ORAL CONTRIBUTIONS

854 Computational Medicine as a Tool to Understand Structural Heart Disease
Tuesday, March 09, 2004, 4:00 p.m.-5:00 p.m.
Morial Convention Center, La Louisiane A

854-1 Standards for Evaluation of Myocardial Viability With FDG-Positron Emission Tomography: A Comparison of Quantitative Methods
Rob Davies, Rob S. Beanlands, Terrence D. Duffy, Ross A. Davies, Tracey L. Faber, Cesar A. Santana, Robert A. deKemp, University of Ottawa Heart Institute, Ottawa, ON, Canada, Emory University Hospital, Atlanta, GA

Background: [18F]fluorodeoxyglucose (FDG) is used widely to assess myocardial viability with positron emission tomography (PET) in patients with left ventricular (LV) dysfunction. However, standardized methods are not yet available for quantification of FDG vs. perfusion mismatch and match patterns that predict recovery of LV function.

Methods: FDG uptake and 18F-FDG perfusion imaging was performed at rest in 29 patients as part of a previous (PARR) study (JACC 2002;40:1735-43). Resting perfusion defects, mismatch and match (scar) scores were calculated as % mismatch within perfusion defects >2 standard deviations below a normal population mean. The accurate representation of 2D images in 3D is an important issue for cardiac MRI. Reconstruction methods applied after data acquisition can provide 3D information and is deserving of further evaluation.

Conclusions: The accurate representation of 2D images in 3D is an important issue for cardiac MRI. Reconstruction methods applied after data acquisition can provide 3D information and is deserving of further evaluation.

854-2 Magnetic Resonance Imaging-Based 3-D Modeling of Cardiac Vascular Anatomies for Surgical Applications
David H. Frakes, Mark A. Fogel, James Parks, Shiva Sharma, Mark J.T. Smith, Ajit P. Yogananth, Georgia Institute of Technology, Atlanta, GA, Children’s Hospital of Philadelphia, Philadelphia, PA

Introduction: The accurate representation of 2D images in 3D is an important issue for cardiac MRI. Reconstruction methods applied after data acquisition can provide 3D information and make surgical applications more effective.

Methods: Current reconstruction techniques suffer due to poor segmentation and sampling constraints that lead to distorted data. We have developed a novel technique for 3D anatomical modeling that uses motion estimation to approximate data not captured by scanning, and a progressive shape-element segmentation technique to complete reconstruction.

Quantitative validations using pediatric cardiac modeling algorithms have confirmed that theoretical advantages of our technique are realized and that higher quality is produced. Vascular diameters from our reconstructions showed errors of less than 1% for a known geometry as compared to over 5% for competing methods. Qualitatively, our models dis-