Detection of Coronary Artery Aneuysms, Stenoses and Occlusions by Means of Multislice Spiral Computed Tomography in Adolescents and Young Adults With Kawasaki Disease

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We evaluated the diagnostic accuracy of multislice spiral computed tomography (MSCT) to detect coronary artery aneuysms (CAAs), stenoses and occlusions in 10 adolescents and young adults with Kawasaki disease. **Methods:** Patients consisted of 7 men and 3 women with the age 18±6 years old (range: 13-26 years old). Coronary artery bypass surgery had been performed in 2 patients (2 arteries). Coronary angiography had been performed within 3 years in all the patients. MSCT was performed using a Siemens SOMATOM Volume Zoom. Patients were premedicated with Metoprolol (20-60mg). The scan was performed with collimation 1.0mm and the gantry rotation time 500ms. In all patients, the single-phase algorithm with 250ms temporal resolution was applied. The retrospectively ECG-gated image reconstruction was performed with the end of the reconstruction window (250ms) positioned at the peak of the R waves on ECG in order to avoid cardiac motion artifacts. **Results:** MSCT detected all the CAAs (n=12) and complete occlusions (n=6).The sensitivity and specificity to detect significant coronary stenoses were 100%, and 94%, respectively. **Conclusion:** MSCT has a potential to become a standard diagnostic tool in adolescents and young adults with Kawasaki disease.

**Figure:** A 20-year-old man with Kawasaki disease. A giant LAD and stenosis at the first diagonal artery (#9-1) are demonstrated on both MSCT and angiogram. In addition, the left circumflex artery (LCx) shows multi-layered ‘noisier’ appearance.

Multislice Gated Cardiac Computed Tomography Accurately Estimates Left Ventricular Volumes and Ejection Fraction

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**Background:** Multislice computed tomography (MSCT) is currently used for non-invasive coronary imaging. Image reconstruction at different times during the cardiac cycle also provides the opportunity to assess left ventricular (LV) volumes and ejection fraction (EF). However, the accuracy of these measurements has not yet been compared with other techniques. Therefore the aim of this study was to compare LV volumes and ejection fraction obtained using MSCT against those obtained by cine MRI.

**Methods:** Fourteen patients with coronary artery disease (12 M, 59±13 years) underwent both MSCT and cine MRI on the same day. MSCT was acquired using a 16 slice system (6T, Philips Medical Systems, Cleveland OH) after injection of 120 cc iodinated contrast agent. Retrospectively ECG gated cardiac images were acquired using a table pitch of 0.24 during a 20 second breathhold and reconstructed every 12.5% of the cardiac cycle. MRI was performed using a 1.5 T (Philips Intera CV, Best, the Netherlands) scanner. First pass LV contrast agent was administered and images acquired using a single breathhold with ECG gating. LV end-systolic (ESV) and end-diastolic (EDV) volumes as well as LVEF were calculated using the Simpson's method and compared among both techniques. Therefore the aim of this study was to compare LV volumes and ejection fraction obtained using MSCT against those obtained by cine MRI.

**Results:** LV end-systolic (ESV) and end-diastolic (EDV) volumes as well as LVEF were calculated using the Simpson's method and compared among both techniques. Therefore the aim of this study was to compare LV volumes and ejection fraction obtained using MSCT against those obtained by cine MRI.

**Conclusions:** Retrospectively gated MSCT accurately estimates LV volumes and ejection fraction. Since assessment of cardiac function with MSCT can easily be obtained at the time of coronary imaging, this places MSCT in a strong position for the one-stop shop assessment of coronary patients.

**Table 1.** Pixel densities obtained by image analysis compared to mean calcium score calculated by EBCT

<table>
<thead>
<tr>
<th>Mean Calcium Score (EBCT)</th>
<th>Mean Measured Area (Computer)</th>
<th>Mean Minimum Pixel Density (Computer)</th>
<th>Mean Arterial Pixel Density (Computer)</th>
<th>Mean Maximum Pixel Density (Computer)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1300.82 mm²</td>
<td>58.25</td>
<td>109.61</td>
<td>151.00</td>
</tr>
<tr>
<td>&gt;2</td>
<td>1044.54 mm²</td>
<td>60.00</td>
<td>112.68</td>
<td>158.86</td>
</tr>
<tr>
<td>Known CAD (n=30)</td>
<td>533.59 mm²</td>
<td>79.00</td>
<td>131.10</td>
<td>184.06</td>
</tr>
<tr>
<td>Skip Lesions (n=15)</td>
<td>536.44 mm²</td>
<td>71.2</td>
<td>138.178</td>
<td>207.47</td>
</tr>
</tbody>
</table>

802 Stress Echocardiography: Beyond Traditional Uses

**Monday, March 08, 2004, 9:15 a.m.-10:30 a.m. Morial Convention Center, Hall D-1**

**802-1 Relationship Between Contractile Reserve and Diastolic Function in Hibernating Myocardium**

Erberto Carugno, Paolo Biagioli, Mariagrazia Sardone, Federico Maroni, Gianfranco Alumni, Adriano Murrone, Gabriella Vincenzi, Kettly Savino, Maurizio Bentivoglio, Temistocle Ragni, Claudio Giombolini, Giuseppe Ambrosio, Silvestrini Hospital, Perugia, Italy

**Background:** In hibernating myocardium, degree of fibrosis is known to dictate extent of contractile response to dobutamine. Since increased fibrosis may also cause increased stiffness and impaired left ventricular (LV) diastolic filling, we evaluated whether there is a relationship between contractile reserve and diastolic filling in hibernating myocardium.

**Methods:** In 31 patients with chronic ischemic LV dysfunction (age 65.2 yrs; 26 males), evidence of viability (by dobutamine echocardiography), and no LV scar, 2D- and Doppler echocardiography were performed at baseline and 6±3 months after revascularization. Based on transmitral flow pattern at rest, patients were divided into two groups: restrictive filling pattern (RF, n=12) and non-restrictive filling (NRF, n=19).

**Results:** At baseline, RF and NRF groups did not differ with respect to average number...
of dysfunctional segments/patient (11.4 ± 0.6 vs 11.0 ± 0.3), global wall motion score index (WMSI: 2.37 ± 0.36 vs 2.12 ± 0.42), and ejection fraction (EF: 29.5% vs 35.6%, p<NS). However, in patients with RF pattern the number of segments/patient showing contractile response to dobutamine (3.50 ± 2.3 vs 6.33 ± 2.59, p<0.01) and the percent contractile reserve (31.2 ± 22 vs 60.2 ± 22%; p<0.0001) were lower compared to NRF patients, and WMSI at peak dobutamine infusion higher (1.90 ± 0.24 vs 1.60 ± 0.36; p<0.05), indicating reduced contractile reserve in patients with impaired diastolic filling. Across all patients there was also a positive correlation between the number of segments showing contractile reserve and both isovolumetric relaxation time (r = 0.46, p<0.001), and deceleration time of peak E-velocity (r = 0.56, p<0.001). After revascularization, LVEF increased by 11.9% in patients with NRF but by only 4.3% in patients with RF pattern (p<0.05). Also, in patients with NRF compared to RF pattern, function recovered in 4.2 ± 0.4 segments vs 1.76 ± 0.3, and WMSI improved by 0.44 ± 0.42 vs by 0.33 ± 0.40 (p<0.05), respectively.

Conclusions: In patients with hibernating myocardium, impaired diastolic filling is associ-ated with reduced contractile reserve; restrictive filling pattern may also predict poor recovery of function after revascularization.

Dobutamine Versus Levosimendan Stress Echocardiography for the Prediction of Recovery of Left Ventricular Dyssynergies After Revascularization
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Background: Levosimendan is a new calcium-sensitizer agent with inotropic and diuretic properties. Although it is used as an inotropic agent in decompensated heart failure showing comparable efficacy to the other inotropic drugs, it has not been in use in stress echocardiography yet. The purpose of our study was to compare the accuracy of levo-simendan (LSE) and dobutamine stress echocardiography (DSE) for the prediction of recovery of left ventricular (LV) dyssynergies after revascularization.

Methods: Twenty eight patients with LV dysfunction due to previous myocardial infarction scheduled for revascularisation (18 coronary angioplasty and 10 bypass surgery) underwent low-dose DSE (5-10 µg/kg/min) and LSE. Levosimendan was infused at least 1 hour after dobutamine infusion, at 2 doses of 12 and 24 µg/kg, over a 5 minutes period each. LV wall motion score was assessed using a 16-segment model. Myocardial viability was detected if improvement of ≥1 grade of regional wall motion score in at least two contiguous segments was noted, during either dobutamine or levosimendan infusion. All patients also underwent resting echocardiography within 6 months after successful revascularization.

Results: No major adverse events occurred during levosimendan or dobutamine administra-tion. Of the 448 segments studied, 212 (47%) were dysynergic at rest. Dobutamine resulted in improved contractile function in 98 (22%) abnormal segments while 88 (90%) of them showed functional improvement after revascularization. During LSE 110/ 220 (52%) dysynergic segments improved and 100 (81%) of them recovered function after revascularization. Analysis of results showed a significantly lower sensitivity of DSE compared to LSE (73% Versus 94%, respectively, p<0.01) but a similarly specific (88% Versus 90% respectively, p=NS) for the prediction of the recovery of LV dyssynergies after revascularization.

Conclusions: Levosimendan can be used safely in stress echocardiography. Further-more, LSE seems to predict postrevascularization recovery of LV dysfunction with higher accuracy than DSE.

Comparative Long-Term Prognostic Value of Dobutamine Stress Echocardiography Versus Dobutamine Stress Myocardial Perfusion SPECT
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Objectives: The purpose of this study was to compare the long-term prognostic value of dobutamine stress echocardiography and dobutamine stress single photon emission computed tomography (SPECT). Background: Dobutamine stress echocardiography and dobutamine stress SPECT are clinically useful methods for the detection of coronary artery disease. The comparative long-term prognostic value of these imaging modalities is not clear.

Methods: A total of 364 consecutive patients underwent simultaneous dobutamine stress 99mTc-sestamibi SPECT and dobutamine stress echocardiography. Follow-up was successful in 351 (99.2%) patients. Fifty patients underwent early (<60 days) revas-cularization and were excluded; the analysis is based on 301 patients.

Results: Abnormal perfusion was detected in 198 (67%) patients, and 182 (62%) had an abnormal stress echocardiography; the agreement was 82% (kappa = 0.62). Under-estimated 7.5 (plus minus) 2.8 years follow-up, 100 (33%) deaths occurred of which 43 (43%) were due to cardiac causes. Nonfatal infarction occurred in 23 (8%) patients and 29 (10%) underwent late revascularization. Annual event rates for cardiac death, or cardiac death or cardiac death were, respectively, 0.7%, and 3.6% after a normal scan, and 2.6%, and 6.5% after an abnormal scan, P<0.0001. For stress echocardiography, annual event rates for cardiac death, all cardiac events were, respectively, 0.6%, and 3.3% after a normal test, and 2.5%, and 10% after an abnormal test. P<0.0001. In multivariate Cox models, 99mTc-sestamibi SPECT and stress echocardiography were the strongest predictors of cardiac death (OR 2.4, CI 1.1-6.5 and OR 3.3, CI 1.2-8.7, respectively) and all cardiac events (OR 2.3 CI 1.1-4.9 and OR 3.4 CI 1.7-6.8). Both modalities had a similar incremental prognostic value over clinical variables (SPECT vs. echocardiography: global chi-square 33.2 vs. 36.0, p=NS).

Conclusions: Dobutamine stress 99mTc-sestamibi SPECT as well as dobutamine stress echocardiography provide comparable, powerful, long-term prognostic information over clinical data. A total of 354 consecutive patients underwent simultaneous dobutamine stress echocardiography and dobutamine stress single photon emission computed tomography (SPECT). The results of this study show that both dobutamine stress echocardiography and dobutamine stress SPECT are clinically useful methods for the detection of coronary artery disease. The comparative long-term prognostic value of these imaging modalities is not clear.

Methods: A total of 364 consecutive patients underwent simultaneous dobutamine stress echocardiography and dobutamine stress single photon emission computed tomography (SPECT). The results of this study show that both dobutamine stress echocardiography and dobutamine stress SPECT are clinically useful methods for the detection of coronary artery disease. The comparative long-term prognostic value of these imaging modalities is not clear.

Results: PSE was negative in 17 and positive in 29 pts. SPECT was negative in 8 and positive in 33 pts. During follow up there were 15 cardiac events (death, myocardial infarction and need for revascularization). The projected two-year event free survival was 81 ± 13% in pts with normal PSE and 24 ± 18% when the PSE was abnormal (p<0.001). Predicted two-year event free survival was 41 ± 19% and 88 ± 11% in pts with abnormal and normal SPECT, respectively (p<NS).

Conclusions: PSE is a powerful predictor of mortality after AMI and provides prognostic information incremental to conventional stress echocardiographic data.