

1021-66 Radiofrequency Catheter Ablation of Idiopathic Left Ventricular Tachycardia with the aid of Purkinje Potentials Recorded During Sinus Rhythm at Sites with Exact ECG Pace Mapping

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Radiofrequency ablation (RFA) of idiopathic fascicular left ventricular tachycardia (IFLVT) has been guided by fast Purkinje potentials (Pjk-P) preceding the QRS during VT. The value of alternative guides to perform RFA is unknown. In 10 consecutive Pts (8 males, aged 34 ± 16 yrs) undergoing RFA (7 ± 7 pulses for success) of an IFLVT, the successful pulse was applied during VT at sites showing Pjk-P in 5 Pts. In 4 Pts, RF application during VT at sites with Pjk-P interrupted the VT but did not prevent its reinduction. In these 4 pts RFA was guided by the combination of 12/12 ECG leads exact pace mapping plus the recording of Pjk-P preceding the QRS during sinus rhythm. In 1 Pt with documented IFLVT, only single VT echo beats were elicited under isoprenaline and RFA was guided by pace-mapping, the recording of Pjk-P during sinus rhythm and during the echo beats. There were 2 recurrences that underwent a successful repeat RFA session, one performed during VT with pre-QRS Pjk-P and the other based on pace mapping plus Pjk-P during sinus rhythm. In all but one Pt, RF application at the successful site induced LV ectopic activity (bigeminy or accelerated idioventricular rhythm) of a configuration identical to that observed during VT. The 10 Pts remain asymptomatic 25 ± 14 months after RFA. **Conclusions:** Interruption of VT during RFA can result in catheter displacement and in an ineffective ablation. RFA in these Pts can be guided by the recording of Pjk-P preceding the QRS during sinus rhythm at sites with exact pace mapping. RF successful pulses frequently induce (9/10) ventricular ectopic rhythms identical in configuration to the IFLVT QRS complexes.

1021-67 Importance of Catheter Stability and Orientation During Microwave Catheter Ablation

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In contrast to radiofrequency ablation, lesion formation during microwave (MW) ablation is not dependent on current flow through tissue, but results from an electromagnetic field created by the antenna. It has therefore been hypothesized that lesion formation may be less dependent on catheter stability and orientation. To test this hypothesis, we evaluated the relationship between lesion size and temperature profiles during MW catheter ablation performed at 65 atrial or ventricular sites in 7 swine. Ablation was performed with a temperature controlled 915 MHz MW ablation system (Power max = 40 watts) and a steerable catheter incorporating an 8 mm coaxial MW antenna. Three thermocouples were positioned at the midpoint of the antenna and one was positioned at the tip. MW energy was delivered at each site for 47 ± 19 sec with a target temp of 70°C. **Results:** A mean peak temperature of 73 ± 10 was achieved with a mean power output of 13 ± 7 watts. Forty eight of 65 (74%) attempted lesions were identified. The mean lesion size was 10 ± 7 × 3.8 ± 1.5 × 2.5 ± 2.2 mm (length × width × depth). Lesion size was greater at those sites associated with parallel orientation (11.4 ± 8.2 × 3.8 ± 1.3 × 3.1 ± 2.4) as compared with those with oblique orientation (5.8 ± 2.7 × 3.8 ± 1.1 × 1.0 ± 0.7, p < 0.05). Significant differences in lesion depth were also observed depending on whether the temperature profile was stable or unstable (3.8 ± 2.7 vs 1.4 ± 0.8, p < 0.05).

Conclusion: Lesion size during temperature controlled microwave ablation is highly dependent on catheter stability and catheter orientation.

1021-68 A New Catheter Design for Validation of Preablation Impedance as a Marker for Myocardial Wall Contact Before Catheter Ablation

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Impedance measurement at a frequency of 50 kHz at 2 µA prior to radiofrequency (RF) energy application has been demonstrated to be a predictive marker for a sudden impedance rise which may be responsible for undesired effects of RF catheter ablation. The aim of this study was to validate whether preablation impedance reflects the myocardial contact pressure of the catheter tip. To facilitate this a catheter with a new electrode configuration (4 mm tip & ring electrode) was used. 336 measurements of preablation impedance in heparinised porcine blood only or with varying myocardial wall contact were carried out. Subsequently we delivered RF energy (n = 72) at 10 and 20 W over 30 s with low (20 g) compared to medium and high myocardial contact pressure (40 g and 80 g) to isolated porcine myocardium superfused with heparinised blood using a 500 kHz RF generator. There was

a significant difference in preablation impedance between measurements in blood only and with myocardial wall contact (78 ± 9 vs 136 ± 14 Ω, p < 0.05). Preablation impedance was significantly higher for energy applications with high as compared to those with low contact pressure (149 ± 29 vs 107 ± 17 Ω; p < 0.05). There was a good correlation between contact pressure and preablation impedance (R = 0.81, p < 0.05). Higher contact pressure resulted in a larger lesion volume 195 ± 81 vs 270 ± 161 mm³ (p < 0.05). An increase in contact pressure also resulted in a greatly increased incidence of impedance rises of 33% vs 80% (p < 0.05).

Using the new electrode configuration preablation impedance allowed not only to differentiate between blood and myocardium but also reflects myocardial contact pressure applied at both tip and ring electrodes. Thus additional information on conditions for RF lesion formation can be obtained prior to the actual energy delivery and the safety of RF ablation can be increased.

1021-69 Temperature Profile During Cooled Radiofrequency Ablation

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Cooled radiofrequency ablation (RF) is currently being investigated clinically for the treatment of ventricular tachycardia. Although these clinical studies employ a constant saline flow rate for cooling, we hypothesized that the temperature (TEMP) profile at depth might be optimized by varying the flow rates during cooled RF. In excised ovine left ventricles in a circulating saline bath, we compared the TEMP from a tip thermocouple to those placed at 0 mm, 1 mm, and 2 mm depths. We compared the following settings: 20 Watts no flow, 20 Watts 0.3 cc/sec flow, 20 Watts 0.5 cc/sec flow, 70 degrees C feedback control no flow.

Mean temperature

| | TIP°C | 0 mm | 1 mm | 2 mm | Depth | Width | Length |
|--------------|-------|------|------|------|-------|-------|--------|
| 20 W no flow | 77.5 | 91.7 | 65.5 | 52.5 | 3.6 | 6.8 | 6.2 |
| 20 W 0.3/sec | 34.7 | 70.9 | 57 | 49.9 | 2.9 | 6.6 | 6.4 |
| 20 W 0.5/sec | 33.0 | 63.4 | 57.1 | 51.6 | 2.7 | 6.0 | 5.6 |
| 70°C no flow | 64.1 | 71 | 60.7 | 45.1 | 2.1 | 5.0 | 5.2 |

We conclude 1) the TEMP profile is greatly dependent upon the rate of saline flow for cooling; 2) at high flow rates, the 0 mm and 1 mm TEMP are similar; 3) even at high flow rates, lesion size is greater than for TEMP feedback control without flow; 4) the tip temperature significantly underestimates the surface 0 mm temperature and improved methods of measuring TEMP may be important.

1022 Computer Applications: New Algorithms and Techniques for Clinical Applications

Tuesday, March 18, 1997, 3:00 p.m.–5:00 p.m.
 Anaheim Convention Center, Hall E
 Presentation Hour: 4:00 p.m.–5:00 p.m.

1022-51 PTCAre – A Computer Expert System for the Management of Post Percutaneous Transluminal Coronary Angioplasty Patients

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Nurses and doctors in training in cardiac care unit often find the management of post percutaneous transluminal coronary angioplasty (PTCA) patients complex and difficult. PTCAre – an interactive computer expert system to recommend heparin adjustment and management of access bleeding was developed. Artificial intelligence theory to simulate human decision making was applied. The system is composed of four major elements: 1). A knowledge base containing the medical knowledge regarding the management of post-PTCA patients. 2). An inference interpreter which controls knowledge base navigation during both forward and backward chaining by depth-first search. 3). Sets of explanations explaining how the conclusions are achieved. 4). A database containing current patient's data. The system is programmed in Arity-Prolog language and runs in windows format. Two retrospective studies comprising of 32 cases (27 patients) regarding heparin adjustment and of another 6 cases (6 patients) regarding femoral artery bleeding after sheath removal were performed respectively to determine if this system provide rational suggestions. System's suggestions were rated by panel of cardiologists.