add incremental prognostic information over MPS in the prediction of both overall mortal-
ity and CD, and are predictors of NCD as well. SSS was the most powerful predictor of
CD, but was not a predictor of NCD.

<table>
<thead>
<tr>
<th>Predictor</th>
<th>All-Cause Mortality</th>
<th>Cardiac Death</th>
<th>Noncardiac Death</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>55.4</td>
<td>14.5</td>
<td>46.0</td>
</tr>
<tr>
<td>SSS</td>
<td>50.2</td>
<td>71.4</td>
<td>ns</td>
</tr>
<tr>
<td>Exercise capacity</td>
<td>26.2</td>
<td>33.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Low %HR-res</td>
<td>19.7</td>
<td>7.2</td>
<td>16.2</td>
</tr>
<tr>
<td>Abnormal HR-Rec</td>
<td>16.6</td>
<td>12.7</td>
<td>8.0</td>
</tr>
<tr>
<td>Resting HR</td>
<td>14.8</td>
<td>ns</td>
<td>13.0</td>
</tr>
<tr>
<td>Abnormal resting ECG</td>
<td>11.8</td>
<td>11.8</td>
<td>ns</td>
</tr>
<tr>
<td>Gender</td>
<td>ns</td>
<td>7.6</td>
<td>7.6</td>
</tr>
</tbody>
</table>

9:15 a.m.

876-4  Physical Inactivity and Increased Thrombotic Risk: The Framingham Heart Study

Geoffrey H. Toller, Joseph Massaro, Patrice Sutherland, Izabela Lipinska, Murray A.
Mittleman, James E. Muller, Daniel A. Levy, Ralph B. D’Agostino, Royal North Shore
Hospital, Sydney, Australia, Framingham Heart Study, Framingham, MA

Background: The link between physical inactivity and cardiovascular disease (CVD) is increasingly recognised, yet society is becoming more sedentary. To investigate the mechanism by which inactivity increases CVD, we studied the relationship between phys-
ical activity and hemostatic risk markers in the Framingham Offspring Cohort.

Methods: We studied 3133 subjects (mean age 54 years, 55% female) who participated in cycle 5. Fibrinogen was measured using the Clauss method, while tissue plasminogen activator (TPA) antigen, plasminogen activator inhibitor (PAI-1), von Willebrand factor (VWF) and factor VII antigen were ELISA. Plasma viscosity was measured using the Brookfield Viscometer. Physical activity level was divided into quartiles. Mean values adjusted for age are displayed for quartiles 1 (least active) and 4 (most active). P-values
adjusted for age are displayed for quartiles 1 (least active) and 4 (most active). P-values
for Q4 vs Q1 were obtained adjusted first for age (1) and then additionally for body mass
index, systolic blood pressure, diabetes, smoking, total cholesterol and HDL (2).

Results: The inactive group (Quartile 1) had higher levels of prothrombotic factors (fibrin-
gen, PAI-1, TPA antigen and factor VII) with the exception of plasma viscosity in men.

Conclusion: A prothrombotic state may be a mechanism by which a sedentary lifestyle
elevates CVD risk. Regular physical activity provides a ready way to lower CVD risk, in
part through a reduced thrombotic potential.

Physical Activity and Thrombotic State

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Men (Inactive)</th>
<th>Women (Inactive)</th>
<th>p-value (1)</th>
<th>Men (Active)</th>
<th>Women (Active)</th>
<th>p-value (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fibrinogen</td>
<td>305</td>
<td>298</td>
<td>0.19</td>
<td>254</td>
<td>247</td>
<td>0.02</td>
</tr>
<tr>
<td>Log PAI-1</td>
<td>3.09</td>
<td>3.09</td>
<td>0.002</td>
<td>2.77</td>
<td>2.83</td>
<td>0.09</td>
</tr>
<tr>
<td>Log TPA</td>
<td>2.29</td>
<td>2.20</td>
<td>0.003</td>
<td>2.03</td>
<td>2.05</td>
<td>0.09</td>
</tr>
<tr>
<td>Factor VII (%)</td>
<td>98</td>
<td>99</td>
<td>0.002</td>
<td>104</td>
<td>102</td>
<td>0.04</td>
</tr>
<tr>
<td>VWF (%)</td>
<td>127</td>
<td>127</td>
<td>0.70</td>
<td>126</td>
<td>126</td>
<td>0.82</td>
</tr>
<tr>
<td>Pl viscosity</td>
<td>1.23</td>
<td>1.23</td>
<td>0.002</td>
<td>1.25</td>
<td>1.25</td>
<td>0.46</td>
</tr>
</tbody>
</table>

9:30 a.m.

876-5  Submaximal Effort Tolerance After Cardiac Rehabilitation Is a Strong and Age-Independent Predictor of All-Cause Mortality

Paul Feuerstadt, Andrew Chai, Paul Kligfield, Cardiac Health Center, New York-
Presbyterian Hospital, New York, NY, Weill Medical College of Cornell University, New
York, NY

Background: Peak effort capacity during maximal exercise testing and distance achieved
during timed walking are strong predictors of survival in patients with heart dis-
ease, but the risk stratification role of submaximal treadmill tolerance during routine ex-
cise training is less clear.

Methods: We examined the relationship of submaximal treadmill effort capacity (guided by heart rate and perceived exertion) to all-cause mortality in 380 patients with varied manifestations of predominantly ischemic heart disease referred to a 12 week program of exercise training and cardiac rehabilitation. There were 237 men and 107 women, whose mean age was 65 ± 12 years; there were 66 patients with diabetes and 100 patients who were obese, including 28 patients who were both diabetic and obese.

Results: Mean submaximal effort tolerance decreased from treadmill performance during training was 3.8 ± 1.4 METs at program entry and 6.9 ± 2.2 METs at exit. There were 18 deaths during a mean follow-up period of 3.1 ± 1.5 years. By univariate Cox proportional

hazard model, individual predictors of survival were submaximal effort level at entry (chi
square 8.7, p=0.005) and at exit (chi square 13.6, p=0.001), the change in submaximal
MET capacity during training (chi square 12.3, p<0.001), and age (chi square 6.5, p=0.02). There was no significant univariate predictor effect for sex, diabetes, or obesity.

By multiple stepwise conditional Cox regression incorporating all variables, only exit sub-
maximal effort tolerance was a significant predictor of all-cause mortality. In this model, each 1 MET decrease in exit submaximal effort tolerance was associated with a 42%
increase in mortality (hazard ratio 0.58 (95% confidence interval 0.44-0.78, chi square 13.6, p<0.001)). Exit submaximal MET level was inversely correlated with age (r = -0.505, p<0.001). After adjustment for age, the hazard ratio of exit submaximal MET level for mortality was 0.61 (95% confidence interval 0.45-0.83, p<0.005).

Conclusion: Submaximal effort tolerance at completion of cardiac rehabilitation is a strong and age-independent predictor of mortality.

9:45 a.m.

876-6  Exercise Training Meta-Analysis of Trials in Chronic Heart Failure Patients (ExTraMATCH)

Massimo F. Piegari, Darrel P. Francis, Costas Davos, Andrew JS Coats, Imperial College
School of Medicine, London, United Kingdom

Background. To determine the effect of exercise training on survival in patients with heart
failure and left ventricular systolic dysfunction

Methods. Randomised parallel-group controlled trials of exercise training, of > 8 weeks
duration, for which original individual patient follow-up survival data available for >3
months were included. 9 data-sets satisfying the entry criteria were identified, including
801 patients: 395 assigned to training and 406 controls.

Results. During follow up of 706-729 days there were 88 deaths in the exercise and 105
in the control arm. At two years, Kaplan-Meier mortality was 20.7% (95% confidence
interval [CI] 15.4%-25.8%) in the exercise arm versus 26.5% (CI 20.7%-31.8%) in the
control arm. Exercise training significantly reduced mortality, with hazard ratio 0.65 (CI
0.46-0.92, logrank chi-sq<0.015). The secondary endpoint of death or hospitalisation
was also reduced: two year event rate was 34.0% (CI 26.4%-41.9%) in the exercise arm
versus 42.3% (CI 35.5%-48.2%) in the control arm (hazard ratio 0.72, CI 0.56-0.93, logrank
chi-sq<0.011). No significant subgroup-specific treatment effect.

Conclusion. Properly supervised medical training programmes might reduce mortality
risk in heart failure.

Morial Convention Center, Room 222

Wednesday, March 10, 2004, 10:30 a.m.-Noon

ORAL CONTRIBUTIONS

885  Cardiovascular Disease in the Elderly: Prognosis

Mikhail Kosiborod, Judith H. Lichtman, Yun Wang, Lawrence M. Brass, Harlan M.
Krumholz, Yale University School of Medicine, New Haven, CT, Yale New Haven Hospital,
New Haven, CT

Background. Prior studies that evaluated trends in incidence and prognosis of patients
with heart failure (HF) were limited by size and geographic constraints. We sought to
evaluate these trends in a large nationally representative sample of pts hospitalized with
HF.

Methods: We analyzed a sample of Medicare pts directly admitted to acute care hospi-
tals with principal diagnosis of HF between 1992-99. Fee-for-service beneficiaries >65
years with their first HF admission, and continuous benefits for >12 months were
included (n=3,957,520). Logistic regression analysis was used to compare HF incidence,
and continuous benefits for >12 months were

Results. The mean age slightly increased (range 1992-99: 79.26 – 79.66 years), as did
the proportion of female (57.4 - 58.9%) and non-white pts (14.1 - 15.6%), and those with

10:30 a.m.

885-1  National Mortality Trends in Elderly Patients

Hospitalized With Heart Failure Between 1992 and 1999

Mikhail Kosiborod, Judith H. Lichtman, Yun Wang, Lawrence M. Brass, Harlan M.
Krumholz, Yale University School of Medicine, New Haven, CT, Yale New Haven Hospital,
New Haven, CT

Background: Prior studies that evaluated trends in incidence and prognosis of patients
(pts) with heart failure (HF) were limited by size and geographic constraints. We sought to
evaluate these trends in a large nationally representative sample of pts hospitalized with
HF.

Methods: We analyzed a sample of Medicare pts directly admitted to acute care hospi-
tals with principal diagnosis of HF between 1992-99. Fee-for-service beneficiaries >65
years with their first HF admission, and continuous benefits for >12 months were
included (n=3,957,520). Logistic regression analysis was used to compare HF incidence,
and continuous benefits for >12 months were

Results. The mean age slightly increased (range 1992-99: 79.26 – 79.66 years), as did
the proportion of female (57.4 - 58.9%) and non-white pts (14.1 - 15.6%), and those with