energy transaction. The increased hemodynamic burden seen in DM individuals might partly explain increased predisposition to ischemia and left ventricular mechanical dysfunction seen in diabetic individuals.

HIH 80+4 mmHg LVM 70+5 g/m² Work (mmHg·L/min) 35+14 MVQO₂ (µmol/O₂/min) Efficiency 0.6+0.1

DM 70±2 73±2 140±1 0.0±0.5 20.0±1.6

Norm 69±2 114±3 146±7 505±18 4.8±0.2 22.7±1.5

*p<0.05 All values are mean ± standard error

1093-41 The Right to Left Ventricular Glucose Uptake Ratio Predicts Left Ventricular Function Recovery After Revascularization in Heart Failure

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Background: Imaging modalities such as dobutamine-echocardiography, magnetic resonance imaging and PET have been able to predict functional recovery of the dysfunctional segments in patients with left ventricular (LV) dysfunction undergoing revascularization. However, the data on prediction of recovery of global LV function is rather limited.

Right ventricular (RV) function carries prognostic value in patients with heart failure (HF). RV metabolism maybe altered in HF but this has not been well studied. The relationship of RV to LV metabolism may also have prognostic value in predicting LV post-operative recovery of LV function type. [18F]FDG PET imaging allows assessment of glucose utilization in both LV and RV.

Subjects and methods: RV and LV glucose utilization was assessed in 17 patients (60±10 yrs, male/female 14/3) with coronary artery disease and HF (LV ejection fraction (LVEF) 25±7 %, NYHA Class 2.6±1.1) using the dynamic [18F]FDG PET imaging. In each patient, regions of interest were applied to the whole LV myocardium and the RV free wall in a representative midventricular short axis slice. Patlak analysis was applied to the dynamic data to determine the rate glucose uptake (Patlak slope). LV function was compared to cardiac PET. 11 out of 30 patients had exercise induced chest pain and 9 of them had viability on PET. 19 out of 30 patients did not have chest pain and 11 of them did not have viability on PET. Of the 13 patients who did not have exercise induced ST-segment elevation by cardiac PET, 9 had ST-segment elevation in inferior leads, and 9 had ST-segment elevation in both anterior and inferior leads. All patients had significant viability in the regions of ST-segment elevation by cardiac PET. Of the 13 patients who did not have exercise induced ST-segment elevation only 3 had significant viability by cardiac PET. p<0.0001. Exercise induced ST-segment elevation had a sensitivity of 85% and specificity of 100% as compared to cardiac PET. 11 out of 30 patients had exercise induced chest pain and 9 of them had viability on PET. 19 out of 30 patients did not have chest pain and 11 of them did not have viability on PET (sensitivity 45%, specificity 80%). Conclusion: Exercise induced ST-segment elevation in pathologic Q-wave leads is indicative of viable myocardium in that region. Patients who have exercise induced ST-segment elevation or chest pain should undergo cardiac PET to confirm viability.

1093-44 Improvement in Regional and Global Myocardial Oxygen Consumption in Resynchronization Therapy: A C-11-Acetate Positron Emission Tomography Study

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Background: The effects of cardiac resynchronization therapy (CRT) on myocardial oxygen consumption (MVO₂) have not been clarified.

Methods: 37 patients (11 female, age 63±7 yrs, EF 22.9±6.7%, NYHA III, QRS 166±20 ms) with severe heart failure (9±CAD, 26±DCM) were investigated before and 3 months after biventricular PM implantation by dynamic C-11-acetate PET. In a 1-compartment model acetate clearance determined for 20 myocardial segments. The global clearance was multiplied by the quotient of the individual rate-pressure product (RPP) and the median of RPP at baseline representing an index of pressure-related MVO₂.

Results: After CRT the normalized acetate clearance significantly decreased in patients with DCM in contrast to a slight increase in those with CAD. RPP increased from 7481 mmHg/min/1000g to 8272 mmHg/min/1000g after 3 months. Regional wall analysis in DCM and CAD prior to implantation showed a ratio of MVO₂ between septum and lateral wall of 0.63 and 0.89, and 3 months later of 1.0 and 1.02, respectively. Conclusion: In DCM pts CRT leads to a more economic myocardial performance. In CAD this effect cannot be shown. Independent of underlying diseases the regional dysbalance oxidative metabolism resulting from asynchronous contraction is corrected.

C-11-acetate clearance (min⁻¹)

before PM 0.08±0.02 after 3 months 0.07±0.02 p-value <0.0001

CAD 0.067±0.02 0.071±0.02 0.3

1093-45 Significance of ST-Segment Elevation and Chest Pain During Exercise Stress Testing for the Assessment of Myocardial Viability

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Background: Exercise induced ST-segment elevation in pathologic Q-wave leads has been traditionally associated with an aneurysm or peri-infarct ischemia. The relationship between ST-segment elevation and myocardial viability by positron emission tomography (PET) has not yet been studied. We evaluated post-infarct ST-segment elevation as detected by exercise electrocardiography (ECG) and compared results with PET imaging for detecting potentially viable myocardium in infarcted regions.

Methods: We evaluated 30 patients (24 male, 11 female) with evidence of Q-wave on 12-lead ECG. All patients underwent exercise treadmill ECG using the standard Bruce Protocol and had evidence of a fixed defect on exercise thallium-24 hour redistribution myocardial perfusion imaging. Subsequent to exercise ECG all patients underwent cardiac PET for assessment of myocardial viability. ST-segment elevation was defined as ≥1mm above baseline in two consecutive leads.

Results: Out of 30 total patients ranging in age from 42-86 (mean age 61±11 yrs) 17 patients had exercise induced ST-segment elevation in pathologic Q-wave leads and 13 patients did not. The mean ejection fraction was 31%±13. Of the 17 patients who had demonstrated exercise induced ST-segment elevation, 9 had ST-segment elevation in anterior leads, 3 had ST-elevation in inferior leads, and 5 had ST-elevation in both anterior and inferior leads. All patients had significant viability in the regions of ST-segment elevation by cardiac PET. Of the 13 patients who did not have exercise induced ST-segment elevation only 3 had significant viability by cardiac PET. p<0.0001. Exercise induced ST-segment elevation had a sensitivity of 85% and specificity of 100% as compared to cardiac PET. 11 out of 30 patients had exercise induced chest pain and 9 of them had viability on PET. 19 out of 30 patients did not have chest pain and 11 of them did not have viability on PET (sensitivity 45%, specificity 80%). Conclusion: Exercise induced ST-segment elevation in pathologic Q-wave leads is indicative of viable myocardium in that region. Patients who have exercise induced ST-segment elevation or chest pain should undergo cardiac PET to confirm viability.

ORAL CONTRIBUTIONS

801F0 Featured Oral Session—Real-Time Three-Dimensional Echocardiography: Novel Approaches and Clinical Applications

Monday, March 31, 2003, 9:15 a.m.-10:30 a.m.
McCormick Place, Grand Ballroom S100 A

9:30 a.m.

801F0-2 Utility of Real-Time 3-D Transesophageal Echocardiography in the Evaluation of Mitral Valve Disease

Lisa Sugeng, Lynn Weinert, Yan Katsonis, Mejdy Jolly, Kirk T. Spencer, Joanne M. DeCaro, Georgianne Lammartin, James E. Bednarz, Karl Thiele, Roberto M. Lang, University of Chicago, Chicago, IL, Philips Medical Systems, Andover, MA

Three-dimensional echocardiographic is superior to 2D echo for the evaluation of mitral valve (MV) structure and function. However, routine transesophageal use of 3D is not performed due to the cumbersome nature of current platforms, prolonged data acquisition and off-line processing time. To avoid these limitations, we used a new transesophageal 3D matrix array probe (Phillips) that allows on-line 3D rendering, to determine whether this modality provides additional information to that of 2D in the assessment of MV disease. Methods: 50 patients (male/female 15/35, age 54±15) were studied. Real-time 3D volumetric imaging from a parasternal and apical windows. Conclusions: Dynamic 3D visualization of the MV apparatus in real-time with off-line processing time. To avoid these limitations, we used a new transesophageal 3D matrix array probe (Phillips) that allows on-line 3D rendering, to determine whether this modality provides additional information to that of 2D in the assessment of MV disease.