matrix, which is regulated by matrix metalloproteinases (MMPs). However, changes in MMPs associated with AF have not been described previously.

Methods and Results: Left atrial myocardium was obtained from explanted hearts of 16 patients (pts) with heart failure (CHF) undergoing transplantation. A history of persistent AF was present in 6 pts and the remaining 10 pts served as non-AF controls. Plasma samples were obtained from 16 separate pts without CHF, including 6 undergoing cardioversion for persistent AF and 10 controls matched for age, gender, left ventricular size and function. Myocardial MMP-2 and -9 levels, two MMP species implicated in cardiac remodeling, were determined by zymography and plasma MMP-2 and -9 levels were measured using enzyme linked immunosorbant assays (Table, p<0.05 vs. non-AF). MMP-9 levels were increased in both the myocardium and the plasma in AF pts, whereas myocardial and plasma MMP-2 levels were similar between groups.

Conclusions: AF is associated with alterations in the myocardial and plasma levels of the same MMP species, despite evaluating 2 very different pt populations. These findings suggest that changes in plasma MMP levels may provide a biomarker to detect atrial structural changes associated with AF.

<table>
<thead>
<tr>
<th></th>
<th>Myocardium (IOD)</th>
<th>Plasma (ng/mL)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-AF</td>
<td>AF</td>
</tr>
<tr>
<td>MMP-2</td>
<td>68±24</td>
<td>83±11</td>
</tr>
<tr>
<td>MMP-9</td>
<td>29±12</td>
<td>51±22</td>
</tr>
</tbody>
</table>

T014-226 Measurement of Atrial Function Before and Immediately After Cardioversion for Atrial Fibrillation Using a Combined Transesophageal Probe for Cardioversion and Echocardiography

Marcoen F. Scholten, Luc J. Jordaens, Jos R. Roelaert, Paul A. Tunk, Izhak Kronzon, Erasmus Medical Center, Rotterdam, The Netherlands, New York University School of Medicine, New York, New York

Background: Early cardioversion (ECV) after exclusion of a clot by transesophageal echocardiography (TEE) is a proven strategy. Transesophageal cardioversion (TEC) has been studied previously and is safe and efficacious. Combining TEE and TEC has the potential benefit of single need for sedation and offers the opportunity to study left atrial (LA), transmural and LA appendage (LAA) flow during and immediately after ECV.

Methods: A custom-made combined TEC and TEE probe was used. After sedation with weight adjusted Dizapem TEE was done. Measurements of pulmonary vein (PV) flow, LAA emptying velocity and transmitral flow were done. Presence of clot or spontaneous echo contrast (smoke) was scored. After exclusion of clot TEC was done after weight adjusted Ethomidate and using a step up protocol 20-30-50 Joules biphasic shock. All echocardiographic measurements were repeated 1 and 5 minutes after ECV.

Results: 20 Patients were included in this study (6 female, mean age 63 y (37-80y), mean BSA 1.81 m2 (1.61-2.60m2). The duration of AF was unknown in most patients and in none clot was seen before TEC. Mean LA dimension 49.4 mm (SD 7.07). Sinus rhythm was achieved in 19/20 patients. Mean transmural peak E wave velocity decreased from 40.4 cm/s to 29.6 cm/s at 1 min. and to 27.6 cm/s at 5 min after TEC. In 3/20 patients smoke was present before TEC andSmoke appeared in 8/20 patients immediately after ECV

Conclusion: Combining TEE and TEC is efficacious and allows to study intra-atrial flow during and after ECV. Atrial stunning was obvious despite the use of very low energy. The appearance of smoke in a significant proportion of patients underlines the necessity of anticoagulation after cardioversion.

POSTER SESSION

1015 Electrocardiographic Insights Into Cardiovascular Disease

Sunday, March 07, 2004, 9:00 a.m.-11:00 a.m.
Morial Convention Center, Hall G
Presentation Hour: 10:00 a.m.-11:00 a.m.

T015-215 Improved Electrocardiographic Detection of Left Ventricular Hypertrophy in Women: Validation by Cardiovascular Magnetic Resonance

Michael L. Chuang, Yoram Ariel, Carol J. Salton, Kraig V. Kissinger, Patricia A. Arand, Lois A. Goepfert, Robert A. Warner, Warren J. Manning, Beth Israel Deaconess Medical Center, Boston, MA, Inovio Medical, Inc, Newberg, OR

Sensitivity of the ECG for left ventricular hypertrophy (LVH) is poor when compared to echocardiography, but echo accuracy is decreased with poor echo windows or distorted ventricular shape. To more accurately assess ECG performance, we compared the ECG to volumetric cardiovascular magnetic resonance (CMR) and investigated whether using multiple gender-specific ECG criteria improves LVH detection in women.

METHODS: 192 consecutive patients (70 women, 122 men, 50±15 years), underwent 12-lead ECG and contiguous multislice SSFP CMR (TR=3.2ms, TE=1.6ms, FA=60°, 1.92-mm×10mm voxels, 1.5-T Philips). Patients were classified as LVH+ or LVH- based on published CMR criteria (LV mass index >=74.7 g/m², men; >=95.0 g/m², men). Multiple ECG criteria for LVH were compared to CMR, including Sokolow-Lyon (SL); gender-specific Cornell Voltage (CV) and Cornell Product (CP); 3 commerical algorithms (C1, C2, C3); and an algorithm (Audicor) using multiple gender specific LVH criteria.

RESULTS: Prevalence of CMR LVH was 13% in women and 23% in men (p<NS). The Table shows ECG sensitivity, specificity and positive and negative predictive values (Sens, Spec, PPV, NPV) % by gender.

CONCLUSION: Commonly used ECG algorithms have high specificity regardless of gender but modest sensitivity for LVH in men and poor sensitivity in women. Use of multiple gender-specific ECG criteria (Audicor) for LVH improves sensitivity in women to a level comparable to that for men while maintaining high specificity and superior PPV and NPV.

<table>
<thead>
<tr>
<th></th>
<th>SL</th>
<th>CV</th>
<th>CP</th>
<th>C1</th>
<th>C2</th>
<th>C3</th>
<th>Audicor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women: Sens/Spec</td>
<td>91/5</td>
<td>11/90</td>
<td>10/100</td>
<td>11/95</td>
<td>9/5</td>
<td>2/92</td>
<td>44/92</td>
</tr>
<tr>
<td>Men: Sens/Spec</td>
<td>30/15</td>
<td>33/99</td>
<td>61/90</td>
<td>46/82</td>
<td>48/81</td>
<td>68/82</td>
<td>54/90</td>
</tr>
<tr>
<td>Women: PPV/NPV</td>
<td>25/88</td>
<td>14/87</td>
<td>100/88</td>
<td>25/88</td>
<td>0/87</td>
<td>29/89</td>
<td>44/92</td>
</tr>
<tr>
<td>Men: PPV/NPV</td>
<td>50/85</td>
<td>91/84</td>
<td>65/89</td>
<td>42/84</td>
<td>42/84</td>
<td>53/90</td>
<td>63/87</td>
</tr>
</tbody>
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T015-217 ST Depression Versus T Wave Amplitude on the Resting Electrocardiogram: Which Is the Better Predictor of Cardiovascular Mortality?

James Beckman, Takuya Yamazaki, Jonathan Myers, Sung Chun, Paul Wang, Victor Froelicher, Stanford University, Stanford, CA, VA Palo Alto Health Care System, Palo Alto, CA

Background: ST depression and T wave amplitude abnormalities are known to be independent predictors of cardiovascular death, but a direct comparison between them has not been described.

METHODS: Analyses were performed on the first electrocardiogram digitally recorded on 46,850 consecutive patients at the Palo Alto Veterans Affairs Medical Center since 1987. Females and patients with electrocardiograms exhibiting bundle branch block, left ventricular hypertrophy, electronic pacing, diagnostic Q waves, or Wolff-Parkinson-White syndrome were excluded, leaving 31,074 male patients for analysis (mean age 55 ± 14). There were 1,878 (6.0%) cardiovascular deaths (mean follow-up of 6 ± 4 years). Electrocardiograms were classified using Minnesota code according to degree of ST depression and T wave abnormality, and the nine possible combinations of ST segment and T wave abnormalities were recorded for analysis.

RESULTS: After adjusting for age and heart rate in a Cox regression model, the combination of major abnormalities in ST segments and T waves carried the greatest hazard (3.2 [CI 2.7-3.8]). Minor ST depression combined with more severe T wave abnormalities carried a hazard of 3.1 (CI 2.5-3.7), whereas minor T wave abnormalities combined with more severe ST depression carried a hazard of only 1.9 (CI 1.6-2.3).

CONCLUSION: While both ST segment depression and abnormal T wave amplitude are clinically important, T wave abnormalities appear to be more highly associated with cardiovascular mortality.

T015-217 Holter-Based Risk Stratifiers May Increase Cost-Effectiveness of Defibrillator Therapy in MADIT II-Like Patients

Dan Wichterle, Jan Simek, John Camm, Marek Malik, General University Hospital, Prague, Czech Republic, St. George's Hospital Medical School, London, United Kingdom

Background: Both prevalent low-frequency oscillation of heart rate (PLF) and turbulence slope (TS) are powerful postinfarction risk stratifiers. We investigated the predictive power of their combination in the subgroup of placebo arm of EMIAT trial defined by LVEF ≤ 30%.

METHODS: PLF and TS were calculated by standard methods. Cut-off values of PLF ≥ 0.1 Hz and TS ≥ 2.5 ms/RR were used as previously established. Two composite risk strati-