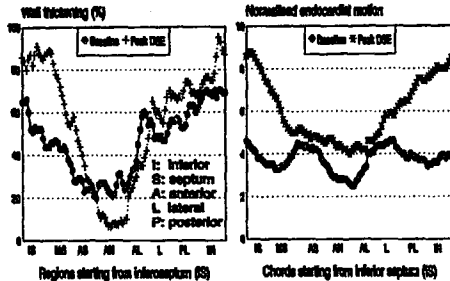


1039-56 Is Wall Thickening Better Than Endocardial Motion for Detecting Myocardial Ischemia During Dobutamine Stress Echocardiography

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Both wall thickening (WT) and endocardial wall motion (EWM) are used to detect ischemic LV dysfunction. To determine whether WT and EWM are comparable for identifying myocardial ischemia during dobutamine stress echocardiography (DSE), we studied 21 pigs in which a LAD diameter stenosis of 50–90% (CAS) was created to reduce flow reserve from 3.6 ± 0.7 to 1.5 ± 0.3 . DSE was performed with a standard protocol. LV short-axis WT and EWM were digitized and analyzed by a centerline method. Regional myocardial lactate production was measured and used as an index of ischemia.



Results: Lactate production was observed in all pigs at peak DSE. Worsening WT (left panel in figure) was observed in 19/21 pigs. But worsening or unchanged (right panel) EWM was seen only in 11/21 pigs ($p < 0.01$). In the 10 pigs where EWM increased at peak DSE, coronary flow reserve was greater than in the 11 with decreased EWM (1.64 ± 0.35 vs. 1.32 ± 0.28 , $p < 0.05$). **Conclusions:** During dobutamine stress with single vessel disease, reduction of wall thickening is a more sensitive marker of ischemia than reduced endocardial wall motion.

1039-57 Does Nitroglycerin Affect Accuracy of Dobutamine Stress Echocardiography for the Detection of Myocardial Ischemia?

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Patients referred for dobutamine stress echocardiography (DSE) are often on nitroglycerin (NTG). There is concern that NTG may prevent dobutamine-induced ischemia by improving myocardial perfusion and reducing oxygen consumption. To determine whether NTG alters accuracy of DSE for detecting myocardial ischemia, we studied 6 pigs with severe LAD stenosis with flow reduction by 30–80%. NTG at 50–100 $\mu\text{g}/\text{kg}/\text{min}$ was infused throughout a standard dobutamine stress protocol. Coronary flow was monitored by a flowmeter. Regional wall thickening was measured from LV short-axis at mid-papillary muscle level with a centerline method. Regional myocardial lactate balance was monitored. **Results:** Dobutamine induced wall thickening in stenotic (from $14.3 \pm 6.4\%$ to $27.6 \pm 11.2\%$, $p < 0.01$) and non-stenotic (from $41.8 \pm 7.5\%$ to $54.9 \pm 8.4\%$) regions initially at low doses but wall thickening in stenotic regions decreased to $8.4 \pm 3\%$ with high doses at peak stress while wall thickening remained increased in the non-stenotic regions. NTG improved coronary flow (39 ± 16 ml with NTG vs. 34 ± 14 ml, $p < 0.05$) during dobutamine stress and increased the magnitude of the augmentation of wall thickening (to $35.9 \pm 6.8\%$, $p < 0.01$) with low doses of dobutamine. However, NTG did not prevent the decrease in wall thickening (to $7.3 \pm 4.7\%$, $p = \text{NS}$) in stenotic regions at peak stress. Dobutamine-induced regional lactate production was also not altered by NTG ($p = \text{NS}$). **Conclusions:** Nitroglycerin slightly increases coronary flow and thus wall thickening improves more at low doses. However, nitroglycerin does not prevent reduction of wall thickening at high doses and thus, should not affect the sensitivity of dobutamine stress test for detecting ischemia.

1039-58 Reasons for Interinstitutional Observer Variance in the Interpretation of Stress Echocardiograms

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A multicenter study involving 5 centers showed obvious heterogeneity in interpretation of dobutamine stress echocardiograms (DSE). A majority agreement (MA) of at least 4 centers was obtained on only 73% of 150 DSE.

We analysed factors increasing the likelihood of interpretation heterogeneity. MA was lower on positivity (41/85, 63%) compared to negativity of a study (69/85, 81%; $p < 0.05$). Studies with a small region of wall motion abnormality (WMA; less than 4 segments) had a lower MA than those with a larger region of WMA (4 segments or more) with 40% and 86%, respectively. Induction of hypokinesis was associated with lower MA compared with development of akinesis (20% vs 72%, $p < 0.01$). Studies with highest image quality on a five point scale reached 100% MA, those with lowest image quality 43% ($p = 0.003$). Omission of a center from DSE interpretation resulted in two centers in a significant increase of agreement (from 73% to 87% and 84%, respectively; $p < 0.01$), omission of those 30 studies submitted by any one center did not result in a significant change of MA.

Conclusion: There is higher MA in interpretation of DSE with a negative or strongly positive test result compared to mildly positive cases. At present, conformity in data acquisition is higher than conformity in DSE interpretation. Thus, more homogeneous interpretation criteria are required, especially for borderline results.

1039-59 Diagnosis of Coronary Disease in the Elderly. A Comparison of Arbutamine and Exercise Echocardiography

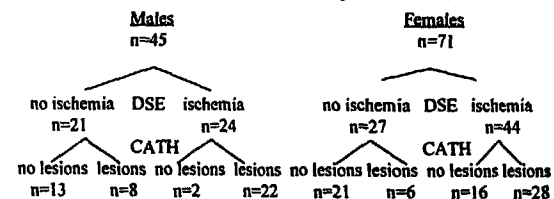
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Considering the increasing mean age of survival and the potential for different responses by elderly pts to therapeutic agents or diagnostic procedures, arbutamine (Arb), a new beta-agonist pharmacological stress agent and exercise stress echocardiography (Ex) were evaluated for detecting coronary artery disease (CAD) in elderly (≥ 65 yrs = Group A; $n = 71$; mean age 53.3 ± 7 yrs) and younger (< 65 yrs = Group B; $n = 27$; mean age 70 ± 3.5 yrs) pts. In this multicenter, multinational study of pts with $\geq 50\%$ stenosis by quantitative coronary angiography, Arb was infused using a computerized, closed loop delivery device which adjusts the Arb to achieve a pre-defined rate of heart rate rise to a maximal limit. The degree of coronary stenoses did not differ significantly between Group A and B. Ischemic response was defined as new or worsening wall motion abnormalities (WMA). During Arb, 29.6% and 40.7% of group A and group B respectively experienced adverse events as compared to exercise where adverse events occurred in 7% (Group A) and 3.7% (Group B), respectively. The most frequent events with Arb. were tremor, flushing, headache and nausea. No serious adverse events were documented. There was no statistical difference between sensitivities of Arb and Ex in detecting echocardiographic signs of ischemia, in the younger or elderly pts. (Group A: 86 vs 76%, $p = 0.857$; Group B 59 vs 78% $p = 0.09$). However, when compared to the younger group the sensitivity of Arb to detect ischemia was much lower in the elderly pts (Group A: 86% vs Group B 59%; $p < 0.01$), whereas there was no difference after Ex (Group A: 76% vs Group B 78%). **Conclusions:** Arb infusion by a closed loop system is safe and effective. In younger pts Arb can induce WMA comparable to Ex.

1039-60 Dobutamine Stress Echocardiography: Influence of Gender on Test Accuracy

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To test the hypothesis that the sensitivity and specificity of dobutamine stress echocardiography (DSE) does not differ between male and female patients, the DSE database of the DUMC was examined using cardiac catheterization (CATH) as the gold standard for comparison. Of the 417 patients studied, there were 156 males (37.4%) and 261 female (62.6%). CATHs were performed in 45 males (28.8%) and 71 female (27.2%). Patients were categorized into presence or absence of ischemia based on DSE interpretation of regional wall motion. These findings were then compared to the CATH data with a significant lesion being defined as $\geq 75\%$ stenosis.



The specificity of DSE was 61.9% in male patients and 77.8% in female patients ($p = 0.23$). On the other hand, the sensitivity of males undergoing DSE was 91.7% compared to 63.6% in females ($p = 0.01$). These data indicate that while the specificity of DSE is comparably low in both genders, the detection of coronary artery disease appears to be more reliable in males than in females.