonary artery (PA) flows, and PA anastomotic site peak velocities]. All subjects underwent echocardiography, chest CTA, LPI and

RHC as deemed necessary by their transplant pulmonologist. The records of all diagnostic tests were reviewed and compared with CMR findings.

Results

All 16 subjects completed CMR imaging without difficulty; no subjects were excluded for reasons of image quality. Mean scan duration was 76 ± 48 min. The mean LVEF was $70.6 \pm 4.4\%$; RVEF was $58.8 \pm 7.8\%$, main PA flow was 5.42 ± 0.99 liter/min, with flows in the transplanted lung PA 3.0 ± 0.84 liter/min. Of the 16 subjects enrolled, 8 were found to have abnormalities on CMR scanning. Five subjects demonstrated mild stenosis (less than 40%) at the transplant-lung PA anastomotic site. One subject demonstrated severe stenosis (70%) at the PA anastomotic site and mild stenosis (33%) at the PV anastomotic site; these abnormalities were confirmed by RHC and intravascular ultrasound and the subject therefore underwent percutaneous PA stenting. Two subjects were found to have constrictive pericarditis by CMR (detected by chest CT scan in only one patient); and both were confirmed at the time of surgical pericardiectomy. No post-operative complications were detected on any diagnostic tests in the 8 subjects whose CMR demonstrated no complications.

Conclusion

A comprehensive CMR protocol can be a useful single noninvasive test for the detection of complications after lung transplantation.