991-72 Effect of Polarity Reversal Using Clinical Defibrillation Waveforms and a Tranvenous Lead System

Gregory P. Walcott, Ellen G. Dixon-Tulloch, William M. Smith, Raymond E. Ideker. *Duke University, Durham, N.C.; U. Alabama, Birmingham, Birmingham, Al*

There have been conflicting reports over the years about the effects of waveform polarity on defibrillation efficacy. The development of the tranvenous lead system has led to an increase in defibrillation thresholds when compared to epicardial patches when using the same pulse generator. Reversing waveform polarity might lower defibrillation thresholds enough to allow implantation of a tranvenous lead system while maintaining an adequate safety margin. This study was undertaken to determine the effects of waveform polarity on monophasic and biphasic waveforms using a tranvenous lead system and three clinically available defibrillation waveforms.

Six 25 kg swine underwent placement of an ENDOTAK® catheter with the distal electrode in the RV apex (RVA) and the proximal electrode at the junction of the SCV and RA. Three defibrillation waveforms were studied: the CPI Ventak 65% fixed tilt monophasic waveform (CPI-M), the CPI Ventak, 60% tilt phase 1, 50% tilt phase 2 biphasic waveform (CPI-Bi), and the Ventritex HVS-02 6 ms / 6 ms biphasic waveform (V-Bi). Defibrillation thresholds (DFT) using an up/down technique were determined for each waveform for RVA electrode as cathode (−) for CPI-M and phase 1 of CPI-BI and V-Bi or as anode (+).

When RVA was (+), CPI-M defibrillated with a lower leading edge voltage (LEV) and energy (E) than when RVA was (−). LEV and E were not significantly different when RVA was (+) vs RVA as (−) for either biphasic waveform tested.

	CPI-M	CPI-Bi	V-BI
(+)	470 ± 51	317 ± 36	345 ± 23
(−)	546 ± 66[†]	296 ± 34	339 ± 25

[†] CPI-M(+) sig lower than CPI-M(−) ($p < 0.05$)

These results show that biphasic waveforms defibrillate better than monophasic waveforms regardless of polarity. It also suggests that when implanting a monophasic waveform device, that the RVA electrode should be anode, but that when implanting a biphasic device, that the RVA electrode can be either anode or cathode.

991-73 Ultrarapid Subthreshold Stimulation Delivered via Epicardial Patches can Terminate Reentrant Ventricular Tachycardia in a Canine Model

Maurice Weiss, Steven Evans, Andrew Grunwald, Robert Palazzo, Ulane Neveling, Stephen Blumberg, Monty Bodenheimer. *Long Island Jewish Medical Center, New Hyde Park, N.Y.*

Although Ultrarapid subthreshold stimulation (USTS) delivered via endocardial electrodes to a critical site of a tachycardia circuit is able to terminate reentrant arrhythmias, it requires detailed electrophsyiologic mapping. We evaluated USTS given via epicardial patches to terminate ventricular tachycardia (VT).

Methods: Canines underwent coronary artery ligation to produce apical infarction. 3–5 days after infarct, two defibrillator patches were sutured epicardially and pacing thresholds determined. VT was induced and USTS was applied at 90% threshold, with a train of 10 stimuli, cycle length 50 ms, and pulse width 2 ms. If there was no effect, increasing trains and pulse widths were used. Threshold was re-tested post-termination to insure subthreshold output. Six dogs survived and had 136 VTs induced.

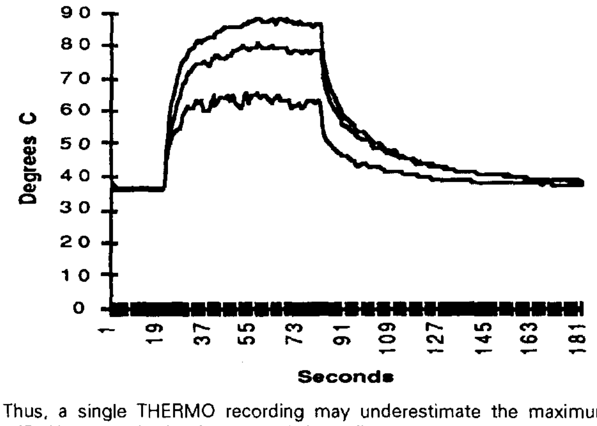
Results: 91/136 (67%) of induced VT episodes were terminated. 41 (30%) terminated after 1 delivery of USTS; 50 (37%) terminated after 2–17 sets of USTS; 22 (16%) were reset; 23 (17%) were unaffected. Of 91 terminations, there was a 66% probability of VT termination within the first three sets of USTS delivery.

Conclusions: USTS may be successfully applied via epicardial patches to terminate induced reentrant VT in the canine model, without the need for extensive mapping of the VT circuit.

991-74 Circumferential Temperature Monitoring versus Single Point Monitoring During Microwave Ablation

Paul J. Wang, Tim Lenihan, Mark Guetersloh, Amin Ahmad, Frederick J. Schoen, Mark Aronovitz, N.A. Mark Estes III. *New England Medical Ctr, Boston, MA; Arrow International, Reading, PA*

Because microwave (MW) energy may achieve high temperatures (TEMP), TEMP monitoring may be important to prevent excessive endocardial damage. Since MW delivery is radial, we examined the value of TEMP monitoring using 3 circumferentially placed thermocouples (THERMO) rather than a single TEMP monitoring. During 15 energy deliveries of 20–40 Watts for 30 sec at separate left ventricular sites in 5 dogs, there was a significant difference in maximum TEMP recorded among the 3 THERMO: 93.6 ± 25.32 vs. 68.73 ± 18.28 degrees C ($p < 0.001$). Mean TEMP curves are shown:



Thus, a single THERMO recording may underestimate the maximum TEMP. We conclude that because of the radial nature of the MW delivery accurate TEMP monitoring requires multiple THERMO rather than a single THERMO as used in RF ablation.

991-75 Radiofrequency Catheter Ablation of Ventricular Tachycardia in Patients with Arrhythmogenic Right Ventricular Dysplasia

Antonio Asso, Jerónimo Farré, Roberto Zayas, Alberto Negrete, José A. Cabrera, José Romero. *Fundación Jiménez Díaz, Madrid, Spain*

In patients (Pts) with right ventricular dysplasia (RVD), radiofrequency catheter ablation (RFCA) has been reported to have low success rates and a high incidence of recurrences. Our study includes 11 (6 M/5 F, 42 ± 15 years) consecutive Pts with RVD and syncopal VT referred for evaluation. At the electrophysiologic study (EPS) VT was induced in every case, being syncopal in 1 Pt, nonsustained in 3, and sustained and well tolerated in 7. One of these 7 Pts had 9 different VT, only 3 of them mappable. Thus, only 6/11 Pts (55%) were eligible for RFCA. RF application was based on the identification of a fast bipolar deflection preceding the VT QRS and the confirmation in unipolar recordings that such a potential originated in the distal electrode. In 4/6 Pts (66%) we did ablate 7 distinct VT successfully (success is noninducibility of VT by programmed stimulation using up to 4 extrastimuli and 2–4 cycles lengths, at 1–2 RV sites). This potential, identified in all 7 VT induced in the 4 Pts with a successful outcome, preceded the VT QRS by 112 ± 74 ms (range 36–260). In 1/4Pts a nonsustained morphologically similar and faster VT was induced after interrupting the slower sustained VT with the first RF application. Under the guidance of pace-mapping this nonsustained VT was ablated and no longer inducible, but a defibrillator was implanted because of induction of short runs of very fast VT and a history of syncope on amiodarone. In the remaining 3Pts we did not induce any form of VT after RFCA. One Pt had an early recurrence and was successfully ablated at a second session. After 22 ± 6 months of follow-up the 4 Pts with successful RFCA continue asymptomatic and a repeat EPS performed in 3 Pts > 6 months after RFCA has been negative in all. Two of these 4 Pts are on 450 mg/day of propafenone (previously uneffective on higher doses) because of a family history of RVD and sudden death. Another Pt whose VT was ablated in the parahisian area developed A-V block and received a pacemaker. In *conclusion,* RFCA can be attempted in 55% of Pts with RVD despite a previous history of syncopal VT with a success rate of 66%. RFCA can abolish distinct VT originating at different RV sites. The origin of VT in some Pts with RVD may be close to the His bundle and RF application result in AV block. In those Pts that really become noninducible after RFCA the recurrence rate is low. There are not mid-term recurrences.