

1/2 year, 49% had REA after the first shock, compared to only 21% with ASY and 30% with persisting VF ($p < 0.0003$). **Conclusion:** In prolonged VF, only 26% of the pts could be converted into a regular rhythm with an initial 200 J countershock. This conversion rate appears unrelated to age, sex, underlying disease, and to the usual response times of rescue services, but is associated with short- and long-term prognosis. Further investigation of characteristics of prolonged VF may aid in the determination of more efficient specific shock forms or energy applications.

912-74 The Effect of Ventricular Fibrillation Duration and a Failed Shock on Defibrillation Thresholds Using Biphasic Waveforms

Stephan Windecker, G. Neal Kay, William M. Smith, Raymond E. Ideker. *The University of Alabama, Birmingham, AL*

Background: While the defibrillation threshold (DFT) has been reported to increase with ventricular fibrillation (VF) duration for monophasic waveforms, the effect of both VF duration and a first failed shock on the DFT using biphasic waveforms has not been investigated. Therefore, a paired comparison of shock strength parameters at ED50 between shocks delivered after 10 sec of VF and after 20 seconds of VF with and without a first failed shock was performed using biphasic waveforms in pigs.

Methods and Results: 8 pigs, implanted with an endocardial lead system, underwent a recursive up-down algorithm for a total of 60 shocks per pig to center most shocks near ED50. Biphasic shocks (6/6 ms) were delivered after 10 sec of VF and after 20 sec of VF with and without a preshock at 10 sec. The result for paired shock strength parameters at ED50 are summarized in the table below:

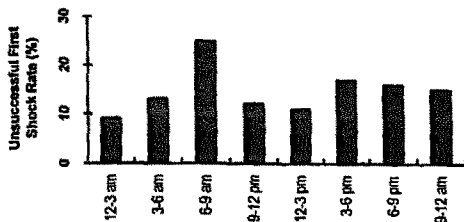
	10 sec VF	20 sec VF with preshock	20 sec VF without preshock	P-Value
Energy	10.1 ± 2.4 J	7.9 ± 2.4 J	7.5 ± 3.2 J	< 0.01
Voltage	363 ± 42 V	323 ± 45 V	314 ± 60 V	< 0.01
Current	9.8 ± 1.2 A	8.8 ± 0.8 A	8.6 ± 1.8 A	0.02

Conclusions: (1) As opposed to monophasic shocks, energy, voltage and current at ED50 are significantly lower for biphasic shocks delivered after 20 sec of VF as compared to 10 sec of VF in pigs. (2) A first failed shock does not significantly change the DFT using biphasic waveforms in pigs.

912-75 Circadian Variation in First Shock Efficacy of an ICD System

Roy M. John, David T. Martin, Ferdinand J. Venditti Jr, for the CPI-P2 Investigators. *The Lahey Hitchcock Medical Center, Burlington, MA*

Reports have demonstrated a circadian variation in the incidence of several cardiac events. We have previously reported a morning peak in defibrillation energy requirements. In order to determine if there was a corresponding peak in failed first shocks delivered by an ICD, we reviewed 1,238 episodes of ventricular tachyarrhythmias treated with shock therapy in 930 patients (mean age 62 ± 12 years; 73% had coronary disease) implanted with an ICD system with date and time stamps for each therapy. Stored electrograms and telemetered data were used to confirm ventricular arrhythmia. The mean tachycardia cycle length was 332 ± 84 ms. The failed first shock rate for the total group which was 15% was not distributed uniformly over time. First shocks delivered in the morning had a lower success rate when compared to other times ($p < 0.002$) (see figure). Peak failure rate was between the hours of 6–9 am (24.9%) with a nadir between 12–3 am (9%).



We conclude that first shock efficacy for spontaneous arrhythmic events is reduced in the morning hours. This finding supports our previously reported data of a higher energy requirement for successful defibrillation in the morning hours and may have implications for ICD programming.

912-76 P-Wave Discrimination in Intracardiac Electrograms Derived From Defibrillation Leads Depends on the Position of the Superior Vena Cava Electrode

Patrick Schwaerte, Christoph Stellbrink, Friedrich A. Schöndube¹, Hilmar Dörge¹, Marius Grossmann¹, Edith Kuckertz, Bruno J. Messmer¹, Peter Hanrath. ¹ *Medical Clinic 1, Dept. of Cardiovasc. Surgery, RWTH Aachen, Germany*

For differentiation of ventricular vs. supraventricular tachycardia in implantable defibrillators (ICD) the presence of a P-wave and its R-wave relationship is important. Newer ICDs allow the storage of intracardiac bipolar electrograms from the proximal defibrillation electrode (PE) in the superior vena cava (SVC), the distal electrode (DE) in the right ventricular apex and from the tip and ring of the DE. Therefore, we investigated in 22 pts undergoing ICD implantation (Medtronic[®] 7219D, n = 10, Medtronic[®] 7220D, n = 12) the presence (PR), duration (D) and amplitude (A) of the P-wave in 4 different electrograms: Tip to ring, tip to DE, ring to PE and DE to PE. Additionally, in 10 pts the PR, D and A were determined at 3 different positions of the PE for DE/PE: low SVC position (at the border of the right atrium = LP), intermediate SVC position (transition to the innominate vein = IP) and high position (innominate vein = HP). **Results:**

	Tip/ring	Tip/DE	Ring/PE	DE/PE
PR/n	2/22	14/22	21/22	22/22*
D (ms)	24 ± 5.6	45.2 ± 16.1	53.9 ± 15.6*	63.6 ± 16.6*
A (mV)	0.13 ± 0.11	0.27 ± 0.15	0.34 ± 0.18	0.38 ± 0.19

* $p < 0.03$ compared to tip/DE (χ^2), * $p < 0.01$ compared to tip/ring (χ^2), * $p < 0.01$ compared to tip/DE (t test)

P wave was present with DE/PE in all 10 pts where different SVC positions were tested. D was longer in LP (105 ± 32.5 ms) vs. IP (96.7 ± 19.7 ms, n.s.) and HP (60 ± 19.4 ms, $P < 0.01$), D in IP was longer than in HP ($p < 0.01$). A was significantly higher in LP (0.92 ± 0.29 mV) vs. IP (0.47 ± 0.15 mV, $P < 0.05$) and HP (0.28 ± 0.08, $P < 0.02$), A in IP was higher than in HP ($p < 0.02$).

Conclusions: 1) For this ICD system P wave detection and size is optimal in the ring/PE and DE/PE electrograms. 2) A and D are significantly higher with IP compared to HP and A is significantly higher with LP compared to IP for DE/PE. 3) For optimal P wave detection the PE should be implanted in the LP as long as a sufficient defibrillation threshold is obtained.

913 Stress Echo

Monday, March 25, 1996, Noon–2:00 p.m.
Orange County Convention Center, Hall E
Presentation Hour: 1:00 p.m.–2:00 p.m.

913-77 Residual Contractile Reserve in Viable Myocardium With Persistent Asynergy After Revascularization

Carlo Trani, Antonella Lombardo, Alessandro Giordano¹, Faustino Pennestri, Alessandro Manzoli, Francesco Loperfido, Attilio Maseri. *Cardiology Institute, Catholic Univ, Rome, Italy;*¹ *Nuclear Medicine Institute, Catholic Univ, Rome Italy*

Preserved tracer uptake at thallium (Tl) scintigraphy and contractile reserve at low-dose dobutamine echocardiography (DE) do not guarantee functional recovery of asynergic myocardium submitted to revascularization (rev). Whether persistent asynergy after rev is associated with exhaustion of contractile reserve is unknown. We performed rest/redistribution Tl SPECT and DE (5–10 mcg/kg/min) in 21 pts (aged 62 ± 8 yrs) with prior MI (9 ant, 11 ant + inf, 1 inf) before and 5 ± 2 months after rev (17 CABG, 4 PTCA). For both Tl SPECT and DE, a 16-segments 4-points score (1 = normal; 4 = dyskinesia-severe hypoperfusion) LV model was utilized. Anterior and inferior infarct zones (IZ) were constructed. An IZ perfusion score index (PSI) and an IZ wall motion score index (WMSI) were derived. IZ were judged to be viable when: a) PSI was less than 2.9; and b) WMSI decreased of ≥ 0.22 during DE (contractile reserve).

Results: Of 30 IZ submitted to rev, 14 (47%) were judged to be viable and 16 (53%) non-viable by both pre-rev Tl SPECT and DE. Functional recovery (WMSI decrease ≥ 0.22) after rev was observed in 8/14 viable IZ (sensitivity: 89%) and 1/16 non-viable IZ (specificity: 71%). Out of the 6 IZ judged viable before rev but persistently asynergic after rev, 5 still exhibited contractile reserve at post-rev DE and all 6 showed improved thallium uptake (decrease in PSI).

Conclusion: Viable IZ, which do not recover normal resting function after rev despite improved perfusion, often exhibit contractile reserve. Myocardial viability without contractile recovery could reflect conditions of admixture of fibrosis and focal areas of viable cells, very unlikely to recover.