What test should we use to assess prognosis: dobutamine stress echocardiography or nuclear imaging?

1 Erasmus Medical Center Rotterdam, Cardiology Dept., Rotterdam, Netherlands; 2Leiden University Medical Center, Cardiology, Leiden, Netherlands

Aim: 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. 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).

Methods: A total of 354 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) revascularization and were excluded; the analysis is based on 301 patients.

Results: Abnormal perfusion was detected in 198 (66%) patients, and 182 (60%) had an abnormal stress echocardiography; the agreement was 82% (kappa=0.62). During 7.3 ± 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 all cardiac events 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, or all cardiac events were respectively, 0.6%, and 3.3% after a normal test, and 2.6%, and 6.9% after an abnormal test, P < 0.0001. In multivariable 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).

Conclusion: Dobutamine stress 99mTc-sestamibi SPECT as well as dobutamine stress echocardiography provide comparable, powerful, long-term prognostic information over clinical data.

The prognostic value of pharmacological stress echo is affected by concomitant anti-ischemic therapy at the time of testing.

E. Pasanisi, R. Sicari, L. Venneri, L. Cortigiani, P. Landi, E. Picano.
1 CNR, Institute of Clinical Physiology, Pisa, Italy; 2 Lucca Hospital, Cardiology Division, Lucca, Italy; 3 CNR, Institute of Clinical Physiology, Pisa, Italy

Aim: To determine whether antianginal medications affect the prognostic value of pharmacologic stress echocardiography.

Methods: 7333 patients (5452 males; 59 ± 10 years) underwent pharmacologic stress echocardiography with either high dose dipyridamole (0.84 mg/Kg over 10') (n= 4984) or high dose dobutamine (up to 40 mcg/Kg/min) (n= 2349) (DET) for diagnostic purposes. One-thousand and ninety-one patients were on antiischemic therapy at time of testing (nitrates and/or calcium antagonists and/or beta-blockers). Patients were followed up for a mean of 2.6 years (range 1 to 206 months).

Results: DET was positive for myocardial ischemia in 2854 (35%) and negative in 4479 (61%) patients. The total mortality was 336 (4.5%). Death was attributed to cardiac causes in 161 patients (2.1%). Survival was highest in patients with negative DET off therapy, and lowest in patients with positive DET studied on therapy (95% vs 81, p= 0.0000). Survival was comparable in patients with negative test on and in patients with positive test off therapy (88% vs 84%, p=ns): figure.

Conclusion: Ongoing antiischemic therapy at the time of testing heavily modulates the prognostic value of pharmacologic stress echo. In presence of concomitant anti-ischemic therapy, a positive test is more prognostically malignant, and a negative test less prognostically benign.
202 patients (16 M, 4 F) who had coronary angiography for stable stress Tc-99m MIBI SPECT myocardial imaging could predict myocardial ischemia is ischemic even before myocardial contraction has decreased. Backscatter (CVIBS) has been shown to be decreased when the myocardium is dipyridamol infusion has been employed for detection of myocardial ischemia. Ab-

Background: In studies involving a prediction of survival during interventional pro-
cedures, jeopardy score has been shown to predict fatal end points, but its impact on long-term mortality rates in the presence of various clinical, angiographic and stress echocardiographic variables is unclear. Objective: We sought to study the prediction of mortality with modified myocardial jeopardy score in combination with Dobutamine-Atropine (DobAtro), Dipyridamole- Atroprine (DipAtro) and Exercise (Ex) stress echocardiography. Methods: From existing database of stress echo laboratory, 166 patients were iden-
tified among 655 patients (age 56 ± 18 years) who were referred for clinical indications of stress echocardiography. Dobutamine (Dob) (up to 40 mg/kg/min i.v. Dob with addition of 1 mg of atroprine), Ex (Bruce) and coronary arteriography (analysed by quantitative arteriography), Coro-
nary artery disease (CAD) was present in 114 pts: 91 one-, 23 two-multi-vessel CAD. Myocardial jeopardy score is calculated for each vessel as a sum of all significant lesions represented as a product of: (1) myocardial kinetic status (0 for akinetic, 0.5 for hypokinetic, and 1 for each normokinetic myocardial segment subxrayed by the vessel with equal or more than 50% diameter stenosis), (2) diameter stenosis of significantly stenosed coronary vessel (scored from 3-5), and (3) weighting flow factor for particular localisation. Results: Among clinical, demographical, stress echocardiographic and angio-
graphical variables, factors strongly associated with high mortality rates were: myocar-
dial jeopardy score >7 (p=0.0003), positive DobAtro (p=0.016), positive DipAtro (p=0.015) and the number of diseased vessels (p=0.005), while other variables and the results of Ex stress echocardiography didn't show significant influence on long-term risk of cardiac death (p>ns). Variable most strongly associated with car-
diac death was myocardial jeopardy score (RR 1.05; p=0.00054). Conclusion: High amount of potentially ischemic myocardium and positive DobAtro and DipAtro stress echocardiography are at high risk for subse-
quent cardiac death. Myocardial jeopardy score is the strongest predictor of long-
term outcome in patients with stress induced myocardial ischemia.

Dipyridamole stress echocardiography and ultrasonic myocardial tissue characterization in predicting myocardial ischemia, in comparison with dipyridamole stress Te-99m MIBI SPECT myocardial imaging. A. Onbasli1, S. Erdogan2, T. Tekten1, C. Ceyhan3, Y. Yurekli4, Adnan Menderes University, Cardiology, Aydin, Turkey; 5Adnan Menderes University, Nuclear Medicine, Aydin, Turkey Continuous two-dimensional echocardiographic monitoring in conjunction with dipyridamole infusion has been employed for detection of myocardial ischemia. Ab-

normal test is usually defined as one demonstrating transient asynergy of con-
traction. However, sensitivity for ischemia detection is less than dipyridamol stress scintigraphy. Ultrasonic tissue characterization with cyclic variation of integrated backscatter (CVIBS) has been shown to be decreased when the myocardium is ischemic, whereas normal myocardial contraction has decreased. The purpose of this study was to validate whether ultrasonic tissue characterization combined with dipyridamole stress echocardiography compared with dipyridamole stress Te-99m MIBI SPECT myocardial imaging could predict myocardial ischemia in patients with chronic coronary artery disease. Method: Twenty patients (16 M, 4 F) who had coronary angiography for stable angina pectoris were included. Mean age was 62 ± 8 years. Left ventricle was di-
vided into 16 segments. Regional wall motion analysis and CVIBS measurements were obtained from 16 myocardial segments at rest. Dipyridamole (0.84 mg/kg) was infused intravenously for 4 minutes. Regional wall motion analysis and CVIBS mea-
surements were completed within 1 minute after infusion from same myocardial segments. After 10 minutes, Te-99m MIBI (20 mCi) was injected and SPECT my-
ocardial imaging was performed. After 1 hour, 8 mCi Te-99m MIBI was reinjected and images were obtained. Results: Te-99m MIBI SPECT showed abnormal distribution in 176 segments and normal distribution in 144 segments after dipyridamole stress. Transient regional wall motion abnormality was detected in 92 segments with 2D echo after dipri-
damol stress. Sensitivity and specificity of dipyridamole stress echocardiography were 62% and 97%, respectively. At rest, no significant difference was seen in CVIBS in the segments with normal (5.8±0.6 db) or abnormal distribution (6.1±0.5 db) on Te-99m MIBI SPECT imaging. But, in the regions showing abnormal distribu-
tion after stress, CVIBS decreased significantly (6.1±0.5 vs 3.8±0.6 db, p<0.001). Significant decrease in CVIBS (>2.0 db) after dipyridamole stress was detected in 184 segments. Sensitivity and specificity of abnormal CVIBS were 85% and 84%, respectively. Conclusion: Dipyridamole stress ultrasonic tissue characterization with CVIBS may provide more sensitive detection of myocardial ischemia than dipiridamol stress echocardiography.