**Conclusion:** Our initial experience indicated that the RE was reduced by 50% but we believe that a greater reduction could be obtained by increasing training after an initial period of learning curve. This may represent an extraordinary benefit in RE time reduction due to the increasing CAP volume without reducing the safety and efficacy of the procedures.

### 8.6 FUSION OF ELECTRICAL MAPS AND MDCT IMAGES FOR VALIDATION OF LEFT ATRIUM ABLATION POINTS

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**Purpose:** Aims of this study are: a) the three-dimensional (3D) reconstruction of the left atrium (LA) and pulmonary veins (PVs) and its fusion with LA electrical map (LAEM); b) the validation of the real positions of the PVs ablation points (APs).

**Methods:** Eight patients underwent TAC 16 slices after PVs ablation for atrial fibrillation (AF). A marker-controlled "watershed segmentation" was developed for 3D LA reconstruction. LAEMs (CARTO) were registered on the 3D LA inner surface of the patients. On the "fusion maps", we count offline the APs number inside the ostia of PVs.

**Results:** A percentage of 5,4% up to 17% of the total APs number was counted inside the left superior PV (LSPV) ostia and in particular on the anterior wall. A percentage of 4,5% up to 13,9% of the total APs number was counted inside the right inferior PV (RIPV) ostia.

**Conclusions:** Fusion maps allow validating the position of the APs on a real map of LA. This study shows that the area between LSPV ostium and LAA could be the critical points during AF ablation.

### 8.7 SINUS RHYTHM ATRIAL FIBRILLATION (AF) CATHETER RF-ABLATION GUIDED BY "AF-NESTS" SPECTRAL MAPPING

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**Background:** Using endocardial spectral mapping in sinus rhythm we have found 2 kinds of atrial myocardium: the *fibrillar* with rightward-segmented spectrum - named *AF-Nest* - and the *compact* with leftward non-segmented spectrum. By inducing AF we have consistently observed very high-disorganized activation only in the *AF-Nest* [*reactive resonant tissue*] while the compact keeps well-organized rather regular activation [*passive tissue*]. These findings suggest that *AF-Nests resonance* plays a crucial role in AF physiopathology refeeding the arrhythmia.

**Objective:** Describe the AF treatment by *AF-Nests* catheter RF-ablation.

**Patients:** 81 p (68M, 51.6±10y) with very frequent refractory AF, paroxysmal 56(Px) and persistent 25(Ps) without significant cardiopathy (LA 42±6mm).

**Methods:** Catheter RF-ablation [EPT 4mm] guided by spectral mapping in sinus rhythm outside pulmonary veins (PV). Endpoints: 1. *AF-nests* RF-ablation [60°/30J/30s] shifting its spectrum to the *compact* pattern; 2. Focal ablation of any residual atrial tachycardia/flutter (AT); 3. AF non-inducibility by atrial pacing and 4. Long-term control with serial EKG and Holter.

**Results**: A mean of 49±19 *AF-nests*/p were treated. At the FU of 11.2±7months 88,8% p have no AF. After *AF-nests* ablation: it was impossible to reinduce AF in 71% Px and in 33% Ps. Non-sustained AF (<10s) was induced in 29% Px and in 44% Ps. Sustained AF was only induced in 22% Ps; residual AT was also induced and treated in 26%. In 23.5% a healing coarse AF/AT was observed [1.5±1 day] readily responsive to brief medical treatment. 11% p were successfully reablated (residual *AF-Nests*/AT). 22% p is taking low AA dose. *AF-Nest* location: LA roof 100%, LS/RS PV insertion 89%, LIA septum 86.4%, RI/LI PV insertion 68%, septal posterior 70%, RA 63%. 2 pericardial effusions occurred 1 clinically and 1 surgically treated.

**Conclusion:** By spectral mapping the *AF-Nests* were easily found and ablated; During the AF the *AF-Nests* play a *reactive resonant* role while the *compact* plays a *passive* one; After all *AF-nest* ablation it was impossible to reinduce AF; Regular residual AT must be sought to be treated in the same procedure; The *AF-nest* ablation outside PV is safe, feasible and very efficient to cure A

### 8.8 IMPACT OF LEFT ATRIAL SCAR ON THE OUTCOME OF PULMONARY VEIN ISOLATION

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Fibrosis and scarring in the left atrium (LA) remote from the pulmonary vein (PV) ostia may promote fibrillatory conduction and contribute to the late recurrence of atrial fibrillation (AF) following PV isolation. Electroanatomical maps (median 68 sites/pt) of the LA were generated in sinus rhythm prior to wide area circumferential PV isolation alone in 58 pts with paroxysmal or persistent AF. Sites were excluded from analysis if within the area of subsequent circumferential ablation. The Scar Index was defined as the proportion of total LA sites with a bipolar voltage $\leq$ 0.50 mv. The mean Scar Index was 12.5$\pm$9% in AF pts compared to 1.3$\pm$1% in 8 normal controls with no history of AF. During a mean follow-up of 7$\pm$3 mo, 9/58 pts (16%) had late recurrence of AF. In pts with a Scar Index $\geq$18%, 5/10 (50%) had recurrent AF compared to 4/48 pts (8%) with a Scar Index <18% (p=0.005). Among 10 clinical variables, multivariate analysis identified the Scar Index as the strongest predictor of AF recurrence (p=0.007), along with greater LA dimensions (p=0.023) and lower ejection fraction (p=0.084). The extent of LA scarring outside the region of the PV ostia is a powerful predictor of AF recurrence in pts undergoing circumferential PV isolation alone, and identifies a subgroup that may benefit from additional interventions.

## 9. PACEMAKERS: CLINICAL RESULTS, PRACTICAL ASPECTS AND LATE-BREAK CLINICAL TRIALS

### 9.1 THE 'ADAMO' REGISTRY ON SINGLE AV LEAD ICD: FINAL OUTCOMES

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Improper SVT discrimination is the main cause of inappropriate delivery of therapy in single chamber ICDs. ICDs mod. Lexos A+ (Biotronik, D) detect atrial rhythm information through floating electrodes located on the single defibrillation A-V lead. SMART algorithm assures specificity. Aim of the ADAMO registry was to assess if specificity and sensitivity of the single-lead ICD are comparable to those achieved in dual-chamber ICDs (93% and 100% respectively). Fifty-seven pts (51m, 63±13y, LVEF 36±10%, NYHA 1.9±0.7) were enrolled. Cumulative f-u is 466 mo. P-wave amplitude was stable around 3.2±1.1 mV during f-u. One-hundred-eighty arrhythmic episodes were detected, of which 65 SVT. Ninety-four VT/VF were interrupted by ATP or shock. Three SVT and two T-wave oversensing were recognized as VT and treated. In 2 pts inappropriate ATP/shocks were delivered for: lead displacement and atrial undersensing. No episodes of VT/VF were erroneously detected as SVT. The data show that the single-lead ICD has 100% sensitivity and 97.2% specificity. Conclusion: the single-AV-lead ICD represents a concrete alternative in most pts in whom a single or dual chamber device should be implanted.

### 9.2 AUTOMATIC ADJUSTMENT OF THE RESPONSE FACTOR APPROACHING PHYSIOLOGY

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**Objective:** Adaptive-rate pacemakers are designed to restore appropriate heart rates for patients during daily life. Wilkoff describes a linear relationship between heart rate reserve and workload reserve. This clinical study investigated whether appropriate rate response can be achieved using an automatic algorithm.

**Methods:** 15 patients received a pacemaker (INSIGNIA Ultra, Guidant Corporation) using a blend of ventilation and activity sensors. The Minute Ventilation Response Factor was automatically determined using an algorithm (AutoLifestyle™) that records the patient's maximum ventilation over time and adjusts the response factor per the patient actual ventilation. The patient age was the only required variable. After 1 month a symptom limited exercise test (CAEP protocol) was performed and the adaptive response was evaluated.

**Results:** The slope of the heart rate reserve to workload reserve averaged 0.87 (range 0.3-1.3, median 0.88, standard deviation .28). The slope of 67% of patients (10 of 15) fell within the normal confidence intervals. The slope of the remaining patients fell below the normal confidence intervals.

**Conclusion:** AutoLifestyle™ can provide appropriate restoration of chronotropic response without extensive testing.