less than 10 % ventricular ectopy. For HRV analysis standard time- and frequency parameters as well as nonlinear dynamical measures were calculated. To determine the time of sympathetic activation we calculated all HRV parameter for successive 5 minutes intervals up to 90 minutes before the onset of VTA.
Results: The mean RR-interval for VTA was significantly lower than for the controls (752.4±13.9 vs. 819.1±8.1, p<0.0001), whereas the number of ventricular premature beats (VPBs) was higher (230.5±19.7 versus 147.7±10.5, p<0.00001). Heart rate and ventricular ectopy rate significant increase already 90 minutes before VTA onset compared with control conditions suggesting a state of sympathetic excitation. Mean heart rate and the number of VPBs were statistically significant for all comparisons. The symbolic dynamics parameter POLVAR10 in addition detected a further sympathetic excitation 10 minutes before the onset of VTA, whereas all other parameters failed to detect these changes.
Stepwise discriminant function analysis gave a classification rate between VTA and control series of 77.1 % with a positive predictive accuracy of 51.4 % and a negative predictive accuracy of 88.3 %.
CONCLUSIONS: First results of this study suggest, that monitoring of heart rate dynamics in ICD patients can predict VTA events with a positive accuracy for VTA of about 50%.

1091-212 Heart Rate Variability Footprint: New Diagnostic Tool to Monitor the Clinical Benefit of Cardiac Resynchronization Therapy in Patients With End-Stage Heart Failure

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Introduction: Heart rate variability (HRV) is a noninvasive measure of cardiac autonomic control. Decreased HRV is an independent risk factor in patients with chronic heart-failure (HF). Cardiac resynchronisation therapy (CRT) improves functional capacity and reduces morbidity in end-stage HF patients. We hypothesized that changes in symptoms and functional status in HF patients as a result of CRT are reflected by changes in autonomic output and are displayed by HRV. We studied HRV "footprints" after ICD implantation and 6 months later obtained via a novel patient diagnostic tool available in the dedicated biventricular defibrillator (Renewal, Guidant, MN, USA) in patients with class III-IV heart failure.
Methods: Between July 2001 and May 2002, Renewal ICD's were implanted in 91patients. Twenty-seven patients were excluded from the HRV-study because of atrial fibrillation and/or atrial pacing. Of the remaining 64 patients footprints of HRV were measured as percentage of square plot surface (X-axis heart rate, Y-axis RR-variability) on the third day after implantation and 6 months later. Correlations were made with the Minnesota quality-of-life (QOL) score and 6-minute-walking test.
Results: Comparison between the baseline plot and the 6-month plot showed improvement in HRV in 46 patients (71%) and the footprint percentage increased with 22 ±12 % (min 10 %, max 52% improvement). In 18 patients (28 %) no improvement was seen. The improvement and deterioration obtained with the patient diagnostic tool correlated significantly with the improvement or deterioration in QOL score (r=0.681, p<0.5) and 6-MWT (r=0.581, p=0.004)
Conclusion: A significant correlation was found between HRV changes and changes in QOL and 6-minute-walking test. The novel patient diagnostic tool allows to obtain HRV footprints and could be used to monitor heart failure patients treated with resynchronisation therapy.

1091-223 The Implantable Defibrillator and the Long QT Syndrome: An Overview of Current Use and Outcome

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The use of the implantable cardioverter-defibrillator (ICD) in the long QT syndrome (LQTS) presents specific complexities (young age, stress-induced events, efficacy of antiadrenergic therapy). The European LQTS-ICD Registry is an ongoing project which enrolls LQTS pts with an ICD to analyze current criteria for implant and to assess outcome. While there is a consensus to implant cardiac arrest (CA) survivors, other indications are controversial. So far, 90 pts (81% females, QTc 514±59 ms, 37% of known genotype) were enrolled. Before implant 98% were symptomatic, CA had occurred in 50% [60% of these prior to β-blockers (BB) therapy]. However, 43 pts (48%) had only syncope: 69% of them despite BB and 31% without therapy. During a 2.8±2.5 years mean follow-up, appropriate shocks occurred in 19% while inappropriate shocks were received by 7% of the pts. A replacement (13%) or repositioning (10%) had to be performed in 23% of pts while 7% received multiple repetitive discharges, average over 50 shocks/pt. Of the appropriate shocks, 73% occurred in pts with prior CA; conversely, only 9% of the 45 pts with (n=43) or without (n=2) syncope independently of BB had appropriate shocks. Of the pts not on BB therapy prior to implant, 23% remained without therapy. In conclusion, ICD implant appears useful in pts with a prior CA, but in pts with syncope only the rate of shocks is low. The Registry reveals potential pitfalls in current management of LQTS: many pts receive an ICD just because of syncope or of family history and are exposed to significant complications, while others are left without anti-arrhythmic protection after implant. With LQTS pts, the ICD needs to be complemented by effective antifibrillatory therapy to minimize the risk of shocks, even when appropriate.

1091-224 Long-Term Outcome of Patients With Cardiac Sarcoidosis Receiving Implantable Cardioverter Defibrillators

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Background: Patients with cardiac sarcoidosis often develop malignant ventricular arrhythmias necessitating implantable cardioverter-defibrillator (ICD) therapy for secondary prevention of sudden death. The long term outcome and the predictors of survival in these patients are unknown.
Methods and Results-: The study population included ten patients who were prospectively diagnosed with cardiac sarcoidosis and received ICDs for secondary prevention of sudden death. Baseline characteristics included demographics, implant indication, left ventricular ejection fraction, and NYHA functional class. Outcome measures included death, cardiac transplantation and time to first ICD therapy. The study group included six male and four female patients with a mean age of 42 ± 9 yrs. Fifty percent were Caucasian and the rest African American. Over a mean follow up of 48±14 months, four deaths occurred in the study population. The 1-, 2-, and 5-year survival was 100%, 67% and 44% respectively. NYHA functional class III and IV heart failure at the time of ICD implantation predicted poor long-term survival (p=0.01). Age at implant, gender and the left ventricular ejection fraction did not have an impact on survival. Nine (90%) of the ten patients received appropriate ICD therapy. The mean duration to first ICD therapy was 10 ± 7 months after the implant. There were no inappropriate therapies.
Conclusions- Patients with cardiac sarcoidosis who receive ICDs for secondary prevention of sudden death have a high rate of arrhythmia recurrence requiring ICD intervention. Poor NYHA functional class at the time of device implantation is associated with worse long-term survival.

1091-225 Atrial Antitachycardia Pacing Efficacy Based on Time and Rhythm

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Background: Atrial antitachycardia pacing (ATP) has been incorporated into implanted devices in an effort to provide painless therapy for atrial tachycardia, flutter and fibrillation.Controversy exists as to which atrial tachyarrhythmias (AT) are susceptible to ATP therapy as well as appropriate calculations of efficacy with respect to time post therapy.
Methods: This study looked at the efficacy of atrial ATP on AT episodes from patients implanted with an atrial and ventricular defibrillator (PRIZM AVT, Guidant Corp). Episodes receiving ATP were retrospectively classified as SVT, disorganized SVT (DSVT) or atrial fibrillation (Afib). Overall atrial ATP efficacy was calculated as well as efficacy within each rhythm classification. Efficacy as a function of time after therapy was also determined.
Results: 293 episodes from 34 patients were included in the analysis. All patients were ICD indicated with a history of = 1 atrial arrhythmia in the 12 months preceding implant. Average age was 70±10 years, the majority of patients were NHYA class II with an average LVEF of 34±14%. 147 episodes (50%) were classified as SVT, 121 (41%) as DSVT and 25 (9%)as Afib. Atrial ATP efficacy was determined at several times post-therapy and found to improve significantly as a function of time, with 21% conversion at 10 secs (post therapy stored EGM) increasing to 41% at 40 secs (device defined efficacy), 47% at 1 min and 57.8% at 3 min. Efficacy was significantly dependent on rhythm type (33% efficacy for SVTs, 12% for DSVTs and 0% for Afib) and rate (overall efficacy for rhythms of < 200bpm was 69% versus 39% for >200bpm).
Conclusion: We conclude that atrial ATP has significant therapeutic potential for some types of AT. Additional analysis is required to determine any positive correlation between programming scheme and ATP efficacy.

1091-226 Implantable Cardioverter Defibrillator Follow-Up: Will Office Visits Be Replaced by Transtelephonic Monitoring?

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Background: Outpatient implantable cardioverter defibrillator (ICD) follow-up (FU) is routinely performed every 3 to 4 months, at which time device interrogation and reprogramming are possible. Transtelephonic monitoring (TTM) is currently available for of ICDs, which initially includes device interrogation without reprogramming. It is unclear whether or not TTM will replace in-office FU. **Methods:** We reviewed outpatient charts on 78 patients (pts) with 587 office visits (median 7) to determine the frequency of interventions performed at FU. Reprogramming of tachycardia and bradycardia parameters, and changes in medical regimens based on ICD interrogations, were examined. **Results:** Mean age was 65 ± 12 yrs and ejection fraction 32 ± 16%. Presentation included sustained VT/VF in 20 pts, syncope 27 pts, and no symptoms 31 pts. Based on ICD interrogations, tachycardia (VT/VF) detection changes were made in 27 pts (35%), bradycardia changes 48 pts (62%), miscellaneous changes 16 pts (21%), and antiarrhythmic drug changes 17 pts (22%). Tachycardia changes included reprogramming VT or VF rate cut-off in 18 pts, turning on VT zone 12 pts, programming detection enhancements 13 pts, and increasing shock energy 3 pts. Bradycardia changes included decreasing lower rate in 14 pts, increasing pacing output 20 pts, decreasing pacing output 30 pts, changing rate response 7 pts, and changing mode 4 pts. Miscellaneous changes included reprogramming magnet function in 3 pts, turning device back "on" 2 pts, reprogramming capacitor maintenance 9 pts, and using new software 4 pts. Changes were made due to VT/VF detections with device therapy or aborted shocks in 13 pts, SVT detections 19 pts, artifact 2 pts, bradycardia 10 pts, paced rate too fast 9 pts, increased pacing threshold 20