	B pattern (n = 22)	U pattern (n = 21)	p
Success	19/22 pts (86%)	12/21 pts (57%)	p < 0.001
Inadvertent CHB	0	3	p < 0.05
Permanent pacing	3/22 (14%)	8/21 (38%)	p < 0.001
No of RF applications	6 ± 4	16 ± 7	p < 0.001
Fluoroscopy duration (min)	13 ± 9	27 ± 16	p < 0.001
Mean HR reduction	29 ± 12%	16 ± 8%	p < 0.015
Max HR reduction	25 ± 12%	17 ± 10%	p < 0.05

Conclusion: This study shows that pts with chronic AF and uncontrolled VR who exhibit a B RR distribution pattern are the most appropriate candidates for RF modification of AVN conduction. In these pts, the procedure is more effective, safe and expeditious.

1150 Implantable Cardioverter Defibrillator Induction and Termination of Ventricular Fibrillation

Tuesday, March 31, 1998, 3:00 p.m.–5:00 p.m.
Georgia World Congress Center, West Exhibit Hall Level
Presentation Hour: 4:00 p.m.–5:00 p.m.

1150-173 Clinical and Electrophysiological Significance of Induction of Morphologically Different Ventricular Fibrillation During Ventricular Vulnerable Period in Humans

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Hypothesis: Premature stimulation-induced cellular graded responses may provoke different reentrant pathways thereby leading to genesis of morphologically different ventricular fibrillation (VF); which may in turn cause a change in the defibrillation threshold (DFT).

Methods: We studied 15 pts undergoing implantation of cardioverter/defibrillators (Medtronic, Mini I or II). Their mean age was 65.7 years. 12 had atherosclerotic heart disease and 3 cardiomyopathy. Low energy (0.8j) biphasic T wave shocks were delivered through right ventricular apical endocardium and a left precordial can to induce VF during which 12 lead ECG – 6 limb and 6 reversed chest leads were simultaneously recorded. The outer (OLV) and inner (ILV) limits of ventricular vulnerable period (VVP) at a cycle length of 400 ms were determined. DFT was measured by starting at 10j using an up-and-down algorithm with an increment or decrement of 2–3 j.

Results: The VVP measured 50.3 msec. Of note, the initiating 3–5 beats of VF had distinct reproducible patterns corresponding to OLV and ILV respectively. Of note, VF induced at OLV tended to be "coarse" with higher QRS amplitudes compared to that induced at ILV which appeared to be "fine" with lower QRS amplitudes. In 10 pts, VF induced at both OLV and ILV had similar DFT (8.6j). However, in the remaining 5 pts, DFT was higher for VF induced at OLV than ILV (15.2 j vs. 7.8 j).

Conclusion: Graded responses induced by T wave shocks with varying coupling intervals can be observed at OLV and ILV and can lead to initiation of morphologically different VF in humans. Clinically observed changes in DFT may be accounted for by induction of morphologically different VF in certain patients.

1150-174 Polarization-Induced Impedance Rise in Defibrillation Is Dependent on Voltage

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Background: Previous studies have shown that iridium oxide (IROX) coated nonthoracotomy leads (NTL) reduce the polarization-induced impedance rise that occurs during a defibrillation shock and subsequently reduce the energy defibrillation threshold (DFT). We sought to test the voltage dependance of shock impedance due to electrode polarization by delivering low-tilt, monophasic defibrillator shocks at different, clinically relevant, peak voltages.

Methods: Monophasic 10 msec shocks of <20% tilt were delivered in 12 swine. Shocks were delivered between a 5 cm platinum coil NTL in the right ventricle and a subcutaneous "can" electrode in the left subclavian position. Uncoated and IROX coated NTL's were tested at 50, 100, 300, and 700 volts (peak). Shocks were delivered from a defibrillator with the capability of measuring voltage and current every 0.1 msec. Shock impedance was then derived by Ohms law (voltage/current). The changes in shock impedance between the initial 0.5 msec and the final 0.5 msec delivered from uncoated and IROX coated NTL's were compared at each voltage.

Results: The table shows the mean impedance change in Ohms.

	50 V	100 V	300 V	700 V
Uncoated	11.4 ± 3.8*	5.3 ± 2.7	1.3 ± 0.8	0.1 ± 0.8
IROX	1.7 ± 1.7§	1.1 ± 0.8§	0.0 ± 0.4§	−0.7 ± 1.3

* p < 0.01 compared to 100, 300 and 700 volt shocks (uncoated).; § p < 0.002 versus uncoated lead shocks.

Conclusions: The polarization-induced impedance rise seen with shocks at 50 volts is reduced at higher voltages when delivered through uncoated electrodes. Also, IROX-coated leads significantly reduced the impedance change at the lower peak voltages and would therefore improve ICD efficiency at these intensities.

1150-175 Mechanism of the Probabilistic Nature of Ventricular Defibrillation Threshold

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Background: It is not known why a given electrical shock (ES) strength can at times be successful (S) and in others unsuccessful (U). Since during VF a vulnerable period (VP) exists during which ES reinitiates reentrant (R) VF, we hypothesize that defibrillation (DF) shock outcome depends on the amount of tissue that is in its VP (50%–60% of local activation cycle length (CL)).

Methods: The RV of five farm pigs were isolated and perfused through the RCA with oxygenated Tyrode's solution. The epicardial surface of the isolated RV was mapped using 477 bipolar electrodes 1.6 mm apart. DF threshold for 50% success (DFT50) was determined by the up-down method using biphasic shocks (6 & 6 ms) with two 4 cm long coil electrodes mounted in the bath.

Results: A total of 50 DF trials (24 S and 26 U) were analyzed. The mean DFT50 was 1.5 ± 0.25 J, 193 ± 14 V, and 49 ± 0.3 ohms. VF was maintained by multiple R and non-R wave fronts in all tissues with a mean CL of 79 ± 4 ms. The number of activated sites during a 5 ms window varied between a maximum of 75 to a minimum of 3 sites. The mean number of sites at their VP (activated 45–50 ms prior the shock) were significantly (P < 0.04) lower in the S than in the U trials (23 ± 8.8 vs. 28 ± 6.6 sites).

Conclusions: The variable (i.e. probabilistic) nature of ventricular DFT results from the changes of the amount of tissue in its VP at the instant of the DF shock.

1150-176 Defibrillation Thresholds Are Increased by Right-sided Implantation of Totally Transvenous Active Can Devices

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Background: Whether a totally transvenous implantable cardioverter defibrillator system (ICD) is placed via a left- or right-sided approach depends on pt and implantor preference, venous access, the presence of a pre-existing pacemaker, and other factors. The defibrillation threshold (DFT) is affected by lead position, which in turn is determined in part by the side of access. We previously demonstrated a significant increase in DFT (mean 5.8 J) with right-sided biphasic cold-can ICD implantation. We now examine whether a similar effect is seen with active can devices.

Methods: Step down to failure DFTs were found in all pts receiving transvenous active can systems at the time of initial ICD implantation and prospectively recorded in a database.

Results: Of 165 implants, 156 were left-sided (102 Transvene, 54 Endotak), and 9 were right-sided (8 Transvene, 1 Endotak). One pt failed implant due to a high right-sided DFT and was excluded.

DFT (Joules)	Right-sided	Left-sided	t-test
All (n = 165)	15.6 ± 5.8	9.6 ± 4.3	p < 0.001
Transvene (n = 110)	16.5 ± 5.7	10.3 ± 4.6	p < 0.001

Conclusion: The right-sided implantation of totally transvenous active can ICDs results in significantly higher DFTs than the left-sided approach. This may be due to the less favorable distribution of the defibrillating field relative to the myocardium with the devices on the right. This should be considered during pre-implant assessment and may become more important as new lower energy devices become available.

1150-177 Do We Need Pre-discharge Testing in Patients who Undergo Cardioverter-Defibrillator Implantation?

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Background: The cardioverter-defibrillator has established in clinical cardi-