

POSTER PRESENTATION

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Effect of cold ischemic times and time after transplantation on regional myocardial motion after heart transplantation

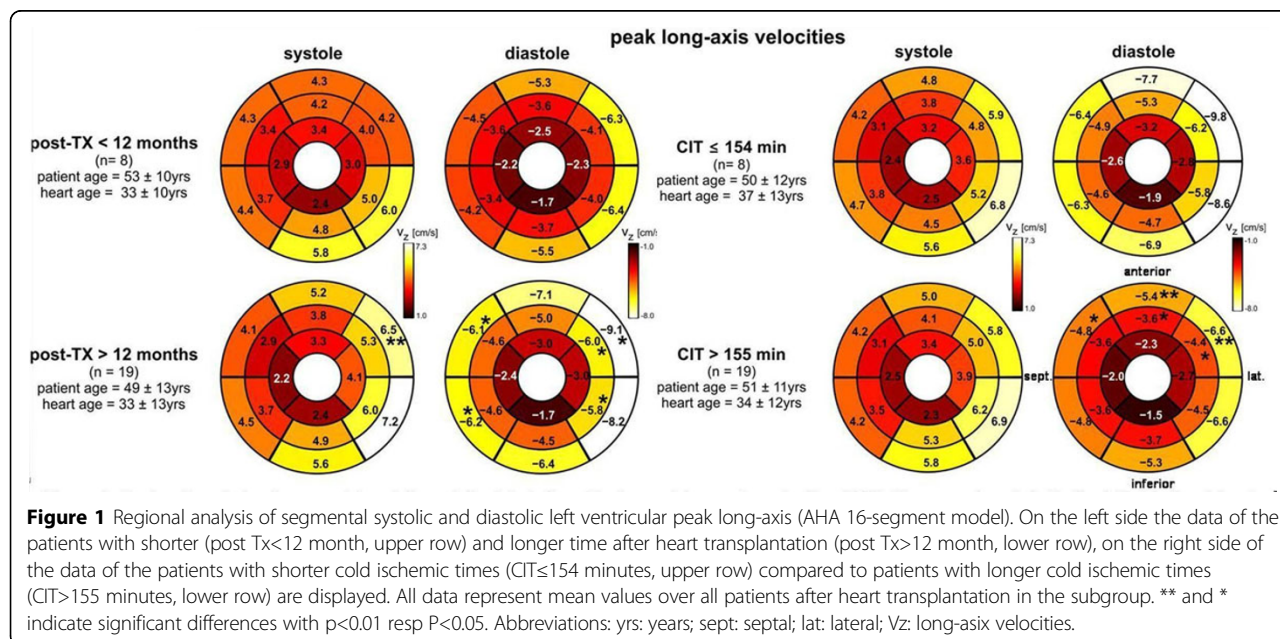
Daniela Föll^{1*}, Michael Markl^{3,4}, Marius Menza², Asad Usman³, Tobias Wengenmayer¹, Anna Lena Anjarwalla¹, Christoph Bode¹, James Carr³, Bernd A Jung²

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Background

Transplant rejection affects the course and survival after heart transplantation (HTx). As a non-invasive alternative to myocardial biopsy, which is the gold standard used for screening and for the diagnosis of rejection, regional left ventricular (LV) myocardial motion analysis has been suggested. But myocardial biopsy is invasive and its diagnostic value is restricted by high sample

errors due to the patchy distribution of early rejection. Alterations of regional wall motion [1], especially in diastole, might be sensitive for the diagnosis. However, evaluation by echocardiography is limited in this context and LV motion after HTx differs from the motion of native hearts. We assessed the influence of cold ischemic time (CIT) and time after HTx on myocardial velocities in stable HTx patients.



¹Cardiology and Angiology I, University Heart Center Freiburg, Freiburg, Germany

Full list of author information is available at the end of the article

Methods

27 heart transplant recipients (50 ± 13 years, 6 female) without signs or former episodes of rejections or relevant transplant vasculopathy (LVEF= $63 \pm 5\%$) were examined using phase contrast MRI (Tissue Phase Mapping) to assess 3D-myocardial velocities. Systolic and diastolic peak radial and long-axis velocities were evaluated in each LV segment. These functional parameters were analyzed with respect to time after HTx and CIT.

Results

Shorter times after HTx ($n=8$ patients <12 month after HTx versus $n=19$ >12 month) resulted in an increase of systolic radial velocities (2 of 16 segments, $p=0.01-0.04$) and a reduction of diastolic long-axis velocities (5 of 16 segments, $p=0.02-0.04$). With longer CIT (>155 minutes) an increase of peak systolic radial velocities ($p=0.03-0.04$ for apico-septal and midventricular inferoseptal regions) and a reduction of diastolic long-axis velocities (5 of 16 segments, $p=0.01-0.04$) were demonstrated compared to those with shorter CIT (<155 min) (see figure 1, results of long-axis velocities).

Conclusions

The transient suppression of long-axis velocities in the first months after HTx might be related to an early ischemia-reperfusion injury after cardiac surgery. The different behavior of long-axis and radial velocities with respect to time after HTx or CIT could be explained by the locations of the myocardial fibers underlying each motion component. Long-axis motion being mainly based on subendocardially located fibers might predispose this motion component for ischemic injury whereas circumferentially orientated fibers underlying radial motion are predominantly situated in the midmyocardium and might therefore have more functional reserves [2].

Time after HTx and CIT influence segmental systolic and diastolic velocities in stable patients after heart transplantation. These findings have to be considered if myocardial velocities are used as diagnostic tools in transplant rejection.

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Author details

¹Cardiology and Angiology I, University Heart Center Freiburg, Freiburg, Germany. ²Department of Radiology, Medical Physics, University Hospital Freiburg, Freiburg, Germany. ³Department of Radiology, Feinberg School of Medicine, Northwestern University, Chicago, IL, USA. ⁴Department of

Biomedical Engineering, McCormick School of Engineering, Northwestern University, Chicago, IL, USA.

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References

1. Wu YL, et al. *JACC Cardiovasc Imaging* 2009, **2**(6):731-41.
2. Pauliks LB, et al. *J Heart Lung Transplant* 2005, **24**(11):1804-13.

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