

1166-213 Computed Tomography Guided Evaluation of Pulmonary Vein Anatomy Following Percutaneous Cryoablation: 12-Month Results

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BACKGROUND: Pulmonary vein isolation (PVI), using radiofrequency energy, for treatment of atrial fibrillation (AF) has been associated with complications including pulmonary vein (PV) stenosis or thrombosis. The purpose of this study was to prospectively evaluate the PV anatomy following cryoablation.

METHODS: 50 patients underwent percutaneous PVI in 3 academic centres. Contrast-enhanced, single-slice or multi-slice spiral CT (1-2.5 mm thick slices) was obtained before, 3 and 12 months following PVI. All examinations were read blinded to the location(s) of ablation. PVs were evaluated quantitatively and qualitatively: the diameter at ostium and at 1 cm from ostium were measured. The presence and location of luminal irregularity or thrombosis was also assessed.

RESULTS: In ablated veins, the mean diameters at ostium were right inferior PV 1.58±0.34, 1.55±0.29 and 1.66±0.15 cm, right upper PV 1.59 ±0.22, 1.53 ±0.24 and 1.47±0.26 cm, left inferior PV 1.29±0.33, 1.24±0.33 and 1.13±0.25 cm, left upper PV 1.73±0.38, 1.70±0.36 and 1.67±0.35 cm before the procedure and, 3 and 12 months after the procedure respectively. No significant difference (p > 0.05) was found between diameter in ablated versus not ablated veins before and after the procedure. Three patients presented with luminal irregularity before the procedure. No patient showed luminal irregularity or thrombosis of PV following cryo-ablation.

CONCLUSION: These results suggest that PVI for the treatment of AF is not associated with stenosis or thrombosis of cryoablated PVs after one year follow-up.

1166-214 Usefulness of a Ventricular Extrastimulus From the Summit of the Ventricular Septum in Diagnosis of Septal Accessory Pathway

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Background: A ventricular extrastimulus (VES) delivered when the His bundle is refractory that advances the subsequent atrial deflection proves the existence of an accessory pathway (AP). Moreover, a VES delivered during His bundle refractoriness which terminates the tachycardia without succeeding atrial activation proves participation of the AP in the tachycardia circuit. The purpose of the study was to compare delivery of a VES from the right ventricular (RV) apex versus the summit of the RV septum in patients with a single septal AP.

Methods: In a retrospective analysis of 16 consecutive patients with a septal AP, a VES from the RV apex delivered at the time of His deflection during tachycardia resulted in advancement of the succeeding atrial deflection in 5 and terminated the tachycardia without subsequent atrial depolarization in 2 patients. We prospectively analyzed the data in a separate group of 12 patients with a septal AP in which a VES was delivered from the RV apex and then from the RV summit at the time of His deflection during tachycardia.

Results: RV apical VES advanced the succeeding atrial deflection in 3 patients and terminated the tachycardia in another 3 patients. In contrast, RV summit VES advanced the succeeding atrial deflection in 4 and terminated the tachycardia in 6 patients. RV summit VES resulted in a significantly higher diagnostic yield for the presence of a septal AP compared with RV apical VES (83% vs. 46%, P <0.05). RV summit VES also resulted in a higher diagnostic yield for proof of participation of a septal AP in the tachycardia circuit compared with RV apical VES (50% vs. 18%, P <0.05). A VES from the RV summit was diagnostic of presence of an AP in all patients with a right-sided septal AP but in only 1 out of 3 patients with a left posteroseptal AP.

Conclusion: A VES during His bundle refractoriness from the RV summit increases the diagnostic yield for both presence of an AP and its participation in the tachycardia circuit with respect to RV apical VES.

1166-215 Atrial Fibrillation Surgery in Patients With Coronary Artery Disease

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Atrial fibrillation (AF) is known to be a risk factor for quality of life and increased mortality. Patients with coronary artery disease undergoing open heart bypass surgery (CABG) often have associated AF. Is antiarrhythmic surgery in patients undergoing CABG safe and effective and is there a subgroup of patients who will benefit most?

Methods: 52 consecutive patients (ejection fraction 54±15%, age 69±7years) with chronic permanent AF (11±10years) underwent CABG (only CABG in 32, CABG plus mitral valve surgery in 20 due to ischemic mitral valve insufficiency) plus additional intraoperative cooled-tip radiofrequency ablation to treat AF (aortic clamp 98±22minutes, bypass time 164±41minutes) treating the left atrium alone in 26 and both atria in 26 patients.

Results: Out of the total of 52 patients 39 converted to stable sinus rhythm (SR) during a mean follow-up of 23±16months ranking up to a 12-month estimated rhythm-success percentage of 80% (3 months 31/44 patients: 70%, 6 months 35/44 patients: 80%, 12 months 28/36 patients: 78%). At 6 months follow-up 79% of patients in SR had documented biatrial contraction. There is no significant difference in rhythm outcome when one or both atria are treated (86% versus 75%, p=0.24). During follow-up 9 patients died (30-day mortality 8%) ranking up to a cumulative 12-months survival rate of 85%.

Patients undergoing CABG procedure alone had a significantly higher survival in short and long term follow-up compared to patients undergoing additional mitral valve surgery (30-day mortality 3% versus 15%, p=0.038; 12-month survival 94% versus 70%, p=0.049). Conversion rates did not differ significantly in between the two groups (74% versus 94%, p=0.31).

Conclusions: Intraoperative cooled-tip radiofrequency ablation in the atria can safely and effectively be added to an open heart surgery in patients with coronary artery disease and the ablation procedure is equally effective independent to the number of atria treated (left versus biatrial). Patients with additional mitral valve disease have a worse outcome in regard to survival but not when considering rhythm outcome. In over 60% of these patients an anticoagulation regimen may be stopped.

1166-216 Efficacy of Cryoablation for Treatment of Paroxysmal Atrial Fibrillation

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Background: Electrical isolation of the pulmonary veins (PV) by radiofrequency catheter ablation (RFCA) has been shown to be an effective treatment for paroxysmal atrial fibrillation (PAF). However, RFCA has been associated with a significant incidence of PV stenosis. Experimental and early clinical studies have shown that catheter cryoablation of the PVs is also effective in curing PAF, but without causing PV stenosis.

Methods: Therefore, we performed PV cryoablation using a 10Fr cryoablation catheter system (CryoCor, Inc) in 31 patients (pts), of whom 23 were males, mean age 56±9 yrs with drug refractory PAF (failure of 2.1±1.1 drugs pre-procedure). Of these pts, 8 also had a history of atrial flutter (AFL). All pts underwent map-guided, segmental, pulmonary vein isolation, with success defined as complete elimination of PV potentials. Event recording, both symptomatic and scheduled, was used to capture arrhythmic episodes prior to and for 6 months following cryoablation. Patients underwent spiral CT scans to evaluate PV diameter at baseline, 3 and 6 months after ablation.

Results: There were 29/31 pts (94%) successfully treated in the index procedure with 86 of 90 veins ablated (96%). At 6 months follow-up there were 13/23 pts (57%) without recurrence of PAF. Of the 10 pts with recurrent AF, 5 pts had a second ablation using RF at 2.8±0.87 months. During the 6 months following the index procedure the average frequency of AF episode in RF re-treated pts was 0.94±1.0/month, whereas the average frequency of AF episodes of those not re-treated was 0.9±1.2/month. In the 13 pts in sinus at 6 months, 8 were on anti-arrhythmic drugs, 2 of whom were on beta-blockers only. Of the 23 pts who underwent spiral CT scan at 6 months, none had PV stenosis.

Conclusion: The initial results of this pilot study show that cryoablation can be used as a single treatment for PAF with 6-month efficacy of 57%. Cryoablation appears to be without risk of PV stenosis.

1166-217 Lone Atrial Fibrillation: A Benign Disease? Data of the RACE Study

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Background - In patients with persistent atrial fibrillation (AF) rate control is not inferior to rhythm control regarding morbidity and mortality. With lone AF, outcome of a rate and rhythm control strategy may differ from that in patients with AF in the setting of underlying heart disease (UHD). The aim of this study was to compare morbidity, mortality and quality of life (QoL) under rate or rhythm control in patients with lone AF and AF in UHD.

Methods - In the RATE versus Electrical cardioversion (RACE) study, 522 patients were randomized to rate or rhythm control. A total of 108 patients had lone AF. The occurrence of cardiovascular endpoints (components see table) and QoL (using SF-36 questionnaire) were compared between patients with and without UHD.

Results - Patients with lone AF were younger (66±10 vs 69±8 years, p=0.001), suffered for a shorter period from AF (p=0.004) and had less complaints of fatigue (p=0.02) and dyspnea (p=0.000) compared to those with UHD. With lone AF, QoL at baseline was higher. Mean follow-up was 2.3±0.6 years. Cardiovascular endpoints occurred in 9% (10) of the patients with lone AF, 7 under rate and 3 under rhythm control, and in 23% (94) of the patients with UHD. QoL did not largely change in both groups towards study end.

Incidence of the primary endpoint and its components

	Lone AF	AF with UHD	
	Rate control (n=53)	Rhythm control (n=55)	Rhythm control (n=211)
Endpoint - no.(%)	7 (13)	3 (5)	57 (27)
Cardiovascular mortality	2 (4)	1 (2)	17 (8)
Heart failure	0	0	12 (6)
Thromboembolic complications	2 (4)	1 (2)	20 (9)
Bleeding	4 (8)	1 (2)	8 (4)
Side effects of antiarrhythmic drugs	0	0	12 (6)
Pacemaker implants	1 (2)	1 (2)	7 (3)

Conclusion - In patients with lone AF treated with rate or rhythm control, cardiovascular event rate was low, compared to patients with UHD. QoL is higher in patients with lone AF. Event rate with lone AF was too small to assess whether to prefer rate or rhythm control.

1166-218 Modification of Electrophysiologic Properties of Pulmonary Veins and Adjacent Left Atrial Tissue by Radiofrequency Circumferential Ablation of the Pulmonary Vein Ostia: Correlation With Nonrecurrence of Atrial Fibrillation

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Background: Electrical disconnection between pulmonary veins (PVs) and left atrium (LA) is now frequently used in the treatment paroxysmal atrial fibrillation (AF). Ablation of PVs per se is, however, time consuming and is often complicated with PV stenosis. Furthermore, the rate of recurrence is rather high perhaps due to anatomical variations of PV-LA junctional area. Hence, we tested the efficacy of PV ostial ablation with a novel radio-frequency balloon catheter (RBC) and elucidated the electrophysiologic changes required for the maintenance of sinus rhythm.

Methods and Results: Forty-nine patients with drug-resistant AF underwent circumferential ablation of PV-LA junction by RBC. Post ablation changes in electrophysiologic properties around the PV ostia were studied with a basket catheter and were correlated with AF recurrence in 34 early cases (ablating 68 superior PVs) and 15 later cases (53 superior and inferior PVs). Total elimination of PV potentials or PV-LA dissociation was achieved in 92.7% (63/68 PVs) and 92.5% (49/53 PVs), respectively. During mean follow-up periods of 15.1±4.8 and 6.2±2.2 months, AF recurred in 38.2% (13/34 cases) and 13.3% (2/15) in early and later groups, but no case developed PV stenosis. Although the amplitude of PV and peristial LA potentials were decreased (p<0.0001) in all patients, the remaining PV potentials in 34 nonrecurrence cases were definitely smaller than those in 15 recurrence cases (p<0.0001). When a cut-off level of less than 0.4 mV in receiver operating characteristic curves was used, its negative predictive value for non-recurrence of AF was 93% and specificity was 95.2%.

Conclusions: Circumferential PV ostial ablation with an RBC is highly effective in terminating AF without the risk of PV stenosis. Maintenance of sinus rhythm can be predicted when both superior and inferior PVs are ablated and amplitudes of all the remaining PV-LA potentials are decreased to less than 0.4mV.

POSTER SESSION

1167

Effects of Cardiac Pacing and Resynchronization Therapy

Tuesday, March 09, 2004, 3:00 p.m.-5:00 p.m.

Morial Convention Center, Hall G

Presentation Hour: 4:00 p.m.-5:00 p.m.

1167-207 Improved Response Rate and Left Ventricular Epicardial Lead Stability Following Robotically-Assisted Ventricular Resynchronization

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Background: Robotically-assisted left ventricular (LV) epicardial lead implantation is a safe and effective technique for biventricular pacing. We hypothesized that such a strategy for ventricular resynchronization therapy might produce improved clinical response rates over the medium term.

Methods: Twenty patients with congestive heart failure (NYHA Class 3.5 ± 0.5) and a widened QRS (184 ± 30 msec) underwent robotic LV lead placement for biventricular

pacing. Mean patient age was 69.4 ± 11.6 years, LV ejection fraction (EF) was 12.3 ± 6% and left ventricular end diastolic volume was 6.8 ± 1.2 cm. The etiology of heart failure was ischemic in 55% and idiopathic in 45%. Ten patients (50%) had prior coronary artery bypass surgery. Indications for robotic LV lead implant included failure of coronary sinus cannulation (10), atretic venous tributaries (4), poor LV lead capture (3), primary implant (2) and coronary sinus dissection (1).

Results: Two epicardial leads were placed on the posterolateral surface of the LV in all patients as directed by intra-operative electrophysiologic mapping. Implant success rate was 100%. Intraoperative lead threshold was 1.2 ± 0.6 v at 0.5 ms, R-wave was 14.4 ± 8.7 mv, and impedance was 1098 ± 220 ohms at 0.5 v. Complications included one post-operative pneumonia, one intraoperative LV injury and one episode of post-operative renal insufficiency. At an average follow-up of 8.5 ± 4.4 months, 19 of 20 patients are alive and well. Improvements in exercise tolerance have been demonstrated in 85% of patients and there have been no lead failures over the follow-up period. Statistically significant improvements in ejection fraction (19.9 ± 13%, p=0.03) and QRS duration (149 ± 21 msec, p=0.007) have also been measured. Over the medium-term lead thresholds have remained unchanged (1.8 ± 1.1V at 0.5 ms, p=ns), and a significant drop in impedance (310 ± 54 ohms, p=0.005) has been detected.

Conclusions: Robotic LV epicardial leads remain stable and reliable over the medium term. Improved clinical response rates may be achieved with the site directed implantation strategy that this technique affords.

1167-208 Relationship Between QRS Duration and Left Ventricular Dyssynchrony in Patients With End Stage Heart Failure

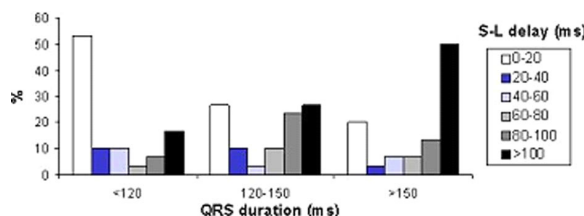
G. B. Bleeker, M. J. Schalij, S. G. Molhoek, H. F. Verwey, E. E. van der Wall, J. J. Bax, Leiden University Medical Center, Leiden, The Netherlands

Background: Patients with end-stage heart failure and wide QRS complex are considered candidates for cardiac resynchronization therapy (CRT). A wide QRS complex is considered to represent left ventricular (LV) dyssynchrony. However, 20-30% of these patients do not respond to CRT. Tissue Doppler Imaging (TDI) may provide more accurate information on intra-LV dyssynchrony. Accordingly we evaluated a large cohort of patients with different QRS durations with TDI to assess LV dyssynchrony.

Methods: 90 consecutive patients with severe heart failure (LVEF<35%, NYHA class III-IV) were divided into 3 groups of 30 patients based on QRS duration. (<120ms, 120-150 ms and > 150ms). All patients underwent TDI to assess LV dyssynchrony and QRS duration was compared to the septal-to-lateral delay (S-L delay), a direct marker of LV dyssynchrony. Based on previous work, an S-L delay >60 ms was considered indicative of severe LV dyssynchrony.

Results: Severe dyssynchrony was observed in 8 patients (27%) with narrow QRS complex (<120 ms), in 18 patients (60%) with a QRS duration of 120-150 ms, and in 21 patients (70%) with QRS > 150 ms (see figure). No relation existed between QRS duration and S-L delay.

Conclusions: QRS duration does not adequately reflect intra LV dyssynchrony and TDI should be used alternatively. In addition, 27% of patients with heart failure and narrow QRS complex have dyssynchrony and may be candidates for CRT.



1167-219 Long-Term Reliability of Epicardial and Transvenous Leads Used for Cardiac Resynchronization Therapy

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Background: Left ventricular pacing leads used in cardiac resynchronization therapy are either placed in the coronary venous vasculature transvenously (TRANS) or surgically implanted transthoracically on the epicardium (EPI) via limited thoracotomy. A long-term comparison of the reliability of these leads in heart failure patients (pts) has not been previously discussed.

Methods: Pts participating in the VIGOR CHF and VENTAK CHF/CONTACT CD studies had either TRANS (443 pts) or EPI (109 pts) leads implanted. EPI leads were either steroid eluting sutureable (SUT, 81 pts) or non-steroid eluting screw-in myocardial (MYO, 28 pts). A Kaplan-Meier estimate of the time to lead failure or replacement was calculated for TRANS vs. EPI as well as for SUT vs. MYO leads. Pt deaths and explants due to heart transplant or infection were censored at the time of the event.

Results: Revision was required in 44 TRANS (10%) and 26 EPI (24%) leads [9 MYO (32%) and 17 SUT (21%)]. Failure in TRANS leads was typically due to dislodgment while that of EPI leads was usually due to exit block or lead fracture. TRANS leads were significantly more reliable than EPI (hazard ratio=2.5, p=0.0003). SUT trended to greater reliability than MYO (hazard ratio=2.1, p=0.08).