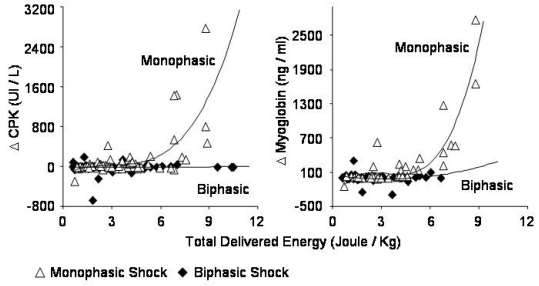
Determinants of muscular damage with external cardioversion of atrial fibrillation: Results of a randomized trial comparing biphasic

1147-211 **Determinants of Muscular Damage With External Cardioversion of Atrial Fibrillation: Results of a Randomized Trial Comparing Biphasic With Monophasic Shock**

Stefano Fumagalli, Lorenzo Boncinelli, Nadia Boni, Margherita Padeletti, Adriana Virgillo, Caterina Franceschini, Massimo Aglietti, Niccolò Marchionni, Institute of Gerontology, Florence, Italy

Background. We want to compare the effects on muscular damage of the monophasic shock (M) with that of the new biphasic one (B) in patients (pts) undergoing external cardioversion (ECV) of atrial fibrillation (AF).
Methods. All the pts admitted for ECV (n=171, age: 74±9, men: 68%) between 3/2001 and 6/2003 were randomized to B (Multipulse Biowave) or M. To stop AF, energy was delivered if necessary with stepwise increments until the highest value; in case of failure, pts crossed to ECV with the other waveform. Blood samples were collected to determine indexes of muscular damage.
Results. After randomization, 90 pts were assigned to B and 81 to M. No differences existed between the two waveforms in efficacy (B: 88 vs M: 90%, p=.813). The energy delivered with the effective shock was lower with B (127±41 vs 229±99 J, p=.001), such as the total amount of delivered energy by weight (3±2 vs 4±3 J/Kg, p=.026). After ECV, indexes of muscular damage were altered only in pts treated with M (CPK - M: +200±75 vs B: -21±11 UI/L, p=.002; Myoglobin - M: +239±85 vs B: -2±11 ng/ml, p=.001). Multivariate models showed that both the increases for CPK and Myoglobin were positively related not only to the total amount of energy delivered (p=.001 in both cases) but also to the use of M (p=.038 and p=.041, respectively). No associations were noted with cardiac and systemic diseases and with variables related to AF.
Conclusion. B has an efficacy comparable to M, but it is safer, because shocks need lower energy and so lower currents go through the patients.



1147-212 **Accuracy of Arrhythmia Discrimination Algorithms: First Results From a Prospective, Randomized Trial of Single Versus Dual Chamber Implantable Cardioverter Defibrillators (PINAPP)**

Dominic A. Theuns, Peter J. Klootwijk, Luc J. Jordaens, Erasmus MC, Rotterdam, The Netherlands

Background: Accurate discrimination between supraventricular tachycardias (SVT) and ventricular tachycardias (VT) is an important clinical issue. The addition of atrial information in dual chamber devices may theoretically improve the accuracy of arrhythmia discrimination. The superiority of enhanced discrimination algorithms in dual chamber ICDs has still not been proven.
Methods: PINAPP is a prospective, randomized trial designed to investigate the accuracy of single and dual chamber discrimination algorithms. All pts met Class I/II (AHA/ACC/ESC) for ICD implantation and had no indication for bradycardia pacing. Pts with permanent atrial fibrillation or an indication for resynchronization therapy were excluded. All patients (pts) received a dual chamber ICD (Prizm DR, Guidant; Tachos DR, Biotronik) and randomized to programmed single chamber detection (onset 16%, stability 40 ms) or dual chamber detection (onset 16%, stability 40 ms, Afib threshold 300 ms, V>A or SMART).
Results: 60 pts (47 male, 59 years, LVEF 30%, coronary artery disease 78%) were included, 29 pts single chamber and 31 pts dual chamber. 496 episodes (31 pts) were documented by stored electrograms. A total of 230 SVTs (65 AF; 10 AFl; 78 AT; 77 ST) and 266 VTs were analyzed. There was no significant difference in accuracy between single and dual chamber arrhythmia discrimination (83% vs 84%, P=NS). The majority of inappropriate detection was observed in antegradely 1:1 AV conducted SVTs (44/97 single vs 28/58 dual, P=NS). Dual chamber detection detected significantly more often AT as VT (14/42 single vs 21/22 dual, P = 0,05). There was no significant difference between single and dual chamber detection of AF.
Conclusion: The preliminary data of the PINAPP trial demonstrate no difference in accuracy in arrhythmia discrimination between single and dual chamber detection. SVTs with a stable ventricular response remain a problem for arrhythmia discrimination in both single and dual chamber ICDs. Detection enhancements in dual chamber devices can act as an accelerator for inappropriate therapy.

1147-213 **Underutilization of Implantable Cardioverter-Defibrillators in Survivors of Sudden Cardiac Death: Discrepancies by Sex, Race, and Hospital Size**

Andrew Voigt, Samir Saba, University of Pittsburgh, Pittsburgh, PA

Background: Sudden cardiac death (SCD) is a class I indication for implantable cardioverter-defibrillator (ICD) therapy. We analyzed the incidence of ICD implantation in survivors of SCD in the United States from 1996 through 2001.
Methods: We searched a representative sample of all hospital discharges for patients admitted with the primary diagnosis of ventricular fibrillation, ventricular flutter, or cardiac arrest who survived to hospital discharge. Patients with a concomitant diagnosis of acute myocardial infarction or prior ICD in situ were excluded.
Results: From 1996 to 2001, 113,262 patients were admitted for SCD. Of those, 63,745 (56.3%) did not survive to hospital discharge. Of the remaining 49,517 patients, 30.7% received an ICD prior to discharge, with a gradual increase in implantation rates from 1996 (23.6%) to 2001 (46.3%). Using logistic regression, patients who were discharged without an ICD were older (OR=1.15 for every 10 year increase in age, P<0.001), more likely to be women (OR=1.76, p<0.001) or of African American race (OR=17.14, p<0.001), and more likely to be admitted to a smaller hospital (OR=0.41 for each additional 100 beds, P<0.001).
Conclusions: Though increasing, rates of ICD implantations after SCD remain very low. There are gross discrepancies by race and gender in the utilization of the ICD. At a time when newer indications for ICD implantation are emerging, efforts should be focused on identifying the causes of this underutilization and discrepancies in survivors of SCD.

Hospital Size (# of beds)	6-99	100-199	200-299	300-499	500+
% of Patients Receiving ICD	0	14.2	30.8	49.2	56.2

1147-214 **Wide WRS Increases Risk From Right Ventricular Pacing**

John J. Hayes, John M. Herre, Beverly Firth, Anna O. Leonen, Alfred Hallstrom, The DAVID Trial Investigators, Marshfield Clinic, Marshfield, WI

Background: An increasing number of studies have shown adverse effects from the dyssynchrony associated with right ventricular (RV) pacing. The DAVID Trial found an increased risk of the combined endpoint of death and hospitalization for new or worsening CHF in ICD patients paced DDDR-70 bpm versus VVI-40 bpm. Patients in the DDDR arm were paced 59% of the time and VVI patients were paced 4%. We sought to determine whether baseline QRS duration was an indicator of increased risk in this trial.
Methods: Subgroup analysis was carried out on DAVID Trial patients defining wide QRS (WQRS) as ≥130 ms. and narrow QRS (NQRS) as <130ms. Time to primary endpoint was analyzed using the Kaplan-Meier method and Cox stepwise regression.
Results: There were 346 pts. with NQRS and 153 pts. with WQRS. The one year event rate in NQRS patients was 20% in DDDR and 16% in VVI (p=0.526). In WQRS the rates were 39% in DDDR and 15% in VVI (p=0.012). Stepwise regression indicated a significant interaction between therapy arm and QRS duration (p=0.022).
The relative risk of the primary endpoint was:

	DDDR vs VVI
WQRS	2.6
NQRS	0.9

Conclusion: This post hoc analysis suggests patients with a QRS duration ≥130ms. are at an increased risk of the adverse effects of RV pacing compared to those with a narrow QRS. NQRS and WQRS ICD patients had similar event rates when not paced (VVI-40 bpm). Further studies will be required to verify these findings.

1147-215 **Soft Indications for Pacing in the DAVID Trial Do Not Increase Mortality and Heart Failure Admission**

Steven P. Kutalek, Arjun Sharma, Alfred Hallstrom, Leon Greene, Jeffrey Neuhauser, Kerry Schwartz, Marc Roelke, Marianne Anderson, Karen Belco, Anna Leonen, and the DAVID Investigators, Drexel University College of Medicine, Philadelphia, PA, University of Washington, Seattle, WA

Background: The Dual Chamber and VVI Implantable Defibrillator (DAVID) Trial demonstrated an increased frequency of combined heart failure (HF) and mortality for defibrillator patients (pts) paced in the DDDR mode vs. those with backup VVI pacing. Although no pts enrolled in the DAVID trial strictly required bradycardia pacing, some had soft indications. We postulated that these pts would utilize more right ventricular pacing and have an increase in endpoints of HF and mortality compared to pts without such criteria.
Methods: Pts enrolled in the main trial were stratified into no firm indications for pacing (NoI, n=378) and soft indications (SoI, n=121), namely sinus rate < 60 bpm and/or first degree AV block with LBBB. Groups were analyzed with respect to endpoints.
Results: There was no difference in baseline characteristics between NoI and SoI, including age (64 v 67 yrs), ejection fraction (27 v 28%), history of HF, coronary disease, or index ventricular arrhythmia. These groups had no difference in time to first recurrent arrhythmia or to the combined endpoint of death or first hospitalization for HF. There was a trend toward increased HF hospitalization for NoI pts (p=0.07), even though frequency of pacing was higher in the SoI group. At 3-months, pacing frequency between NoI and SoI was 51.0% v 74.4% (p=0.001) in the atrium and 26.4% v 39.1% (p=0.008) in the ventricle.
There was no difference in time to first recurrent arrhythmia between pts with SoI paced VVI v DDDR, although cumulative mortality tended to be greater in the DDDR group (one-year event rates of 2.9% vs. 11.9%, p=0.09).