POSTER SESSION

1126  Heart Failure: Diagnostic Methods

Tuesday, March 09, 2004, 9:00 a.m.-11:00 a.m.  Morial Convention Center, Hall G  Presentation Hour: 10:00 a.m.-11:00 a.m.

1126-109  Impedance Cardiography in Heart Failure Patients in the Intensive Care Unit: Its Value in the Detection of Left Ventricular Systolic Dysfunction and Correlation With the Echocardiogram

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Background: Impedance cardiography (ICG) is a simple noninvasive method capable of determining multiple hemodynamic parameters, which include indices of systolic cardiac function. It has been utilized in the hemodynamic evaluation of patients with congestive heart failure. This study describes and differentiates the ICG findings of heart failure patients with normal and abnormal systolic function, and evaluates the ability of the ICG to detect systolic dysfunction in patients with heart failure, as well as its correlation with the echocardiogram.

Methodology: Sixty-seven consecutive adult patients with heart failure, and admitted to the intensive care unit were included. Impedance cardiography was done on admission, and a transthoracic echocardiogram was done within 24 hours. The population was grouped into two based on echocardiographic evaluation – (a) normal systolic function with normal ejection fraction, and (b) abnormal systolic function with ejection fraction <50%. ICG parameters of systolic function were then described in the two groups. ICG parameters of systolic function were then compared and correlated with the echocardiographic parameters of systolic function.

Results: Of the 67 patients, 30 had a low EF (<50%) and 37 had a normal EF as described by echocardiogram. For the group with a low EF, the ICG findings revealed a decreased acceleration index and velocity index. For the second group, ICG showed a normal acceleration index and velocity index. When compared with the standard echocardiogram, the ICG was 70% sensitive and 73% specific to detect systolic dysfunction. Correlation studies using the acceleration index against the presence of systolic dysfunction showed moderately high correlation at p<0.01.

Conclusion: Impedance cardiography is useful in the noninvasive hemodynamic assessment of heart failure patients. Patients with systolic dysfunction demonstrate a low acceleration index and a low velocity index by ICG, while those with normal systolic function show normal values in both parameters. The ICG correlates moderately with the echocardiogram in the detection of systolic dysfunction.

1128-110  Predicting Significant Coronary Artery Disease in Heart Failure Patients


Background: Current guidelines state that patients with low ejection fraction (EF) should be evaluated for coronary artery disease (CAD). The objective of the current study was to develop a model to assist clinicians in determining the likelihood of CAD prior to cardiac catheterization (cath).

Method: Subjects were identified from the Duke Databank for Cardiovascular Disease. Patients had cath between 1992 and 2000, that was preceded by echocardiography (echo) with an EF ≤45%. Patients were considered to have significant CAD if any epicardial vessel had ≥70% stenosis. A multivariable model of CAD was generated using stepwise logistic regression.

Results: 2241 patients meeting the criteria were identified. Of these patients, 1225 (57%) had +CAD; 964 (43%) had –CAD. The median age was 63 and the EF was 30%. SWMA was identified as a significant predictor of CAD (Table 1, listed in order of contribution to the model). The area under the ROC curve was 0.852.

Conclusion: By utilizing baseline demographic and clinical characteristics as well as echo-derived SWMA, we developed highly discriminatory diagnostic model for predicting CAD in heart failure patients. Given the high prevalence of +CAD (43% in this cohort), accurate baseline assessment of patients with LV dysfunction for CAD might avoid a significant amount of unnecessary testing.

Predictors of CAD in HF Patients

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Odds Ratio (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of MI</td>
<td>5.9 (4.5;7.6)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Age (every 10 yrs.)</td>
<td>1.6 (1;5.18)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Diabetes</td>
<td>2.3 (1.8;2.9)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Male</td>
<td>2.1 (1.7;2.7)</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>SWMA</td>
<td>2.1 (1.6;2.7)</td>
<td>&lt;.0001</td>
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</tbody>
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1126-111  The CenterSurface Method for Quantitative Evaluation of Cardiac Magnetic Resonance Regional Wall Thickening

Niral Bechor, Adam Brodsky, Charles J. Davidson, Daniel Lee, Edwin Wu, Edward Bolson, Robert O. Bowon, Florence Sheehan, Feinberg School of Medicine of Northwestern University, Chicago, IL, University of Washington, Seattle, WA

Background: The Centerline Method has been used for regional wall motion analysis of the LV. Whether these methods can be applied to quantify 3-D LV wall thickening of cardiac MR is unknown.

Methods: A computer algorithm based CenterSurface method was used to compare fractional thickening between MI induced percutaneously (n=19) by 90-minute proximal LCX balloon occlusion and control (n=3) in a pig model. CineMR was performed 8 weeks post MI. Regional wall thickening was measured orthogonal to the CenterSurface, a triangular surface constructed midway between the endo- and epicardium (Figure 1). For segmental analysis, a long axis was constructed from mid-point of mitral annulus to apex. Sixteen segments were created: 6 basal and 6 medial 60 degree segments, and 4 apical 90 degree segments. Mean segmental thickening=End systolic mean thickness – End diastolic mean thickness/End diastolic mean thickness. Weighted average, based on number of vertices per segment was calculated for infarct and noninfarct areas.

Results: Mean thickening in LCX area was 0.45±0.1 for control and 0.35±0.1 for MI; p=0.004. Mean thickening in non LCX area was 0.3±0.09 for control and 0.2±0.02 for MI; p=0.05. LVEF was 52% for control, 41% for MI; p=0.04.

Conclusions: The CenterSurface method can be used to quantify left ventricular function of cardiac MRI images. This technique can be used to evaluate regional wall thickening after myocardial infarction.

Figure 1. 3D CenterSurface rotated to...