

increases cardiac preload.

Methods: Study 1) In nine male hypertensive subjects, LV inflow (LVIF) using Doppler echocardiography were examined before and after passive leg lifting (LL) maneuver. Then, LVIF were re-examined before and after intravenous volume loading (physiological saline, 500 mL/15 min). Study 2) In 26 hypertensive patients (diabetes: n=13; non-diabetes: n=13), LL loading was performed to evaluate the impact of diabetes on LVIF change. There was no difference between the two groups in age, body size, blood pressure, cardiac structure, or systolic and diastolic function in the baseline echocardiographic examination.

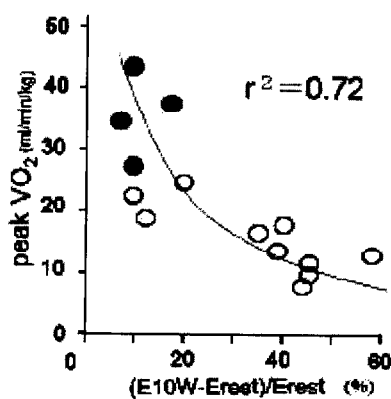
Results: Study 1) The shortening of the deceleration time of the E-wave (DcT) by LL was strongly correlated with DcT shortening by volume loading ($r=0.88$, $p=0.0006$). Study 2) The DcT shortening by LL in diabetic group (236 ± 47 to 188 ± 34 msec) was significantly greater than in non-diabetic group (222 ± 38 to 202 ± 34 msec). Furthermore, the presence of diabetes was an independent predictor for the DcT shortening. There was no independency as a predictive factor in other clinical and echocardiographic parameters. **Conclusions:** 1) In the present study, we showed a strong correlation between changes in DcT by passive LL maneuver and by intravenous volume loading. 2) This study also showed that DcT shortening by LL in hypertensive patients with diabetes was significantly greater than in those without diabetes. 3) These findings suggest that LL maneuver can be useful as a simple preloading test and that this test may unmask the latent LV diastolic dysfunction in diabetic hypertensives, because a great shortening in DcT by LL is shown to reflect the restrictive (more severe) diastolic dysfunction.

1066-34

Dynamic Diastolic Stress Echocardiography With Minimal Exercise Enables Prediction of Exercise Tolerance in Patients With Congestive Heart Failure

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Background: The most important factor to determine quality of life is exercise tolerance. It can be quantified with peak VO_2 by analyzing patients' expired gas during carefully performed moderate or more exercise by skilled examiners. The purpose of this study is to investigate whether minimal exercise stress echocardiography allows noninvasive prediction of peak VO_2 or not. **Methods:** Subjects consisted of 10 patients with congestive heart failure of grade 2 to 3 of New York Heart Association's classification and 4 normal controls. Anaerobic threshold (AT) and peak VO_2 was measured conventionally by analyzing expired gas during multiple step ergometer exercise. By minimal stress echo with 10W exercise by ergometer, mitral flow velocity profile and its change relative to baseline value was evaluated by pulsed Doppler echo [E velocity, E_{10W}/E_{rest} ($E_{10W} - E_{\text{rest}}/E_{\text{rest}}$)] E deceleration time (DcT), $DcT_{\text{rest}} - DcT_{10W}$, $(DcT_{\text{rest}} - DcT_{10W})/DcT_{\text{rest}}$. **Results:** 1) E_{rest} and DcT_{rest} were not significantly correlated with AT and Peak VO_2 . 2) In contrast, E_{10W}/E_{rest} as well as $DcT_{10W}/DcT_{\text{rest}}$ had good and significant correlation with AT ($r^2=0.67$ and $r^2=0.64$, $p<0.01$) and peak VO_2 ($r^2=0.72$ and $r^2=0.66$, $p<0.01$). **Conclusion:** Dynamic diastolic stress echo with minimal exercise allows practical prediction of exercise tolerance in patients with congestive heart failure.



POSTER SESSION

1067 Cardiac Computed Tomography: Novel Uses and New Insights Into Established Applications

Sunday, March 30, 2003, 3:00 p.m.-5:00 p.m.

McCormick Place, Hall A

Presentation Hour: 4:00 p.m.-5:00 p.m.

1067-35

Multislice Computed Tomography for Noninvasive Coronary Angiography: Diagnostic Accuracy of Volume Rendering Versus Maximum Intensity Projection Reconstructions

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Background: Contrast multislice computed tomography (MSCT) with retrospective ECG-gated image reconstruction is a new challenging technique for noninvasive visualization of coronary artery. High spatial resolution MSCT images are reconstructed by different algorithms. We investigated the accuracy of sliding thin-slab maximum intensity projections (MIP) and 3-D volume rendered reconstruction (VR) in the detection of significant (>50%) coronary artery stenosis in comparison with coronary angiography (CA).

Methods: We studied 26 symptomatic patients with MSCT who underwent CA within 5 days. Images were obtained using a 8-detector scanner (LightSpeed Ultra, GE, USA) with a 120 ml intravenous bolus of non-ionic contrast agent during a single breath-hold. Mean heart rate was 62 ± 8 bpm. From 0.6-1.2 mm thickness slices, retrospective ECG-gating was used to reconstruct images during the diastolic phase of cardiac cycle. MIP and VR reconstructions were analyzed by two operators unaware of CA results. We considered 13 coronary segments: RCA: proximal, middle, distal and posterior descending; LM; LAD: proximal, middle, distal, first and second diagonal; LCX proximal, middle-distal, marginal branch.

Results: Of 352 coronary segments, 250 (71.1%) were adequately visualized with MIP and 246 (69.8%) with VR. Motion artifacts were the most frequent reason for unevaluable segments. The LM, proximal and middle LAD were always visualized by both methods. The overall sensibility was 76.9% for MIP and 72.3% for VR, with a specificity of 75.6% and 75% respectively (positive predictive value 54.3% for MP and 53.4% for VR; negative predictive value 89.6% for MIP and 87.2% for VR). Evaluation based on both MIP and VR showed a sensibility of 80% and specificity of 76.5%, with a positive predictive value of 57.6% and a negative predictive value of 90.7%. Considering only main branches (LM, RCA, LAD, LCX) the sensibility and specificity were 77.5 and 78.4% for MIP and 67.0 and 80.1% for VR respectively.

Conclusions: MIP and VR showed similar diagnostic accuracy in identification of coronary artery stenoses and their combination allows a slight increase in diagnostic value of MSCT.

1067-36

The Accuracy of Multislice Spiral Computed Tomography Using a Novel ECG-Gated Image Reconstruction Method for the Assessment of Coronary Artery Stenosis

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We investigated the accuracy of multislice, spiral computed tomography (MSCT) to detect coronary artery disease in comparison with coronary angiography (CAG) using a new retrospective ECG-gated reconstruction method which minimizes cardiac motion artifact.

Method: 40 consecutive patients undergoing MSCT and CAG entered the study. MSCT was performed using a Somatom Zoom (Siemens, Germany) with collimation 1.0mm, pitch 1.5 and gantry rotation time 500msec. Metoprolol (20-60mg) was administered orally one hour prior to MSCT imaging in order to achieve the heart rate less than 64/min. The retrospective ECG-gated image reconstruction was performed with a data acquisition window (250msec) positioned immediately before atrial contraction in order to minimize motion artifacts caused by the abrupt diastolic ventricular movement during the rapid filling and atrial contraction periods. Following inspection of volume rendering images, multiplanar reconstruction images of the left main trunk (LMT), the left anterior descending artery (LAD), the left circumflex artery (LCx) and the right coronary artery (RCA) were obtained and evaluated for luminal narrowing semiquantitatively. The results were compared to those obtained by CAG.

Results: 152 (95%) out of 160 coronary arteries were free from motion artifact and eligible for evaluation. The remaining 8 arteries were excluded from the analysis because of severe calcification (n=4) and difficulty in breathhold (n=4). The sensitivity to detect coronary luminal narrowing greater than 50% was 100% for the LMT, 92% for the LAD, 100% for the LCx and 96% for the RCA. The specificity to define luminal narrowing less than 50% was 100% for the LMT, 92% for the LAD, 85% for the LCx and 83% for the RCA. The overall sensitivity and specificity was 96% and 93%, respectively. **Conclusion:** Using a retrospective ECG-gated reconstruction technique which minimizes cardiac motion artifacts, MSCT provides excellent sensitivity and specificity for detecting coronary artery disease.