

**Results.** All delays significantly decreased under biV pacing (table). Dyssynchrony was defined as a delay > 40 ms. Before Biv, 26 (74%) pts had both D and S DYS, 1 (3%) had S DYS alone, and 6 (17%) had D DYS alone. Overall, S and D DYS were observed in 27 (77%) and 32 (91%) pts, respectively at baseline, but only in 6 (19%) and 24 (69%) of pts under Biv. However, 4 new S and 7 new D DYS appeared after BiV pacing.

**Conclusion.** Diastolic DYS is more frequent than systolic, and may be observed alone in some pts. D DYS is less improved than S DYS by Biv pacing. Persistent D DYS may explain some cases of lack of improvement after biV pacing despite good systolic resynchronization.

	QRS width	S Inter	S Intra	D Inter	D Intra
basal	166 ±24	55 ±35	44 ±31	51 ±44	42 ±42
biV pacing	113 ±20	6 ±13	16 ±29	34 ±32	32 ±43
p	< .0001	< .0001	0.003	0,04	ns

9:45 a.m.

**872-6 Atrial Pacing May Negate the Benefits of Resynchronization**

**Seth J. Worley,** Douglas C. Gohn, Joann L. Tuzi, Lancaster Heart Foundation, Lancaster, PA, Lancaster General Heart Institute, Lancaster, PA

**Background:** Cardiac resynchronization therapy (CRT) was proven beneficial in the VDD mode, however since FDA approval most patients are programmed DDD/DDDR where single site right atrial pacing (SSRAP) dominates. The impact of SSRAP on the delivery of CRT is not known and may have untoward effects similar to those of single site RV pacing reported in the DAVID trial. The purpose of this study was to evaluate the effect of SSRAP on atrial depolarization in patients receiving a CRT device.

**Methods:** At the time of implant 34 patients had bipolar electrograms recorded simultaneously from the RA pacing lead and a mid CS catheter during sinus rhythm and SSRAP. The RA-LA activation time was measured from the onset of RA activation or pacer spike to the end of LA activation in the mid CS.

**Results:** The mean sinus RA-LA activation time was 147.7ms compared to 204.1ms with SSRAP. The paced RA-LA activation time was > 190ms in 55.9% and >200ms in 41.2%. The difference between sinus and paced RA-LA activation time varied unpredictably from -20 to 192ms.

**Conclusion:** SSRAP has a profound and unpredictable impact on the duration of atrial depolarization, which has important implications for programming CRT devices. Although paced RA-LA activation time is much longer than sinus, the sinus activation time does not reliably predict the paced activation time. If nominal paced AV delay settings are used the majority of pts will have LA contraction occur during LV contraction, producing pacemaker syndrome. It may not be possible to program the paced AV delay to allow both complete LA depolarization and LV pacing in cases where the RA-LA activation time exceeds 190 ms. In these cases alternative approaches to atrial pacing for CRT are needed.

ORAL CONTRIBUTIONS

**876 Exercise Physiology and Risk Scores: Prognosis**

Wednesday, March 10, 2004, 8:30 a.m.-10:00 a.m.  
Morial Convention Center, Room 257

8:30 a.m.

**876-1 The Duke Treadmill Score and Cardiac Mortality in Asymptomatic Women: The St James Women Take Heart Project**

**Martha Gulati,** Dilip K. Pandey, Morton F. Arnsdorf, Diane S. Lauderdale, Roxanne H. Wicklund, Arfan J. Al-Hani, Henry R. Black, Rush University Medical Center, Chicago, IL

**Background:** Cardiovascular disease is the leading cause of death among women, accounting for over half of their mortality. However, women have been underrepresented in most studies of cardiovascular disease. Virtually no information is available concerning the predictive value of exercise testing in asymptomatic women. The hypothesis that a reduced Duke Treadmill Score (DTS) is associated with an increased risk of cardiac mortality in women was investigated in a cohort of 5721 asymptomatic women who underwent stress testing in 1992. **Methods:** A symptom-limited stress ECG using Bruce Protocol was performed at baseline. The DTS was calculated as: Exercise time on the Bruce Treadmill protocol in minutes-(5X maximal ST-depression)- (4XAngina Score Index). The cohort was divided into 2 groups: low risk (DTS≥5) or moderate-to-high risk (DTS<5). A National Death Index Search was performed in 2001 to identify all deaths up to the end of year 2000. Cardiac deaths were identified by ICD-9 codes 390-449 or ICD-10 codes I00-I09,I11,I13,I20-I51,I60-I70, as appropriate. Survival analysis was performed using Cox proportional-hazards regression models.

**Results:** The unadjusted risk of death decreased by 15% for each unit increment in the DTS (p<0.001). After adjusting for the Framingham Risk Score (FRS), the risk of death decreased by 9% for each unit increase in the DTS (p<0.001). Those in the lowest risk DTS category had a 54% reduction in mortality compared to the moderate-to-high risk DTS, after adjusting for the FRS (p<0.001). The risk of cardiovascular death decreased

by 13% for each unit increase in DTS, after adjusting for the FRS (P=0.003). Those with the lowest risk DTS category had a 60% reduction in mortality compared to the moderate-to-high risk DTS, after adjusting for the FRS (p<0.001).

**Conclusion:** This study has demonstrated that the DTS is an independent predictor of mortality and cardiovascular mortality in asymptomatic women, even after adjusting for traditional risk factors. The DTS is a valid tool for use in asymptomatic women.

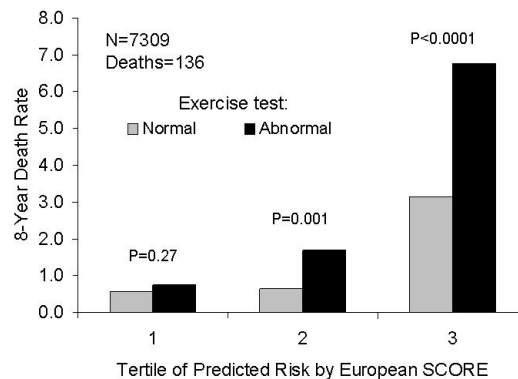
8:45 a.m.

**876-2 Global Risk Score and Exercise Testing for Predicting All-Cause Death in a Preventive Medicine Program**

**Mehmet K. Aktas,** Volkan Ozduran, Claire E. Pothier, Michael S. Lauer, Cleveland Clinic Foundation, Cleveland, OH

**Background:** The usefulness of exercise testing in asymptomatic subjects is unclear. **Methods:** We followed for a mean of 8 years 7309 asymptomatic adults (age 50±8, 84% male) who underwent routine screening exercise testing as part of a preventive medicine program. Global risk for death was assessed based on the European Systematic Coronary Risk Evaluation (SCORE). Exercise test abnormalities included impaired physical fitness, abnormal heart rate recovery, chronotropic incompetence, and ST-segment abnormalities.

**Results:** There were 136 deaths. The 8-year predicted death risk based on the SCORE was 1.81% while the actual death risk was 1.86%. In a multivariable model, independent predictors of death were a higher SCORE (for 10% predicted increased risk, RR 1.13, 95% CI 1.11-1.15, P=0.0001), impaired functional capacity (RR 1.98, 95% CI 1.23-3.20, P=0.005), and an abnormal heart rate recovery (RR 1.99, 95% 1.32-2.99, P=0.001). ST-segment changes did not predict risk of death. There were 1173 (16%) subjects who had either impaired fitness or an abnormal heart rate recovery. The Figure shows risk of death according to tertile of SCORE and exercise test findings. In the highest tertile of SCORE, an abnormal exercise test identified a risk of death close to 1% per year.



**Conclusion:** Exercise testing when combined with a global risk score may be useful for stratifying risk in asymptomatic subjects in a preventive medicine program, particularly when focusing on exercise capacity and heart rate recovery.

9:00 a.m.

**876-3 The Prognostic Value of Percent Heart Rate Reserve, Heart Rate Recovery, and Exercise Capacity Over Myocardial Perfusion SPECT in the Prediction of Cardiac, Noncardiac, and All-Cause Mortality**

**Babak Azarbal,** Sean W. Hayes, Rory Hachamovitch, John D. Friedman, Ishac Cohen, Daniel S. Berman, Cedars-Sinai Medical Center, Los Angeles, CA, University of California, Los Angeles, Los Angeles, CA

**Background:** While low percent heart rate reserve (%HR-Res), abnormal heart rate recovery (HR-Rec), poor exercise capacity, and abnormal myocardial perfusion SPECT (MPS) have separately been shown to be predictors of all-cause mortality and cardiac death (CD), the relative contribution of these exercise variables to each end point has never been examined together in a single population.

**Methods:** 11,465 consecutive pts with no valvular disease and not on β-blockers underwent symptom-limited exercise MPS; 815 pts were censored for early revascularization (<60 days). %HR-Res = [(peak HR - rest HR)/(220-age-rest HR)] x100, with %HR-Res <80% defined as low. HR-Rec = [peak HR - recovery HR]. HR-Rec ≤ 22 bpm at 2 min post peak exercise was considered abnormal. Exercise capacity ≤ 7 MET was considered poor. Summed stress perfusion scores (SSS) were calculated using a 20-segment model, 5-point scoring scale, as previously described. Analysis was performed using survival modeling.

**Results:** Of 10,216 pts, there were 339 deaths (133 CD/209 noncardiac deaths (NCD)). Mean follow-up was 789 ± 412 days (96% complete). The predictors of all-cause mortality, CD, and NCD from multivariable analysis are shown in the table.

**Conclusion:** Exercise capacity, %HR-Res, and HR-Rec are exercise variables which