Conclusion: This animal study exhibited no discernable difference acutely or throughout the duration of the study of R-wave amplitudes reported by the ICD between the true bipolar and the integrated bipolar Riata ICD leads. Moreover, no device sensing functionality irregularities were noted with respect to any R-waves.

425 Myocardial revascularization before ICD treatment has reduced one-year mortality after the implantation: data from the Czech registry

J. Bytešničk 1, M. T. Borsk 2, M. Fiala 2, M. Herold 4, J. Janousek 3, T. Mínař 4, M. Novák 5, M. Psenicka 8, M. Tauchmann 9 on behalf of the Committee of ICD Indications, Czech Republic

Methods: We compared the characteristics of 76 patients with CHD who died within the first year after ICD implantation with the data of 922 survivors until 31.12.2002. The mean left ventricle ejection fraction (LVEF) was 7.2%.

Results: Perioperative mortality (0–31 days after implantation) was in 11 of 1491 (0.7%). The one-year mortality rate (incl. perioperative m.) was 7.2%.

Conclusion: The cardiac causes of death during first year after ICD implantation in 107 pts were: congestive heart failure (CHF) in 65 (60.7%), acute myocardial infarction with cardiogenic shock in 14 (13.1%) and arrhythmic storm in 14 (13.1%). The most serious clinical tachyarrhythmias were as follows: ventricular tachycardia (VT) in 54%, ventricular fibrillation (VF) in 41%, non-sustained VT in 5%. The main diagnosis were coronary heart disease (CAD) in 67% and non-ischemic dilated cardiomyopathy in 17%.

Purpose: Life expectancy less than 1 year due to noncardiac disease is considered as a contraindication for implantable cardioverter-debrillator (ICD) treatment. The aim of this study was to evaluate what is the share of cardiac mortality during 1 year after ICD implantation.

Methods: We analysed retrospectively the respective clinical data of pts before ICD implantation and the mortality data obtained from the regular annual reports of 11 implanting centres in the Czech Republic. The first ICD implantation was performed in 1491 pts (age 62 ± 13 years, 81% men) until 31.12.2002. The mean left ventricle ejection fraction was 30.2 ± 11.3% and the most serious clinical tachyarrhythmias were as follows: ventricular tachycardia (VT) in 54%, ventricular fibrillation (VF) in 41%, non-sustained VT in 5%. The main diagnosis were coronary heart disease (CAD) in 67% and non-ischemic dilated cardiomyopathy in 17%.

Results: Perioperative mortality (0–31 days after implantation) was in 11 of 1491 (0.7%). The one-year mortality rate (incl. perioperative m.) was 7.2%.

Conclusion: Cardiac causes of death during first year after ICD implantation in 107 pts were: congestive heart failure (CHF) in 65 (60.7%), acute myocardial infarction with cardiogenic shock in 14 (13.1%) and arrhythmic storm or sudden cardiac death in 6 (5.6%). The causes of remaining deaths were cerebral apoplexy, malignancy and other or unknown diagnosis.

We compared the characteristics of 76 patients with CHD who died within the first year after ICD implantation with the data of 922 survivors with the same diagnosis. We found no significant differences as regards age (63 ± 11 vs. 64 ± 10 years), LVEF (30 ± 1 vs. 29 ± 1) and the clinical VT/VF. Nevertheless, the myocardial revascularization (CABG or PCI) before ICD implantation was less frequent (in 19.7%) in pts who died during first year after implantation comparing with the survivors in whom CABG/PCI was performed in 47.1%.

Conclusion: Congestive heart failure and acute myocardial infarction are main causes of one-year cardiac mortality after ICD implantation indicated predominantly as secondary preventive treatment. The risk of death was higher in CHD patients without myocardial revascularization before ICD implantation.

426 Assessment of T-wave alternans to predict ventricular tachyarrhythmias recurrence in ICD recipients with ischemic heart disease

M.J.M. Oliveira 1, N. Da Silva 2, E. Antunes 3, J. Feliciano 3, J.M. Concei 4, S. Santos 2, I. Carlos 2, J. Quinimla 2

1Hospital Santa Maria, Department of Cardiology, Lisbon, Portugal; 2Hospital Santa Maria, Cardiology Dept., Lisbon, Portugal; 3Hospital Santa Maria, Cardiothoracic Surgery, Lisbon, Portugal

Conclusion: T-wave alternans (TWA) has been accepted as a tool for assessing vulnerability to malignant ventricular tachyarrhythmias (VT/VF). In ICD recipients, prediction of VT/VF recurrence may be useful for the clinical management (use of antiarrhythmics, ICD programming, psychological support, outpatient clinic visits.)

Aim: To analyse TWA and assess its correlation with the occurrence of VT/VF in infarct survivors submitted to ICD implantation.

Method: 28 pts (25 men; 62 ± 9 years, LVEF 36 ± 13%) submitted to ICD implantation because of VT (n=17) or VF (n=11), with a follow-up >6 months. TWA was measured using the HeartWave System (Cambridge Heart, Inc.)

Results: TWA was defined as positive if the sustained alternans microvoltages was >1.9 mV at heart rates >100 bpm, negative if the criteria for positivity were not met while maintaining heart rate at a level ≥105 bpm, and indeterminate if it could not be classified as either positive or negative. TWA was carried out when pts were in stable clinical conditions. Beta-blockers were held for 24 hrs prior to TWA testing. Pts with a positive or indeterminate TWA test were classified as the TWA “non negative” group.

Results: During a follow-up of 35 ± 22 months, 12 pts (42.8%) had at least one VT/VF event treated appropriately via ICD, 4 pts (14.2%) had arrhythmic storm episodes, and 10 pts (35.7%) underwent unplanned hospital admission(s) due to cardiac causes. TWA was positive in 7 pts (25%), indeterminate in 9 pts (32.1%) and negative in 12 pts (42.9%), respectively with an occurrence of VT/VF of 85.7%, 44.4% and 16.6% (TWA negative versus TWA “non negative” p=0.023). In the group with “non negative” TWA the relative risk of VT/VF was 6.3, (p=0.012), the relative risk of arrhythmic storm episodes was 5.0, (p=0.026) and the relative risk of admission due to cardiac causes was 1.1, (p=NS). There was no statistical difference in the left ventricular ejection fraction between pts with and without VT/VF.

Conclusions: In a population of AMI survivors and VT/VF treated with an ICD, TWA is a statistically significant predictor of VT/VF events and therefore it can be used as a prognosis marker after ICD implantation.

427 Ventricular tachyarrhythmias after ICD implantation - differences in event rates according to presenting arrhythmia

D.A.M.J. Theuns 1, A.P.J. Klootwijk 2, M.F. Scholten 2, A.S. Thornton 2, M. Rivera Ayerza 2, L.J. Jordaan 3

1Erasmus Medical Centre, Dept. of Clinical Electrophysiology, BD 402, Rotterdam, Netherlands; 2Erasmus MC, Clinical Electrophysiology, BD 402, Rotterdam, Netherlands

Background: The benefit of the implantable cardioverter-defibrillator (ICD) for prevention of sudden cardiac death has been proven in recent trials. However, not all patients experience device therapy for VT/VF.

Methods: Clinical and ICD data from 356 patients receiving ICDs between 1998 and 2003 were examined. Patients were categorized into 3 groups based on their presenting arrhythmia, namely: non-sustained ventricular tachyarrhythmias (NSVT), VT or VF. Actuarial event-free rates from device therapy were calculated according to the Kaplan Meier method. Groups were compared using chi-square test and ANOVA.

Results: Of the 356 patients, 99 (28%) received ICD for VT, 50% for VF, and 22% for NSVT. During follow-up 155 patients (44%) experienced device therapy for VT/VF. The actuarial event-free rates from VT/VF...
triggering device therapy are shown in the figure. The time to first appropriate device therapy was different between the groups (638 days for VF-group, 241 days for VT-group, and 404 days for NSVT-group; P < 0.001). The median cycle length of ventricular tachyarrhythmia was different between the 3 groups (260 ms for VF-group, 340 ms for VT-group, and 313 ms for NSVT-group; P < 0.001). No differences in demographic and clinical data between all groups. Patients presenting with NSVT had more frequently lower LVEF and prolonged QRS duration (P < 0.001).

Conclusion: Patients who present with NSVT have an arrhythmia recurrence during follow-up similar to those patients who present with VF. Screening for factors such as low LVEF and QRS duration remain important in evaluating the risk of sudden cardiac death.

428 The outcome of ICD patients during long-term follow-up: analysis of the cause of death and predictors of survival
M. Fiek1, B. Zieg2, T. Matis2, A. Hahnefeld2, C.H. Reithmann2, G. Steinbeck2
1Klinikum Grosshadern der LMU Muenchen, Med. Klinik I, Muenchen, Germany; 2University of Munich, Medical Hospital I, Munich, Germany

Background: Implantable cardioverter defibrillators have been shown to be an effective therapy to prevent sudden cardiac death in patients with ventricular arrhythmias. This implies a change in the spectrum of causes of death. There exist no large studies providing an exact differentiation of these causes of death and identifying predictors for survival.

Methods: During an observation period of 12 years (mean 39±4.29 months) we analyzed the outcome of n=429 ICD patients (CAD n= 274, dilative CMP n=97, others n=23, no structural heart disease n=35), mean age 62±12 years.

Results: The over-all survival rate was 79.7%, 3.5% of these patients underwent successful heart transplantation, 2.1% died suddenly. 60.9% of all deaths showed a non-sudden cardiac cause (heart failure 56.3%, myocardial infarction 4.6%). In 28.7% a non-cardiac fatal event was present (cancer 11.5%, septicemia 6.9%, stroke 4.6%). Absence of ventricular arrhythmias, a higher left ventricular ejection fraction (LVEF) and medication with beta blockers and class III antiarrhythmic agents were identified as independent predictors of survival.

Summary: Mortality due to sudden death was reduced to 2.1% in ICD patients associated with a shift of causes of death towards severe heart failure. Independent predictors of survival were the absence of ventricular arrhythmias, a higher LVEF and medication with beta blockers and class III antiarrhythmic agents.

429 Longevity and premature battery depletion of current implantable cardioverter defibrillator devices
A.S. Manolis1, T. Maounis2, V. Vassilikos2, E. Simeonidou3, J. Chiladakis3, D.V. Cokkinos2
1Glifaída-Athens, Greece; 2Onassiss Hospital, Cardiology, Athens, Greece; 3Patras University, Cardiology, Patras, Greece

Background: Manufacturers of newer generation implantable cardioverter defibrillator (ICD) devices promise a 5-7-year projected longevity. In the initial series of our first 100 patients (pts), we had shown a worrisome 33% premature battery depletion among 15 pts having battery replacement. The aim of the present study was to reassess the pulse generator longevity among 185 consecutive pts who received an ICD over the last 8 years.

Methods & Results. The study included 166 men and 18 women, aged 59±13 years, who received a newer generation transvenous ICD under general (n=40) or local (n=144) anesthesia. The underlying disease was coronary artery (n=117) or valvular heart disease (n=6), cardiomyopathy (n=54) or electrical disease (n=7). The mean left ventricular ejection fraction (EF) was 36%, and pts presented with ventricular tachycardia (VT) (n=135) or ventricular fibrillation (VF) (n=34) or syncope (n=15). One (n=174) or two (n=10) ICD leads were implanted, 36 pts received a dual-chamber ICD. The ICD devices were implanted in the abdomen (n=10) or in the chest (n=165). The defibrillation threshold was 11.7±4.8 J. Pacing and sensing thresholds averaged 0.7±0.3 V/14.1±5.5 mV respectively.

All ICDs were biphase devices. Active shell devices were used in 159 pts. Over 8 years, ICD pulse generator replacement was performed in 42 pts (23%). These pts were 40 men and 2 women, aged 62.5±13 years, with a mean EF of 37±12%. The indication for ICD implantation was VT (n=12), VF (n=8), or syncope with inducible VT (n=2). The mean ICD device longevity in these 42 pts was 50.8±13.8 months. In 6 pts the ICD devices exhibited premature battery depletion within 19-35 months. All 42 pts had minor or modest use of the ICD device electrical therapy with shocks or antitachycardia pacing.

In conclusion, newer generation ICDs continue to have relatively limited longevity of 4.2±1.2 years. A good percentage (14%) of current ICD devices demonstrate premature battery depletion by 3 years, thus falling short of the 3-year manufacturer’s warranty. These findings have important implications particularly in view of the high expense involved with this type of electrical therapy.

430 Evaluation of medico-economic impact of new implantable defibrillators with a longer lifetime
J.Y. Le Heuzey1, L. Lamarssalle2, A. Vainchtock2, C. Matalon3, J.R. Hazard4, C. Henric3
1H pital Europ en G. Pompidou, Cardiology, PARIS, France; 2GYD institut, Division of IMS Health, Lyon, France; 3Guidant SAS, CRM, Ruell Malmaison, France

Background: Implantable defibrillator(ICD)have to be replaced in average every 5 years. Replacement complications rates can be estimated based on data reported for implantations and reach 16.46% of adverse events including a peri-operative mortality incidence of 0.9%. In addition, health care costs for complications treatment are significant. Thus reducing replacement frequency yields a clear clinical benefit. Vitality 2EL®, a new ICD with a lifetime increased of an average of 35% compared to current ICDs, has been designed to answer to this issue.

Objectives: This study aims to compare direct medical costs using this new ICD, Vitality 2EL®, versus its main competitors in France and to define the population who could benefit most of this new technology.

Methods: We first identified among patients included in EVADEF (French national registry of ICD-implanted patients), 7 homogeneous groups according to age at first implant. Then, within each group, we determined average ages and life expectancies using Deale’s method and data from the French national statistical institute (INSEE). A Markov...