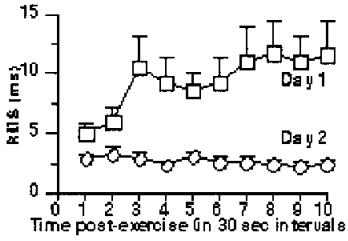
mean square residual (RMS) from the linear regression analysis; RMS quantifies the deviation of the RR interval from a pure linear change over the 30 sec period. PE was defined as the difference in the 30 sec average RR intervals without (day 1) and with (day 2) atropine. Results: RMS dramatically increases after 1 minute of recovery. P blockade attenuates the increase in RMS. Day 2 RMS was less than day 1 RMS for all time periods ($p<0.03$). There was a correlation between day 1 RMS and PE ($R2 = 0.63$, $p< 0.0001$) Conclusion: RMS is a new measure of HRV that is related to recovery of PE after Ex. RMS may help differentiate whether the recently demonstrated prognostic significance of HR recovery after Ex testing is due to P recovery or sympathetic withdrawal, both of which decrease HR. If P recovery is more important, RMS may provide better risk stratification than HR recovery.



1116-118 **Effects of Nesiritide and Dobutamine on Heart Rate Variability in Patients With Decompensated Heart Failure**

Doron Aronson, Darlene P. Horton, Andrew J. Burger, *Rambam Medical Center, Haifa, Israel, Beth Israel Deaconess Medical Center, Boston, Massachusetts.*

INTRODUCTION: Congestive heart failure (CHF) is characterized by sympathetic overactivity and parasympathetic withdrawal. Clinical trials in patients (pts) with decompensated CHF have shown that nesiritide (brain natriuretic peptide) is associated with beneficial hemodynamic effects and symptomatic improvement. Recent studies suggest that nesiritide exerts a favorable effect on autonomic dysfunction in CHF. We compared the effect of nesiritide and dobutamine (Dob) on heart rate variability (HRV) in decompensated CHF.

METHODS: We studied 185 pts admitted for decompensated CHF requiring intravenous vasoactive therapy. Baseline 24-h Holters were obtained prior to initiation of the study drugs (nesiritide or Dob) and continued for an additional 24-h after initiation of therapy. The study population was divided into 2 groups: highly depressed HRV (SDNN < 50 ms) and moderately depressed HRV (SDNN = 50-100 ms). HRV time domain indices were compared from baseline and treatment Holter recordings.

RESULTS: In the Dob group, pts with moderately depressed HRV at baseline (n = 20) displayed a reduction in indices of total variability such as SDNN (82 ± 4 to 71 ± 4 ms, p = 0.01) and SDANN5 (69 ± 3 to 60 ± 4 ms, p = 0.01). Indices of parasympathetic modulation, pNN50 (7.2 ± 1.5 to 6.6 ± 1.7 %, p = 0.04) and RMSSD (29 ± 4 to 27 ± 4 ms, p = 0.05), also decreased. With severely depressed HRV (n = 38), no significant changes occurred with Dob in indices of overall HRV or parasympathetic modulation. However, in the nesiritide group, pts with severely depressed HRV (n = 75) displayed a significant increase in SDNN (35 ± 1 to 40 ± 2 ms, p = 0.002), SDANN5 (30 ± 1 to 34 ± 1 ms, p = 0.02), and RMSSD (13 ± 1 to 15 ± 3 ms, p = 0.01). No significant changes occurred in HRV indices with moderately depressed HRV at baseline (n = 53).

CONCLUSION: In pts with relatively preserved HRV, Dob reduces overall variability and parasympathetic modulation. With severely depressed HRV, the effect of Dob on HRV is minor, presumably due to β-adrenergic receptor down-regulation or saturation. In contrast, nesiritide improves indices of overall HRV and parasympathetic modulation in pts with severely depressed HRV and has no adverse effect on pts with relatively preserved HRV.

1116-119 **Altered Fractal Behavior and Heart Rate Variability in Daily Life in Neurally Mediated Syncope**

Bonpei Takase, Haruhiko Hosaka, Yoshihiro Matsushima, Takashi Akima, Syuuichi Katsushika, Toshihiko Nishioka, Fumitaka Ohsuzu, Akira Kurita, *National Defense Medical College, Tokorozawa, Japan, Self Defense Forces Central Hospital, Tokyo, Japan.*

Background: The fractal dimension is an index to the complexity of cardiovascular control system and autonomic function is important in the pathogenesis of neurally mediated syncope (NMS). However, it is still not fully understood if the derangement of the autonomic nervous system exists in NMS in daily life. **Methods:** Thus, we performed 24-hour ECG monitoring (AECG) and measured traditional heart rate variability indices (HRV) along with long fractal scaling exponent (b) in 36 pts (NMS, 24±3 y/o) with NMS diagnosed by head-up tilt testing (HUT, 80? tilt) and 11 age-matched normal controls (NL). AECG was performed within 48 hours before HUT procedure. For HRV, SDANN, SD, rMSSD, pNN50, low frequency (0.04-0.15Hz, LF) and high frequency (0.15-0.40 Hz, HF) were measured. All measurements were analyzed in three different periods such as total 24-hour, awake (09:00-15:00) and sleep (00:00-06:00) phases. The ratio of each measurements in awake over sleep phase (A/S ratio) was also calculated. **Results:** Several 24-hour HRV showed significantly higher values in NMS than those in NL (SD, 91±32 vs 65±11 ms; rMSSD, 60±31 vs 38±11 ms; pNN50, 30±17 vs 14±7%; LF, 35±15 vs 26±5 ms; HF, 27±11 vs 14±7 ms: $p<0.05$) while 24-hour b was not different (0.95±0.13 vs 0.95±0.14). In contrast, although A/S ratio of any HRV showed no differences, A/S ratio of b revealed significantly higher value in NMS than in NL (1.7±0.49 vs 1.2±0.15, $p<0.05$). The awake and sleep values of b in NMS were also significantly different from those in NL. **Conclusion;** Overall autonomic activity in daily life is exaggerated in NMS. Since in most of the time pts are upright during awake and are supine during sleep phase, the significant differences between awake and sleep values of b, and abnormal A/S ratio of b suggest that deteriorated fractal behavior exits in NMS. These findings may be associated with the mechanisms of orthostatic intolerance in NMS.

1116-120 **Right Atrial Size May Be a Primary Determinant of Atrial Conduction Time of the Sinus Node Impulse**

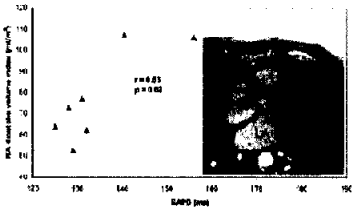
Susette K. Therkelsen, Bjoern A. Groenning, Ulrik Dixen, Gorm B. Jensen, *Department of Cardiology, Copenhagen University Hospital Hvidovre, Copenhagen, Denmark, Danish Research Center of Magnetic Resonance, Copenhagen University Hospital Hvidovre, Denmark.*

Background: Prolonged signal-averaged p-wave duration (SAPD) measured by a signal-averaged ECG is thought to represent a delay in the intra-atrial conduction of the electrical impulse. Prolonged SAPD is a prognostic marker of development of atrial fibrillation (AF). In addition, atrial dilatation in patients with previous AF has been associated with risk of relapse of AF. However, the relation between duration of atrial conduction of the electrical impulse and atrial dimensions is not clear. Our aim was to evaluate the correlation between atrial dimensions measured by magnetic resonance imaging (MRI) and the intra-atrial conduction time measured by SAPD.

Methods: In 7 subjects with no history of cardiac disease, we measured the total filtered SAPD. Atrial dimensions were evaluated by cinematographic breathhold MRI scans.

Results: Right atrial (RA) diastolic volume index (mean±SD=77±21ml/m^2; r=0.83, p=0.02), systolic volume index (49±17ml/m^2; r=0.76, p=0.05) and stroke volume index (29±6.7ml/m^2; r=0.77, p=0.04) were positively associated with SAPD (135±10.6ms). Left atrial (LA) diastolic (64±7.1ml/m^2) and systolic (39±7.3ml/m^2) volume indices and stroke volume index (24±1.0ml/m^2) were completely unrelated to SAPD. The combined RA and LA diastolic (141±21.6ml/m^2; r=0.80, p=0.03) and systolic (87.8±17.0ml/m^2; r=0.70, p=0.08) volume indices correlated positively with SAPD.

Conclusion: Our results suggest that RA size may be a primary determinant of atrial conduction time measured by SAPD.



ORAL CONTRIBUTIONS

826 External and Implantable Defibrillators: Clinical Studies

Monday, March 18, 2002, 2:00 p.m.-3:30 p.m.
Georgia World Congress Center, Room 254W

2:00 p.m.

826-1 **New Therapeutic Option for Patients With Time-Dependent Risk of Sudden Cardiac Arrest: Application of Novel Wearable Cardioverter-Defibrillator**

Arthur M. Feldman, Helmut Klein, Patrick Tchou, The WEARIT & BIROAD Investigators, *University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, Otto Von Guericke University, Magdeburg, Germany.*

Background: Outpatient populations with temporary risk for sudden cardiac arrest (SCA), such as patients awaiting cardiac transplant, post-myocardial infarction patients (p-MI) or post-CABG patients (p-CABG), often rely on emergency medical services (EMS) for defibrillation therapy. Success rates for EMS resuscitation are poor. A new therapeutic option, the completely automatic (no bystander intervention) wearable cardioverter-defibrillator (WD), may provide better protection for these populations.

Methods: A multicenter trial studied the use of WD (WCD® system, LIFECOR Inc., Pittsburgh). WD provides automatic detection and treatment of ventricular tachycardia and fibrillation (VT/VF) using unique non-stick ECG electrodes and self-gelling therapy electrodes. WEARIT sub-population: patients on the cardiac transplant list or equivalent in cardiac status. WEARIT subjects used WD until transplanted, hospitalized for transplant or circulatory assist device, or receiving an active ICD. BIROAD sub-population: patients not receiving an ICD who were p-MI or p-CABG and had either VT/VF within 48 hours, an ejection fraction < .30 or Killip class > II after 72 hours, or syncopal VT/VF after 48 hours. BIROAD used WD for ~4 months. The effectiveness objective was >25% resuscitation success with 90% confidence. The safety objective was <2.3% false shocks per patient-month with 90% confidence (500 patient-months minimum).

Results: There were 8 VT/VF SCA events in 6 patients (4 BIROAD, 2 WEARIT). 6 were successfully treated. 2 were unsuccessful with VT/VF detected but treatment prevented by incorrect patient assembly of WD (therapy electrode in pocket backward, gel released away from body). A redesign occurred to prevent this from reoccurring. 6 false shock episodes occurred in 873 patient-months. The most frequently reported adverse event (20) was temporary skin rash under electrodes. 285 patients were enrolled over 3 years. Daily