1026 Defibrillation Threshold Testing With Implantable Cardioverter Defibrillators

Wednesday, March 22, 1995, 3:00 p.m.–5:00 p.m.
Ernest N. Morial Convention Center, Hall E
Presentation Hour: 4:00 p.m.–5:00 p.m.

Background: The upper limit of vulnerability (ULV) is defined as the upper limit of shock strength, above which ventricular fibrillation will not be induced when the shock is delivered during the vulnerable period. ULV is postulated to correlate with the defibrillation threshold (DFT) and, if true, it would streamline implantable cardioverter-defibrillator (ICD) surgery and follow-up.

Methods and Results: We sought to determine whether the biphase ULV measured with an easily implemented clinical protocol via the T-shock method available in the 72190 Medtronic ICD using 65% tilt, 120 μF asymmetric pulses, would correlate with the biphase DFT assessed during follow-up electrophysiologic (EP) evaluation of ICD function. Twelve consecutive patients were evaluated. The average age was 67 ± 3.4 years, LV ejection fraction was 0.45 ± 0.04, and 58% had underlying CAD. The index arrhythmia prompting ICD therapy was VF in 83% and VT in 17%. At the time of the follow-up EP study, all patients had VF induced with T-shocks at 310 ms following 3 ventricular paced beats at 400 ms starting at 0.2 Joules and stepping up until the ULV was found as follows: 0.6, 1.0, 2.0, 3.0, 4.0, 5.0, 7.0, 10, 14, and 18 Joules. The DFT was determined using the exact same waveform, polarity and shock steps as was the ULV determination.

Results: The ULV and DFT were 8.9 ± 4.4 vs 10.2 ± 5.5 Joules, which was not significant (r = 0.09, p = 0.11).

Conclusion: We found a poor correlation between the biphase ULV and the DFT using this clinically feasible follow-up technique. The ULV appears to underestimate the DFT using this technique for evaluating ICD defibrillation efficacy during follow-up EP evaluation.

1026-84 Impact of the Defibrillating Surface Area of an Additional Superior Vena Cava Electrode on the Unipolar Right Ventricular Coil/Defibrillator Can System

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We assessed the hypothesis that the surface area of an additional superior vena cava (SVC) defibrillation electrode may impact on the defibrillation efficacy of a right ventricular (RV) coil/ICAN system. In ten dogs we randomly assigned the same defibrillation lead system to achieve low defibrillation thresholds (DFT) in each lead system. With every electrode system the AV coil was used as cathode. Energy (J).

OFT (Joules) 8.6 ± 3.1* 8.5 ± 3.1* 13.1 ± 6.7 395 ± 105 49 ± 5 13.1 ± 6.7
Lead + Shell 8.5 ± 3.1* 319 ± 61* 42 ± 4*

P Value
Baseline 0.006
LIDO 0.001
P Value** 0.003

*p value of monophasic vs biphase. **p value of baseline vs LIDO

In 2 dogs, the DFT during LIDO was >50 joules with monophasic shock and 27.9 ± 5.6 joules with biphase shocks. LIDO caused a 13.1 ± 9.6% increase in ventricular refractoriness (p < 0.037) and a 29.8 ± 22.7% increase in QRS duration (p < 0.01), neither of which were predictive of DFT response. Conclusion: Sodium channel blockade does increase the DFT of biphase shocks but to a lesser extent than observed with monophasic shock DFT’s. These results may have favorable implications for the use of Class I antiarrhythmics in patients with newer generation ICD’s.

1026-87 Long-term Changes in Defibrillation Thresholds Using Two Nonthoracotomy Lead Systems and a Biphase Waveform

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We implanted nonthoracotomy defibrillators in consecutive pts with sustained ventricular arrhythmias. A Ventrex Cadence (V-100C) device using a biphase waveform was implanted in all pts. The first 21 systems (Grp I) consisted of a lead (BT-10) endocardial lead at the RV apex for sensing and pacing, with a CPI-C (10) spring electrode at the SVC/HRA junction and a large CPI patch (L67) implanted subcutaneously in the right axillary region for defibrillation. A single lead defibrillation system (CPI Endotak C, Model #0064) was implanted in 27 pts (Grp II). Mean age was 61 ± 12 years and LVEF was 37 ± 16%. Three successful shocks for sustained VF were required to...