R wave. For LBBB patients, however, there was substantial variability. In 45% of the cases (15 of 33), the R wave did not coincide with onset of atrial motion.

Conclusion: In patients with a normal ECG, the onset of atrial motion has a predictable relation with the R wave. In LBBB, this relationship is variable owing to QRS morphology and electromechanical heterogeneity. In LBBB, atrial motion can be used to determine time/degree zero because its union with the onset of systole is obligatory and because EPI can reliably detect it. Setting the onset of the cardiac cycle to an "atriophasic" reference standard should prove useful in situations where the ECG is an unsuitable timing signal.

POSTER SESSION

1133 Blood Flow Velocity, Coronary Angiography, and Myocardial Perfusion by Magnetic Resonance Imaging

Tuesday, March 09, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 10:00 a.m.-11:00 a.m.

1133-154 Coronary Artery Magnetic Resonance Angiography Comparison of High Field Magnetic Resonance Imaging at 1.5 and 3 Tesla

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Background:
Cardiac MRI examinations are currently performed at 1.5T. Yet, 3T MRI systems have recently been approved for human use by the FDA. We compared objective and subjective parameters for coronary MRA image performance at both 1.5T and 3T.
Methods:
Twelve healthy adult subjects were scanned within one week on both a 1.5 and 3T whole body scanner (Philips Intera) with an ECG and navigator gated fat suppressed T2 prep 3D gradient coronary MRA- (TR=8.2ms; TE=2.4ms, FOV=360; 512 matrix, 20 slices a 1.5mm, voxel-size= 0.7/1.0/3 mm) sequence. LAD and RCA vessel sharpness / diameters were analysed semi-automatically. Fat saturation-, image quality and motion artefacts were assessed via consensus reading (1-4= poor to excellent image quality) and evaluated using a two-tailed paired Student´s t-test.
Results:
On both scanners LAD and RCA coronary MRA could be successfully obtained. Vessel sharpness was significantly improved at 3T (RCA: 63.24±0.24 vs. 40.77±0.04; LAD: 42.19±0.08 vs. 33.25±0, 04; both p<0.05) with insignificant difference in diameter comparison (RCA 1,5T= 2,85±0,24mm vs. 2,94±0,26 at the 3T; LAD at 1,5T= 2,96±0,27 vs. 2,81±0,25 at 3T). Fat saturation-, image quality and motion artefacts were not significantly different.
Discussion:
Three Tesla Coronary MRA results in an objectively improved vessel sharpness and diameter assessment when compared to 1.5T, while subjective parameters as navigator and fat saturation performance were not affected by using higher magnetic field strength.

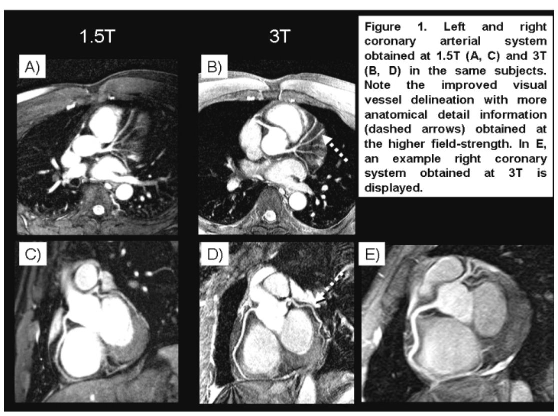

Figure 1. Left and right coronary arterial system obtained at 1.5T (A, C) and 3T (B, D) in the same subjects. Note the improved visual vessel delineation with more anatomical detail information (dashed arrows) obtained at the higher field-strength. In E, an example right coronary system obtained at 3T is displayed.

1133-155 Phase Velocity Mapping by Cardiac Magnetic Resonance Is a Valuable Noninvasive Tool in the Assessment of Patients With Pulmonary Hypertension

Paola Kuschnir, Rafael Salguero, Javier Sanz, Teresa Rius, Roxana Sulica, Valentin Fuster, Michael Poon, Mount Sinai School of Medicine, New York, NY

Background: Advanced pulmonary hypertension is a disease with very poor prognosis. Right heart catheterization (RHC) is currently the gold standard for its diagnosis. Phase velocity mapping (PVM) by cardiac magnetic resonance (CMR) is a well-established method to quantify pulmonary artery (PA) flow velocities. The purpose of our study was to assess the correlation between hemodynamic data obtained by PVM with RHC.

Methods: 20 consecutive patients were referred for pulmonary hypertension evaluation with CMR. Right ventricle ejection fraction was assessed by prospective triggered fast imaging with steady-state precession sequence. PVM of PA was acquired with a breath-hold, 2D segmented gradient-echo fast low-angle shot pulse sequence with retrospective cardiac gating. All patients underwent RHC within one week to assess mean PA pressure (MPAP, mmHg), right atrium pressure, PA saturation, PA vascular resistance index and cardiac output by thermodilution. Correlations between PVM and RHC hemodynamics were performed with Pearson's linear coefficient. Cardiac output results were compared with paired t-test.

Results: Average PA flow velocity (APV, cm/s) by PVM showed very good correlation with MPAP (r=-0.86). APV values over 15 were found in all patients with MPAP under 25 (n=5). AVPAFV results between 10-15 were observed in those (n=6) with MPAP between 25-45 except one with an APV values of 9.85. APV values under 10 were found in all patients (n=9) with MPAP>=45 except in one with an APV value of 10.03. APV value also showed good correlation with PA vascular resistance index (r=-0.87), right ejection fraction (r=0.83) and PA saturation (r=0.61). No significant correlations were observed for peak PA flow velocity and forward volume by PVM with RHC data. Cardiac output (L/min) assessed by PVM (5.34+/-1.50) was significantly lower than by RHC (6.28+/-2.13)(P=0.047, r=0.45). The use of background suppression does not affect the results significantly.

Conclusions: PVM can be clinical useful in the initial and follow-up evaluation of patients with pulmonary hypertension. APV as assessed by PVM shows good correlation with most RHC data and may be used as a non-invasive parameter in these patients.

1133-156 Results of Four Multicenter, Phase III, Magnetic Resonance Angiography (MRA) Trials With MS-325, a Blood Pool Contrast Agent, for the Detection of Vascular Disease in the Aortoiliac, Renal, and Pedal Regions

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Background: To evaluate the safety and efficacy of MS-325 for contrast enhanced (CE) MRA in the Aortoiliac, Renal, and Pedal arteries as compared to non-contrast 2D-TOF MRA, using catheter angiography (XRA) as the standard of reference (SOR) in adult patients with known or suspected arterial occlusive disease.

Methods: Patients received a 0.03 mmol/kg IV bolus of MS-325, an investigational MRI blood pool contrast agent. In each study, two independent blinded readers interpreted all XRA images for the presence of clinically significant (≥50%) stenosis, with a third reader independently reading in case of disagreement, in order to establish the SOR. Three different independent blinded readers separately interpreted 2D-TOF and CE-MRA image sets. Sensitivity, specificity, and accuracy of diagnosis were evaluated for each blinded reader. Vessels deemed uninterpretable in MRA were considered inaccurate. Inter-reader XRA agreement was estimated by comparing the results of the two XRA readers. Patient safety parameters were monitored for 72-96 hours post injection.

Results: Over the four trials, 641 patients and 3404 vessels were evaluated. On average, MRA readers showed absolute improvements in sensitivity, specificity, and accuracy of 16.4%, 14.6%, and 13.9%, respectively with the application of MS-325. Each reader showed improvement in accuracy; these improvements were statistically significant in 11/12 readers. MS-325 gave significant improvements in specificity in all readers; the renal and aortoilliac readers also showed significant sensitivity improvements. These values for MS-325-enhanced MRA were comparable to that of XRA inter-reader agreement. Rates of uninterpretable vessels were 1.6% in CE-MRA, 15.1% for TOF-MRA, and 9.5% for XRA. Studies yielded consistent safety results: overall AE rate possibly or probably related to MS-325 was 21%, of those, the majority (96%) were mild or moderate in severity. No adverse trends in lab chemistries or ECG results were observed.

Conclusion: In 4 Phase III studies, MS-325 was demonstrated to be safe and effective for the MRA assessment of vascular disease in multiple vascular territories.

1133-157 Effect of Serum Cholesterol Levels on Coronary Vasoreactivity in Patients With Type II Diabetes Mellitus

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Introduction: Coronary endothelial function is often impaired in patients with diabetes mellitus (DM). However the determinants of endothelial function in patients with DM have not been clearly defined. e assessed the magnitude and determinants of myocardial blood flow response to cold-pressor testing (CPT) using first-pass contrast-enhanced MRI.

Methods: Twelve patients (5 females, mean age 59 ± 9 with DM but without overt CAD, underwent MRI first-pass perfusion study at rest and following CPT). Imaging was performed on a 1.5 T Siemens Sonata scanner (Siemens Medical Solutions, Malvern, PA), using TurboFLASH sequence with the following parameters TR/TE/TI/FA/contrast dose/data matrix/spatial resolution = 2.9ms/1.3ms/90ms/6°/0.05 mmol/kg/128x70/3.5x1.9x8mm^3. Using MEDIS software (Medis Imaging Systems Inc, The Netherlands), the steepness of the first pass myocardial signal intensity curve's upslope, normalized to blood pool upslope (relative upslope) with CPT was divided by corresponding baseline measurement to calculate myocardial perfusion reserve index (MPRI). In addition the following serum assays were measured: total cholesterol (T chol), triglycerides (trig), HDL cholesterol (HDL), LDL cholesterol (LDL), Fasting blood glucose (FBS), C-reactive protein (CRP), insulin, hemoglobin A1c (H-A1c), and Von-Willebrand factor (VWF). Urinary microalbumin level (µalb), weight (Wt) and waist circumference (WC) were also measured.

Results: Mean weight 163 ± 55 lbs, µalb: 23 ± 32 mg/dl, WC= 106 ± 9 cm, Tchol= 192 ± 41, Trig = 177 ± 107 mg/dl, HDL= 42 ± 11 mg/dl , LDL= 114 ± 32 mg/dl, FBS = 148 ± 43