Diagnostic Accuracy of Adenosine Myocardial Perfusion Tomography in Patients With a Right Ventricular Pacemaker

Su Min Chang, Felix Y. Keng, Eduardo Cwej, Diego Arekaki, Zuo-Xiang He, Guillermo A. Reyes, Wayne S. Hwang, Mario S. Verani, Baylor College of Medicine, Houston, Texas, The Methodist Hospital, Houston, Texas.

Background: Patients (pts) with a left bundle branch block (LBBB) or a right ventricular pacemaker (RVP) often have perfusion defects during exercise SPECT. Pharmacologic stress has been proposed as an alternative to exercise in pts with LBBB, but its accuracy is unknown. Objective: We investigated the diagnostic performance of adenosine SPECT for the diagnosis of coronary artery disease (CAD) in pts with RVP.

Methods: Ninety-six pts (63 males, 33 females, mean age 72±8 years), with a RVP were examined. Adenosine (140 μg/kg/min for 6 minutes) and dobutamine (5 mg/min) were administered in random order. Adenosine SPECT was performed within 2 days of each other. Results: During stress, 75 pts remained in ventricular paced rhythm (VPR) and 21 pts were in non-paced rhythm (NPR). The sensitivity and specificity of adenosine SPECT were 82% and 43% overall, but rose to 84% and 100% during NPR and fell to 81% and 33% during VPR (p<0.03). The accuracy for detection of individual stenoses was similar between pts with VPR and pts with NPR, except for a higher specificity for left descending artery (LAD) disease in the NPR group (63% vs 100% pt=0.03). Among the 12 false-positive tests, all occurred in pts with VPR throughout the study. The false-positive rate is high in this elderly cohort of pts with VPR, which may be due to cardiac abnormalities caused by prolonged ventricular pacing, presence of a cardiomyopathy or changes in myocardial perfusion secondary to abnormal ventricular activation.

The Utility of Stress Myocardial Perfusion Imaging Performed Prior to Electrophysiological Testing

Kenneth A. Coleman, Richard M. Steinberg, Sinoma Pollock, Todd J. Cohen, Winthrop-University Hospital, Mineola, New York, Health Sciences Center, Stony Brook, New York.

Background: Prior to the attempted induction of ventricular tachycardia (VT) by programmed electrical stimulation (PES), pts are often first referred for stress SPECT myocardial perfusion imaging (MPI) to identify candidates for revascularization (REVASC). Methods: To assess the utility of this approach, all pts who underwent MPI followed within 30 days (mean 4.9 days) by PES between 11/97 and 6/00 were studied. The stress MPI modality was exercise in 36%, adenosine in 60% and dobutamine in 4%. Inducibility (IND) at PES was defined as sustained monomorphic VT. Results: There were 251 pts, 60% male, age 71±11 yrs. History included MI in 42%, prior REVASC in 26% and idiopathic myopathy in 4%. Indications for pts were arrhythmia in 64% (usually nonsustained VT) and syncope in 36%. The table shows the relationship between MPI results and IND. Normal MPI or IND with ischemia (IS) were associated with low rates of IND. No pt had an ischemic complication associated with PES even though 51% had MPI IS and 33% had multiple ischemic regions. REVASC was performed between the MPI and PES in only 12 pts; IND remained high (63%) and was associated with a prior infarct. Conclusions: A small proportion of pts undergo REVASC after MPI and before PES, but this is not necessary to ensure the safety of PES. MPI is associated with a high rate of IND even after successful REVASC. Further study is required to determine whether the low rate of IND with normal MPI or IND with MPI IS can obviate the need for PES in select pts.

Insulin-Sensitizing Thiazolidinedione Improves Endothelial Dysfunction in Insulin Resistant Patients by PET Measurements of Myocardial Blood Flow

Miguel Hernandez-Pampaloni, Manuel Quiñones, Isabel Bueno-Enriquez, Xochitl Jimenez, Gustavo Hernandez, Rosana De la Rosa, Zoe Sarnat, Wilma Hsu, Heinrich R. Scheibeit, UCLA School of Medicine, Los Angeles, California.

Coronary endothelial dysfunction, by intracoronary acetylcholine (ACh), predicts long-term atherosclerosis progression and cardiac events. Closely correlated normal and abnormal coronary flow responses to intracoronary ACh and to cold pressor testing (CPT), proportionate responses in rate pressure product (RPP) and in coronary flows to CPT and an abnormal CPT flow response as a predictor of cardiac events. In our study, we used ACh and insulin-sensitizers to restore endothelial function in IR. MBF was measured at rest, after dipyridamole (DIP; integrated coronary vasoconstriction) and during CPT in 11 IR subjects (10 F; 33±2 years) at baseline (BL), after 3 months of rosiglitazone treatment, (ROS; 40 mg/day), and in 12 age-matched normals. ROS improved body glucose disposal rates from BL (2.57±0.63 to 3.95±0.90 mg/min/kg).

Dependence of Flow Propagation Velocity on Cardiac Size: Observations From Patients With Dilated Cardiomyopathy and Hypertrophic Cardiomyopathy

Kimiko Takeda, Su-Min Chang, Sherif F. Naghshineh, Guillermo Torre-Amione, William A. Zoghbi, Baylor College of Medicine, Houston, Texas.

Background: Tissue Doppler at the mitral annulus (EA) and flow propagation velocity (FPV) are new indices of myocardial relaxation, which, combined with mitral E velocity, can improve the prediction of filling pressures. Since these indexes are dependent on ventricular size is presently not known.

Methods: Patients with hypertrophic cardiomyopathy (HCM, n=22) and dilated cardiomyopathy (DCM, n=17), which represent clinical conditions with impaired relaxation yet different ventricular sizes, were investigated. Comprehensive diastolic function, calculations of end-systolic and end-diastolic volumes (EDV) and ejection fraction were performed. Left atrial pressure (LAP) was estimated from Ea and FPV using previously published and published equations.

Results: Myocardial relaxation was impaired (Ea<10 cm/s) in all patients. Ea was slightly higher in DCM compared to HCM (7.2±1.6 vs. 8.4±1.5 cm/s; p<0.02). In contrast, using FPV, more marked differences in the opposite direction were observed (FPV in DCM = 22.9±6.0 cm/s vs. 35.5±12.4 cm/s in HCM; p<0.001). In DCM, EDV was higher compared to HCM (237±42 vs. 100±21 ml; p<0.001) and ejection fraction was lower (20.4±6% vs. 73±6%; p<0.001). A weak relation was observed between Ea and EDV (r = -0.0020) and lowered fasting plasma glucose from 91±5 to 94±3 mg/dl (p<0.05). At BL, MBFs in IR at rest and during DIP were similar to normal (DIP 2.32±0.42 vs. 2.4±0.92 mL/min/g; NS) and were not modified by ROS. CPT in normals produced a 44.5% increase in RPP and a proportionate 43.3% increase in MBF. In the IR, MBF failed to increase significantly at BL (19±19%, NS) with CPT despite a normal RPP increase (35±21%; NS vs normals). The RPP response to CPT did not change after 3 months of ROS (42±26%), while, importantly, MBF now increased significantly (36±28%) and in proportion to RPP, which no longer differed from normals. CPT significantly raised MBF from BL to ROS (0.8±0.24 to 1.0±0.24 mL/min/g; p<0.001, vs 0.9±0.20 in normals, NS). Coronary resistances (mean blood pressure MBF) declined from BL to ROS at rest (102±24 vs. 95±26; p<0.05) and during CPT (120±8 vs. 99±31; p<0.01), but did not change during DIP (36±2 vs. 41±18). In conclusion, PEP measures confirm the presence of endothelial dysfunction in IR and indicate that thiazolidinediones sensitize restore endothelial function.

Which Echo/Doppler Index is Most Predictive of Adverse Outcome in Patients With Severe Heart Failure Referred for Transplantation?


BACKGROUND: Although it is critical to identify severe heart failure (HF) patients who are at the highest risk for poor outcomes awaiting transplant (TX), this remains unclear. The objective was to test the prognostic value of a multitude of echo/Doppler variables to predict event-free survival in this specific group of patients. METHODS: Eighty-five patients with NYHA class III-IV HF and EF<35% referred for TX were studied by quantitative 2D/Doppler echo. End-diastolic dimensions, biplane aortic jet (EF) using Simpson's rule, tricuspid valve descent, mitral E wave deceleration time, degree of mitral regurgitation (semi-quantitative color Doppler), and Tel index (Sovocord contraction time+isovolumic relaxation time/ejection time) were recorded. Patients were followed for end points of death or left ventricular assist device (LVAD). Patients with TX had follow up truncated at that time. RESULTS: Mean follow-up was 14.8 months. Twelve patients (14%) died before 21/12 received LVAD. 12 (14%) received TX. Of all the above 2-D echo/Doppler parameters, only biplane EF with a cutoff of 20% was significantly predictive of event-free survival (p<0.01). No other previously reported echo/Doppler index was predictive of outcome. CONCLUSION: Echocardiographic EF remains the singular most important predictor of death or LVAD placement in patients with severe HF referred for TX. No other resting echo/Doppler measure was prognostically significant in this high risk subset of HF patients.