ABSTRACTS

ORAL PRESENTATION

ANTIARRHYTHMICS

O001

EFFECTIVENESS AND SAFETY OF NEW CLASS III ANTIARRHYTHMIC AGENT NIFERIDILE IN PHARMACOLOGICAL CONVERSION OF PERSISTENT ATRIAL FIBRILLATION AND FLUTTER

Yuricheva Y; Maykov E; Sokolov S; Golitsyn S; Mironov N; Beloshapko G; Yushmanova A; Rosenshtraukh L; Chazov E
Russian Research Cardiology Centre

The aim of our study was to evaluate the efficacy and safety of i.v. administered new class III antiarrhythmic agent niferidile in doses up to 30 mkg/kg in conversion of persistent atrial fibrillation (AF) and flutter (AFL) to sinus rhythm. 50 patients (33 male) without structural heart diseases, age 55 ± 12 years, with arrhythmia lasting 4,4 ± 4,2 months (2 weeks- 24 months) were included. Niferidile was administered as 3 bolus injections (10 mkg/kg each) performed with the 15-min interval. Conversion to sinus rhythm within 24 hours was achieved in 44 of the 50 patients: success rate of niferidile in dose of 10 mkg/kg was 54%, in dose of 20 mkg/ kg – 70%, and in dose of 30 mkg/ kg reached 88%. Niferidile was effective in all 11 patients with AFL and in 33 of 39 patients (85%) with AF. None of patients developed proarrhythmic effects such as «torsade de pointes». **Conclusion:** i.v. niferidile in doses up to 30 mkg/kg seems to be very effective (up to 88%) and safe for sinus rhythm restoration in patients with persistent AF and AFL.

O002

ELECTROPHYSIOLOGIC AND ANTIARRHYTHMIC EFFECTS OF NEW CLASS III AGENT NIFERIDILE IN PATIENTS WITH PAROXYSMAL SUPRAVENTRICULAR TACHYCARDIAS

Mironov NYu; Golitsyn SP; Sokolov SF; Yuricheva YuA; Maikov EB; Shlevkov NB; Rosetstraukh LV; Chazov EI
Russian cardiology research complex

Background: According to preclinical studies Niferidile (Nf) is a novel potassium channel blocker that inhibits transient outward and delayed rectifier currents and increases effective refractory periods (ERP) more in atria, less in ventricles. High affinity of Nf to atrial myocardium predispose to high efficacy in patients with supraventricular arrhythmias and to low risk of ventricular arrhythmogenic action. **Objectives:** To evaluate electrophysiologic and antiarrhythmic effects of Nf in patients with paroxysmal supraventricular tachycardia (PSVT). **Materials and Methods:** Effects of Nf (20micrograms/kg intravenously) were studied in 22 patients (14 males) with PSVT (11 orthodromic tachycardia in WPW syndrome, 8 atrioventricular nodal reentrant tachycardia, 3 orthodromic tachycardia due to concealed bypass tract) during endocardial electrophysiological study (EPS). Termination of PSVT by Nf could be investigated in 16 patients and prevention of reinduction of PSVT by this drug – in 19 patients. **Results:** Nf terminated PSVT in 81.25% and prevented reinduction of PSVT in 75.95% of patients. Nf increased the ERP of right atrium (by 22.61%, $p < 0.001$), left atrium (by 21.55%, $p < 0.001$), right ventricle (by 14.02%, $p < 0.05$) and accessory pathways (anterogradely by 30.16%, $p < 0.001$; retrogradely by 33.6%, $p < 0.001$). Nf did not alter sinus node recovery time and atrioventricular conduction. Nf prolonged QT (by 21.3%, $p < 0.01$) and QTc (by 16.01%, $p < 0.05$) intervals without the evidence of proarrhythmic effect. **Conclusions:** Prolongation of ERP in cardiac tissues (mostly in atrials) is the main electrophysiologic effect of Nf. New drug demonstrated high antiarrhythmic efficacy and good safety profile in patients with PSVT.

O003

PHARMACOLOGICAL TREATMENT OF PATIENTS WITH INAPPROPRIATE SINUS NODE TACHYCARDIA: BETA-BLOCKER OR IF-CHANNEL INHIBITOR?

Borbola J; Abraham P; Foldesi Cs; Kardos A
Hungarian Institute of Cardiology

Inappropriate sinus-node tachycardia (IST) is a rare disease defined as increased heart rate at rest, and/or inadequate response to physical or emotional stress. In the last years 25 patients (23 women, 2 men, age: 18–57 (33) years) were treated with IST due to palpitations. Patients had no structural heart disease (LVEF: 65 ± 2%), TSH values were within normal limits, but resting heart rate were repeatedly high: 106 ± 3/min. The results of Holter recording (expressed as minimal-maximal and average heart rate/min) without medication showed high heart rate values: 58 ± 2 – 163 ± 3 – (96 ± 2)/min. The bicycle ergometry showed an average loading capacity of 120 ± 5 W (heart rate: control (C): 104 ± 4/min, top (T): 170 ± 6/min. The aim of the study was to compare

the beta-blocker and ivabradine treatment in IST patients. The beta-blocker treatment (bisoprolol 5 mg/day) improved the high sinus node frequency spectrum both during Holter monitoring ($54 \pm 2 - 135 \pm 4 - 81 \pm 2$/min, $p < 0.0001$) and during ergometry (120 ± 8 W; C: 86 ± 3; T: 145 ± 4/min; $p < 0.05$). The ivabradine therapy decreased the heart rate significantly and dose-dependently compared to the control values: ivabradine 5 mg b.i.d: $50 \pm 2 - 131 \pm 5 - 76 \pm 2$/min ($p < 0.0001$), ivabradine: (7.5 mg b.i.d.): $48 \pm 1 - 130 \pm 6 - 72 \pm 2$/min; $p < 0.0001$), and decreased the heart rate frequency during ergometry: ivabradine (2×5 mg/day: C: 83 ± 3; T: 137 ± 4/min ($p < 0.05$)), (2×7.5 mg/day: C: 77 ± 4; T: 137 ± 8/min ($p < 0.05$)). There was no change in the loading capacity. The ivabradine treatment was well tolerated, there was no sinus bradycardiac episode leading to treatment discontinuation. On the other hand, several side effects were noticed during beta-blocker therapy. Based on our clinical experiences, IST can be treated with the sinoatrial node modulator drug ivabradine successfully and safely. The ivabradine treatment might be considered as an alternative to the ablation of the sinoatrial node with the inherent risk of pacemaker implantation.

ATRIAL FIBRILLATION ABLATION

O004

ABLATION OF PAROXYSMAL AND PERSISTENT ATRIAL FIBRILLATION: 1-YEAR FOLLOW-UP THROUGH IMPLANTABLE ECG RECORDER

Romanov A; Pokushalov E; Corbucci G; Shabanov V; Elesin D; Stenin I; Losik D
State Research Institute of Circulation Pathology

Introduction: The aim of this prospective observational study was to identify Responders to ablation through continuous subcutaneous monitoring for 1 year after ablation in patients with paroxysmal atrial fibrillation (PAF) or persistent AF (PersAF). **Method:** Patients with symptomatic drug refractory AF were enrolled. Real-time three-dimensional (3D) left atrium maps were reconstructed by using a nonfluoroscopic navigation system (CARTO, Biosense-Webster, USA). The ipsilateral left and right pulmonary veins (PVs) were encircled in 1 lesion line by circumferential PV isolation. All patients were implanted with Reveal XT (Medtronic Inc.) for continuous AF monitoring and data collected every month during the 12-month follow-up. **Results:** We enrolled 129 patients (56 ± 9 years, 102 males), all of whom were followed-up for 12 months after the last ablation procedure: 58 (45%) had a history of PersAF. After only 1 ablation procedure, 76 (59%) of the 129 patients were AF-free at 12-month: 48 out of 71 (68%) in the PAF group and 28 out of 58 (48%) in the PersAF group. After 1 or more ablation procedures, 94 (73%) of the 129 patients were AF-free 12 months after the last procedure: 57 out of 71 (80%) in the PAF group and 37 out of 58 (64%) in the PersAF group. **Conclusion:** Ablation is highly effective in treating AF, as assessed through detailed 1-year continuous monitoring: success rate is higher in PAF than in PersAF patients. The use of subcutaneous monitors is a valuable means of identifying responders and nonresponders, and can potentially guide antiarrhythmic and antithrombotic therapies.

O005

FUNCTIONAL IMPROVEMENT IN ADVANCED HEART FAILURE AFTER MITRAL SURGERY IN PATIENTS UNDERGOING RADIOFREQUENCY ABLATION OF ATRIAL FIBRILLATION IS RELATED TO LONG TERM MANTAINANCE OF SINUS RHYTHM

Rostagno C; Blanzola C; Sclafani G; Montesi GF; Braconi L; Stefano PL; Cardiologia Generale1, §Cardiochirurgia – AOU Careggi – Firenze

Objective: Atrial fibrillation is associated with a higher mortality in patients with advanced heart failure, Persistence of AF after mitral valve (MV) surgery is associated with poorer hemodynamic improvement in comparison to resumption of sinus rhythm (SR). RF-maze associated with MV surgery is associated with a 60–70% long term persistence of SR. The aim of this prospective investigation was to evaluate the relation between persistence of SR and change of functional status in patients in patients with advanced NYHA class. **Methods:** 301 consecutive patients were treated by RF-maze with Medtronic CardioBlate® system associated with MV surgery between November 2001 and December 2007 and were followed up for an average period of 1450 days. 234 /301 were in advanced NYHA functional class (III-IV). Clinical examination, ECG and echocardiogram were evaluated at baseline and during follow-up (3 to 96 months). **Results:** At an average follow-up of 1450 days, 180/234 (77%) patients in preoperative NHYA class III-IV were alive. One hundred and twenty were in SR, while 60 remained in stable AF. In the two groups age was similar (mean 64.7 years in SR, 66.7 in AF) as mean AF duration

(36 vs 39 months). Baseline LA diameter, left and right atrium area were greater in patients in whom AF persisted in comparison to those in SR. These last patients showed a more relevant remodelling of atrial chambers after surgery. Baseline mean NYHA class was 2.96 in SR and 3.13 in AF patients. At follow-up a significant functional improvement was found in SR patients (average NYHA class 1.31 vs 2.33, $p < 0.003$), associated with a significant decrease of calculated systolic pulmonary pressure. **Conclusions:** persistence of SR after AF ablation is associated with a significant functional improvement in comparison to patients who remain in AF. Persistent pulmonary hypertension after surgery may limit clinical improvement and contribute to maintenance of AF.

O006

TRANSSEPTAL ACCESS AND ATRIAL FIBRILLATION ABLATION GUIDED BY INTRACARDIAC ECHO IN PATIENTS WITH ATRIAL SEPTAL CLOSURE DEVICES

Santangeli P; Di Biase L; Burkhardt JD; Horton R; Sanchez J; Lakkireddy D; Bai R; Beheiry S; Hongo R; Natale A
Texas Cardiac Arrhythmia Institute – St. David's Medical Center, Austin, TX

Background: Percutaneous positioning of closure devices is a well-established treatment of atrial septal defects (ASD). These patients are at increased risk of developing atrial fibrillation (AF), and treatment by catheter ablation is underutilized due to the perceived difficulty of obtaining transseptal access in the presence of the closure device. We report the acute and long-term results of radiofrequency catheter ablation of AF in patients with ASD closure devices. **Methods:** Thirty-nine patients (age 54 ± 6 years, 72% males) with drug-refractory AF (33% paroxysmal, 51% persistent, 16% long-standing persistent) and ASD closure devices (82% Amplatzer®, 18% Cardioseal®) underwent radiofrequency catheter ablation. A double transseptal access guided by intracardiac echocardiography (ICE) was obtained in all patients. **Results:** In 35/39 (90%) patients the transseptal access was obtained in a portion of the native septum, while in 4/39 (10%) a direct access through the device was required. The latter group had a significantly longer time for achieving the double transseptal access (73.6 ± 1.1 min vs. 4.3 ± 0.4 min, $p < 0.001$), longer fluoroscopy time (122 ± 5 min vs. 80 ± 8 min, $p < 0.001$), and total procedure time (4.1 ± 0.2 hours vs. 3.1 ± 0.3 hours, $p < 0.001$). At a follow-up of 14 ± 4 months the overall success rate was 77% (85% in paroxysmal AF, 73% in non-paroxysmal AF). Transthoracic contrast-enhanced echocardiography with the Valsalva maneuver, performed between 3 and 6 months after the procedure, failed to detect shunt in all patients. **Conclusions:** Radiofrequency catheter ablation of AF is feasible, safe and effective in patients with ASD closure devices. Transseptal access can be obtained in portions of the native septum in the majority of the cases. Direct transseptal puncture of the device is feasible and safe, but it requires longer time for each transseptal access.

O007

IMPACT OF RADIO-FREQUENCY CHARACTERISTICS ON ACUTE PULMONARY VEIN RECONNECTION AND CLINICAL OUTCOME AFTER PVAC ABLATION

De Greef Y; Tavernier R; Schwagten B; De Keulenaer G; Stockman D; Duytschaever M
Department of Cardiology, Antwerp Cardiovascular Institute Middelheim, Belgium

Aim: To study the impact of radio-frequency (RF) characteristics on acute pulmonary vein reconnection (PVR) and outcome after PVAC ablation. A strategy of PV isolation with additional ablation of PVR (PVI + PVR) was compared to PVI-only. **Methods:** Eighty patients underwent PVAC-ablation: in 40 patients, PVI-only was performed; in another 40 patients adenosine and 1-hour waiting time were used to unmask and ablate PVR (PVI+PVR) after baseline PVI. Freedom of AF was compared at 12months. RF-characteristics of PVAC applications needed for baseline PVI were assessed. **Results:** There was no difference in clinical characteristics or baseline RF-profile between the 2 groups. In the PVI+PVR group, PVR was observed and ablated in 38 out of 160 veins (24%). Freedom of AF after PVI+PVR was higher compared to PVI-only (85% vs 65%, $p < 0,05$). Within the PVI group, when comparing patients with and without AF recurrence, percentage of PVAC applications with high T° but low power (>48°, <3W) was higher (28 ± 18% vs 11 ± 11%, $p < 0,0001$). When comparing PVs with and without PVR, the percentage of PVAC applications with high T° but low power was also higher (27 ± 13% vs 13 ± 15%, $p < 0,0001$). **Conclusions:** After PVAC-guided PVI, 24% of PVs exhibit acute PVR. Additional ablation of PVR is associated with improved clinical outcome. Acute PVR and recurrence of AF are characterised by a

prior PVAC ablation with a considerable number of applications with high temperature but low power. If PVI is obtained with low power PVAC applications, a consistent use of adenosine and waiting time is required.

O008

THE ROOF LINE DOES NOT INFLUENCE THE 12-MONTH SUCCESS OF CIRCUMFERENTIAL ABLATION OF THE PULMONARY VEINS: RESULTS OF A PROSPECTIVE RANDOMIZED STUDY.

Arbelo E; Guiú E; Andreu D; Borras R; Berruezo A; Tolosana JM; Brugada J; Mont L
Hospital Universitari Clínic, Thorax Institute, Barcelona, Spain

Introduction: The isolation of the pulmonary veins (PV) for the treatment of atrial fibrillation (AF) is often associated to linear radiofrequency lesions within the left atrium (LA) in an effort to improve results. The aim of the study was to evaluate the contribution of the roof line in the mid-term success of AF ablation. **Methods:** We prospectively included patients (p) undergoing catheter ablation for AF. The PV isolation was performed by continuous circular lesions around ipsilateral PV, checking for conduction block with a circular multipolar catheter within the veins. Subsequently, p were randomized to no further ablation (CPVA-NoRL) versus an additional linear ablation at the roof of the LA (CPVA-RL) between the superior aspect of the circular lesions at the left and right PV). Follow-up was performed at 1, 3, 6 months after the procedure and every 6 months thereafter. After a 3 month blanking period, recurrence was defined as the occurrence of any arrhythmia of $\geq$30 seconds. **Results:** 140 patients (55 $\pm$ 11 years, 69% male, 35% hypertension, LA diametre 42 $\pm$ 6 mm, LVEF 62 $\pm$ 8%, 20% structural cardiomyopathy) undergoing AF ablation, were randomized. No significant differences were observed between the CPVA-NoRL vs. CPVA-RL groups in terms of LA diametre, presence of hypertension, structural cardiomyopathy nor any other arrhythmia predictor. After a first procedure of AF ablation, there was no significant difference in the arrhythmia-free survival curve between the two groups (72% in CPVA-RL vs. 78% in CPVA-NoRL at 12-months, log-rank p = 0,29). The incidence of LA macroreentrant tachycardias after a first procedure was 4,8% in the CPVA-RL group versus a 5,5% in the CPVA-NoRL one. **Conclusion:** The left atrial roof line does not improve mid-term results of the isolation of the pulmonary veins for the ablation of atrial fibrillation.

O009

COMPLEXITY OF ATRIAL FIBRILLATION IN CHINESE IN ROUTINE DAILY PRACTICE: INSIGHTS FROM THE REALISEAF-TAIWAN REGISTRY

Chiang CE; Wang KL; Naditch-Brule L; O'Neill J; Steg PG; RealiseAF registry
General Clinical Research Center, Taipei Veterans General Hospital, Taipei, Taiwan

Purpose: Patients with atrial fibrillation (AF) have multiple co-morbidities and high cardiovascular risk. Most studies were carried out in Western countries, and there is a paucity of data from Chinese patients. The aim of this analysis was to describe clinical characteristics, risk factors, co-morbidities, and management strategies in Taiwanese patients in the RealiseAF registry. **Methods:** RealiseAF was a cross-sectional survey of 10,523 patients from 831 sites in 26 countries on 4 continents, with at least one AF episode documented by standard electrocardiogram or by Holter monitoring in the last 12 months. Participating physicians were randomly selected in 2009 from lists of office-/hospital-based cardiologists and internists. **Results:** Among 742 patients in Taiwan who were eligible for analysis, the mean (SD) age was 70.2 (11.8) years. More men (59.8%) than women were enrolled. Permanent AF was most common (51.7%), followed by paroxysmal (33.3%) and persistent (11.1%) AF. Cardiovascular risk factors and co-morbidities were very common: 72.9% had hypertension, 27.0% had diabetes, 40.7% had heart failure, 34.5% had coronary artery disease, 21.9% had cerebrovascular disease, and 38.8% had valvular heart disease. A rate-control strategy (67.8%) was more frequently undertaken than rhythm-control (24.5%). The majority of patients (85.2%) received at least one anti-arrhythmic drug, but 81.5% of patients had an EHRA AF classification $\geq$2. The mean (SD) CHADS2 score was 2.2 (1.4), and 65.1% had a CHADS2 score $\geq$2. However, only 31.8% of patients were receiving an oral anti-coagulant. **Conclusions:** AF patients in daily practice in Taiwan had multiple risk factors and co-morbidities, similar to those in Western countries. Patients were highly symptomatic despite the widespread use of anti-arrhythmic drugs. The risk of stroke was generally high, but the use of anti-coagulants was extremely inadequate. There is an

apparent unmet need in AF treatment in Chinese patients.

O010

IMPACT OF RADIOFREQUENCY CATHETER PULMONARY VEIN ISOLATION (PVI) ON TOTAL ATRIAL FIBRILLATION (AF) BURDEN IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION

Urban L; Hlivak P; De Melis M; Garutti C; Corbucci G; Hatala R
National Cardiovascular Institute, Slovak Medical University, Bratislava, Slovakia

Background: Evaluation of success of radiofrequency catheter ablation (RFCA) in AF patients (pts) is largely based on symptoms reduction / abolition and on intermittent ECG recordings. Evaluation of the occurrence of AF by means of continuous ECG monitoring was rarely used until now. **Aim:** To quantify the total AF burden (AF%) in pts undergoing catheter PVI in the pre- and post-ablation period. AF% was defined as the percentage of the total monitoring time during which the patient was in AF. To this aim, continuous ECG monitoring was performed by means of implantable loop recorder (ILR, Reveal XT, Medtronic Inc., USA) in pts undergoing radiofrequency catheter ablation for paroxysmal AF. **Patients and Methods:** 52 pts (56 ± 9 years, 79% males) were prospectively enrolled in this study. All patients had the ILR implanted in stable sinus rhythm before RFCA (3 ± 2 months) and were followed-up for 9 months after RFCA. The initial 3 months were blanked and were not comprised in the analysis. All pts had paroxysmal AF for a mean of 6.4 ± 4.8 years, 47% of them had a history of >1 episode of persistent AF prior to ILR implantation, mean left atrial diameter was 44 ± 4 mm, LVEF% was 59 ± 6%. Their mean CHADS2 score was 1 ± 0.7. RFCA comprised point-by-point electroanatomically guided PVI only in 31 pts (60%), linear lesions were added in 21 (41%). **Results:**

1 The median pre- versus post-RFCA AF% was 19.5% and 0.4%, respectively ($p < 0.00001$)
2 The maximum daily AF burden decreased from 21 ± 6 h to 7 ± 8 h ($p < 0.0001$)
3 Post RFCA, 90% of pts did not have episodes lasting >24h.

Conclusions: This pilot study on the role of continuous ecg monitoring by ILR in assessing RFCA outcome demonstrates a dramatic reduction in paroxysmal AF burden and episode duration after PVI based RFCA. Pre and post-RFCA ecg data derived from ILR allow for comprehensive AF characterization which is important for quantifying RFCA success and for further clinical arrhythmia management.

O011

INDUCIBILITY OF ATRIAL FIBRILLATION DOES NOT INFLUENCE THE OUTCOME AFTER PULMONARY VEIN ISOLATION

Arbelo E; Guiú E; Andreu D; Borras R; Berruezo A; Tolosana JM; Brugada J; Mont L
Hospital Universitari Clínic, Thorax Institute, Barcelona, Spain

Introduction: Some conflicting results of the efficacy of the inducibility test used in the catheter ablation of atrial fibrillation (AF) have been reported. The aim of this study was to investigate the value of inducibility in the outcome of circumferential pulmonary vein isolation in patients with paroxysmal AF. **Methods:** In this prospective study, 114 consecutive patients (p) undergoing ablation of atrial fibrillation were included. The ablation set included antral encircling of the pulmonary veins (PV) in all p (checking for conduction block with a multipolar circular catheter placed within the veins), with additional lines at the LA roof in 55 p and the mitral isthmus line in 8 p. At the end of the procedure, inducibility was evaluated with trains of 10 impulses with an initial cycle length of 350 ms, reduced by 10 ms until 250 ms or until 1:1 atrial capture was lost. AF was considered inducible when sustained for at least 30 seconds. Patients were followed up at 1, 3 and 6 months after the procedure and every 6 months thereafter. **Results:** 130 patients (55 ± 11 years, 74% male, 40% hypertension, LA diametre 42 ± 5 mm, LVEF 60 ± 10%, 16% structural cardiomyopathy) undergoing AF ablation (99 p Paroxysmal AF, 31 p Persistent AF in sinus rhythm during the procedure) were evaluated. AF was inducible in 25 p (22%) after antral PV isolation. No significant differences were observed between the inducible vs. non-inducible groups in terms of LA diametre, presence of hypertension, structural cardiomyopathy nor any other arrhythmia predictor. After a first procedure of AF ablation, there was no significant difference in the arrhythmia-free survival curve between the two groups (68% vs 86% at 12-months, $p = 0{,}584$) (figure). **Conclusion:** The absence of inducibility of arrhythmias after circumferential pulmonary vein isolation does not predict a better

mid-term result after catheter ablation of atrial fibrillation.

O012

THE ABLATION OF COMPLEX FRAGMENTED ATRIAL ELECTROGRAMS DOES NOT INFLUENCE 12-MONTH SUCCESS OF PULMONARY VEIN ISOLATION FOR THE ABLATION OF ATRIAL FIBRILLATION: A PROSPECTIVE RANDOMIZED STUDY

Arbelo E; Guiú E; Andreu D; Borras R; Berruezo A; Tolosana JM; Brugada J; Mont L
Hospital Universitari Clínic, Thorax Institute, Barcelona, Spain

Introduction: The ablation of continuous and fragmented potentials has been proposed as an adjuvant therapy to the isolation of the pulmonary veins (PV) in an effort to improve results. The aim of this study was to evaluate the impact of the ablation of fragmented potentials in the ablation of persistent/permanent atrial fibrillation (AF). **Methods:** We prospectively included patients (p) undergoing catheter ablation for persistent / permanent AF. The PV isolation was performed by continuous circular lesions around ipsilateral PV, checking for conduction block with a circular multipolar catheter within the veins. Subsequently, p were randomized to no further ablation (CPVA-NoF) versus additional ablation of fragmented potentials (CPVA-F). These fragmented potentials were defined as any continuous and fractionated activity of low voltage, sustained over >10 seconds over time. Follow-up was performed at 1, 3, 6 months after the procedure and every 6 months thereafter. After a 3 month blanking period, recurrence was defined as the occurrence of any arrhythmia of ≥30 seconds. **Results:** 110 patients (53 ± 10 years, 81% male, 36% hypertension, LA diametre 45 ± 6 mm, LVEF 54 ± 12%, 26% structural cardiomyopathy) undergoing AF ablation, were randomized (82% persistent AF, 18% permanent AF). No significant differences were observed between the CPVA-NoF vs. CPVA-F groups in terms of LA diametre, presence of hypertension, structural cardiomyopathy nor any other arrhythmia predictor. After a first procedure of AF ablation, there was no significant difference in the arrhythmia-free survival curve between the two groups (58% en CPVA-F vs. 65% en CPVA-NoF at 12-months, log-rank p = 0,434). **Conclusion:** The ablation of complex fragmented atrial electrograms in addition to PV isolation does not improve the mid-term results of pulmonary vein isolation for the ablation of persistent and permanent atrial fibrillation.

O013

SINGLE CENTER EXPERIENCE OF CATHETER ABLATION FOR ATRIAL FIBRILLATION USING MULTI-ELECTRODE MAPPING AND ABLATION CATHETERS

Zeb M; Scott A Paul; Yue A; Roberts P; Morgan J
Southampton University Hospital

Purpose: Radiofrequency Ablation (RFA) is an established therapy for the treatment of paroxysmal and persistent atrial fibrillation (AF). Many techniques have been reported to achieve RFA. We report a single center experience of RFA using three multielectrode catheters. **Method:** We collected data of the patients who had radiofrequency ablation for AF using custom designed multielectrode mapping and ablation catheters between May 2007 and November 2009 at this center. **Results:** 105 pts aged 56 ± 9.6 yrs underwent radiofrequency ablation using three multielectrode catheters. Eighty seven patients were new and 18 patients had redo AF ablation using the multielectrode mapping and ablation catheters. In the new patients the mean duration of procedure was 141 + 38 minutes and fluoroscopy time was 38 + 14 minutes. The mean duration of follow up was 15.8 + 6.4 months. Symptomatic improvement was achieved in 75 (86%) patients, 48 (55%) patients remained in sinus rhythm (SR) after first procedure while 7 (8%) had multiple procedures and remained in SR without Antiarrhythmic drugs (AADs). Fourteen (16%) patients required AADs following single procedure and one (1.1%) patient after multiple procedures to remain in sinus rhythm. Seven (8%) patients had reduced burden of AF. No improvement occurred in 12 (13.7%) patients. In the 18 redo patients, 15 (83.3%) patients had symptoms improvement. Four (22.2%) patients remained in SR after single procedure and 4 (22.2%) patients required multiple procedures to remain in sinus rhythm without AADs. one (5.5%) patient remained in sinus rhythm on AADs following single procedure one (5.5%) patient remained in sinus rhythm on AADs following multiple procedures. Five (27%) patients had reduced burden of AF and 3 (16.6%) patients had no improvement. **Conclusion:** PVI using multielectrode mapping and ablation catheters is an effective treatment of paroxysmal and

persistent AF with a complication rate equivalent to published data.

O014

CHARACTERIZATION OF FRACTIONATED ATRIAL ELECTROGRAMS CRITICAL FOR MAINTENANCE OF AF: A RANDOMIZED CONTROLLED TRIAL OF ABLATION STRATEGIES (THE CFAE AF TRIAL)

Hunter RJ; Diab I; Tayebjee M; Richmond L; Sporton S; Earley M; Schilling RJ
Cardiology Research Department, St Bartholomew's Hospital

Introduction: Whether ablation of complex fractionated atrial electrograms (CFAE) modifies AF by eliminating drivers or atrial de-bulking remains unknown. This randomised study aimed to determine the effect of ablating different CFAE morphologies compared to normal electrograms (i.e. de-bulking normal tissue) on the cycle length of persistent AF (AFCL). **Methods:** After pulmonary vein isolation CFAE were targeted until termination of AF or abolition of CFAE prior to DC cardioversion. 10s electrograms were classified according to a validated scale, with Grade 1 being most fractionated and grade 5 normal. Patients were randomised to have CFAE grades eliminated sequentially, from grade 1 to 5 (group 1) or grade 5 to 1 (group 2). Because grade 5 electrograms were considered normal, only 5 were ablated. An increase in AFCL (mean of left and right atrial appendage) $\geq$ 5 ms was regarded as significant. **Results:** 968 CFAE were targeted in 20 patients. CFAE grade determined by rapid visual inspection agreed with that at off-line manual measurement in 93% ($\kappa = 0.91$). AFCL increased after targeting 51 $\pm$ 35% of grade 1 CFAE, 30 $\pm$ 15% grade 2, 12 $\pm$ 5% grade 3, 33 $\pm$ 12% grade 4, and 8 $\pm$ 15% grade 5 CFAE ($p < 0.01$ for grades 1, 2, and 4 versus 5, 3 versus 5 not significant). Binary logistic regression confirmed the impact of CFAE grade, but showed no effect of electrogram amplitude, location in the left or right atrium, or the order in which CFAE were targeted on the proportion of lesions causing AFCL prolongation. Elimination of the most fractionated electrograms first reduced the number of grade 3 and 4 CFAE encountered (group 1 versus group 2 both $p < 0.01$), translating to fewer CFAE targeted per patient in group 1 compared to group 2 (37 $\pm$ 14 and 58 $\pm$ 18 respectively; $p = 0.015$). **Conclusion:** Targeting CFAE is not simply atrial de-bulking. Ablating certain grades of CFAE increases AFCL, suggesting they are more important in maintaining AF.

O015

COMPARISON OF LEFT MITRAL AND INFERIO-SEPTAL ISTHMUS ABLATION FOR CURE POSTABLATIVE PERIMITRAL FLUTTER

Ardashev AV; Zhelyakov EG; Konev AV; Rybachenko AV; Belenkov YuN*
83 Clinical Hospital of FMBA, * Lomonosov State University, Moscow, Russia

Aim: to compare mitral isthmus vs. inferio-septal isthmus ablation to cure perimitral atypical atrial flutter (PAAF) after radiofrequency ablation (RFA) of atrial fibrillation (AFib). **Methods:** Study consisted of 22 pts (8 women, 54.3 $\pm$ 13.6 years of age) with PAAF who underwent RFA because of paroxysmal (4 pts), persistent (11 pts) and permanent (7 pts) AFib. All studied pts underwent redo because of drug-refractory PAAF in the period of 6 $\pm$ 3 months after primary RFA. Activation mapping and entrainment technique demonstrated PAAF in all studied pts. Mitral isthmus RF-lesions in the left atrium were a first step (endocardial approach to mitral isthmus). Then distal CS-roof RFA was performed (epicardial approach to mitral isthmus). As a third step linear RFA of the inferio-septal isthmus (from right inferior pulmonary vein ostium to mitral annulus) was performed (endocardial approach to inferioseptal isthmus). Additional RF-applications delivered inside the proximal CS roof (epicardial approach to inferioseptal isthmus). **Results:** Left mitral isthmus endocardial RF-pulses terminated AAF in 4 cases, increased CL of PAAF without changes of atrial hierarchy activation in 2 cases (from 200 to 310 ms), and transformed PAAF to AFib in 2 cases. Distal CS-roof RF-isolation terminated PAAF in 2 pts. Endocardial inferio-septal isthmus ablation was associated with SR restoration in 2 cases and increasing of PAAF CL in 5 cases. RFA applied into the proximal CS terminated PAAF in 10 pts. Follow up was 26.7 $\pm$ 12.4 mos. Endocardial and epicardial mitral isthmus approach terminated perimitral PAAF in 6 pts (36%). RF-ablation of endocardial and epicardial aspects of the inferioseptal isthmus restored SR in 12 pts (64%) ($p < 0.05$). There were neither AFib nor PAAF during follow up period. **Conclusion:** Endocardial and epicardial aspects of the inferioseptal isthmus seem to be more critical comparing to mitral isthmus to cure PAAF after RFA of AFib.

O016

TWO DIFFERENT ABLATION STRATEGIES IN PATIENTS WITH PAROXYSMAL ATRIAL FIBRILLATION: A PROSPECTIVE RANDOMIZED COMPARISON

Romanov A; Pokushalov E; Shabanov V; Elesin D; Artemenko S; Stenin I; Yakubov A; Losik D
State Research Institute of Circulation Pathology

Introduction: The aim of this study was to compare PVI isolation plus LL with PVI plus ablation of ganglionated plexi (GP) in patients with paroxysmal AF. **Methods:** One hundred forty six consecutive patients with paroxysmal AF were randomly assigned to 2 different ablation schemes: PVI plus LL (n = 72) and PVI plus GP (n = 74). Primary end point was to assess the maintenance of sinus rhythm (SR) after procedures. Antiarrhythmic drugs were discontinued within 2–4 weeks after ablation in both groups. PVI was successful in all targeted veins in both groups. **Results:** PVI plus GP – after single procedure at the 12-month follow-up, 51 of 74 patients (68.9%) were in SR without AAD. AF recurrence was the reason of a redo procedure in 11 patients, atypical atrial flutter in 2 patients, and typical atrial flutter in 3 patients. In the 2 patients with atypical atrial flutter, a reentry circuit involving the right PVs was the mechanism. Among the remaining 11 patients with AF recurrence a recovery of veno-atrial conduction in at least 1 or more PVs was found in all the patients. With the addition of a second procedure, the overall success rate without AAD was 79.7% (59 of 74 patients). PVI plus LL – 38 of 72 patients (52.7%) were in SR without AAD (p = 0.006). Repeat ablation was performed for recurrent AF in 21 patients, and for atypical atrial flutter in 9 patients. The mechanism of the atypical atrial flutter was a conduction gap in the lesion line of the left isthmus in 7 cases and a conduction gap in the roof line in 2 patient. Among the 21 patients with AF recurrence, a recovery of veno-atrial conduction in at least one or more PVs was found in all the patients. After second procedure, the overall success rate without AAD was 73.6% (53 of 72 patients; p = 0.03). **Conclusions:** PVI isolation plus GP is superior to the PVI plus LL strategy in maintaining SR without antiarrhythmic drugs after first and second procedures in paroxysmal AF.

O017

PULMONARY VEIN ISOLATION: A COMPARISON OF THE ABLATION PROCEDURAL OUTCOMES BETWEEN POINT BY POINT AND MULTIPOLAR CIRCULAR ABLATION CATHETER (PVAC) IN PATIENTS WITH ATRIAL FIBRILLATION

Lim SH; Lewis A; Affolter J; Broadhurst P
Aberdeen Royal Infirmary

Background: Catheter ablation is widely used in the treatment of atrial fibrillation. The aim of this study is to compare the procedural outcomes between point by point ablation and multipolar circular ablation catheter (PVAC) for pulmonary vein isolation (PVI) in patients with atrial fibrillation. **Methods:** This was a retrospective cohort analysis of adults undergoing PVI in a tertiary care center. Procedural outcomes were compared between PVAC and point to point ablation group using student's t-test and the chi-square as appropriate. A $p < 0.05$ was considered statistically significant. **Outcomes:** Among 85 patients (mean age 56years, 54men) undergoing PVI ablation, 57 patients had point to point ablation and 28 had PVAC ablation. NAVX geometry mapping of the left atrium was used in both ablations. Screening time (46 vs 66mins; p = 0.000), radiation dose from fluoroscopy (5553 vs 8282cGy.cm^2; p = 0.010) and duration of procedure (3 vs 4 hours; p = 0.000) were significantly shorter in the PVAC group. There was also higher success of complete electrical isolation of targeted pulmonary veins using PVAC (93 vs 76%; p = 0.064). In addition, there was less additional ablations (roof lines and cavo tricuspid isthmus ablation) and pre procedural cardiac CT/MRI performed in patients undergoing PVAC ablation and this were statistically significant. Ablation duration, day 1 post ablation rhythm, procedure complications and days of admission were comparable between both groups. **Conclusion:** Patients undergoing PVI ablation using PVAC had higher success in electrically isolating the targeted pulmonary veins and lower screening time, procedure duration and radiation dose. The results suggest PVAC may prove to be a practical option to point by point ablation.

O018

EFFECTS OF PULMONARY VEIN ISOLATION ON THE CARDIOPULMONARY EXERCISE PARAMETERS IN PATIENTS WITH SYMPTOMATIC ATRIAL FIBRILLATION

Kriatselis C; Brala D; Nedios S; Gerds-Li JH; Fleck E
Deutsches Herzzentrum Berlin

Introduction: Pulmonary vein isolation (PVI) is an effective procedure for symptomatic atrial fibrillation refractory to treatment. Following successful

PVI, most patients experience an improvement in subjective symptoms. However, the effect on objective cardiopulmonary exertion parameters is not yet known. We studied the influence of PVI on these parameters, as tested by cardiopulmonary exercise testing with maximal exertion. **Methods:** Twenty-eight patients (8 women, age 58 ± 11 years) with paroxysmal (n = 15) or persistent (n = 13) atrial fibrillation and indication for PVI were studied. Spiroergometric testing was performed before and 3 and 6 months after PVI (ergometer bicycling in semi-supine position, stress increase of 10 Watts/min until symptom-limited maximal exertion reached). Antiarrhythmic medication was terminated after 4 weeks in patients with paroxysmal and after 3 months in those with persistent atrial fibrillation. Cardiopulmonary parameters measured or calculated were: maximal oxygen uptake (VO2max, ml/min), functional capacity (FC,% VO2max/VO2 pred.) und anaerobic threshold (AT, calculated by the V-slope method). **Results:** FC before PVI was 92 ± 16% (range 65–125%). Six months after PVI 24 patients had sinus rhythm. VO2max and FC were significantly increased in comparison with the baseline values (2114 ± 750 vs 1954 ± 635 ml/min, p: 0.021 and 101 ± 24 vs 93 ± 17%, p: 0.04). The AT was also significantly improved (1224 ± 330 vs 1080 ± 338%, p: 0.003). **Summary:** Following primarily successful isolation of the pulmonary veins the maximal oxygen uptake, functional capacity and anaerobic threshold of patients show a significant increase through a follow-up period of six months.

O019

EFFICACY, SAFETY, AND OUTCOME OF ATRIAL FIBRILLATION ABLATION IN THE ELDERLY

Arbelo E; Guiú E; Andreu D; Borras R; Berruezo A; Tolosana JM; Brugada J; Mont L
Hospital Universitari Clínic, Thorax Institute, Barcelona, Spain

Introduction: Catheter ablation of atrial fibrillation (AF) has become a treatment option for patients with drug refractory AF. With improved safety, the therapy has been offered to older populations. However, the outcome of AF ablation in the elderly is not clear. The aim was to compare success rate, outcome, and complication rate of AF ablation in the elderly (>70 years old) versus the younger population. **Methods:** We retrospectively analyzed 785 consecutive patients that had undergone a catheter ablation for drug-refractory symptomatic AF from 2003 to 2011. Patients were divided into two groups: (Gr1) ≥70 years (n = 41) and (Gr2) <70 years (n = 744). AF ablation consisted of pulmonary vein antral isolation with or without additional linear lesions of complex fractionated electrogram ablation. Follow-up was performed at 1, 3, 6 months after the procedure and every 6 months thereafter. After a 3 month blanking period, recurrence was defined as any arrhythmia of ≥30 seconds. **Results:** Baseline characteristics among the two groups only differed in gender (78% Gr1 vS 42% Gr2), presence of hypertension (40% Gr1 and 59% Gr2) and the duration of AF (57,5 ± 58,1 Gr1 and 59,1 ± 59,2 Gr2). No differences were observed in terms of LA diametre, structural cardiomyopathy, nor other arrhythmia predictor. After a follow-up 14,5 ± 14,9 months, there was no difference in the arrhythmia-free survival curve after a 1st procedure (60% G1 vs. 56% Gr 2 at 12-months, log-rank p = 0,66). The complication rate was similar (8,1% in group 1 versus 7,3% in Gr2). However, there were 2 strokes and 2 other cardioembolic events in the group ≥70 yo, and this was significantly different (1,5% group 1 versus 9,8% group 2,). There were no deaths. **Conclusion:** AF ablation is a safe and effective treatment for AF in the older patients. However, special care must be taken with the anticoagulation management, for there seems to be a higher risk of periprocedural thromboembolic events.

O020

CATHETER ABLATION WITHOUT FLUOROSCOPY: A SINGLE INSTITUTION EXPERIENCE

Clark JM; Smith GL; Lane J
Akron Children's Hospital, Akron OH

Introduction: Catheter ablation without the use of fluoroscopy is becoming more widely used. We review our experience over the last three years utilizing the Ensite system. **Methods:** Chart review was performed for all ablations either completed or attempted without fluoroscopy between January 2008 and May 2011. Information gathered included patient age, height, weight, tachycardia mechanism, ablation energy used, procedure time, fluoroscopy time, success or failure of procedure, and complications. For patients undergoing transseptal puncture, transesophageal echocardiography (TEE) was used instead of fluoroscopy. **Results:** There were 224 procedures performed or attempted without fluoroscopy. In 221 procedures fluoroscopy was not used. Mean patient age was 14 years (range 6 months to 65 years). Mean weight was 57.2 kg (range 7.2 – 142kg). Mean procedure

time was 142 minutes (range 42 – 402 minutes, median 127). The mechanisms of tachycardia were as follows: AVNRT in 80 patients; WPW in 80 patients; concealed accessory pathway in 46 patients; AET in 5 patients; VT in 4 patients; flutter in 2 patients; and 7 patients had more than one tachycardia mechanism. Radiofrequency energy was used in 123 procedures, cryoenergy in 99, and both in 2. Acute success was achieved in 219/224 (98%). There were no complications. Fluoroscopy was needed in three procedures. One patient with a left-sided pathway was ablated under conscious sedation, and therefore could not undergo TEE. One patient required fluoroscopy due to technical problems with TEE. And one patient with flutter had a transvenous atrial pacing lead. Fluoroscopy was used to localize the tip of the pacing lead. **Conclusion:** Catheter ablation can be routinely performed without the use of fluoroscopy. Utilizing newer three-dimensional mapping systems, fluoroscopy is rarely necessary. This has long-term benefits to both patients and staff.

O021

TRANSCRANIAL MEASUREMENT OF CEREBRAL MICROEMBOLIC SIGNALS DURING PULMONARY VEIN ISOLATION: A COMPARISON OF TWO DIFFERENT ABLATION TECHNIQUES

Nagy-Baló E; Tint D; Beke I; Clemens M; Kovács R*; Csiba L*; Édes I; Csanádi Z
Institution of Cardiology and Department of Neurology*, University of Debrecen, Hungary

Backround: Pulmonary vein isolation (PVI) have been increasingly used to cure atrial fibrillation. Recently, concerns have been raised that subclinical brain damage may occur due to microembolisation during these procedures. We compared the occurrence of bubble formation seen on intracardiac echocardiography (ICE) and microembolic signals (MES) detected by transcranial Doppler using different ablation techniques and anticoagulation strategies. **Methods and Results:** 26 procedures in 25 consecutive patients (age: 51 ± 13 years; female:male 5:20) were included in this prospective study. PVI was performed using cryoballoon and conventional anticoagulation protocol (ACT>250 sec) during 7 procedures (Group1), multipolar duty-cycled radiofrequency catheter (PVAC) and conventional anticoagulation protocol in 12 procedures (Group 2) and PVAC with an aggressive anticoagulation regime (ACT>350 sec) during 7 procedures (Group 3). The total number of MES detected during the procedures were 1494 ± 1136 in group 1, 5631 ± 3317 in group 2 and 5419 ± 2064 in group 3 (p = 0,01). A significant difference was also demonstrated in the number of solid microemboli in the 3 groups (220 ± 97, 915 ± 240 and 963 ± 385, respectively, p = 0,01). MES were detected mostly during energy delivery in all 3 groups (425 ± 405, 30903 ± 3076 and 3619 ± 1636, respectively, p = 0,01). Strong correlation (r = 0.89) was found between the degree of bubble formation on ICE and the number of MES in all groups. **Conclusion:** Duty-cycled RF ablation is associated with significantly more MES even when a more aggressive anticoagulation is applied. Most of MES are gaseous in nature and occur during energy delivery.

ATRIAL FIBRILLATION: EPIDEMIOLOGY, AETIOLOGY AND MANAGEMENT

O022

PREDICTORS OF CLINICAL EFFICACY OF "ABLATE AND PACE" THERAPY IN PATIENTS WITH PERMANENT ATRIAL FIBRILLATION

Brignole M; Botto GL; Mont L; Oddone D; Iacopino S; De Marchi G; Campoli M; Sebastiani V; Vincenti A; Garcia Medina D; APAF
Ospedali del Tigullio

Aim: To evaluate the 2-year clinical improvement after "Ablate and pace" therapy and to identify the variables able to influence its efficacy in patients with severely symptomatic permanent atrial fibrillation (AF). **Methods and results:** In the Ablate and Pace in Atrial Fibrillation (APAF) trial, 171 patients, in whom AV junction ablation had been successfully performed, were randomly assigned to right ventricle (RV) pacing or echo-guided cardiac resynchronization (CRT) pacing and had valuable follow-up data. During a median follow-up of 20 months (interquartile range 11 – 24), 125 (73%) patients had clinical improvement after "Ablate and pace" therapy (Responders group); responders were 63% of RV paced patients and 83% of CRT paced patients (p = 0.003). Other 46 (27%) patients did not have clinical improvement (7%) or worsened (20%) (Non-responders group). At univariate analysis, non-responders were more likely to be males, to have lower systolic blood pressure, larger LV end-systolic diameter and to have RV pacing. At multivariable Cox regression analysis, CRT mode and echo-optimized CRT remained the only independent protective factors against non-responsive conditions (HR = 0.24 [95% CI

0.10–0.58, p = 0.001 and 0.22 [95% CI 0.07–0.77, p = 0.018 respectively). When comparing freedom from non-responsive conditions, there was a trend in favor of echo-optimized CRT versus simultaneous biventricular pacing (p = 0.077). **Conclusion:** In patients affected by severely symptomatic permanent AF, clinical benefit from Ablate and Pace therapy was observed in 63% of RV pacing group and 83% of CRT pacing group. CRT pacing and echo-optimized CRT were the only independent predictor of clinical benefit.

O023

DOES THE LEFT ATRIAL APPENDAGE MORPHOLOGY CORRELATES WITH THE RISK OF STROKE IN PATIENTS WITH ATRIAL FIBRILLATION? RESULT FROM A MULTICENTER STUDY

Di Biase L; Gaita F; Anselmino M; Horton R; Santangeli P; Salvetti I; Gilli S; Sanchez J; Burkhardt JD; Natale A
Texas Cardiac Arrhythmia Institute at St. David's Medical Center, Austin, Texas, USA

Introduction: The left atrial appendage (LAA) represents one of the major cause of TIA/stroke in pts with atrial fibrillation (AF). We quantitatively studied various morphology of the LAA by computed tomography (CT) and by magnetic resonance (MRI) and correlated the LAA morphology with the history of stroke/TIA. **Methods:** 932 pts with drug refractory AF planning to undergo AF ablation. All pts underwent cardiac CT or MRI and care was taken to obtain LAA frames. All pts were screened for history of TIA/stroke. LAAs were categorized into different morphologies which included Chicken Wing, Windsock, Cauliflower and Cactus. **Results:** CT images of 499 patients and MRI images of 433 pts were analyzed (59 ± 10 yrs, 79% male, BMI 27 ± 4, EF 60 ± 7, 14% CHADS2 ≥2). The LAA was categorized into four morphologies: 278(30%) pts were classified as Cactus, 451(48%) as Chicken Wing, 179(19%) as Windsock and 24(3%) as Cauliflower. Out of the 932 pts, 73(8%) pts had prior history of ischemic stroke or transient ischemic attack. The prevalence of pre-procedure stroke/TIA in Cactus, Chicken Wing, Windsock, and Cauliflower morphologies were 12%, 4%, 10%, and 18% respectively (p = 0.003). After controlling for CHADS2 score, gender, and AF types in a multivariable logistic model, Chicken Wing morphology was found to be more likely to remain stroke-free (odds ratio 19, p = 0.043). In separate multivariate model we entered chicken wing as reference group and assessed the likelihood of stroke in other groups in relation to reference. Compared to chicken wing, Cactus had 4.08 times (p = 0.046), Windsock-4.5 times (p = 0.038), and Cauliflower 8.0 times (p = 0.056) more likely to have an ischemic event. **Conclusion:** This study suggests that pts with chicken wing morphology are less likely to have an embolic event even after controlling for comorbidities. If confirmed, these results could have a relevant impact on the anticoagulation management of pts with an intermediate risk for stroke.

O024

A GLOBAL COMPARISON OF THE APPROPRIATENESS OF THROMBOPROPHYLAXIS AT TIME OF ACUTE CARDIOVERSION: PRELIMINARY DATA FROM THE RHYTHM-AF STUDY

Lip GYH; Crijns HJGM; Bash LD; for the RHYTHM-AF Study Scientific Committee
University of Birmingham, Birmingham, England

Purpose: Explore type of antithrombotic therapy (ATT) in atrial fibrillation (AF) patients (pts), and appropriateness at cardioversion (CV), in terms of stroke risk and AF duration. **Methods:** RHYTHM-AF is a prospective observational study in 10 countries (8 in EU, Brazil, Australia). Pts considered for CV were enrolled from acute care settings between May 2010 and July 2011. Data collected at time of AF; descriptive statistics compared type of ATT administered at time of CV and discharge, related to both stroke risk ('high risk' defined by CHA2DS2-VASc score ≥ 2) and duration of AF (< or ≥ 48 hrs) of each patient. Pts with unknown AF duration were included in the group with AF ≥ 48 hrs. **Results:** Of 2381 pts who were cardioverted (35% via pharmacologic (PCV), 65% via direct current (DCV) cardioversion), 63% were at high risk of stroke and 24% presented with AF ≥ 48 hrs. Among all pts undergoing PCV and DCV, 64% (n = 540) and 74% (n = 1141), respectively, had either a high stroke risk or AF>48hrs. Among these high risk pts, 35% (n = 191), and 85% (n = 971) were on vitamin K antagonists (VKA) or heparin at time of PCV and DCV, respectively. At discharge, these rates had risen to 60% and 93%, respectively. Among all low stroke risk pts with a short AF duration undergoing PCV (n = 300) and DCV (n = 400), 14% and 71% were overtreated with VKA or heparin at the time of CV, respectively. At discharge, these rates even rose further to 27% and 79%, respectively. **Conclusions:** In the majority of high risk AF pts PCV is performed without appropriate

ATT. PCV does not seem to trigger correct ATT although between conversion and discharge the numbers of appropriately treated PCV pts increased significantly. In contrast, DCV is most frequently performed under appropriate ATT. Overtreatment with ATT occurs mainly in pts undergoing DCV. To enhance pericardioversion stroke prevention, CV algorithms should focus less on type of conversion and more on stroke risk factors and AF duration.

O025

AF AS A CONSEQUENCE OF TUBERCULOUS PERICARDITIS: SOUTH AFRICAN EXPERIENCE

Syed FF; Ntsekhe M; Wiysonge C; Badri M; Oh JK; Mayosi B; IMPI Africa
Cardiac Clinic, Univ. of Cape Town, S.Africa and Div. of Cardiology, Mayo Clinic, Rochester, USA

Background: There is no study regarding the prevalence, correlates, and natural history of atrial fibrillation (AF) associated with tuberculous (TB) pericarditis to guide the management of affected patients. **Methods:** Consecutive patients presenting with TB pericardial effusion of at least 1 cm width anteriorly recruited between January 2006 and September 2008 for a study of HIV-associated cardiomyopathy were reviewed. AF was diagnosed on 12-lead electrocardiography taken at presentation and repeated at follow-up intervals of 2 weeks, 2 months and 6 months. Logistic regression analysis was used to determine factors associated with AF at presentation. No anti-arrhythmic interventions were administered to patients with AF. **Results:** Eighty patients with TB pericardial effusion were enrolled. The median [IQR] age was 33 [28–43] years, 53 (66%) were male and 71% were HIV-infected. The prevalence of AF at presentation was 25% (20/80). All underwent pericardiocentesis, with no change in numbers with AF. Anti-tuberculosis chemotherapy was associated with a rapid resolution of AF, with 80% recovery of sinus rhythm at 2 weeks, 90% at 2 months, and 100% at 6 months. In multivariate logistic regression analysis, left ventricular systolic dysfunction (odds ratio [OR] = 10.395, 95% CI 2.504–43.157, p = 0.001) and raised N-terminal pro-brain natriuretic peptide (NT-proBNP) (OR per ng/L increase = 1.001, 95% CI 1.000–1.002, p = 0.003) were independently associated with AF. There was no significant difference in the prevalence of AF in survivors compared to those who died at 6 months of follow-up, and no case of stroke was observed among the survivors. **Conclusions:** AF is common in patients with TB pericardial effusion, but resolves completely over six months of anti-tuberculosis treatment without anti-arrhythmic interventions. Left ventricular systolic dysfunction and raised NT-proBNP are independently associated with AF in TB pericarditis.

O026

AV NODE ELECTRIC BYPASS IN PATIENTS WITH REFRACTORY SYMPTOMATIC PERMANENT ATRIAL FIBRILLATION: SINGLE CENTRE PROSPECTIVE STUDY

De Filippo P; Ferrero P; Ferrari P; Brambilla R; Cantù F
Electrophysiology and Cardiac Pacing Unit, Cardiovascular Department, OORR Bergamo, Italy

Background: Ablate and pace provide optimal rate control in patient with refractory symptomatic atrial fibrillation. Main drawback of this strategy is life-long nonphysiologic ventricular activation. An appealing solution is to set up a AV node electric bypass (AVNEB) combining pure His bundle stimulation with compact node ablation. We sought to investigate the feasibility and the long term clinical and technical outcome of this strategy. **Methods:** This intention-to-treat study enrolled patients with long lasting symptomatic atrial fibrillation refractory or not further amenable of rhythm control with heart rate not controlled. Preliminary workup included: echo, six minute walking test, quality of life assessment (SF 36). All patients underwent an attempt of AVNEB; if it failed, a conventional ablate and pace procedure was delivered. In patients undergoing AVNEB a second back up lead was implanted. Pre procedural assessment and device control were repeated at 3, 6 and 12 months. **Results:** 12 patients (67 ± 6 years) were enrolled: in 10/12 AVNEB was achieved, in 2/12 a conventional ablate and pace procedure was performed. Out of the 10 patients with AVNEB, we observed a transient loss of capture during RF application in 5/10 not impairing procedural success, a late loss of His capture in 2/10 and a recovery of AV conduction in 2 patients that required a redo AV node ablation. His capture threshold progressively increased over time (2,5 times at 1 year vs baseline). In all 12 patients, we observed a significant improvement of quality of life and 6 minute walking distance, while the trend in EF increase was not significant. **Conclusions:** Although AVNEB is an attractive therapeutic strategy, we observed important technical drawbacks that may limit its clinical routine applicability. The main challenge appears to be the capability of delivering a stable pure His pacing

together with an efficacious ablation of the AV node.

O027

DIASTOLIC FUNCTION IS AN IMPORTANT FACTOR FOR BOTH SUCCESSFUL AND FASTER PHARMACOLOGIC CONVERSION TO SINUS RATE IN PATIENTS WITH FIRST EPISODE OF NON-VALVULAR ATRIAL FIBRILLATION

Nikas D; Theodorou S; Karanasios A; Antonopoulos E; Papazoglou G; Kyriazos I; Latsoudas S; Kefalas K; Antonoulas A
Cardiology Department, Lamia General Hospital, Lamia, Greece

Introduction: To evaluate patterns of diastolic dysfunction associated with successful pharmacological cardioversion (PCV) in patients with atrial fibrillation of recent onset (Afib). **Methods:** Prospective study included 164 patients [82 males (50.0%), mean age 67.6 ± 14.6] with first episode of Afib for PCV. NT-proBNP at admission (aNT-proBNP) and discharge (dNT-proBNP), absolute and relative (%) NT-proBNP difference (dfNT-proBNP,%dfNT-proBNP) and E/e' ratio were used as patterns of diastolic dysfunction. Patients were categorized in group A for successful PCV and Group B for unsuccessful PCV, within 72 hours. Statistical analysis was performed using t-test for comparisons and linear regression analysis for correlations. **Results:** Patient in Group A had significantly lower values of E/e' ratio (mean 7.0 ± 3.4 for Group A and mean 8.6 ± 3.7, $p = 0.04$). There was no difference in aNT-proBNP, dNT-proBNP or dfNT-proBNP between the two groups. Lower levels of aNT-proBNP and the lower values for E/e' were significantly correlated with shorter days for PCV ($r = 0.41$, $p < 0.03$ and $r = 0.44$, $p = 0.05$, respectively) (Figures 1 and 2). **Conclusions:** Lower values of E/e' ratio in admission are associated with better rates and shorter time for PCV. Lower levels for aNT-proBNP is associated with shorter time for PCV but no better rates of PCV.

O028

SIX MONTH OUTCOMES IN PATIENTS ENROLLED IN A CONTEMPORARY MIDDLE EASTERN ATRIAL FIBRILLATION REGISTRY (GULF SAFE)

Zubaid M; Rashed W; Alsheikh-Ali AA; AlMahmeed W; Shehab A; Sulaiman K; Al-Zakwani I; Al Qudaimi A; Asaad N; Amin H; Gulf SAFE Registry
Department of Medicine, Faculty of Medicine, Kuwait University, Kuwait

Purpose: To study the clinical characteristics and six month outcomes of atrial fibrillation (AF) patients in the Middle East. **Methods:** We used data from the Gulf Survey of Atrial Fibrillation Events (Gulf SAFE), a prospective multinational registry of consecutive AF patients presenting to emergency rooms (ER) of 23 hospitals in the Gulf region of the Middle East between October 2009 and June 2010. **Results:** We enrolled 2043 patients (age 57 ± 16, age ≥75 (14%), 48% female, 30% with diabetes, 53% with hypertension, 28% with history of heart failure, 13% with prior stroke/transient ischemic attack (TIA), 24% with history of significant valvular disease). Types of AF were: first attack 37%, paroxysmal 17%, persistent 10%, permanent 33% and not known 3%. Of patients with non-valvular disease, 25% had CHADS2 score of 0, 27% had CHADS2 score of 1 and 48% had a CHADS2 score of 2 or more. AF was the primary reason for ER visit in 45% of patients, of whom 75% presented within 48 hours of symptom onset. Six month follow up was completed for 1772. Six month mortality was (7%). [3.2% for patients with primary reason for ER visit AF, 17% for patients with primary reason for ER visit other cardiac, 24.2% for patients with primary reason for ER visit other non-cardiac]. At six month follow up the following outcomes were recorded: TIA in 21 patients (1.2%), stroke in 26 (1.5%), peripheral embolization in 2 (0.1%), any bleeding in 114 (6.4%), major bleeding in 21 (1.2%), admission for heart failure in 142 (8%) and admission for atrial fibrillation in 109 patients (6.2%). **Conclusions:** Middle Eastern patients with AF are relatively young with high risk profile. They have relatively low incidence of adverse outcomes at six months.

O029

PREDICTIVE FACTORS OF ATRIAL FIBRILLATION RECURRENCE AFTER CARDIOVERSION

Masar G; Ejup P; Blerim B; Dardan K; Xhevdet K
UCC of Kosova

Introduction: Cardioversion to sinus rhythm should be considered for all patients in atrial fibrillation (AF). Our aim was to determine the immediate and long-term outcome of cardioversion in patients with atrial fibrillation, and to determine factors predicting AF recurrence after cardioversion. **Materials and Methods:** A prospective twenty-years follow-up study of 1220 patients with atrial fibrillation (coronary artery

disease, 24.5%; arterial hypertension 65%; lone AF 10.5%) undergoing cardioversion between 1990 and 2010 was done. Transthoracic (98%) and transoesophageal (12%) echocardiograph examination were performed before rhythm-control cardioversion treatment algorithm strategy was involved. **Results:** Electrical cardioversion was successful in 94% of the patients. Female gender was associated with successful cardioversion ($p = 0.02$). Only 46% remained in sinus rhythm after the one-year follow-up. Patients with a structural myocardial disease were at a higher risk of recurrence of AF (54% of patients had one and 22%, more than one AF episode during one year follow-up). Maintenance of sinus rhythm was associated with anti-arrhythmic drug treatment ($p = 0.033$). Relapse of atrial fibrillation was associated with reduced left ventricular ejection fraction ($p = 0.003$). Complications occurred in 1.2% of the electrical cardioversions; of these, 0.4% were thromboembolic events. **Discussion:** Less than one half of the patients remained in sinus rhythm after the one year follow-up despite the use of anti-arrhythmic drugs and upstream therapies on AF. Electrical cardioversion is not without risk. Patients with a history of AF of >12 months, mitral valve disease, left ventricular dysfunction, enlarged left atrium and a history of recurrence of AF were at a higher risk of recurrence of AF. **Conclusion:** Cardioversion should be considered primarily when symptoms of AF are unacceptable despite optimal frequency regulation or in patients with AF detected for the first time.

O030

THE FIRST EPISODE OF ATRIAL FIBRILLATION (AF): PAROXYSMAL, PERSISTENT OR UNCERTAIN?

Panizo JG; Perea J; Galán L; Jiménez S; Romero R; Ruiz M; Villanueva A; Hinojar R; Ruiz JG; Cosío FG

Cardiology Service. Hospital Universitario de Getafe, Madrid. Spain.

Background: The classification of AF in paroxysmal or persistent has advanced our understanding of the clinical course and improved treatment indications. However, at the time of the first episode AF can not be classified and the clinical course is uncertain. **Objectives:** To study clinical presentation and course of a first documented episode of AF in a public hospital serving a Spanish industrial town of 250,000 people. **Methods:** From January 2008 to December 2010 we registered all patients with a first episode of AF admitted to the emergency room (ER). We excluded patients with poor clinical tolerance or structural heart disease, as cardioversion (CV) is generally applied in these, altering the natural course. Patients were followed up 15 ± 4 days after discharge. **Findings:** 168 patients admitted for AF were discharged (50.6% men, age 63.9 ± 13.9 y). The symptoms were palpitations in 35.5%, dyspnea in 13%, chest pain in 7.1%, syncope/presyncope in 14.3%, other in 7.1%, and 23.1% were asymptomatic. In 27 CV was attempted with antiarrhythmic drugs (AAD) followed in 1 by electrical CV and 25 of these were discharged in sinus rhythm (SR). The remaining 141 patients were managed with rate control drugs (digoxin, beta-blocker, calcium antagonists) or no drugs, and after an observation time ≤ 48 h, 58 (41%) were discharged in SR and 83 (59%) in AF. Two patients each in the SR and AF groups received AAD on discharge. At follow-up 15 patients discharged in AF had recovered SR. **Conclusions:** In patients without severe structural heart disease or arrhythmia intolerance, in the absence of AAD 41% recover SR in $\leq$48 h and another 11% at 15 day follow-up. This high trend to persistence of AF after the first episode underlines the importance of early consideration of CV, either in the ER or soon after short-term follow-up, in order to prevent structural remodeling. Only long-term follow-up will allow the diagnosis of paroxysmal AF in cases with recurrent self-limited episodes.

BASIC SCIENCE: FROM BENCH TO BEDSIDE

O031

AUTOANTIBODY AGAINST THE BETA1-ADRENERGIC RECEPTOR PREDICT INCREASED MORTALITY FOR SUDDEN CARDIAC DEATH WITH CHRONIC HEART FAILURE

Pei J-H; Chen J-Z; Zhang Y-H; Cao K-J; Zhang P; Pu J-L

Fu Wai Cardiovascular Hospital, Peking Union Medical College and Chinese Academy of Medical Sciences

Background: Clinical studies and in vitro animal experiments suggested that β1- adrenergic receptor autoantibody (β1-AAB) played an important rule in the pathophysiological process of chronic heart failure (CHF). Removal of β1-AAB with immunoabsorption reduced mortality in those patients. Therefore, we set to evaluate whether β1-AAB may predict the prognosis and sudden cardiac death (SCD) in patients with CHF. **Methods:** In total of 2062 patients of CHF including

824 cases of dilated cardiomyopathy(DCM) and 1238 cases of ischemic cardiomyopathy(ICM) and control group(824 cases) were collected and followed-up in this study. β1-AAB was detected by ELISA method and compared the results in different groups. The correlation between β1-AAB and the prognosis of CHF was analyzed. **Results:** The successful follow up rate was 85.26%(1758 cases) including 704(85.44%) cases of DCM and 1054(85.14%) cases of ICM with the median of 36 months(0.40□65 months), 379 (21.56%) cases composed of 164 cases of DCM and 215 cases of ICM died in total, 153(40.37%) cases including 69 cases of DCM and 84 cases of ICM had SCD. The positive rate β1-AAB between CHF group and control group were 8.19% and 2.2% ($p < 0.01$). Cox regression analysis revealed that the positive β1-AAB was associated with all-cause mortality and SCD but not with Non-SCD(NSCD) both in DCM(HR were 2.420 [95% CI:1.605–3.649] for all-cause mortality, 4.514 [95% CI:2.405–8.471] for SCD and 1.691 [95% CI:0.969–2.951] for NSCD) and in ICM (HR were 2.339 [95% CI:1.673–3.271] for all-cause mortality,3.749 [95% CI:2.389–5.884] for SCD and 1.475 [95% CI:0.877–2.480] for NSCD). **Conclusions:** The positive rate of β1-AAB was higher in patient group than in the control group. It indicated 4 to 5-fold of risk for SCD. It may serve as an independent predictor for the prognosis of the patients with CHF.

Keywords: Autoantibody; β1-adrenoceptor; biological marker; chronic heart failure; sudden cardiac death

O032

FEASIBILITY OF LASER DOPPLER PERFUSION SENSOR FOR HEMODYNAMIC DIFFERENTIATION OF CARDIAC ARRHYTHMIAS

Rajan V; Lee M; Schauerte P; Marx N; Stegemann B; Stegemann E

Medtronic Bakken Research Center, Endepolsdomein 5, 6229GW, Maastricht, the Netherlands

Introduction: Arrhythmia detection in cardiac implantable devices is solely based on rate and rhythm obtained from intracardiac electrogram signals. There is no proven, reliable and sensitive, hemodynamic sensor which can work in a closed loop with these devices. We are exploring the feasibility of using a tissue perfusion sensor based on laser Doppler flowmetry (LDF) technique to monitor the hemodynamic status of cardiac arrhythmias. **Methods:** Fifteen patients with an indication for an electrophysiological study were enrolled. Tissue perfusion was measured using a commercial laser Doppler perfusion monitor (LDPM). Fiber optic perfusion probes were placed epicutaneous on the left arm or high chest skin where a stable perfusion signal was observed. Arterial blood pressure was used as hemodynamic reference. High rate atrial and ventricular pacing at 120, 140, 160 and 180 beats per minute simulated supra ventricular and ventricular tachycardias. **Results:** Patients were mostly male (10 male, 5 female), the mean age was 47 $\pm$ 20 years, and the mean left ventricular ejection fraction was 52 $\pm$ 9.1%. Patients were evaluated for ventricular arrhythmia (7), AVNRT (4), WPW (1) and SVT (4). A significant linear relationship was observed ($p < 0.01$, $r = 0.7$) between change in mean arterial pressure and perfusion at 5 seconds after the simulated cardiac arrhythmias. High rate ventricular pacing (180BPM) resulted in 43.25 $\pm$ 13% drop in perfusion from baseline at 5 seconds reflecting the drop in pressure (35.5 $\pm$ 10%). Whereas the change in perfusion and pressure during high rate atrial pacing (180BPM) was relatively low (0.03 $\pm$ 19% vs 0.77 $\pm$ 15%) showing that LDPM has the potential for discriminating hemodynamically stable and unstable arrhythmias. **Conclusion:** Laser Doppler perfusion sensor is a potential tool for cardiac arrhythmia monitoring and therapy optimization. We are currently exploring the feasibility of miniaturizing the technique to realize a closed loop system.

O033

CARDIAC RESYNCHRONIZATION THERAPY AND BONE MARROW CELL TRANSPLANTATION IN PATIENTS WITH ISCHEMIC HEART FAILURE AND ELECTRO-MECHANICAL DYSSYNCHRONY. A RANDOMIZED PILOT STUDY

Romanov A; Pokushalov E; Corbucci G; Prokhorova D; Shabanov V; Artemenko S; Stenin I; Elesin D; Losik D; Yakubov A

State Research Institute of Circulation Pathology

Introduction: The aim of this study was to evaluate the benefit of combining BMMC transplantation with CRT in patients with severe ischemic HF, left bundle branch block (LBBB) and mechanical dyssynchrony. **Methods:** Patients with ischemic HF, LVEF < 35%, LBBB and mechanical dyssynchrony underwent intramyocardial transplantation of BMMC and CRTD system implantation. This randomized, single-blind, cross-over study compared clinical and echocardiographic parameters during two follow-up periods: 6 months of active CRT (BMMC+CRTact) and 6 months

of inactive CRT (BMMC+CRTinact). Physical performance was assessed by means of a 6-minute walking test. Myocardial perfusion was evaluated by SPECT. Quality of Life (QoL) was assessed through the Minnesota Living with HF Questionnaire (MLwHFQ). **Results:** Twenty-six patients (64 ± 7 years) were enrolled in the study. The distance covered by the patients during the 6-minute walking test significantly increased in the BMMC+CRTinact phase (BMMC therapy only) in comparison with the baseline (269 ± 68 vs 206 ± 51; $p = 0.007$) and in the BMMC+CRTact phase (BMMC therapy + CRT) in comparison with the BMMC+CRTinact (378 ± 59 vs 269 ± 68; $p < 0.001$). The summed rest and stress score (SPECT) decreased significantly in the BMMC+CRTact and BMMC+CRTinact phases in comparison with the baseline ($P \leq 0.03$). Both phases showed equivalent myocardial perfusion in the segments into which BMMC had been injected. QoL score was significantly lower in the BMMC+CRTinact phase than at the baseline (44.1 ± 14 vs 64.8 ± 19; $p < 0.001$), and in the BMMC+CRTact phase than in the BMMC+CRTinact phase (26.4 ± 12 vs 44.1 ± 14; $p = 0.004$). **Conclusion:** BMMC and CRT seem to act independently on myocardial perfusion and electro-mechanical dyssynchrony, respectively. Combining these two complementary therapies can significantly improve LV performance in patients with severe HF and electro-mechanical dyssynchrony.

O034

EFFECTS OF WENXIN GRANULE ON L-TYPE CALCIUM AND TRANSIENT OUTWARD POTASSIUM CURRENT IN ADULT RAT MYOCARDIUM

Wang X; Wang X; Wang T; Gu Y-W; Tang Y-H; Huang C-X
Department of Cardiology, Renmin Hospital of Wuhan University

Arrhythmia is the leading cause of death of heart disease. The class I anti-arrhythmic drugs showed that these drugs increased sudden death and total mortality compared with the placebo group. Wenxin Granule is developed by The China Academy of Traditional Chinese Medicine (TCM). From clinical application, it can effectively control the arrhythmia, and is safe and reliable. We used ventricular myocytes isolated from the heart of male rat. The whole patch-clamp technique was performed to record current in ventricular myocardial cells of adult rats. Upon the application of Wenxin Granules, the amplitude of calcium current was decrease, The peak amplitude of ICa-L was decreased 29.3% ± 4.8%, 45.8% ± 5.3%, 72.6% ± 4.1% ($n = 6$, $P < 0.05$) by WenXin Granules derivatives at 1g/L, 5g/L, 10g/L, respectively. Wenxin Granules made current-voltage (IV) curves upwards, shifted the curve to the right, and prolonged the recovery time of Ca2+ channel from inactivation. WenXin particle inhibited the current density of Ito and the decreased rates of the peak Ito were (15.31 ± 7.21)%, (32.86 ± 5.08)%, (53.25 ± 4.74)%, (73.23% ± 4.11)%. at 1g/L, 5g/L, 10g/L, 20g/L group, respectively. The current-voltage curve was shifted downward, and steady-state inactivation curve shift to right. The results of the present work suggested that Wenxin Granule modulate L-type calcium channels and transient outward potassium channel in rat cardiac myocytes. Our study suggested that Wenxin Granule might play a cardioprotective role, and suppress arrhythmias by altering Electrophysiological properties of ilon channel.

O035

ASSOCIATION BETWEEN MYOCARDIAL HYPOXIA AND ATRIAL STRUCTURAL REMODELING IN THE RAPID ATRIAL PACING CANINE MODE

Tianyi G; GuoJun X; Xianhui Z; Baopeng T; Xia G; Yaodong L
Department of Cardiology, First Affiliated Hospital, Xinjiang Medical University, Urumqi 830054, Chi

Introduction: Atrial structural remodeling is important for the occurrence and maintenance of atrial fibrillation(AF). The high rate of atrial excitation would lead to tissue hypoxia during AF. However, the relation of myocardial hypoxia and atrial structural remodeling has not been clarified. **Methods:** "J"-type electrodes were placed in the right atrial appendage under the guidance of X-ray in 16 dogs, Animals in model group ($n = 8$) received fast pacing (400 beats/min) for 10 weeks while animals in control group ($n = 8$) maintained at sinus rhythm. Burst stimulation was applied to induce atrial fibrillation in all animals after 10 weeks, animals were sacrificed thereafter and the left atrial tissues were taken for myocardial collagen measurement (Masson staining) and myocardial ultrastructure examination. Western blot and real-time polymerase chain reaction analyses of the expression of Matrix metalloproteinase 9(MMP-9), vascular endothelial growth factor (VEGF), VEGF receptors, and hypoxia-induced transcription factor-1α (HIF-1α) were performed.

Results: Atrial myocardial collagen volume fraction was significantly increased in model group compared with the control group. Ultrastructure examination in atrial tissue evidenced disorder, fracture, collagen fiber proliferation, mitochondrial swelling, blurred cristae, and intercalated disc distortion, expansion. Compared with the control group, the MMP9, the VEGF, HIF-1α of mRNA and protein levels increased significantly in the AF group. VEGF receptor-1 mRNA, a high affinity receptor for VEGF, but not VEGF receptor-2, was upregulated in the atria of the AF group. **Conclusions:** Upregulation of HIF-1/VEGF is involved in the enhancement of MMP-9 expression under hypoxic conditions.This may lead to atrial structural remodeling.

Atrial fibrillation; Atrial structural remodeling; Hypoxia; Matrix metalloproteinase

O036

SEVOFLURANE PRECONDITIONING PROTECTS ISOLATED RAT HEARTS AGAINST ISCHEMIA/REPERFUSION INJURY VIA ATTENUATION OF L-TYPE CA2+ CURRENT SUPPRESSION

Gong J; Yao Y; Fang N; Li L
Department of Anesthesiology, Fuwai Hospital, and Peking Union Medical College

Background: To investigated the effects of sevoflurane preconditioning on action potential duration (APD) and L-type Ca2+ current (ICa, L) characteristics. **Methods:** Langendorff perfused SD rat hearts were randomly assigned to one of the 3 groups: time control group (TC group), ischemic-reperfusion group (I/R group, 25 mins of ischemia followed by 30 mins of reperfusion), and sevoflurane preconditioning group (SpreC group, preconditioned with 3% sevoflurane for 15 mins). The hemodynamics, cardiac troponin I (cTnI) levels and arrhythmia data were measured. At the end of reperfusion, single left ventricle myocytes of epicardium were dissociated enzymatically, then the APD and ICa, L characteristics were determined by a whole-cell patch clamp technique. Statistical significance was assigned as $P < 0.05$. **Results:** Sevoflurane preconditioning improved LVDP, $\pm$ dp/dt, and HR recovery, decreased cTnI release, and decreased the incidence of ventricular tachycardia or ventricular fibrillation upon reperfusion (SpreC vs I/R, $P < 0.05$). Compared with the TC group, ischemia-reperfusion injury could shorten the APD90 (from 37.65 ± 3.05 s to 31.44 ± 2.93 s), reduce the peak ICa, L densities (from 9.68 ± 0.47 to 4.79 ± 0.25 pA/pF) and elevate the current-voltage curves ($P < 0.05$). Compared with the I/R group, sevoflurane preconditioning could prolong the APD90, increase the peak ICa, L densities, and lower the current-voltage curves ($P < 0.05$). The ICa, L steady-state activation, inactivation, and recovery from inactivation curves were not significantly different between the I/R and SpreC groups. **Conclusions:** Sevoflurane preconditioning could protect isolated rat hearts against ischemia/reperfusion insults and improve reperfusion ventricular arrhythmias, which may be related to the attenuation of ICa, L current suppression induced by ischemia/reperfusion injury.

Key words: reperfusion arrhythmia, sevoflurane, ischemia/reperfusion injury, preconditioning, L-type Ca2+ current

O037

DIFFERENTIAL DENSITIES OF CHOLINERGIC NERVES IN CANINE SUPRAVENTRICULAR REGIONS OF HEARTS

Li Z; Zhao QY; Huang H; Yang B; Huang CX
Department of Cardiology, Renmin Hospital of Wuhan University, Wuhan 430060, China

Introduction: Cholinergic nerve plays an important role in the induction and maintenance of atrial fibrillation (AF). Cholinergic innervation at supraventricular tissues is considered to be the histological basis and ablation associated target site for the arrhythmia, however, the distribution of cholinergic nerve in supraventricular tissues is not studied. **Methods:** We performed histological and immunohistochemistrical staining on canine tissues of left atrial appendage (LAA), right atrial appendage (RAA), left atrium (LA), right atrium (RA), atrial septum (AS), crista terminalis (CT), pulmonary vein (PV) and superior vena cava (SVC) using hematoxylin and eosin (H&E) and antibodies to choline acetyltransferase (ChAT). **Results:** Normal canine cardiovascular histological structures were shown from H&E staining. Cholinergic nerve densities at LAA and RAA were significantly higher than LA, which was higher than RA, but no significant difference was observed between LAA and RAA. Furthermore, RA was significantly higher than AS, CT, PV and SVC while there were no significant differences among the latter four. **Conclusions:** The different densities of cholinergic nerve at canine supraventricular regions indicate that the heterogeneity property establishes the histological basis of cholinergic nerve mediated

pathological conditions. Structures with higher cholinergic innervation at supraventricular tissues are considered to be ablation associated target site for AF.

O038

DIFFERENT ELECTROPHYSIOLOGY EFFECTS BETWEEN SEVOFLURANE AND SEVOFLURANE POSTCONDITIONING ON CARDIOMYOCYTES DISPERSED FROM RAT HEARTS

Gong J; Yao Y; Fang N; Li L
Department of Anesthesiology, Fuwai Hospital, and Peking Union Medical College

Objectives: To observe the effects of sevoflurane or sevoflurane postconditioning on action potential (AP) and L-type calcium currents (ICa,L) of cardiomyocytes dispersed from Langendorff perfused rat hearts. **Methods:** Part I: The effects of 3% sevoflurane on AP and ICa,L of single left ventricle myocytes were tested. Part II: Langendorff perfused isolated SD rat hearts were randomly assigned to one of the 2 groups: ischemic/reperfusion group (I/R group), and sevoflurane postconditioning group (SpostC group, postconditioned with 3% sevoflurane at the first 15 minutes of reperfusion), then the AP and ICa,L characteristics of single left ventricle myocytes were determined by a whole-cell patch clamp technique. Statistical significance was assigned as $P < 0.05$. **Results:** Part I: The amplitude of membrane potential (AMP) and resting membrane potential (RMP) were not changed by 3% sevoflurane ($P < 0.05$), but the APD90 was significantly prolonged from 37.56 ± 3.09 ms to 48.39 ± 3.13 ms ($P < 0.05$). Peak ICa,L densities were reduced at about 37% of the control group by 3% sevoflurane ($P < 0.05$). The data between the control group and the recovery group were not significantly changed. Part II: Compared with the I/R group, sevoflurane postconditioning increase peak ICa, L densities (from 4.79 ± 0.25 pA/pF to 6.94 ± 0.20 pA/pF, $P < 0.05$), but the time to peak was not changed ($P < 0.05$). There were no significant differences in the ICa,L steady-state activation, inactivation, and reactivation curves between the I/R and SpostC groups. **Conclusions:** 3% Sevoflurane directly suppresses ICa,L peak densities and prolongs APD90 of cardiomyocytes, while 3% sevoflurane postconditioning attenuates the suppression of ICa,L peak densities induced by ischemia/reperfusion injury, which may extenuate calcium overload and may improve reperfusion ventricular arrhythmias.

Key Words: ischemia/reperfusion injury, sevoflurane, L-type Ca2+ current, action potential duration, postconditioning

CARDIAC IMAGING

O039

ESOPHAGYC MULTI SLICE 64 COMPUTED TOMOGRAPHY (MSTC-64) 3D RECONSTRUCTION AND PASSIVE FUSION WITH ESOPHAGUS SHELL. A NOVEL APPROACH DURING PULMONARY VEIN ISOLATION.

Scazzuso FA; Rivera S; Gomez L; Albina G; Laino R; Sammartino V; Giniger A; Kamlofsky M; Banega R
Instituto Cardiovascular de Buenos Aires (ICBA)

Purpose: Catheter ablation(CA) has proven as standard procedure for drug-refractory atrial fibrillation (AF). Atrio esophagic fistula has been described as an infrequent but lethal complication of this procedure. Differents techniques were described to avoid this tremendous complication. **Objective:** Describe a new technique to determinate the accuracy of tridimensional esophagic reconstruction from MSTC-64 to. Determine its feasibility and reproducibility as a methodological approach to avoid atrio esophagic fistula complication in a huge cohort of patients. **Methods:** Single-center prospective analysis of consecutive patients who underwent ablation of atrial fibrillation and received a MSCT-64 prior to ablation in the Center between May 2009 and May 2011. A MSTC-64 computed tomography was optimized for imaging of pulmonary veins. We performed the tridimensional reconstruction of the esophagus as described previously to determinate the relation with the PVO. We designed simultaneously with the left atrium shell another one for the esophagus positioning a quadripolar catheter inside the esophagus. We performed the fusion of the left atrium with the MSTC using Verismo® tool. **Results:** 153 patients were included with a mean age 61 ± 9.7 yrs, 90% male and a mean BMI of 26.5 ± 6.4 kg/m^2. 78 (93.97%) patients were in sinus rhythm at time of MSCT-64. We determine the esophagus tract in 146 patients (95.18%). The accuracy obtained was of 62.02% when MSTC was performed more than 48hs prior PVI. When we discriminate studies performed less than 48 h we have obtained 83.82% of accuracy ($p < 0.05$). The range of mismatch between each structure after fusion was 6 mm $\pm$ 10 mm. **Conclusions:** Passive Fusion of the esophagus has a high accuracy to determinate the esophagus

position if the MSCT is performed during the last 48h before the procedure. This allows avoid this critical structure during AF ablation and lets us modify the strategy during ablation procedure.

O040

PREDICTIVE VALUE OF LEFT ATRIAL VOLUME AS DETERMINED BY MAGNETIC RESONANCE IMAGING FOR PULMONARY VEIN ISOLATION AS SINGLE ABLATION APPROACH FOR PERSISTENT ATRIAL FIBRILLATION

Kriatselis C; Nedios S; Gebker R; Jahnke C; Paesch I; Gerds-Li JH; Fleck E
Deutsches Herzzentrum Berlin

Background: Pulmonary vein isolation (PVI) is an effective interventional treatment for paroxysmal atrial fibrillation (AF). The role of PVI as single interventional treatment of persistent AF remains unclear. The purpose of this study was to test the predictive value of left atrial volume (LAV) as determined by cardiac magnetic resonance (CMR) imaging in patients with persistent atrial fibrillation undergoing PVI without any additional left or right atrial ablation lesions. **Methods and Results:** Sixty-three consecutive patients (44 men, mean age: 63 ± 10 years) with drug-refractory persistent AF were included. A CMR examination was performed one day before the scheduled PVI and the different LAVs were determined: maximal LAV (LAVmax), minimal LAV (LAVmin), LAVmax and LAVmin per m^2 of body surface area, LA ejection fraction. The ablation procedure included isolation of all pulmonary veins without additional ablation lesions. If a second procedure was needed this included only reisolation of the reconnected PVs. During a mean follow-up of 25 ± 7 months AF recurred in 25 out of 63 (40%) patients. A cut-off value of 110 ml for LAVmin was the strongest predictor of outcome. 32 out of 34 patients (94%) of patients with an LAVmin ≤110 ml remained in sinus rhythm during follow-up while this was the case in only 6 out of 29 patients (21%) with an LAVmin >110. The number of second ablation procedure was lower in patients with LAVmin ≤110 compared to those with LAVmin >110 (1.3 vs 1.7, p:0.01). **Conclusions:** LA volume as measured by preinterventional CMR is a significant predictor of long-term outcome after pulmonary vein isolation in patients with persistent atrial fibrillation. As a minimal LAV of 110 ml or less predicts long-term freedom from AF after pulmonary vein isolation, a strategy of extensive left atrial ablation in these patients does not seem to be justified.

CARDIAC RESYNCHRONISATION THERAPY

O041

CARDIAC RESYNCHRONIZATION THERAPY IN ROUTINE CLINICAL PRACTICE: RESULTS FROM A EUROPEAN SURVEY

Nagamori J; Braunschweig F; Ståhlberg M
Karolinska Institutet, Department of Cardiology, Karolinska University Hospital, Stockholm, Sweden

Background: Current guidelines give detailed advice with regard to the selection of appropriate patients for cardiac resynchronization therapy (CRT). However, strategies for patient follow-up and device optimization have not been subject to systematic research and may differ largely between institutions. This survey aimed to describe current follow-up and device optimization strategies in European centers. **Methods:** A survey containing 35 questions regarding methods for post implantation follow-up routines and optimization methods was sent out by email to centers implanting CRT-devices in Sweden, Finland, Denmark, Spain, France and Germany. **Results:** A total of 52 centers, following-up approximately 10.050 patients, responded to the survey (participation rate 15%). For CRT-P patients the median time-interval between follow-up visits was 6 months (IQR: 3–6) while it was 1 month shorter for patients with CRT-D. In 69% of the responding centers CRT-optimization was routinely performed in all patients while 29% optimized selected patients only (non-responders, NYHA IV, lowest EF). When device optimization was considered, the atrioventricular- and interventricular delay was individualized in 98% and 82% respectively. In a subset of centers, pacing mode (55%) and basic heart rate (32%) was also modified to maximize treatment efficacy. Echocardiography was the most commonly used method to optimize devices (92% of the centers) while only 6% routinely used invasive methods. **Conclusions:** The clinical routine concerning follow-up of CRT-patients varies between European centers but generally includes device optimization, at least for selected patients. Echocardiography is the most widely used method for device tuning. The differences in follow-up strategies probably reflect the lack of evidence for optimal CRT-patient follow-up and device programming.

O042

HIGH-SPEED ROTATIONAL ANGIOGRAPHY FOLLOWED BY 3-D RECONSTRUCTION OF CORONARY SINUS IN CRT DEVICE IMPLANTATION

Zubarev E; Lebedev D
Almazov Federal Heart, Blood and Endocrinology Centre, Saint-Petersbug, Russian Federation

Aim: To assess the capability of rotational angiography in CRT device implantation. **Methods:** We implanted CRT devices in 109 patients from 2009 till 2011 years. After coronary sinus (CS) cannulation standard occlusive retrograde angiography was performed in all patients. Besides, 17 patients underwent high-speed rotational angiography followed by 3-D reconstruction of coronary venous tree. Rotational isocentric scan was obtained by rapid rotation of C-arm, left anterior oblique (LAO) 45° to right anterior oblique (RAO) 45° with speed of 60° per second (Allura Exper FD 10, Philips). Received images were analyzed using special software with assessment of full range of angles, diameters of target veins and 3-D model of coronary venous tree was created, providing an operator with significantly more information about CS anatomy. According by received data we chose angulation and instrument for each patient. **Results:** Performing single rotational scanning was enough to evaluate venous anatomy in 82%, while additional standard angiography was required in 18% of cases. Optimal angulation for left ventricle lead implantation was found to vary significantly both for each vein and patient. The mean volume of contrast dye was 11.2 ± 3.3 ml for rotational angiography compared to 48.6 ± 29.9 ml for standard angiography ($p < 0.0001$). **Conclusion:** Rotational angiography followed by 3-D reconstruction of CS anatomy allows minimizing the dose of contrast dye. Using this method enables an operator to evaluate parameters of target vein and choose LV lead and its delivery system more accurately.

O043

CORONARY SINUS LEAD EXTRACTION: SAFETY, TECHNIQUES, AND COMPLICATIONS

Taborsky M; Fedorco M; Heinc P
Ist Internal Clinic, Universtity Hospital Olomouc, Czech Republic

Introduction: The implantation of coronary sinus (CS) pacemaker leads has dramatically increased over the past few year. Extraction of CS leads remains limited. **Methods:** We analysed all percutaneous extractions of transvenous CS leads performed at our institution. Extractions occurring within 1 month of implantation were excluded. **Results:** Between 2000 and 2010, 117 CS leads were percutaneously extracted from 99 patients(8 infections and 91 lead dysfunction). In 1 patient the endovasal CS lead extraction was unsuccessful. The average duration in situ for the CS Leads was 2.41 ± 1.77 years. The majority of the leads were removed by simple traction ($n = 97$, 82.8%). The rest of the LV electrodes were removed by advanced extraction techniques including locking stylet with sheath support ($n = 14$,11.9%), locking stylet and laser ($n = 6$, 5.1%). The majority of CS leads implanted longer than four years required advanced extraction techniques (20/37, 54.3%). There were complications with extraction of 11 leads (9.4%). It was difficult to determine whether complications were attributable to CS lead extraction, another lead extraction, or reimplantation. Complications included CS or vein thrombosis ($n = 4/99$ pts, 4.4%), CS dissection ($n = 2/99$ pts, 2.2%), bleeding ($n = 3/99$, 3.3%), and pneumothorax ($n = 2/99$, 2.2%). Endovascular reimplantation of a new CS lead was successful in 87 of 99 attempts (87%). A longer duration after the implant was associated with increased use of an advanced extraction technique ($p < .001$). Duration of implantation and method of extraction were not associated with complications, fluoroscopy time, or re – implantation success. **Conclusions:** CS leads in situ greater than four years often require advanced techniques. Advanced extraction techniques can be implemented when simple traction is unsuccessful without an appreciable increase in complications.

O044

THE STRUCTURAL CHANGES OF THE RIGHT HEART DURING CARDIAC RESYNCHRONIZATION THERAPY

Bucyte S; Sedlickaite D; Silkute A; Brukstute S; Puodziukynas A; Jurkevicius R; Kazakevicius T; Zabiela V; Sileikis V
Department of Cardiology, Lithuanian University of Health Sciences, Medical Academy

Purpose: To estimate the structural changes of the right heart during cardiac resynchronization therapy (CRT). **Methods:** 37 patients meeting ESC recommended CRT implantation indications were included into this study. The size of the right ventricle (RV), the volume of the right atrium (RA), right ventricle myocardial performance index (RV MPI), tricuspid annular plane systolic excursion (TAPSE) and the highest tricuspid annular systolic

velocity (TASV) were evaluated before starting CRT and after 3 and 6 months of treatment. Statistical analysis was performed using SPSS version 15.0. **Results:** Mean initial RV size was 34.95 ± 8.6 mm., after 3 months of CRT in responders' and non – responders' group it was 34.02 ± 8.45 mm and 35.67 ± 8.88 mm, respectively, after 6 months – 34.82 ± 7.9 mm and 34.45 ± 10.23 mm, respectively. Mean initial RA volume was 82.31 ± 39.3 ml., after 3 months of CRT in responders' and non – responders' group it was 48.9 ± 10.46 ml and 89.75 ± 35.12 ml, respectively, after 6 months – 65.62 ± 25.23 ml and 70.0 ± 24.2 ml, respectively. Mean initial RA and mean RA after 3 months appeared to differ significantly ($p < 0.05$) between the responders' and non – responders' groups. Mean initial RA correlated with mean initial RV and highest TASV. We found a high positive correlation ($r > 0.5$) between the reduction of mean RA and the increase of LV EF and TASV in responders' group after 3 months.

Conclusions:

1 During CRT the structure of the right heart does change.

2 The difference of the mean initial RA volume and mean RA volume after 3 months of CRT between responders' and non – responders' was statistically significant.

3 Severe dilation of the RA might be the prognostic sign of the absence of the response to CRT.

O045

THE FUNCTIONAL CHANGES OF THE RIGHT HEART DURING CARDIAC RESYNCHRONIZATION THERAPY

Bucyte S; Sedlickaite D; Silkute A; Brukstute S; Puodziukynas A; Jurkevicius R; Kazakevicius T; Zabiela V; Sileikis V
Department of Cardiology, Lithuanian University of Health Sciences, Medical Academy

Purpose: To estimate the functional changes of the right heart during cardiac resynchronization therapy (CRT). **Methods:** 37 patients meeting ESC recommended CRT implantation indications were included into this study. The size of the right ventricle (RV), the volume of the right atrium (RA), tricuspid annular plane systolic excursion (TAPSE) and the highest tricuspid annular systolic velocity (TASV) were evaluated before CRT and after 3 and 6 months. Statistical analysis was performed using SPSS version 15.0. **Results:** Mean initial RV size was 34.95 ± 8.6 mm., after 3 months of CRT in responders' and non – responders' group it was 34.02 ± 8.45 mm and 35.67 ± 8.88 mm, respectively, after 6 months – 34.82 ± 7.9 mm and 34.45 ± 10.23 mm, respectively. Mean initial RA volume was 82.31 ± 39.3 ml., after 3 months of CRT in responders' and non – responders' group it was 48.9 ± 10.46 ml and 89.75 ± 35.12 ml, respectively, after 6 months – 65.62 ± 25.23 ml and 70.0 ± 24.2 ml, respectively. Mean initial TAPSE was 12.92 ± 5.62 mm., after 3 months of CRT in responders' and non – responders' group it was 14.5 ± 3.1 mm and 11.9 ± 5.7 mm, respectively, after 6 months – 14.52 ± 3.9 mm and 14.5 ± 3.15 mm, respectively. Mean highest initial TASV was 11.03 ± 3.37 cm/s., after 3 months of CRT in responders' and non – responders' group it was 13.0 ± 4.0 cm/s and 10.56 ± 3.94 cm/s, respectively, after 6 months – 13.15 ± 3.77 cm/s and 12.0 ± 3.0 cm/s, respectively. Mean initial RA correlated with mean initial RV and highest TASV. We found a high positive correlation ($r > 0.5$) between the reduction of mean RA and the increase of LV EF and TASV in responders' group after 3 months.

Conclusions:

1 During CRT the structure and function of the right heart does change.

2 Even in non – responders' group the function of RV does improve.

3 Severe dilation of the RA might be the prognostic sign of the absence of the response to CRT.

O046

WHY WE STILL CALL THEM NON-RESPONDERS?

Papavasileiou L; Forleo GB; Vecchio F; Cioè R; Minni V; Della Rocca DG; Topa A; Magliano G; Santini L; Romeo F
Division of Cardiology, Department of Internal Medicine, University of Rome "Tor Vergata"

Introduction: The objective of cardiac resynchronization therapy (CRT) is the improvement of objective parameters and the amelioration of the quality of life of patients with heart failure. We have different measures to evaluate the percent of patients who could be considered CRT responders. The aim of our study was to evaluate if there is a concordance between left ventricular ejection fraction (LVEF) changes and changes in subjective (patients view) parameters. **Methods:** We analyzed 61 consecutive patients underwent CRT implantation at our institution between May 2009 and December 2010. Patients were divided in two groups based on the presence (responders) or absence (non responders) of an

improvement (≥15%) of LVEF. Patients view was assessed by: the six minute walk test (6MWT) and the Minnesota Living With Heart Failure Questionnaire (MLHFQ). **Results:** The two groups were homogeneous regarding age, sex, EF prior implantation and underlining heart disease. After a mean follow up of 8.4 ± 4.8 months, 34 patients were responders (Δ EF = 19 ± 13) while 27 patients (non responders) did not fulfill LVEF criteria (ΔEF = −3 ± 13). Regarding patients view, no significant differences were found between two groups about Δ 6MWT distance (209 ± 119 in non responders group vs 221 ± 105 in responders group, p = ns), Δ MLHFQ (−13 ± 16 vs −7 ± 22, p = ns). Of note, acute decompensation with necessity of hospitalization was observed in similar mode in both groups (4 events in non responders group vs 3 in responders group). **Conclusions:** Objective parameters routinely used in order to evaluate the response of patients in CRT are valid, nevertheless a vast majority of patients report improvement of clinical status in absence of the classic measurable parameters. New tools are necessary in order to assess benefits of cardiac resynchronization therapy.

O047

DIRECT ENDOCARDIAL LEFT VENTRICLE: A SAFE AND EFFECTIVE ALTERNATIVE TO TRADITIONAL RESYNCHRONIZATION VIA CORONARY SINUS

Roa-Garrido J; Moriña-Vazquez P; Barba-Pichardo R; Fernandez-Gomez Juan M; Venegas-Gamero J; Arrhythmias Department
"Juan Ramón Jiménez" Hospital, Huelva, Spain.

Introduction: Biventricular pacing through the Coronary Sinus (CS) is effective for the treatment of patients with heart failure and left bundle branch block. However, this approach is sometimes not feasible (lack of response, anatomical considerations of CS, etc). Although surgical epicardial lead implantation is the alternative, this technique may be deleterious in patients with low ejection fraction (EF) and high anaesthetic risk. Thus, direct endocardial Left Ventricle (LV) stimulation performed under local anaesthesia may be an alternative. We describe the results of direct endocardial LV pacing. **Method:** Prospective study (n = 12) with failed resynchronization via CS (April 2006-January 2011) all except one with width QRS. Technique: Femoral approach, transeptal puncture and LV mapping; active fixation of the lead at the point where the longer electrical delayed was observed, peeled away from the introducer and connection to generator. Parameters: previous device implanted through the upper veins, inferior generator was programmed VVT (n = 8); n = 3 with an exclusive femoral approach was accomplished and connected to a tricameral generator. Follow-up: 6 to 48 months. An echocardiogram was performed before implantation and 6 months later. **Results:** The LV lead was implanted successfully in all the cases (thresholds under 1.5 V). 4 Pocket haemathoma were observed, 3 cured spontaneously, the other suffered from infection so the system was explanted. A patient with narrow QRS died due to cardiogenic shock, another died due to a hemorrhagic stroke after implantation. The rest of the patients had improved at least a step in the NYHA status at 3 months. All of them improved EF. A patient with recurrent episodes of ventricular fibrillation and shocks is now asymptomatic. **Conclusion:** Direct endocardial LV pacing through the transeptal approach is safe and may be a less risky and more efficient alternative than surgical epicardial lead implantation to resynchronization via CS.

O048

INCREASE IN TPEAK-END INTERVAL INDUCED BY BIVENTRICULAR PACING PREDICTS VENTRICULAR TACHYARRHYTHMIA FOLLOWING CARDIAC RESYNCHRONIZATION THERAPY

Miyoshi F; Onuma Y; Watanabe N; Kikuchi M; Ito H; Adachi T; Kawamura M; Asano T; Tanno K; Kobayashi Y
Division of Cardiology, Department of Medicine, Showa University School of Medicine

Background: The relationship between induction of arrhythmias and dispersion of repolarization after CRT is controversial. **Objective:** This study aimed to determine whether cardiac resynchronization therapy (CRT) alters QT interval, QT dispersion, and Tpeak–Tend interval (Tpeak–end) and whether such changes relate to the risk of developing major arrhythmic events (MAE). **Methods:** Data from 67 patients (49 male, age 71 ± 10 years) who underwent CRT device placement were analyzed retrospectively. Patients had NYHA class III (n = 62) or IV (n = 5) heart failure, as a result of ischemic heart disease (n = 28), cardiomyopathy (n = 35) or valvular heart disease (n = 4). Mean left ventricular ejection fraction was 25 ± 9%. The electrocardiogram was recorded at baseline and during follow-up after implantation (3 days, 7 days, 1 month, and 2 months). For each electrocardiogram, the following parameters

were measured: QRS duration, QT interval, QTc, QT dispersion, and Tpeak–end. **Results:** After 29-month follow-up, 11 patients experienced MAE. QT interval, QTc, QT dispersion, and Tpeak–end did not change significantly immediately after CRT. However, 3 days after CRT, Tpeak–end in patients with MAE was significantly increased when compared with patients without MAE ($p < 0.05$). We divided patients into two groups according to change in Tpeak–end after 3 days of follow-up (increased Tpeak–end group; $n = 27$, decreased Tpeak–end group; $n = 40$). The increased Tpeak–end group demonstrated a significant increase in MAE ($p < 0.05$). **Conclusions:** Increased Tpeak–end at 3 days after CRT was associated with a significant increase in MAE, and this could be a useful predictor of ventricular proarrhythmias.

O049

EVALUATION OF LEFT INTRAVENTRICULAR SYNCHRONY IN ASYMPTOMATIC LEFT BUNDLE BRANCH BLOCK PATIENTS BY NON-INVASIVE PARAMETERS OBTAINED FROM RADIONUCLIDE VENTRICULOGRAPHY

Pastor A; Perea J; Leguizamón J; Villanueva A; Jiménez S
Hospital Universitario de Getafe (Madrid), Spain

Introduction: Radionuclide ventriculography (RNV) has been used to assess ventricular synchrony by means of phase and amplitude parametric images and their quantitative-derived parameters: the mean (M) phase angle (PA) represents mean time of ventricular contraction onset and the standard deviation (SD) of the PA relates to the synchrony of ventricular contraction. **Methods:** We evaluated parameters obtained from RNV of left intraventricular synchrony in 16 normal ECG controls and compared them with a group of 36 asymptomatic patients (P) with a left bundle branch block (LBBB, no previous cardiac history, referred for routinely evaluation at the cardiology outpatient room. MPA and the SD of the PA was derived and measured from the phase histogram obtained in the best left anterior oblique view. Both the MPA and the SD of PA were expressed in grades (°) or msec (MPA° or SD° x RR interval/360°). **Results:** Mean left ventricular ejection fraction (LVEF) was $39 \pm 9\%$ in 15 LBBB P, while in 21 LBBB and controls P, LVEF was $60 \pm 5\%$ and $62 \pm 6\%$ respectively. MPA measures in (°) or ms were non statistically significant between groups. However, SDPA measures in (°) or msec were significant less in control and LBBB/EF $\geq$50% P compared with LBBB/EF $\leq$ 50% P ($24 \pm 14°/36 \pm 22°$ vs $58 \pm 14°$, $p < 0.001$ and 55 ± 31ms/86 ± 53ms vs 130 ± 34ms, $p < 0.001$). No differences in SDPA values were observed between control/LBBB/EF$\geq$ 50% P. In LBBB P an inverse correlation between SD and LVEF was found ($r = -0.73$, $p < 0.001$), so the greater SD of PA, the less LVEF. **Conclusion:** Abnormal LV systolic function is present in 42% of asymptomatic LBBB P, referred for routinely evaluation. An important subset of LBBB P who show left intraventricular electrical dyssynchrony may have not mechanical dyssynchrony data estimated by RNV parameters being similar to normal P. We can speculate if depressed LVEF found in 42% of the LBBB group is due to the LBBB-dependent electrical asynchrony itself or vice versa

O050

SENSOR EQUIPPED IMPLANTATION TOOLS FOR LV LEAD PLACEMENT USING A NOVEL NON-FLUOROSCOPIC INTRA-CARDIAC DEVICE TRACKING SYSTEM: IN ANIMAL EVALUATION

Piorkowski C; Sommer P; Rolf S; Doring M; Eitel C; John S; Wetzel U; Arya A; Gaspar T; Hindricks G
University of Leipzig, Heart Center, Department of Electrophysiology, Germany

Background: Cardiac resynchronisation therapy has evolved as standard treatment for patients with advanced heart failure and asynchronous ventricular contraction. Difficulties implanting the LV lead may result in long procedure and fluoroscopy times. Hereby we report on an animal evaluation of specialized sensor-equipped implantation tools for LV lead placement using a novel non-fluoroscopic intra-cardiac device tracking system. **Methods:** The novel non-fluoroscopic tracking system consists of an electromagnetic field controller mounted on a conventional X-ray system. Interventional intracardiac devices equipped with a miniaturized single coil sensor can either be projected over fluoroscopy or tracked non-fluoroscopically at the precise position of the sensor within the electromagnetic field. Sensor equipped EP catheters, CS sheaths, target vein sub-selectors, and angiography guidewires were tested for LV lead positioning in a porcine animal model. **Results:** In one porcine subject, the CS was non-fluoroscopically engaged after jugular venous access using a sensor-equipped steerable EP catheter and a sensor-equipped CS sheath. Acquisition of occlusive CS venograms was performed and utilized to reconstruct a 3D model

of the CS venous anatomy and to serve as the underlying image for non-fluoroscopic target vein access achieved by sensor-equipped sub-selectors and guidewires.Utilization of live fluoroscopy during CS navigation procedures, which should be reduced by the unique "road mapping" algorithm with cardiac and respiratory motion compensation, was monitored and reported. **Conclusions:** A novel non-fluoroscopic device tracking system together with sensor equipped implantation tools were able to support a new workflow of LV lead implantation in a porcine animal model. Future studies should examine applicability of this technology in the clinical setting and demonstrate the actual effect on any reduction of fluoroscopic time and exposure to both patients and operators.

CHANNELOPATHIES

O051

CRITICAL VENTRICULAR REPOLARIZATION PROLONGATION PRECEDING TORSADE DE POINTES IN ACQUIRED LONG QT SYNDROME

Chiladakis I; Zagkli F; Kalogeropoulos A; Koutsogiannis N; Alexopoulos D
University Hospital of Patras, Greece

Objective: There is a strong but not causal association between ventricular repolarization prolongation and torsade de pointes (Tdp) in acquired long QT syndrome (aLQT). We determined the preferred method of ventricular repolarization assessment which best identifies the critical degree of ventricular repolarization prolongation exacerbating Tdp. **Methods:** We evaluated the electrocardiograms immediately before the occurrence of Tdp in 29 patients (age 63 ± 16 years) with aLQT. Drug-induced ventricular repolarization prolongation had 17 patients. The QT (QTc) and the JT (JTc) intervals were measured by the use of six different QT/JT heart-rate correction methods. We compared the distribution of QT(QTc) intervals for patients with normal QRS duration against the proposed cutoff levels of concern at 450ms, 480ms and 500ms, and the distribution of JT (JTc) intervals for patients with wide QRS complex at the cutoff levels of 310ms, 330ms and 360ms, respectively. **Results:** The study included 25 patients with normal QRS duration of QRS 106 ± 9 ms and QT interval of 543 ± 60 ms, and 4 patients with wide QRS complex of 162 ± 9 ms and JT interval 434 ± 58 ms. In the whole patient group as well as in patients with normal QRS duration the correction formulae of Hodges and Fridericia yielded highest detection probability for Tdp at all three cutoff levels (i.e. at the 480ms cutoff level, $t = 7.34$, $p < 0.001$, and $t = 6.70$, $p < 0.0001$, respectively, and at the 500 ms cutoff level, $t = 5.28$, $p < 0.001$, and $t = 4.77$, $p < 0.005$, respectively). For patients with wide QRS complex, greatest detection performance for Tdp showed the uncorrected JT interval ($t = 3.55$, $p < 0.05$) followed by the Hodges formula ($p = NS$) at the level of 330ms. **Conclusions:** Assessment of ventricular repolarization based on the use of the Hodges or alternatively Fridericia formula best identifies the likelihood of Tdp development. The uncorrected JT interval may be of comparable usefulness in patients with wide QRS complex.

O052

RIGHT VENTRICLE MAPPING IN PATIENS WITH BRUGADA SYNDROME

Ficili S; Galeazzi M; Lavalle C; Russo M; Chiarelli G; Santini L; Amati F; Mele F; Pandozi C; Santini M
dipartimento Cardiovascolare, Ospedale San Filippo Neri – Roma-Italy

Background: The role of structural heart disease and sodium channel dysfunction in the induction of electrical instability in Brugada syndrome is still known. However recent paper had showed that endomyocardial biopsy detected structural alterations in subjets with Brugada syndrome and arrhythmias. **Objective:** To investigate the role of structural alterations in subjects with Brugada syndrome and inducible at electrophysiological study (EPS). **Methods:** We studied 28 consecutive probands (24 males, 4 females) with clinical and istrumental diagnosis of Brugada syndrome. All probands were Caucasian. According to the most recently proposed diagnostic criteria, the clinical presence of BS was based on demonstration on the ECG of a type 1 or a type 2 that was converted to type 1 after flecainide test (2 mg/kg). All patients were inducible at EPS. A bipolar voltage mapping was also performed by CARTO system. In a subset of patients (8), the electroanatomical right ventricular map was integrated with MR/CT image to assure the contact between the tip of catheter and endocardial tissue. In 2 patients intracardiac echo (ICE) was used to investigate the structural alterations. Genetic study for SCN5A mutational screening was also performed onto DNA obtained from peripheral blood sample of all 148 patients. **Results:** Programmed electrical stimulation induced VF in all the patients. The electroanatomical mapping showed normal potentials of the right ventricle in all the patients. The mean number of acquired points was (325 ± 25 points) with an average mapping

period of 24 ± 4 minutes. Structural alterations were non detected by ICE. Genetic study revelead 3 mutation (mutation rate 21,4%) IVS-24/CT in two patients (B6 and B 11) and R 1512 W in one patient (B15). **Conclusion:** Substrate right ventricular mapping of Brugada patients does not highlight any alterations.

O053

MUTATION SPECTRUM IN KCNQ1 AND KCNH2 GENES IN IRANIAN LONG QT SYNDROME PATIENTS

Banihashemi K; Saber S; Houshmand M; Moradmand Z; Aryan H; Fazelifar AF; Haghjoo M; Emkanjoo Z; Eftekharzadeh M; Zaklyazminskaya EV
Medical Science Department, IECF, Ministry of Science, Research and Technology, Tehran, Iran

Background: Long QT Syndrome (LQTS) is a heterogeneous group of inherited arrhythmic disorders characterized by QT interval prolongation, and associated with high risk of sudden cardiac death (SCD). At present more than 10 genes were detected as causative. But mutations in KCNQ1 and KCNH2 genes encode the cardiac potassium channels account about 60% of all LQTS patients. **Material and Methods:** We had 40 Iranian LQTS index patients under our observation. Clinical examination was performed in Rajaei Hospital, and Tehran Arrhythmia Clinic. Genetic screening was performed by direct sequencing of all coding area of KCNQ1 and KCNH2 genes in Special Medical Center. **Results:** We did find 3 mutations in KCNQ1 gene, in 3 out of 40 (about 8%) index patients. About 46% of patients are carrying common single nucleotide polymorphisms (SNPs). Screening of KCNH2 coding and adjacent intronic area did not reveal any of disease-causing mutation, but 40% of patients were carrying intervening SNPs in KCNH2 gene. **Conclusion:** We found surprisingly low prevalence (8%) of mutations in KCNQ1 gene. Lack of mutation in KCNH2 gene in Iranian LQTS patients is also rather confusing. This is not in concordance with findings in other populations. This discrepancy may reveal different molecular mechanisms in Iranian LQTS patients due to different pathogenic candidate genes, or phenomena such as allelic drop-out. Further molecular investigations in other known genes involved in LQTS pathogenicity may elucidate its genotype-phenotype correlation in Iran.

E-HEALTH AND ARRHYTHMIAS

O054

ARRHYTHMIA TELEMONITORING IN SYMPTOMATIC AND ASYMPTOMATIC PATIENTS IN GEORGIA (REPUBLIC OF)

Gegenava T; Gegenava M; Kirtava Z; Patients with arrhythmia, syncope, epilepsy
Tbilisi State Medical University

Introduction: Mobile telemedicine (m-Health) represents an important recent sub-segment of e-Health and a rapidly growing branch of telemedicine. A classical example demonstrating the impact of telemedicine on diagnosis is the event recording of arrhythmias. **Method:** We investigated 47 outpatients with different types of arrhythmia (n = 27 male and n = 20 female, age − 12–80 year. Among them were n = 7 patients with unexplained syncope, n = 10 patients with epilepsy, n = 2 patients after radiofrequency catheter ablation, n = 5 patient after aorto-coronary bypass graft surgery. Control group was performed with n = 10 sportsmen. Investigations were made by 3-lead electrocardiograph-ECG Loop Recorder in automatic recording/transmitting mode. **Results:** Arrhythmias were registered during 7–68 hours of observation. n = 22 (48%) patients had arrhythmia symptoms. n = 25 (52%) patients were asymptomatic. Cases of sinus brady- and tachyarrhythmia, sick-sinus syndrome, atrial fibrillation, supraventricular tachycardia (SVT) supraventricular premature complexes (SVPCs) and ventricular premature complexes (VPCs) have been correctly recognized by automatic recognition software and recorded. We also studied n = 2 patients after radiofrequency catheter ablation (RFA). Arrhythmia relapse was shown in both of them (SVT, SVPCs), but mostly they were asymptomatic. We studied also n = 10 patients with epilepsy and discovered n = 3 patients with SVT and n = 2 patients with sinus tachycardia. Among n = 7 patients with unexplained syncopes, we revealed n = 2 patients with sinus tachycardia, n = 2 patients with SVT. Asymptomatic episodes revealed mostly in study group p = 0.001, there were no different between gender p = 0.05. **Conclusions:** Mobile telecardiology represents feasible methodology to monitor arrhythmia outpatients in Georgia, promoting earlier discharge of non-life-threatening cases, improving patients' comfort of life and increasing their mobility with enhanced safety.

O055

A NEW WEB-BASED NATIONAL DATABASE: THE HELLENIC CARDIOLOGY SOCIETY ABLATION REGISTRY. RESULTS OF THE 2008–2010 YEAR PERIOD

Vassilikos V; Efraimidis M; Billis A
First Cardiology Dept, AHEPA University Hospital, Thessaloniki, Greece

In 2008 the radiofrequency ablation procedures (RFA) registry of the Hellenic Cardiology Society (HCS) was created. This is a dynamic, web-based application, which acts as the interface for storing and retrieving patients' demographic data and ablation procedures. Access to the site is permitted only to registered users. The purpose of this study is the report of the results of RFA procedures performed in Greece over the 2008–2010-year period. There are 24 licensed centers to perform RFA in Greece. During the 2008–2010 year period 3413 RFA procedures were performed in 3222 patients in 19 centers. 5 centers did not contribute data for various reasons. It is interesting that >50% of the total number of procedures were performed at 4 high volume centers (>100 cases/year). Male:Female ratio was 54% vs 46% and the mean age was 51.2 years. The most common procedure was slow pathway ablation for atrio-ventricular reentry tachycardia (AVNRT), the second was accessory pathway related tachycardias (AVRT), and the third was atrial fibrillation ablation. Success rates were high (92%), complication rate was 2.6% (serious complications <1%) and total relapse rate was 9% at six months follow-up. The electronic RFA registry in Greece confirmed that all RFA procedures are performed in Greece with high success and low complication rates, comparable to the European and US standards. The experience and results from the first three- year period use of the application are very interesting and encouraging, thus indicating the need for development of similar national databases at the National level.

GENETICS

O056

NEW SCN5A GENETIC VARIANT IN IRANIAN PATIENT WITH BRUGADA SYNDROME

Saber S; Banihashemi K; Houshmand M; Fazelifar AF; Haghjoo M; Emkanjoo Z; Alizadeh A; Zaklyazminskaya EV
Petrovsky Russian Research Center of surgery, RAMS, Moscow, Russia

Background: Brugada syndrome (BrS) is an autosomal dominant cardiac arrhythmia characterized by ST elevation in V1-V3, pseudo-Right bundle branch block (RBBB), high risk of sudden cardiac death (SCD) due to polymorphic ventricular tachycardia and apparently normal heart. Mutations in SCN5a gene cause 15–20% of BrS cases. Clinical examination: Physical examination, standard 12-leads ECG, echocardiography and 24-Holter monitoring were performed for index patient. Genetic screening: included PCR-based Senger sequencing of all coding exons and adjacent introns area of SCN5a gene. **Results:** We observed male BrS patient, 46 y.o, at first hospitalization. He had atypical chest pain, syncope and positive family history of Sudden Death (his brother at 5 y.o). Brugada-pattern, type 1 was registered on resting ECG (HR = 70, QTc = 465 ms, PR = 200 ms, without other arrhythmia). Myocardial structural was normal by Echo-CG examination. Genetic screening revealed a new rare variant c.C5787T (p.R1929C) in SCN5A gene. This change has not been observed in other ethnic groups. Single-chamber ICD was implanted with a regular checking every 3 months. During first month after implantation, patient got two appropriate shocks, and the one inappropriate. Quinidine administration (200 mg/twice daily) was prescribed. Three years later, patient interrupted quinidine therapy and had one appropriate shock. After this episode quinidine therapy was resumed and no appropriate shock or any other major cardiac events were registered during next three years. **Conclusion:** We have recently identified new possibly disease-causing c.C5787T variant in SCN5A gene in patient with Brugada syndrome. This variant was not found in other ethnic groups. Population analysis in ethnically-matched control group is in progress now. Long-term quinidine therapy seems to be efficient in events-free surviving in BrS patient. This drug can be promising in control of ventricular tachycardia in BrS but cohort study has to be performed to verify their efficiency.

O057

AMINO ACID SUBSTITUTIONS IN THE PORE OF THE CAV1.2 CALCIUM CHANNEL AFFECT ANOMALOUS MOLE FRACTION EFFECT OF THE CHANNEL

Li Z; Huang H; Yang B; Gao GF; Peterson BZ; Huang CX
Department of Cardiology, Renmin Hospital of Wuhan University, Wuhan 430060, China

Introduction: The nature of ion permeation through ion channel is the electrophysiological basis of arrhythmias and has long been the subject of investigation. The anomalous mole fraction effect (AMFE) is an important probe of ion-ion interactions in the pore of voltage-gated Ca2+ channel and depends on holding voltage, total ion concentration and the intrinsic binding properties of the channel. The amino acid residues at position 1144 differed from several classes of voltage-gated Ca2+ channels are important to the pore's permeation of multiple Ba2+ and Ca2+ ions. **Methods:** We substituted Phe-1144 (F, CaV1) with glycine (G, CaV2) and lysine (K, CaV3) and observe the effects of mutation on voltage and concentration dependences of AMFE. Whole-cell currents were recorded in the external solutions mixing of Ca2+ and Ba2+ such that the Ba2+/(Ba2+ + Ca2+) was 0, 0.3, 0.5, 0.7, 0.9, 1.0 and with total divalent cation concentration held at 2, 10 or 20 mM at holding potential from −80 to −20 mV. **Results:** IBa/ICa determined under 2 mM differs from IBa/ICa determined under higher concentrations (10 and 20 mM) and also differed while tail currents were evoked at potentials from −80 to −20 mV. The AMFE was greatest when tail currents were evoked at relatively positive potentials (−20 mV) and when the total divalent cation concentrations were kept low (2 mM). AMFE is attenuated for F1144G while accentuated for F1144K compare with wild-type respectively. **Conclusions:** These results indicate that glycine and lysine substitutions of Phe-1144 affect on AMFE via different mechanisms. Phe-1144 substitutions confer to structure-based models for Ca2+ channel permeation. The residues at position 1144 determine the permeation of several classes of voltage-gated Ca2+ channels.

O058

ALTERATIONS IN THE EXPRESSION OF GENES RELATED TO CONTRACTILE FUNCTION AND HYPERTROPHY OF THE LEFT VENTRICLE IN CHRONICALLY PACED PATIENTS FROM THE RIGHT VENTRICULAR APEX (PRELIMINARY RESULTS)

Simantirakis EN; Kontaraki I; Arkolaki EG; Chrysostomakis SI; Nyktari EG; Patrianakos AP; Vardas PE
Cardiology Department, University Hospital of Heraklion

Background: Long term asynchronous ventricular activation from right ventricular apex results in reduced systolic and diastolic function. The purpose of this study is to assess in the peripheral blood alterations of the expression of genes related to contractile function and hypertrophy of the left ventricle, after right ventricular apical pacing in patients with preserved left ventricular systolic function. **Methods:** Patients were divided into two categories, based on the cumulative percentage of ventricular pacing post-implant. Group A consisted of those paced due to atrioventricular conduction disturbances (ventricular pacing> 90%), while group B of those with preserved intrinsic atrioventricular conduction. At the time of implantation and 3 months later, we evaluated in the peripheral blood concentrations of mRNA of sarcoplasmic reticulum calcium ATPase (SERCA) and β-myosin heavy chain (β-MHC). We also estimated echocardiographically left ventricular end-diastolic and end-systolic diameter and left ventricular ejection fraction. **Results:** We have collected data for 30 patients during a period of 3-months follow up. In group A at 3-months follow-up, mRNA levels of SERCA were decreased (9,3 ± 1,49 vs 4,04 ± 1,33 p = 0,021) and β-MHC mRNA levels were increased though not significantly (62,12 ± 46,97 vs 424 ± 245 p = 0,127). Left ventricular end-diastolic diameter, left ventricular end-systolic diameter and left ventricular ejection fraction remained unaltered (46.5 ± 2.2 vs 47.85 ± 2.18 p = 0.7, 27.8 ± 2 vs 32.4 ± 2.2, p = 0.4 and 61 ± 2.8 vs 59 ± 2.1, p = 0.7 respectively). In controls all measured parameters showed no significant changes. **Conclusions:** Permanent right ventricular apical pacing is associated with alterations, in the peripheral blood, in the expression of genes regulating left ventricular contractile function and hypertrophy. These findings are traceable, while at the same time left ventricular function has not been deteriorated.

O059

GENETIC VARIATION OF SCN5A IN KOREAN PATIENTS WITH SICK SINUS SYNDROME

Kim YN; Lee YS; Park HS; Jung BC; Shin DG; Cho YK; Lee SH; Han SM; Lee MH; Daegu Arrhythmia Gene Study Group
Keimyung University Dongsan Medical Center

Purpose: Recent western studies have been shown that the genetic variation of SCN5A is related with sick sinus syndrome (SSS). To determine the SSS-associated genetic variation in Korean patients, we investigated the genetic variation of the SCN5A in Korean patients with SSS. **Methods:** We enrolled 30 patients with SSS, who diagnosed by sinus pause more than 3.0 sec in Holter monitoring, and 30 control. All exons including

the putative splicing sites of the SCN5A gene were amplified by PCR and sequenced directly or after subcloning using an ABI PRISM 3100 Genetic Analyzer. The structure model of the human SCN5A domain was obtained from the Automated SWISS-MODEL. **Results:** A total of 9 genetic variations in 30 patients were identified. Among these, 7 variations (G87A-A29A, IVS9–3C>A, A1673G-H558R, G3823A-D1275N, T5457C-D1819D, T5963G-L1988R, C5129T-S1710L) have been reported in previous studies and 2 variants (A3075T-E1025D, T4847A-F1616Y) were firstly found. In three-dimensional modeling of SCN5A domain, only 1 variation site (F1616Y) was able to be analyzed. **Conclusion:** There were 2 novel genetic variations (E1025D, F1616Y) in the SCN5A gene in Korean patients with SSS. However, further functional study might be needed.

IMAGING MODALITIES

O060

PULMONARY VEINS VARIATIONS PATTERNS DETERMINED BY MULTI SLICE COMPUTED TOMOGRAPHY AN ATRAIL NON FLUOROSCOPIC GEOMETRY

Scazzuso FA; Rivera S; Gomez L; Albina G; Laino R; Sammartino V; Giniger A
Instituto Cardiovascular de Buenos Aires (ICBA)

Objective: To determine pulmonary veins drainage patterns determined by multi slice 64 computed tomography (MSCT-64). **Method:** A total of 153 MSCT of patients with atrial fibrillation eligible for pulmonary veins isolation (PVI) were analyzed. The images were fused with the left atrium En Site (Nav X) Verissmo System electro-anatomic map obtained during PVI. The primary end point was to determine the number of pulmonary ostiums located at each side of the LA, therefore the most common anatomic drainage pattern variations. We defined single Ostia as the ones which did not showed vein bifurcations in the endoscopic view; Common Ostia as the ones that showed vein bifurcation and primary trunk to those presenting vein bifurcation >5 mm away from the ostium. **Results:** The mean age was 57.88 years (± 9.68 DS); 80.73% male and 19,27% female. 69.87% presented 2 left ostiums; 93.97% showed 2 right ostium, corresponding to the superior and inferior PVs. A single left ostia was seen in 18.07% of the cases; 8.43% showed a left single trunk; 6.02% presented right single ostia and 4.08% a third right ostium. The correlation between the atrial geometry and MCCT-64 was 100%. **Conclusion:** The presence of 4 pulmonary vein ostium corresponds to the known left atrium anatomy. This study suggests the most frequent anatomic drainage pattern variations in the following order: a unique left ostia, a single left trunk containing both superior and inferior left PVs, a single right ostia and less frequent a third right ostium corresponding to the middle vein. Knowing the LA anatomy may help to select the most suitable strategy during PVI.

O061

OPTIMAL FLUOROSCOPIC PROJECTIONS FOR ANGIOGRAPHIC IMAGING OF THE LEFT ATRIUM APPENDAGE: LESSONS LEARNED FROM THE INTRAPROCEDURAL RECONSTRUCTION OF THE LEFT ATRIUM AND PULMONARY VEINS

Kriatselis C; Nedios S; Tang M; Gerds-Li JH; Fleck E
Deutsches Herzzentrum Berlin

Introduction: Percutaneous left atrium appendage (LAA) obliteration is a new strategy for prevention of embolic events in patients with atrial fibrillation. Selective angiography of the LAA in standard fluoroscopic projections is used to identify the LAA ostium. Anatomical variability is an important limitation of this imaging approach. **Methods:** Hundred patients (67% men, age: 60 ± 12 years) undergoing a PV isolation procedure received intraprocedural rotational angiography and three-dimensional reconstruction of the left atrium (LA), the pulmonary veins (PVs) and the LAA. For each patient, 33 angiographic projections, from RAO 80° to LAO 80°, in steps of 5°, were evaluated. Optimal projections of the LAA ostium were defined at sagittal plane: (i) clear identification of both superior and inferior segments of the LA–LAA junction and (ii) no overlapping between LA and LAA ostium. At frontal plane: (i) clear identification of all four quadrants of the LAA ostium and (ii) visualisation of the maximal horizontal ostial diameter. **Results:** A reconstruction of the LA, the PVs and the LAA was obtained for 97 patients. The optimal fluoroscopic projection for the LAA ostium in a sagittal plane was RAO 30 in 82 out of 100 patients (82%). Projections in RAO 25 and 35 were optimal in 71% of the patients. RAO 45 resulted in optimal sagittal LAA visualisation in 45%. The optimal ostial projection in a frontal plane for the LAA ostium was LAO 40 in 60 out of 100 patients (60%). Optimal LAA visualisation was feasible in 50% in LAO 45 projections and in 38%

in LAO 35 projections. **Conclusion:** If selective angiography of the LAA is performed to facilitate implantation of an occlusion device, fluoroscopic projections should be carefully selected to avoid suboptimal visualisation. The preselected projections proposed in our study: RAO 30 and LAO 40 result in optimal sagittal and frontal angiographic projections of the LAA ostium respectively in the majority of patients.

IMPLANTED CARDIOVERTER DEFIBRILLATORS

O062

ICD THERAPY IN THE ELDERLY: LONG-TERM PREDICTORS OF BENEFIT AND MORTALITY

Wolber T; Haegeli L; Steffel J; Schmid C; Duru F
University Hospital Zurich

Background: Implantable cardioverter defibrillator (ICD) therapy reduces arrhythmic and all-cause mortality in patients at high risk of sudden death. However, its clinical benefit in elderly patients is uncertain. The aim of this study was to assess the long-term efficacy of ICD treatment in elderly patients and to identify markers of successful ICD therapy and risk factors of mortality. **Methods:** We performed multivariate analysis of a prospective long-term database from two tertiary care centres including 1118 consecutive patients implanted with an ICD. Predictors of ICD therapy and risk factors for mortality were assessed in patients aged 75 years or older at ICD implantation compared with younger patients. **Results:** The mean follow-up time was 45 ± 40 months. The rates of ICD therapy were similar among both age groups. No significant predictors of ICD therapy could be identified among older patients. Median estimated survival was 165 months among patients younger than 75 years, and 81 months among those aged 75 and older ($P = 0.004$). Age (HR 1.23 per year; $P = 0.05$), reduced ejection fraction (HR 1.82 per 10% decline; $P = 0.02$) and impaired renal function (HR 1.40 per 10 ml/kg/m2 eGFR decline; $P = 0.05$) are risk factors of mortality in patients aged 75 years and older. However, mortality of older patients is similar to that of the age-matched general population irrespective of the delivery of ICD therapy. **Conclusion:** ICD therapy is effective for treatment of life-threatening arrhythmias in all age groups. However, prevention of sudden cardiac death may have limited impact on overall mortality in older patients. Despite a similar rate of appropriate ICD therapies, the risk of death is increased twofold in ICD recipients aged 75 years or older compared with younger patients. Patients with reduced ejection fraction and impaired renal function are at highest risk.

O063

SERUM MARKERS OF COLLAGEN TURNOVER PREDICT FUTURE SHOCKS IN ICD RECIPIENTS WITH DILATED CARDIOMYOPATHY ON OPTIMAL TREATMENT

Kanoupakis EM; Kallergis EM; Mavrakis HE; Goudis CA; Saloustros IG; Koutalas EP; Chlouverakis GI; Vardas PE
Cardiology Dpt, University Hospital of Heraklion

Objectives: We investigated prospectively whether serum markers of collagen turnover could be used as predictors for the occurrence of malignant ventricular arrhythmias in patients with non-ischemic dilated cardiomyopathy (NIDC) implanted with an implantable cardioverter defibrillator (ICD) for primary prevention. **Methods:** Serum C-terminal propeptide of collagen type-I (CICP), C-terminal telopeptide of collagen type-I (CITP), matrix metalloproteinase (MMP)-1, and tissue inhibitor of matrix metalloproteinases (TIMP)-1 were measured as markers of collagen synthesis and degradation in 70 patients with mildly to moderate symptomatic heart failure due to NIDC with LVEF <35%, who received an ICD for primary prevention of SCD. Patients were evaluated for any appropriate ICD delivered therapy, whether shock or antitachycardia pacing, during a 1-year follow-up period. **Results:** Appropriate device therapies were delivered in 14 of the 70 patients during the follow-up period, with antitachycardia pacing in 2, antitachycardia pacing with shocks in 4, and shocks in 8. Preimplantation MMP-1 levels were significantly higher in patients who had appropriate ICD-delivered therapy than in those who did not have any therapy (27.7 ± 1.6 ng/ml vs. 24.1 ± 2.5 ng/ml, respectively, $p < 0.001$). The same was true for baseline serum concentrations of TIMP-1 and CITP (89 ± 14 ng/ml vs. 58 ± 18 ng/ml, $p = 0.008$ and 0.46 ± 0.19 ng/ml vs. 0.19 ± 0.07 ng/ml, $p < 0.001$, respectively). **Conclusions:** Undoubtedly, ECM alterations play a crucial role in the constitution of an arrhythmogenic substrate in NIDC and, given the availability of therapies to prevent fatal ventricular tachyarrhythmias, the quest for factors that have a very good correlation with appropriate ICD discharges in these patients is logical. Our results confirm the role of serum markers of collagen turnover as predictors of arrhythmic events in ICD recipients and could provide an auxiliary tool in this context.

O064

EARLY DETECTION OF CHRONIC MYOCARDIAL ISCHEMIA IN A PATIENT IMPLANTED WITH AN ICD CAPABLE OF INTRACARDIAC ELECTROGRAM MONITORING

Papavasileiou LP; Forleo GB; Santini L; Romeo F
University of Rome "Tor Vergata". Department of Internal Medicine, Division of Cardiology. Rome, Ita

We report the detection of intracardiac ST-segment variation in a 75 year-old man affected by ischemic heart disease; previous coronary artery by-pass surgery (1983, 1995) previous percutaneous coronary treatment (2002, 2006) and ICD implantation (AnalyST Accel TM DR, St. Jude Medical, Sylmar, USA). During routine in-clinic visits pacing thresholds were stable and no arrhythmic or ischemic events were documented. Remote monitoring with the Merlin system was provided, but unfortunately the patient was not able to use. In September 2010 he reported stress angina so antiischemic treatment was potentiated. The first week of January 2011 he was admitted to the emergency department for unstable angina. He reported that episodes of angina became more frequent and more graving since September. During ICD interrogation; 140 ST episodes were documented. During inspection of the intracardiac electrograms (IEGM) a clear ST segment depression >2 mm was documented initially for higher cardiac rate. A coronary angiogram (CA) was performed and two saphenous grafts (SVG), for obtuse marginal (OM) and right coronary artery (RCA), resulted occluded. The two grafts were patent in previous CA, performed in 2006. PCA and bare metal stent implantation was performed in native right coronary artery and SVG for OM. In March 2011, an in-clinic ICD follow-up was performed and no new ST events were documented and patient reported to be asymptomatic. **Comment:** We report the correct documentation of ST-segment modification by the AnalyST Accel ICD in patient with stress angina. Of note, clinical manifestation of stress angina and myocardial ischemia, as reported by patient during last in clinic FU, preceded ST segment modification detected by the algorithm only by few days. In fact, patient reported reduction of angina threshold during time and the algorithm initially recognized ST modifications in high frequencies and over time reported episodes of ST depression for lower heart rates.

O065

ROLE OF IMPLANTABLE CARDIOVERTER-DEFIBRILLATORS IN PATIENTS WITH LEFT VENTRICULAR ASSIST DEVICES

Gkouziouta A; Adamopoulos S; Leontiades E; Kostopoulou A; Elivanis; Maounis T; Pavlides G; Voudris V; Bairaktaris A
Onassis Cardiac Surgery Centre

Purpose: Left ventricular assist devices (LVADs) have been used effectively as a "bridge" to cardiac transplantation and as destination therapy in patients with advanced heart failure(H.F.). Patients with H.F. are prone to ventricular arrhythmias (ventricular tachycardia/ventricular fibrillation -VT/VF) and implantable cardioverter-defibrillators (ICDs) reduce the morbidity and mortality. No indication guidelines for ICD implantation in patients with LVADs exist. We retrospectively reviewed the role of ICDs in patients with LVADs in our centre. **Methods:** 65 patients were supported with VADs since 2003 in the Onassis Cardiac Surgery Centre as a bridge to transplantation. 26 patients(40%)were supported with LVADs. Devices used were:HeartMate XVE, Novacor LVAS, LVAD Berlin Heart, INCOR LVAD and Heartware. All VT/VF and the type of therapy delivered by the ICDs were analyzed from time of LVAD implantation. Concurrent anti-arrhythmic medications were documented. **Results:** Indications for LVADs were non ischemic dilated cardiomyopathy in 65% and ischemic cardiomyopathy in 35%.19(73%)patients had ICDs implanted prior to VAD implantation. VT/VF occurred in 10 patients (52.5%)(8 non-ischemic and 2 ischemic) post-LVAD. 7 patients were defibrillated while antitachycardia pacing was utilized in 8 of them. All of them were in heart failure treatment(including amiodarone)and 3 of them were on anti-arrhythmic medications (mexilitine, or procainamide). 4 patients had a single VT/VF event which was terminated by the ICDs and did not require any management changes. A pt died of intractable VT/VF in another hospital due to complications of an unsuccessful ablation. **Conclusions:** Patients on LVAD support have VT/VF events. Anti-arrhythmic drugs were not always successful in terminating VT/VF. ICDs terminated these events and may contribute to decreased morbidity and mortality in patients with LVADs. Prospective studies analysing their role would provide guidelines for ICD implantation in patients on LVADs.

O066

THE EFFECT OF REMOTE MONITORING ON JAPANESE CRT-D PATIENTS

Nakajima J; Suga C; Wakaba H; Hirahara T; Sugawara Y; Ako J; Momomura S
Division of Cardiovascular Medicine, Jichi Medical University Saitama Medical Center, Japan

Abstract: Recently, device remote monitoring (RM) has been applied in clinical settings especially in heart failure. However, the effect of RM for heart failure practice is controversial. The aim of this study was to verify the effect of RM for heart failure on cardiac resynchronization therapy-defibrillator (CRT-D) patients in our institution. **Methods and Results:** We retrospectively analyzed hospital files of fifty-seven CRT-D consecutive patients who were followed up in our out-patient clinic every three-four months; thirty patients were out-patient clinic only (non-RM group), and twenty-seven patients were in addition controlled with RM (RM group). There were no differences between two groups regarding clinical background, i.e., NYHA functional class, serum BNP, and QRS duration. Kaplan-Meier curves of clinical adverse event free rates were obtained. During a median follow-up of 865.4 ± 445.6 days, clinical adverse events were death in nine patients (two in RM group, and seven in non-RM group), and heart failure hospitalization in nineteen patients (nine and ten respectively). Three device-related adverse events also occurred, one in RM group and two in non-RM group. As comparing the RM group with non-RM group, Kaplan-Meier curves of clinical adverse events did not show statistically significant difference. **Conclusion:** RM failed to show clinical benefit in terms of reducing the clinical adverse events in CRT-D patients. We need to consider how to utilize the information from RM to improve clinical outcome of heart failure patients.

O067

PATTERNS OF ICD USE IN PATIENTS ENLISTED FOR HEART TRANSPLANTATION: A SINGLE CENTRE RETROSPECTIVE ANALYSIS 2006–2010

Sedlacek K; Jurkuvenas P; Hoskova L; Malek I; Kautzner J
IKEM, Clinic of Cardiology, Videnska 1958/9, 140 21 Prague, Czech Republic

Purpose and methods: We retrospectively analyzed indications for ICD (and CRT-D) use and occurrence of appropriate ICD therapies in patients enlisted for heart transplantation between 2006–2010. Potentially life-saving therapy was defined as ventricular tachycardia (≥ 150 bpm) or fibrillation, adequately terminated by anti-tachycardia pacing or shock. **Results:** During the study period, 223 patients were enlisted for heart transplantation. Among 89 non-urgent candidates receiving an ICD, 36 patients were implanted at the time of the waiting list enrollment ("bridging" indication; mean time on the waiting list 301 days; mean time from implant to transplantation 367 days) and 53 received an ICD earlier (conventional primary or secondary indication; mean time on the waiting list 180 days; mean time from implant to transplantation 729 days). In the bridging strategy group, potentially life-saving therapies were recorded in 8 patients (22%; 3 with ischemic and 5 with non-ischemic cardiomyopathy). In the conventional indication group, appropriate ICD therapy was registered in 19 patients (36%; 9 with ischemic and 10 with nonischemic cardiomyopathy). The incidence of potentially life-saving therapies was thus 19% per year in both groups with minimal difference between ischemic and non-ischemic disease etiology. Among 16 patients who died during the study period, no sudden death was identified. Nine of the deceased patients had an ICD and 3 of them received potentially life-saving therapies unrelated to their cause of death. **Conclusions:** ICD was effective in preventing of sudden cardiac death in patients enlisted for heart transplantation. The rate of adequate therapies justifies consideration of ICD bridging indication in ambulatory patients waiting for heart transplantation. Cost-effectiveness is probably limited by the short time between implantation and heart transplantation comprising approximately year in this study.

O068

LONG-TERM FOLLOW-UP OF PATIENTS RECEIVING ICDS FOR SECONDARY PREVENTION IN THE ISLAND OF CRETE

Kanoupakis EM; Koutalas EP; Mavrakis HE; Kallergis EM; Saloustros IG; Stokkos K; Psathakis E; Solidakis G; Vardas PE
Cardiology Dpt, University Hospital of Heraklion Crete

Introduction: Implantation of ICDs has proven its efficacy in various subgroups of patients having experienced spontaneous malignant arrhythmic episodes. However, relative scarcity of data exists regarding long-term follow-up outcomes of this population in the context of tertiary hospitals-ICD implantation centres beyond randomized clinical trials borders. In the following analysis the survival and the incidence of appropriate ICD therapy for ventricular arrhythmias in patients who underwent ICD implantation at our institution, the only in the island of Crete, was examined. **Methods and Results:** We acquired data from patients with ischemic (ICM), non-ischemic dilated (DCM) and hypertrophic cardiomyopathies as well as in patients with inherited channelopathies who received an ICD from 1997 to 2009 for secondary

prevention of sudden cardiac death. Of 188 ICD recipients 53 deaths were observed (28.2%). Median survival was 118 months (95% CI: 100–135). Eighty six patients (45.7%) had ICD therapy. Of the delivered therapies, 16,3% were inappropriate. Median shock-free survival was 64 months (95% CI: 53.8–74.2). Median survival between the largest subgroups, ICM and DCM patients, differs in favor of DCM ones in a statistically marginal non-significant way (89 months vs 131 months, p = 0.053. **Conclusion:** In a close geographical region, where the general level of health care is good and well appreciated by the population, the survival and the incidence of appropriate ICD therapy for ventricular arrhythmias is in accordance with that of the international large trials.

O069

THE ACCURACY OF THORACIC IMPEDANCE MEASUREMENT BY CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICES IN PATIENTS ON DIALYSIS

Kimura R; Inoue K; Toyoshima Y; Doi A; Masuda M; Sotomi Y; Iwakura K; Fujii K
Sakurabashi Watanabe Hospital

The measurement of thoracic impedance by implantable device (Medtronic Optivol) is expected to be useful for early detection of heart failure, but the accuracy of thoracic impedance measurement in human body is not yet fully investigated. Here we report two cases of heart failure and chronic dialysis.
Case 1 with ischemic cardiomyopathy, NYHA class III, QRS width 210 ms, left ventricular ejection fraction (EF) 35% with dyssynchrony, underwent CRTD (Medtronic Concerto) implantation. After 4 months the patient was admitted because of heart failure. The trend chart of the thoracic impedance showed the distinctive pattern of oscillation. The thoracic impedance increased from the baseline value during the therapy for heart failure.
Case 2 with dilated cardiomyopathy, NYHA class III, QRS width 160 ms, EF 21% with dyssynchrony, underwent CRTD (Medtronic Concerto) implantation. After 4 months the patient was admitted because of pneumonia and heart failure. The trend chart of the thoracic impedance also showed the distinctive pattern of oscillation. The thoracic impedance slightly decreased during the therapy for heart failure.
In both cases, it is important to note that the increase and the decrease of the thoracic impedance perfectly coincided with the schedule of dialysis on a daily basis. Thus, the trend chart of the thoracic impedance showed the distinctive pattern of periodical oscillation. Those patients had dialysis on Monday, Wednesday and Friday. The thoracic impedance sharply increased on these days, and rapidly decreased on other days without exception. This fact clearly indicates that the measurement of thoracic impedance has enough accuracy and temporal resolution to detect the daily change of the fluid status in human body before and after dialysis. Though the algorithm to calculate thoracic impedance index (Optivol index) seems to have room for refinement, the thoracic impedance monitoring for the detection of heart failure is feasible.

O070

OCCURRENCE OF ICD INTERVENTIONS INFLUENCES THE OUTCOME OF PATIENTS IMPLANTED FOR SECONDARY PREVENTION OF SUDDEN CARDIAC DEATH POST MYOCARDIAL INFARCTION

Svetlosak M; Sasov M; Leclercq C; Martins R; Daubert JC; Mabo P; Hatala R
National Institute of Cardiovascular Diseases, Bratislava, Slovakia

Background: Occurrence of appropriate (AI) or inappropriate (InI) ICD interventions relates to a worse prognosis of patients implanted for primary prevention of sudden cardiac death (SCD) post myocardial infarction (MI). However, less is known about their prognostic value in patients implanted for secondary preventative reasons in the era of modern reperfusion therapy of MI. **Aim:** To analyze the impact of ICD interventions (AI or InI) on mortality in a secondary preventative cohort of post-MI patients. **Methods:** This retrospective analysis included all consecutive post-MI patients implanted with an ICD for secondary SCD prevention in a single centre between 2000 and 2007 (n = 148; mean age 65 ± 10 years; mean left ventricular ejection fraction 33 ± 8%). We analyzed the total mortality of patients with AI comparing to the other patients. The impact of InI or ICD shocks for any reason was studied thereafter in the same way. **Results:** After a mean follow-up of 51 ± 27 months we found at least one AI in 96 (65%) and at least one InI in 37 (25%) patients, 27 (18%) patients had both AI and InI, 37 (25%) patients died. Patients experiencing an AI had a significantly higher mortality comparing to the others (OR 2,92; 95% CI 1,18–7,23; P = 0,02). There was a non-significant trend for a higher mortality

in the group with InI (32% vs. 23%; P = 0,23). However, when only ICD shocks irrespective of their appropriateness were considered, they were associated with a higher mortality (OR 2,32; 95% CI 1,05–5,15; P = 0,04). **Conclusion:** In our cohort of consecutive patients with ICD implanted in the setting of secondary prevention of SCD after MI, AI and ICD shocks (delivered as AI or InI) were related to a higher mortality. These findings correspond to the data from primary preventative post-MI ICD populations and highlight the need for a careful follow-up and management of the underlying disease in patients experiencing an AI, as well as the use of algorithms minimizing ICD shocks.

O071

IMPLANTABLE CARDIOVERTER-DEFIBRILLATORS IN ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA: A SINGLE CENTER EXPERIENCE

Hatzinikolaou-Kotsakou E; Kotsakou M; Latsios P; Reppas E; Moschos G; Beleveslis T; Tsakiridis K
Electrophysiology Department Saint Luke's Hospital-Thessaloniki-Greece

Introduction: Arrhythmogenic Right Ventricular Dysplasia (ARVD) is associated with potential life-threatening ventricular tachyarrhythmias and an increased risk of sudden death. Our purpose was to study the outcome of ARVD patients treated with an implantable cardioverter-defibrillator (ICD). **Methods and Results:** We included 28 ARVD patients(pts) with ICD (60% male, ages 15–58, median 36). Twenty four pts for secondary prevention and for primary prevention 4 pts. Primary prevention based: 1) on the clinical criteria 2) EP study findings and 3) familiar history. The mean follow-up was 35 ± 18 months. Complications associated with ICD implantation included need for lead repositioning (n = 4). During follow-up, one patient underwent heart transplantation. During this period 19/28 (70%) pts received a mean of 4.7 (range 2–68) appropriate ICD therapies. Two (50%) of the pts who underwent ICD implantation for primary prevention had appropriate ICD discharges. The median period between ICD implantation and the first shock was 6-months. ICD electrical storms were observed in 3 pts. Inappropriate shocks were seen in 9 pts. Predictors of appropriate therapy were fulfillment of the ARVD criteria (82% vs 25% respectively, $p < 0.001$), the frequency of the daily PVCs > 3.500 (72% vs 29% respectively, $p < 0.001$) induction of VT during EPS (70% vs 35% respectively, $p < 0.001$), syncope (82% vs 31% respectively, $p < 0.001$) and severe RV dysfunction in echocardiography (69% vs 14% respectively, $p < 0.02$). The inappropriate shocks were seen in patients with very frequent atrial tachyarrhythmias. **Conclusions:** Patients with ARVD have a high arrhythmia rate requiring appropriate ICD therapies. ICD treatment appears to be well tolerated and effective in the management of patients with ARVD.

O072

WORK BURDEN OF CLINICIAN IN REMOTE MONITORING OF IMPLANTABLE CARDIOVERTER-DEFIBRILLATORS

Papavasileiou LP; Panattoni G; Santini L; Mahfouz K; Schirripa V; Magliano G; Vecchio F; Minni V; Forleo GB; Romeo F
University of Rome "Tor Vergata," Department of Internal Medicine, Division of Cardiology, Rome, Italy

Background: The efficacy, accuracy and safety of remote monitoring (RM) as well as patient's satisfaction is well demonstrated. Work burden of remote monitoring has not be estimated. In addition in most European countries reimbursement schemes of RM clinics are currently unavailable. Our study aimed to establish the work burden related to RM. **Methods:** Consecutive patients with implanted cardioverter defibrillators (ICD) were enrolled to RM. Parameters analyzed: total work hours (WH) of follow-up with RM, WH/patient, total WH/patient in RM vs total WH/patient without RM. **Results:** 119 patients with mean follow-up of 13,5 ± 12,4 months. 19 patients were unable to perform transmissions and so exclude from the study. The network received 843 transmissions. Mean number of transmissions per patient was 8,5. There were 514 event-free transmissions while 329 transmissions regarded one or more events. Total WH used in RM were 308,55 (80 hours for training visits and first in clinic visit, reviewing event-free transmissions 26 h, 27 hours for reviewing transmissions with events, 12,25 hours for transtelephonic contact of patients and 163,3 hours for in clinic visits of patients after transmissions or transtelephonic contact). WH/pt with RM was 3,08 while WH/pt without RM was 1,6. Statistical analysis' resulted to be significant regarding total WH but not regarding WH/pt with RM ($p < 0,0001$ and p = ns, respectively). **Conclusions:** Work burden of clinician is superior in patients with remote monitoring. In order to expand remote monitoring

in all patients reimbursement formulas should be made.

O073

EARLY DETECTION OF A SPRINT FIDELIS LEAD FRACTURE WITH THE CARE LINK MONITORING SYSTEM.

Papavasileiou LP; Schirripa V; Minni V; Panattoni G; Sergi D; Mahfouz K; Santini L; Forleo GB; Magliano G; Romeo F
Department of Cardiology, University of Rome "Tor Vergata," Rome, Italy

In October 2007, Medtronic's vigilance process announced that the Sprint Fidelis high-voltage implantable cardioverter-defibrillator (ICD) lead (Medtronic, Inc., Minneapolis, MN, USA) is prone to fracture and voluntarily removed it from the market. The advisory recommended the use of lead impedance monitoring alerts to identify impending lead fractures in order to reduce the adverse events, including inappropriate shocks. We report the case of a 75 years old patient with an In Sync ICD implanted in October 2007 in primary prevention. Routine in clinic follow-up revealed stable impedance thresholds (448 Ohm). At September 2010 patient was provided with Carelink remote monitoring system and he performed first manual transmission on January 2011. During inspection of transmission lead impedance was out of range (1088 Ohm) and short VV intervals were 7. Patient was immediately asked to reach the emergency room of our hospital. During ICD interrogation data confirmed imminent fracture of lead. Patient did not recognize the audible alerts. When asked he confirmed hearing alerts, but he failed to recognize them. The patient was hospitalized and the next day a new ICD lead was implanted through the subclavian vein. This is the first report of successful prevention of lead failure of Sprint Fidelis lead with the Care Link remote monitoring system. It is reported that With RV Pacing Impedance Alert set to 1,000 ohms, 47% of patients would have four or more days notice, an additional 2% would have two days notice, and an additional 2% would have one day notice. The ICD lead fracture might induce inappropriate intervention and in extreme cases might be fatal. The remote monitoring systems automatically perform transmissions in case of lead integrity alerts and/or clinical-arrhythmic events. Extended use of RM systems can help fast and correct detection of technical or clinical problems regarding patients with implantable devices.

PACING

O074

IMPACT OF MULTIPLE PACING SITES ON LEFT VENTRICULAR FUNCTION. EXPERIMENTAL STUDY

Kaladaridou A; Bramos D; Skaltsiotes I; Kottis G; Papadopoulou E; Daskalakis C; Agrios I; Matthaios I; Antoniou A; Toumanidis ST
Dpt. Of Clinical Therapeutics, Medical School, University of Athens,

Purpose: Left ventricular (LV) torsion and apical rotation(rotap),are very important contributors to LV performance. The purpose of this study is to examine the effect of simultaneous multiple pacing (P)sites on LV function including rotational and torsional parameters in intact myocardium. **Methods:** In 9 healthy pigs atrio-ventricular epicardial P in multiple P sites was performed simultaneously. Classic right ventricular apical(RVap)P was combined with: 1) LVapex lateral 2) LV basal posterior 3) RV basal anterior 4) RV basal anterior+LV basal posterior. Moreover, 5) LV basal posterior+ LVapex lateral, 6) LV basal posterior+RV basal anterior and 7) RV basal anterior+LV apex lateral P in a random order were performed. LV torsion was calculated by measuring LV basal and apical rotation from basal and apical short-axis epicardial planes with speckle-tracking technique using EchoPac software. LV torsion, ejection fraction (EF), cardiac output(CO), rotap, untwisting rate in sinus rhythm were compared to every P combination. **Results:** CO reduced significantly in:RVap+LVbasal posterior, RVap+RV basal anterior, RVap+RV basal anterior+LV basal posterior, LV basal posterior+LVapex lateral and LVbasal posterior+RVbasal anterior P in comparison to CO in sinus rhythm. EF and LV torsion in sinus rhythm revealed superior in comparison to EF and LV torsion in every P combination. Rotap reduced significantly in: RVap+LVapex lateral, RVap+LV basal posterior, RVap+RVbasal anterior, RVap+RVbasal anterior+LVbasal posterior and RVbasal anterior+ LVapex lateral P. Finally, untwisting rate reduced significantly in: RVap+LVapex lateral, RVap+LV basal posterior, RVap+RVbasal anterior+LV basal posterior, LV basal posterior+LVapex lateral P in comparison to untwisting rate in sinus rhythm.

Conclusions: Different combinations of multiple pacing sites did not increase haemodynamic and rotational deformation parameters of intact LV myocardium.

O075

INITIAL EXPERIENCE WITH A NEW MAGNETIC RESONANCE CONDITIONAL PACEMAKER SYSTEM UNDERGOING MAGNETIC RESONANCE IMAGING: PRELIMINARY RESULTS OF THE PROMRI SINGLE CENTER PILOT STUDY

Wollmann C; Vock P; Steiner E; Mayr H
Hospital of St. Pölten-Lilienfeld, Dep. of Cardiology

Introduction: The purpose of our study is to evaluate safety of a new magnetic resonance imaging (MRI) conditional pacemaker (PM) system (Evia SR-T and DR-T with Safio S53/S60 active screw-in leads, Biotronik SE & Co KG, Berlin, Germany) under MRI conditions. We report preliminary results of the ProMRI single center pilot study. **Methods:** Patients implanted with Evia SR-T or DR-T PM and Safio leads at our institution are eligible for enrollment in this single center prospective non-randomized pilot study. Patients undergo a non-diagnostic MRI of the brain and the lumbar spine at 1.5 Tesla. PM are interrogated before and after MRI to assess potential changes of lead parameters (right atrial (RA)/right ventricular (RV) sensing [mV], pacing threshold [PT, V/0.4 ms], pacing impedance [Ohm]). Patients are followed for 3 months with in-hospital visits at 4 weeks and 3 months after MRI. Continuous variables are expressed as mean ± SD. **Results:** By now, 27 patients (female 11, age 74 ± 10 years, higher degree AV block 10, sick sinus syndrome 5, atrial fibrillation with significant bradycardia 12, dual chamber PM 13) were enrolled in the study. Twenty-three patients completed the 4 weeks FU by now and 11 patients the 3 month FU, respectively. Except for RV pacing impedance paired Student's t-test revealed no significant changes of lead dependent parameters when comparing measurements immediately before and after MRI. When comparing lead measurements assessed immediately before MRI with measurements assessed at the 1 month and 3 month FU, no statistically significant differences were found. One-way ANOVA revealed no statistically significant differences for all parameters when comparing all available FU. No MRI related adverse events occurred. **Conclusion:** The new MRI conditional Evia pacemaker system demonstrated unobtrusive function under MRI conditions. Observed differences in lead measurements between the different follow-ups were in clinically accepted ranges.

O076

THE EFFECT OF AAI AND DDD PACING MODE ON LEFT VENTRICULAR STRAIN, TWIST AND CORONARY FLOW PARAMETERS

Papadopoulou E; Kalantaridou A; Hatzidou S; Pamboucas C; Toumanidis S; Antoniou A
Dpt. of Clinical Therapeutics, Athens Medical School, Alexandra hospital, Athens, Greece

Background: RV apical pacing may induce detrimental effects on left ventricular (LV) function and coronary flow. In this study we evaluated the effect of DDD and AAI pacing mode on cardiac mechanics and potential changes on coronary blood flow. **Methods:** This preliminary study included 14 patients who have received DDD pacemaker for sick sinus syndrome or carotid sinus syndrome and presented with sinus rhythm at their regularly scheduled visit at the pacemaker clinic. All patients had their ventricular lead placed in the RV apex. Patients underwent a complete transthoracic echocardiographic examination while in sinus rhythm and subsequently underwent non-invasive Doppler assessment of coronary flow in the LAD and speckle tracking echo of basal and apical short-axis planes during AAI and DDD pacing mode for 5 min with a 5 min interval in sinus rhythm. **Results:** Rotation of the base was significantly decreased in DDD pacing compared to AAI pacing (−7.44 ± 2.55o vs. −5.26 ± 2.85o, p = 0.012) as well as LV twist (17,65 ± 4.12o vs. 13.99 ± 5.5o, p = 0.05). Time to peak basal rotation during DDD pacing (expressed as percentage of systole) was significantly shortened (98.8% ± 2.06% vs. 86.21% ± 10.48%, p = 0.002). Circumferential strain of the base and time to peak significantly deteriorated in DDD compared to AAI pacing (−16.41 ± 3.00% vs. −13.65 ± 4.60%, p = 0.04 and 97.25% ± 7.00% vs. 103.64% ± 8.72%, p = 0.04 respectively). Apical rotation and circumferential strain did not change significantly. Flow in the LAD, expressed as velocity–time integral, decreased significantly in DDD pacing (10.42 ± 2.49 cm vs. 9.12 ± 1.94 cm, p = 0.002). **Conclusions:** Acute DDD pacing mode showed a detrimental effect on LV twist, rotation of the base and in LAD flow in comparison to AAI pacing mode. Further study is needed to support the above preliminary data.

O077

INACCURACY OF THE 12-LEAD ELECTROCARDIOGRAM IN PREDICTING LEAD POSITION IN RIGHT VENTRICULAR OUTFLOW TRACT PACING

Salahuddin S; Sharma G; Jagia P; Sharma S; Bahl VK
All India Institute of Medical Sciences, New Delhi, India

Introduction: The 12-lead electrocardiogram (ECG) and fluoroscopic landmarks are usually the only guides available to achieve a true septal location in right ventricular outflow tract (RVOT) pacing. These have, however, not been properly anatomically validated. We sought to validate these using cardiac computed tomographic (CT) angiography to confirm lead position within the RVOT. **Methods:** 34 patients with pacemaker leads in the RVOT position were subjected to a cardiac CT angiogram (64-slice Dual Source Siemens Definition) for lead localization within the RVOT as anterior, free wall or septal location. 12-lead ECGs were analysed during forced pacing. Fluoroscopic images of the pacemaker leads were also obtained in 4 standard views-AP, LAO, RAO and lateral views. **Results:** Cardiac CT angiography was performed in 34 patients with a mean age of 59 ± 13 years (25 males). 17 patients (50%) were found to have an anterior lead location within the RVOT, while 17 (50%) had a septal position. Mean QRS axis and QRS duration did not differ significantly among the two groups (QRS axis: 71 ± 5.4° vs 74 ± 4.3° (P-0.20) and QRS duration: 153 ± 21.1 vs 148 ± 19.3 msec (P-0.55) for anterior versus septal respectively). A negative QRS in lead I could not distinguish an anterior from a septal lead location (10/17 vs 13/17, P-0.46, anterior vs septal). Similarly, notching in none of the limb leads, including inferior leads, was helpful in differentiating the two groups. In the fluoroscopic LAO view, the lead was directed rightward in all 17 patients with septal location, but also in 14/17 patients in the anterior location (P-0.22).The lateral view revealed posterior direction of lead in 12/17 patients with septal location, and in only 3/17 patients with anterior lead location (P-0.003). **Conclusions:** Conventional ECG criteria are inaccurate in differentiating septal from anterior RVOT pacing. Also, the fluoroscopic LAO view is insufficient in predicting septal lead placement.

O078

SHORT TERM EFFECT OF RIGHT VENTRICULAR OUTFLOW TRACT COMPARED WITH CONVENTIONAL APICAL PACING ON LEFT VENTRICULAR FUNCTION AND SYNCHRONY IN PATIENTS WITH NORMAL BASELINE CARDIAC FUNCTION

Sharma G; Singh H; Patel C; Ray A; Sharma P; Bahl VK
All India Institute Of Medical Sciences, New Delhi, India

Objectives: Chronic ventricular pacing is known to adversely affect left ventricular (LV) function. We sought to have an objective assessment of LV function and dyssynchrony in patients with right ventricular outflow tract (RVOT) and RV apical (RVA) pacing using equilibrium radionuclide angiography (ERNA). **Methods:** Thirty three patients who underwent dual-chamber, rate-modulated (DDDR) pacemaker implantation were prospectively included. All patients had no history of cardiac disease and baseline normal left ventricular function. Out of 33 patients, 19 had pacemaker lead positioned at RVOT site and 14 at the RVA site. All patients underwent ERNA within 2 week post pacemaker implantation and at 6 month follow-up. All studies were acquired under forced pacing at heart rate of 100/min. Standard deviation of LV mean phase angle (SD LV mPA) expressed in degrees, which was derived by Fourier first harmonic analysis of phase images was used to quantify left intraventricular synchrony and LV ejection fraction (LVEF) were evaluated at baseline and at follow up. **Results:** There was no statistically significant difference between the RVA and RVOT groups at baseline with respect to LVEF (52.9 ± 6.38% vs. 50.8 ± 6.70%; p 0.271) and SD LV mPA (13.3° ± 7.36° vs. 14.4° ± 6.17°; p 0.412). Similarly, no significant difference was observed between the groups at 6 month follow up (LVEF 51.3 ± 9.07% vs. 51.5 ± 9.48%; p 0.855, SD LV mPA 15.3° ± 9.23° vs. 15.1° ± 5.24°; p 0.560). **Conclusions:** No significant difference in LVEF & LV synchrony was observed between RVOT and RVA pacing in patients with normal baseline LV function at 6 month follow-up. A longer follow up with ERNA annually is underway to see the effect of chronic pacing from the two locations.

O079

CLOSED LOOP STIMULATION IMPROVE HAEMODINAMIC RESPONSE DURING MENTAL STRESS TEST

Proietti R; Manzoni GM; Castenuovo G; Lombardi L; Vegliante N; Pietrabissa G; Quaglia C; Spoto A; Sagone A
Cardiac Electrophysiology Laboratory Luigi Sacco Hospital. Milan. Italy

Cloose Loop Stimulation (CLS) algorithm is a form of rate adaptive pacing, able to provide an effective

pacing rate profile not only during physical exercise but although during mental stress. To test this hypothesis CLS or accelerometers sensor (AS) rate response was compared intraindividually during a mental stress test. **Methods:** 36 patients (mean age 76 ± 9)implanted with a VVI-CLS Cylos Biotronik underwent mental stress test in different pacing configuration: non-rate adaptive mode (VVI), accelerometer sensor (AS) mode (VVIR), and CLS respectively. A modified Stroop test was used in order to induce mental stress. Heart rate (HR), systolic and diastolic blood pressure and pacing percentage burden were collected for 5 minutes before, during and 5 minutes after the test. **Results:** Our study show that the average peak HR during mental stress test was significantly higher in CLS configuration than in AS and non adaptive mode. Further the average HR increase (calculated as the difference in minimum HR and the HR peak) during mental stress test was wider in CLS configuration than in VVIR and VVI. Finally, the percentage of pacing beats during mental stress test was higher in CLS configuration than with the other algorithms.

Table I
Within-subjects effects on Hemodynamic outcomes

Outcomes	CLS	AS	VVI	p-value*
Peak HR	92.8 ± 12.6	78.9 ± 6.5	77.8 ± 7.5	<0.000
HR increase	22.7 ± 16.7	8.2 ± 8.6	6.6 ± 6.3	<0.000
Peak SBP	172.6 ± 15.5	156.7 ± 12.2	145.5 ± 13.7	<0.000
SBP increase	51.8 ± 24.7	18.4 ± 13.7	16.4 ± 10.3	<0.000
% Pacing	48.4 ± 17.9	27.4 ± 17.5	25.8 ± 17.6	<0.000

Notes: * = Greenhouse-Geisser corrected Wilk's Lamba Test.SBP = systolic blood pressure

Conclusion: CLS showed to be more effective than AS mode in providing a rate-adaptive pacing during mental stress. Results support the issue that CLS algorithm can detect an hemodynamic demand due to an emotional upheaval and supply a proper heart rate increase.

O080

AAISAFER PACING REDUCES THE PERCENTAGE OF RIGHT VENTRICULAR PACING IN PATIENTS UNDERGOING PULSE GENERATOR REPLACEMENT.

Stazi F; Mampieri M; Verde M; Cardinale M
Dipartimento Apparato Cardiocircolatorio, A O. San Giovanni Addolorata, Roma. CLI Foundation

Introduction: Several trials have shown that high percentages of right ventricular pacing (RVP) induce an increased risk of mortality and heart failure, particularly when the RVP percentage is > 40%. Accordingly, the AAISafeR® (Sorin Group) algorithm was specifically developed to decrease the RVP. The aim of this study was to assess if this pacing mode actually decreased the unnecessary RVP in patients undergoing pulse generator replacement. **Methods:** Thirty-six patients (M = 20, F = 16, mean age 80 ± 7 years) with standard DDD pulse generators (22 for sinus node disease and 14 for atrioventricular block) underwent generator replacement with a device programmed with the AAIsafeR algorithm. **Results:** Pre-replacement analysis of the 36 patients showed a mean RVP percentage of 82 ± 28% and 31/36 (86%) had a RVP percentage > 40%. Twenty-three days after the pulse generator replacement the mean RVP percentage was 21 ± 36% (p < 0,0001 compared to the pre-replacement analysis) and only 9 patients (25%) had a RVP percentage > 40%. **Conclusions:** In our study, that uses the same patients as the control of themselves, the AAIsafeR algorithm significantly decreases the RVP percentage compared to the standard DDD stimulation.

O081

AV NODAL ABLATION AND PACING FOR ATRIAL FIBRILLATION (AF) AND HEART FAILURE (HF) – LONG TERM EXPERIENCE

Obel IWP; Daniels J; Marcer G
Milpark Hospital, Johannesburg, ZA

Atrial fibrillation commonly accompanies heart failure. When heart failure is severe (NYHA grade III-IV) the prognosis is extremely poor. AV node ablation provides excellent rate control but adds ventricular dyssynchrony unless bi-ventricular pacing is instituted. **Method:** 407 Patients (26% female) have been followed for up to 19 years (m = 4.68 yrs). Age m = females 67.5 years, males 64 years. All patients had chronic AF with poor rate control. NYHA III-IV = 220 patients (54%) all receiving optimal medical therapy and monitoring. Bi-ventricular pacing (BiV) was instituted initially for broad QRS or previously paced patients or as clinically indicated following AV nodal ablation and RV pacing. 189 patients received BiV pacing. Ischaemic heart disease (IHD) – 73 (59%), non-ischaemic cardiomyopathy – 89 (28%). Follow up by referring doctors and others at pacemaker clinic. Underlying heart disease included ischaemic heart disease (25% female, 71% male), cardiomyopathy (41% female, 59% male), valve disease (56% female, 44% male) and miscellaneous (58% female, 42% male). **Results:** There were 142 deaths. 38% non cardiovascular

and 21% unknown. Heart failure deaths (14.8%) were more frequent in ischaemic patients. The effect of or delay to bi-ventricular pacing did not appear to support the concept of routine bi-ventricular pacing in this group of patients. Disease aetiology appeared to have a greater influence on mortality than mode of pacing. This may represent the effects of case selection for BiV pacing. The shortcomings of Warfarin as an anticoagulant in the real world situation are profound. **Conclusion:** AV node pace and ablate is an attractive and simple approach to uncontrollable AF and HF. Better anticoagulation is essential.

O082

THE EFFECT OF THE RIGHT VENTRICULAR MID-SEPTAL PACING FOR LEFT VENTRICULAR FUNCTION AND HEMODYNAMICS STATUS IN PATIENTS WITH PERMANENT PACEMAKER IMPLANTATION

Baimbetov AK; Iskakova BK; Moldabekov TK; Oshakbayev KP
Republican Scientific Center of Emergency Medical Care, National Medical Holding, Kazakhstan

Purpose: To compare the effect between the right ventricular apex (RVA) pacing and the right ventricular mid-septal (RVMS) pacing for left ventricular function and hemodynamics status in patients with bradyarrhythmias. **Methods:** We observed 58 patients (age 59 ± 19 years, 19 men), who underwent permanent pacemaker implantation suffering from AV block III. We evaluated 28 patients with RVMS-pacing and 30 patients with RVA-pacing. Left atrial volume index, Pulsed-wave Doppler-derived mitral inflow indices, colour M-mode flow propagation velocities (Vp), Tissue Doppler measurements of systolic and diastolic (e') velocities at four mitral annular sites and mitral E/e' ratio, were assessed by transthoracic echocardiography, before and 6 month after implantation. **Results:** Permanent RVA-pacing contributes to increase inter- & intra-ventricular dyssynchrony and to increase pressure into the left atrium that lead to diastolic dysfunction of LV, as a result mechanical dyssynchrony caused by dyssynergia of systolic activation of walls LV. However, RVMS-pacing procedure did not lead to increase intraventricular dyssynchrony and to impairment of hemodynamics status of LV. **Conclusion:** This study reveals that permanent RVMS-pacing procedure contributes to less left ventricular dysfunction and mechanical dyssynchrony of walls LV compared with a conventional RVA-pacing procedure in patients with permanent pacemaker implantation.

O083

IS LEFT SIDED SINGLE LEAD VDD OR DDD PACING FEASIBLE?

Obel IWP; Daniels J; Camps T; Smeets P; Obel OA; Lindemans F
Milpark Hospital, Johannesburg, ZA

Cardiac resynchronisation therapy (CRT) can provide great relief for heart failure patients. However, ± 30% of heart failure patients (pts) do not respond. Most attention has been centered on the site of the LV lead, provision of optimal LV filling and an excess of intravascular/cardiac leads. Intra-atrial delay (sensed or paced) may contribute to poor left sided A-V timing. We explored the possibility of a single lead, capable of sensing and pacing both left atrium and left ventricle, optimally placed in the coronary sinus (CS) to address these problems. **Methods:** Five prototypes were implanted in pts with standard CRT indications including 13 pts with chronic atrial fibrillation. In total, 36 pts received 1 of 5 prototypes. Underlying heart disease; ischaemic cardiomyopathy (18), non-ischaemic cardiomyopathy (16), sinus node disease where right atrial pacing was impossible (1) and congenital heart block/single venous access (1). In 5 pts intra atrial conduction (pace or sense RA) was tested. **Results:** The site of the atrial bipole was the proximal CS, regardless of the final site of LV lead (9F lead placed without sheath or guide wire). Pacing and sensing results are given in the table below:

	LA Sense mV V@0.5ms	LA Pace	LV Sense mV V@0.5ms	LV Pace
Acute	3.58 (1.5–7.1)	1.8 (1–3)	13.22 (5.6–34)	1.28 (0.4–3.0)
Chronic (m = 21.4 months)	10 ± 4.8mV		1.8 ± 2.5V	

* Not possible in 2 pts

Pacing and LV pacing was satisfactory up to 4 yrs with one LV lead displacement. Intra atrial conduction time increased from 97 ms to 147 ms with RA pacing. Time from LA sense to RV (at permanent RV site) was 83 ms longer from RA than LV. In the last 7 pts R-wave size was measured via the atrial (CS) electrode and varied from 1.0–8.0 mV. **Conclusion:** Our experience showed the potential value and feasibility of long term single lead, left sided atrioventricular pacing.

O084

LONG-TERM RESULT OF THE CLINICAL TREATMENT FOR PACEMAKER INFECTION WITH VACUUM-ASSISTED WOUND CLOSURE (VAC)

Satsu T; Saga T; Onoe M; Miyashita N
Department of Cardiovascular Surgery, Kinki University, School of Medicine

Background: Although pacemaker infection is a rare, but life-threatening complication, the optimal treatment of such infections is poorly defined in the literature. **Methods:** We describe 9 cases (8 patients), treated for an infected pacemaker at our and colleague institutes between 2008 and 2011. The pacemaker generator was partially exposed in four patients. The pacemaker pockets were fenestrated and treated with vacuum-assisted wound closure (VAC). **Results:** Purulent fluid cultures were positive for methicillin-sensitive Staphylococcus (four cases), methicillin-resistant Staphylococcus (four cases), and Bacillus cereus (one case). Infection was eradicated in eight patients without the need for aggressive surgery or removal of the intra-vascular lead. Fenestrated wounds in two cases were re-sutured without replacement of the entire pacemaker system. The others were implanted with new pacemakers in the contra-lateral side after removing the infected generator. However, in only a case (73-year-old man, who had been operated for pacemaker implantation before 42 days) VAC did not lead to eradicate the infection, and intra-vascular lead was removed using traction. A pacemaker became infected again in one patient without removing the entire pacemaker system nine months later. The VAC therapy was repeated and the infection was eradicated by removing the pacemaker generator but not the intra-vascular lead. The mean durations of VAC and hospitalization were 30.3 and 47.4 days, respectively. The patients remained completely asymptomatic after VAC, with no evidence of recurrent infection for 1–41 months (mean: 24.6 months) after discharge. **Conclusions:** Although complete removal of an infected pacemaker system is essential, less invasive VAC might serve as the first option for treating pacemaker infection when the risk of total system explantation is high, such as among the very elderly.

O085

SAME DAY CONTRALATERAL DEVICE IMPLANTATION IN PATIENTS WITH POCKET INFECTION UNDERGOING DEVICE EXTRACTION

Mountantonakis SE; Tschabrunn CM; Cooper J
Electrophysiology Section, Division of Cardiology, University of Pennsylvania, Philadelphia, USA

Introduction: Minimal data exist regarding the timing of device reimplantation following an extraction for infection. Pacemaker-dependent patients pose a management challenge, given the ongoing need for pacing support after infected device extraction, but with the risk of infection of newly implanted hardware. **Methods:** Clinical and procedure-related data were retrospectively collected on pacemaker-dependent patients who underwent device and lead extraction for local pocket infection only, and who had a new contralateral device implanted on the same day, to investigate outcomes. **Results:** 15 patients (11 male, mean age 77, range 58–93) with pacemaker-dependence underwent device (8 pacemaker, 4 ICD, 3 bi-v ICD) and complete lead extraction (mean 2.5 leads per patient, range 1–5; mean implant duration 6.2 years, range 6 weeks-16 years) for simple pocket erosion or purulent pocket infection, but negative blood cultures and no evidence of systemic infection. Femoral vein temporary pacing support was used during the extraction and a new contralateral permanent device was implanted on the same day, following a new complete sterile prep (9 pacemaker, 5 ICD, 1 bi-v ICD). The infected pocket was managed with debridement with full capsule resection (sent for culture), and primary wound closure except for leaving the wound end open with a Penrose drain in place. Intravenous antibiotics were used prior to the procedure and continued for a mean of 2 days post-procedure, with oral antibiotics used thereafter for a mean course of 2 weeks. All infected pockets healed, with daily dressing changes and gradual withdrawal of the drain. No infections of the new device system occurred, with a mean follow-up of 32 months (range 4–66 months). **Conclusions:** In the setting of simple device erosion and pocket infection a new contralateral device can be implanted on the same day as the extraction. This strategy can be particularly useful in patients with pacemaker-dependence.

O086

SAFETY AND ELECTRICAL PERFORMANCE OF THE NEW CAPSUREFIX MRI LEAD IN PATIENTS WITH STANDARD PACING INDICATION

Pignalberi C; Lacopino S; Santini L; Piraino L; Calò L; Bongiorni MG; Aquilani S; Magris B; Forleo G; Santini M
San Filippo Neri Hospital – Department of Cardiology, Roma

Introduction: Magnetic Resonance Imaging (MRI) is one of the most widely used non-invasive imaging modalities because of its unique ability to discriminate soft tissues. We aimed to evaluate long-term clinical outcomes and electrical performances of first MRI safe cardiac pacing system in patients treated for bradycardia in the clinical practice of 16 Italian centers. **Methods:** 318 patients (64% male; mean age 71 ± 13y) with Class I or II indication for dual chamber pacemaker implantation according ACC/AHA/HRS guidelines received a Medtronic EnRhythm MRI SureScanTM with CapSureFix MRI leads. Data were collected at implant and every 6 months after implant, to characterize the atrial and ventricular lead pacing capture threshold, impedance and sensing amplitude changes through a long term follow-up period and procedure or device-related complications. **Results:** Preliminary analyses were performed on 292 patients who had at least 1 follow-up visit. Median follow-up time was 16 months (25th – 75th percentile 9 – 22 months). At implant and at follow-ups pacing thresholds, sensing and impedances were stable and comparable with literature data. In particular at 6 months follow-up, atrial and ventricular sensing were 3 ± 1 mV and 9 ± 4 mV respectively, thresholds were 0.7 ± 0.4 V and 0.7 ± 0.6 V at 0.5 ms, and impedances were 524 ± 106 Ω and 535 ± 79 Ω. When considering atrial and ventricular leads together, we observed 11 lead dislodgements out of 584 leads (1.9%). This dislodgement raw rate decreased from 2.7% (8/292), in the first 146 patients, to 1.0% (3/292) in the second 146 patients. **Conclusions:** Adoption of the new EnRhythm MRI SureScanTM and CapSureFix MRI lead in the Italian clinical practice has confirmed that the pacing system is safe and that lead measurements are stable in the long run. The temporal trend of lead dislodgements suggests that a learning curve is associated with the use of this new MRI lead.

O087

LONG TERM EFFICACY OF AAISAFER AND MVP STIMULATION TO MINIMIZE THE PERCENTAGE OF RIGHT VENTRICULAR PACING IN AN UNSELECTED POPULATION OF PATIENTS

Stazi F; Mampieri M; Verde M; Cardinale M
Dipartimento Apparato Cardiocircolatorio. A. O. San Giovanni Addolorata. Roma. CLI Foundation

Introduction: High values of right ventricular pacing (RVP) can be deleterious increasing the probability of mortality and heart failure, particularly when the RVP percentage is >40%. The AAISafeR® (Sorin Group) and MVP® (Medtronic) have shown to minimize the RVP percentage. Aim of the study was to assess the long term efficacy of these pacing modes in an unselected population of patients undergoing pacemaker or defibrillator placement. **Methods:** Fiftyfour patients (M = 33, F = 21, mean age 76 ± 10 years) who underwent placement of a pacemaker (N = 41, sinus node disease = 27, atrioventricular block = 14) or defibrillator (N = 13) both with pacing minimizing algorithms (AAISafeR® = 40, MVP® = 14) were studied. **Results:** After a mean follow-up of 18 ± 21 months the mean RVP percentage was 18 ± 30% and 43 patients (80%) had a mean RVP percentage <40%. The median percentage of RVP was 0,9%. **Conclusions:** In our study after 18 months of follow up AAIsafeR and MVP allow a low RVP percentage in an unselected population of patients. Moreover, the majority of the patients presents a RVP percentage <40%.

O088

CLS ALGORITHM IS ASSOCIATED WITH SIGNIFICANT COGNITIVE IMPROVEMENTS IN A SMALL SAMPLE OF ELDERLY PATIENTS

Manzoni GM; Proietti R; Castelnuovo G; Spoto A; Lombardi L; Sagone A
Istituto Auxologico Italiano

Introduction: CLS (Closed Loop Stimulation) algorithm showed to provide a rate-adaptive stimulation in response to haemodynamic demand due to emotional upheaval in chronotropically incompetent patients. We hypothesized that the hemodynamic benefits supplied by CLS algorithm may extend to neuro-cognitive functioning through enhanced cerebral blood perfusion. **Methods:** In order to test this hypothesis, we conducted a small-scale three-arm randomized controlled clinical trial involving 45 implanted patients randomly assigned to three pacing configurations: CLS (n = 15), Accelerometer Sensor (AS) mode (n = 15) and non rate-adaptive mode (n = 15). A pool of ten neuropsychological tests tapping main neuro-cognitive domains (memory, attention, language, visuospatial skills and executive function) was administered to each participant before randomization

and one year after. Mean change scores in cognitive measures were compared among the three pacing configurations at 1-year follow-up. **Results:** Statistically significant differences in change scores were found on attention and executive functioning measures. On average, patients in CLS configuration showed significant improvements on such measures, while patients in AS and non rate-adaptive modes showed non-significant deterioration trends. No statistically significant difference was found in change scores for the other neuro-cognitive parameters. **Conclusion:** CLS algorithm showed to be effective in improving attention and executive functioning in a small sample of chronotropically incompetent patients one year after pacing configuration. Large-scale trials are needed to corroborate such preliminary and novel results.

O089

PATTERNS OF PACEMAKER AND ICD IMPLANTATION IN SOUTHERN AFRICA

Okreglicki A; Scott Millar R; for the Cardiac Arrhythmia Society of South Africa
University of Cape Town

Introduction: World surveys of cardiac pacing show implant rates <5/million in most of Africa. In South Africa it is >12fold higher and increasing. Despite this, provision of pacing is not homogenous within South Africa; great variations in implantation rates, indications and implant practice exist. **Methods:** Implantation data from South Africa submitted to the World Society of Arrhythmias Surveys in 2001, 2005 and 2009, device company sales data, questionnaires to implanters and South African data from the international Panorama registry were analysed. **Results:** Pacemaker implantation rate in South Africa increased from 39 to 47 and 60/million in 2001, 2005 and 2009 respectively; corresponding ICD implantation rates: <1, 2 and 6/million. South Africa accounted for 99% of pacemakers implanted in southern Africa. No ICDs were implanted in other countries. Company sales data show that of all pacing leads sold, 33% were atrial, 57% ventricular and 10% coronary sinus. Biventricular pacing/ICD devices (CRT-D) increased from 37% of the total ICDs in 2005 to 51% in 2009. The Panorama registry revealed differences in primary indication by hospital type (1 public and 12 private): AV block: 69.1% vs 19.3%; Sinus node disease: 19.8% vs 66.9% ($p < 0.001$) and in devices implanted: in patients with AV block, 2 or 3 chamber pacemakers were implanted in 12.5% in public and 76.1% in private. **Conclusions:** Despite limitations in methods of data collection, implantation of arrhythmia devices in southern Africa has increased 7% annually. Significant differences in implant rates exist between countries and also in indications and especially implantation practice within South Africa; these need to be recognized in analysis of any pacemaker related data included in surveys from this region. Although financial, equipment and personnel constraints account for most differences between the countries, these do not apply for many of the differences observed in South Africa.

O090

VENTRICULAR PACING IN ICD PATIENTS AND CLINICAL OUTCOME

Vecchio F; Santini L; Papavasileiou L; Schirripa V; Sergi D; Tota C; Cioè R; Magliano G; Forleo GB; Romeo F
Division of Cardiology, Department of Internal Medicine, University of Rome "Tor Vergata"

Purpose: Few data are available about the influence on outcomes of right ventricular pacing in patients implanted with implantable cardioverter defibrillators (ICD). **Methods:** We analyzed 285 consecutive patients who underwent ICD implantation at our institution between September 2003 and November 2010. Patients were divided in two groups "Vp > 50%" (n = 39, 33 males, age 64,8 ± 11,6 years) and "Vp < 50%" (n = 246, 233 males, age 65,7 ± 12 years) based on the percent of right ventricular pacing during follow-up. **Results:** Mean follow–up was 24.12 ± 18.4 months. The two groups were homogenous regarding age, sex, ejection fraction, type of device (single or dual chamber) and pharmacologic treatment. No statistically significant differences were observed between the two groups regarding episodes of AF and appropriate discharge of the device. Nevertheless, the Vp > 50% group experienced appropriate discharge earlier (time to 15,75 months vs 39,5 months, $p < 0.05$) The group with Vp < 50% presented more episodes of non sustained ventricular arrhythmias (NSVT 66/264 vs 19/39, $p = 0,05$). **Conclusion:** Despite what communally thought right ventricular pacing seems to be protective in ICD recipients.

O091

CONTINUOUS RIGHT VENTRICULAR APICAL PACING CAUSE ASYMPTOMATICALLY REDUCED CARDIAC FUNCTION WITHIN TWO YEARS

Yamada T; Arita T; Ohshima M; Okamoto K; Murata T; Iseikai Hospital
Cardiovascular Center

Puropose: To elucidate long-term outcome after continuous right ventricular pacing for cardiac function. **Methods:** Forty patients with advanced or complete atrio-ventricular block who needed permanent pacemaker and their ejection fraction were preserved or mild reduced (more than 45%) were analayzed. Their cardiac function was evaluated by cardiac echocardiography at pre-implanatation, one week after implanatation, 12 months and 24 months after pacemaker implantation. Ventricular permanent pacemaker leads were all placed at right ventricular apex. And optimal atrio-ventricular delay was adjusted by echocardiography within 1 week after implanatation. **Results:** Mean age was 71.7 and percent male was 46.2%. QRS widths were changed as following, 161.4 msec (1 W), 165.3 msec (12 M) and 165.9 msec (24 M). Percent ventricular pacing were more than 98% all the period. Systolic function (= ejection fraction) significantly decreased gradually after pacemaker implantation, 1W-12 M (0.605–0.592, P = 0.0065), 1 W-24 M (0.605–0.576, P = 0.0017), respectively. Tei index was also significantly reduced, 1 W-12 M (0.652–0.612, P = 0.0832), 1 W-24 M (0.652–0.576, P = 0.0071), but NYHA classes were not significantly changed (1.67 – 1.75: P = 0–4352) at 2 years after implantation. **Conclusion:** Continuous long term right ventricular apical pacing might reduce cardiac function.

O092

ELETRICAL AND MECHANICAL ATRIAL REMODELING PREVENTION USING MINIMAL VENTRICULAR PACING AND RIGHT OUTFLOW TRACT VENTRICULAR LEAD IN SINUS NODE DISEASE

Menezes A Jr; Carneiro ARC; Oliveira BL; Souza LA; Neto WJS
Catholic University of Goias

Introduction: Will the minimum ventricular stimulation of the pacemaker when associated with alternate ventricular stimulation site reduce the incidence of Permanent or Intermittent Atrial Fibrillation (AF) in long-term? **Objectives:** Compare the synergetic effects of the minimum ventricular stimulation management (IRS PLUS) and right ventricular outflow tract (RVOT) stimulation in sick node syndrome (SND) patients in electrical and mechanical atrial remodeling to RVOT stimulation alone. **Methods:** 50 SND patients were submitted to a dual chamber pacemaker implantation. The atrial leads were positioned in the right atrium septum and the ventricular lead in the right outflow tract. Patients were randomized in two groups, GROUP I (IRS plus ON in the first 6 months, then the next 6 months the IRS PLUS was turned OFF, then again turned ON for the next 12 months) e Group II (exact the opposite sequence of group I). After 6, 12, 18 and 30 months all patients were submitted to: 1) Follow-up, 2) Pacemaker telemetry of the AF burden and Mode Switches 3) Transesophageal Echo and 4) Completion of SF-36 form. **Results:** All data were calculated using the Mann-Whitney Test

1) AT- AF burden in IRS Plus OFF was higher in all evaluations (6, 12, 18 and 30 months)- $p < 0{,}0001$

2) Left Atrial Volume in IRS ON was smaller than in IRS plus OFF in all evaluations either.

3) Quality of Life (SF- 36 had not changed during the follow-up ($p > 0{,}05$)

4) Note that during the 30 month follow-up 7 patients presented permanent AF, for this reason they were excluded. GROUP I = 1 patient and GROUP II = 4 patients.

Conclusion: Minimum ventricular stimulation associated with right ventricular outflow tract stimulation reduced the AF burden and left atrium remodeling due to a lower incidence of Atrial Fibrillation in 30 months follow-up.

SUDDEN CARDIAC DEATH

O093

ARRHYTHMOGENIC RIGHT VENTRICULAR DYSPLASIA: CLINICAL POLYMORPHISM AND THE ROLE OF ACCOMPANYING MYOCARDITIS

Blagova OV; Nedostup AV; Morozova NS; Kogan EA; Gagarina NV; Sedov VP; Shestak AG; Zaklyazminskaya EV; Frolova YuV; Dzemeshkevich SL
I.M.Sechenov I Moscow State Medical University, B.V.Petrovsky Russian Scientific Center of Surgery

Objective: To study clinical polymorphism of arrhythmogenic right ventricular dysplasia (ARVD), prevalence and a role of accompanying myocarditis. **Methods:** We did observe group of 15 patients (9 females; 6 males, 45,5 ± 15,9 y.o.) with clear (n = 9) and suspected (n = 6) diagnosis of ARVD. Investigations included heart CT/MRI; PCR detection of virus genomes, anti-heart antibodies (AB); one right ventricle (RV) biopsy; and 2 autopsy. Genetic analysis is in progress now for all patients. **Results:** Three variants of ARVD phenotypes were sorted out. Group 1, "Typical" (or "latent arrhythmic", n = 8; 44.5 ± 12.9 y.o.), with frequent persistent «idiopathic» premature

ventricular beats from RV, nonsustained ventricular tachycardia (VT); lack of major ECG criteria in the presence of intra-myocardial fat. The prevalence of myocarditis was 50%, and Epstein-Barr virus was detected in 1 case. Patients from group 2 (n = 2, 71 y.o.), "Arrhythmic" developed stable VT alongside with major ECG criterias; RV dilatation of various degree; myocarditis is not revealed. Group 3 is ARVD with biventricular heart insufficiency (n = 5, 39.7 ± 13.5 y.o.); prevalence of myocarditis is 60%. Two patients within this group died; and Herpes virus types 1, 6 in myocardium were detected in both. Three patients have got ICD, for 4 patients ICDs were recommended, for 2 patients RFA were performed. **Conclusions:** The ARVD can be found in patients of any age and gender. The fat inclusion is revealed by MRI in 82% (from 11 patients), and detected by CT in 83% (from 6), but criteria's of the diagnosis do not fulfill. Inexplicable RV dilatation always requires exclusion of ARVD. Dysfunction of the left ventricle (due to fibro-fatty replacement or myocarditis) make correct diagnosis ARVD more complicated. For isolated ARVD is not peculiar increase of a anti-heart AB. Biopsy with viral genome detection seems to be very helpful in diagnostics of ARVD, myocarditis by itself or in combination.

O094

RESULTS OF THE SOUTH AFRICAN REGISTRY FOR ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY (ARVC): SOME NOVEL GENETIC AND OTHER FINDINGS

Okreglicki A; for the Cardiac Arrhythmia Society of South Africa
University of Cape Town

Introduction: ARVC is a heart muscle disorder characterized by ventricular arrhythmias, heart failure and sudden death often occurring in the young and in athletes, familial in >50% and with mutations in genes encoding essential desmosomal proteins. First described in South Africa in 1997 and reported in 2000, it has been found in all segments of African society. The ARVC Registry of Southern Africa has enrolled probands and affected first degree relatives since 2004. **Methods:** Results of the SA ARVC registry which provides diagnostic validation, assessment of clinical risk and therapy, and genetic screening were analyzed. **Results:** Of 259 individuals with suspected ARVC enrolled in the registry, 67 have definite diagnosis according to the ARVC Task Force Criteria: 68% male; median age 27yrs; most frequent presenting symptom: palpitations; most frequent ECG abnormality: abnormal T-wave inversion; ventricular tachycardia documented in >80%; >60% involved in sports; annual mortality ± 3% with history of syncope and VT strongest independent predictors of death. Genetic screening in 36 of the first 50 unrelated index cases revealed: in 25% disease-causing mutations in the PKP2-gene encoding plakophilin 2 of the desmosome; 5 being novel mutations; and in 2 individuals compound heterozygosity giving an allelle 'double dose' effect and severe phenotype. Screening in 62 definite ARVC cases of the DSP-gene encoding desmoplakin found mutations in 2; the same mutation occurred in 6 of 150 patients with dilated cardiomyopathy (DCM). **Conclusions:** ARVC in South Africa is not uncommon and similar in many respects to other international reports. However, the registry is unique in showing: younger age of death (<40yrs), strongly predicted by syncope and VT; high rate of sport participation; compound and novel mutations in the commonly affected PKP2-gene; and the demonstration of DSP-gene mutations in both ARVC and DCM patients suggesting a common spectrum of heart disease.

O095

CLINICAL AND GENETIC CHARACTERIZATION OF JAPANESE PATIENTS WITH ARRHYTHMOGENIC RIGHT VENTRICULAR CARDIOMYOPATHY

Ohno S; Nishio Y; Nagaoka I; Miyamoto A; Kimura H; Itoh H; Makiyama T; Horie M
Cardiovasacular Department, Shiga University of Medical Science

Background: Arrhythmogenic right ventricular cardiomyopathy (ARVC) is an inherited heart disease characterized by fibrofatty replacement of right ventricle (RV). ARVC often presents ventricular tachycardia (VT) of RV origin, heart failure and sudden death. Recently numerous mutations in desmosomal genes—plakophilin-2 (PKP2), desmoplakin (DSP), desmoglein-2 (DSG2), desmocollin-2 (DSC2)—have been shown to cause ARVC. The incidence rate of these gene mutations was reportedly 30∼40% in Europe, but in Asia, it remains unstudied. **Methods and Results:** This study aimed to elucidate the clinical characteristics in Japanese ARVC patients. The diagnosis of ARVC was established in accordance with new criteria (Circulation, 2010). We examined consecutive 33 Japanese ARVC probands (definite, borderline and possible) from 33 unrelated families. Twenty-eight probands (84%)

were diagnosed as definite, 4 (12%) as borderline and 1 (3%) as possible. The cohort consisted of 25 males (75.8%) and 8 females. The frequency of male patients was higher as reported. We screened four genes: PKP2, DSP, DSG2 and DSC2 using direct sequencing methods. We identified gene mutations in 15 patients (45%): 9 patients with PKP2, 5 DSP, 4 DSG2 and 1 DSC2 mutations. Four of them were compound mutations: 2 PKP2 + DSG2, 1 PKP2 + DSP, and 1 DSP + DSG2. We also identified homozygous mutation carriers in 1 patient with PKP2, 2 DSP and 1 DSG2. The frequency of PKP2 mutation carriers was as high as reported previously. **Conclusions:** We identified mutations of ARVC-related genes in 15 of 33 patients (45%). The prevalence of the mutation carriers in four desmosomal genes appeared to be higher in Japan than Europe. As the cardiac arrest can be an initial manifestation of ARVC, the identification of genetically affected family members (even though asymptomatic) would also offer a strong clinical modality to prevent sudden death.

O096

A FIVE-YEAR FOLLOW-UP OF PATIENTS WITH HEART FAILURE: CLINICAL PREDICTORS OF ARRHYTHMIC VS ALL-CAUSE MORTALITY

Stergiou P; Flevari P; Lagou S; Ntai K; Kolokathis F; Filippatos G; Anastasiou-Nana M
2nd Department of Cardiology, Attikon University Hospital, Athens, Greece

Background: Risk stratification for sudden cardiac death (SCD) in heart failure remains suboptimal. LV ejection fraction (LVEF) is currently used for guiding cardioverter-defibrillator implantation, but is also associated with pump failure. Aim of this study was to identify readily available clinical markers that increase the risk of arrhythmic vs clinical parameters associated more with all-cause mortality. **Methods:** A cohort of 386 patients was assessed, with heart failure of dilated (n = 252) or ischemic (n = 134) etiology. LVEF, 6-min walking test, atrial fibrillation (AF), QRS duration, QT duration, hyponatremia, serum urea, and LV hypertrophy were estimated in order to identify i) prognostic factors of SCD or rapid sustained ventricular tachycardia (VT) and ii) factors associated with all-cause mortality. VTs faster than 180 bpm were taken into account (verified by either surface ECG or intracardiac defibrillator recordings) and were used as SCD surrogate end-points. Cox stepwise regression was used for analysis. **Results:** During a 5-year period, all-cause mortality was 27.7%, while SCD or sustained VT 7.7%. Regarding all-cause mortality, AF ($p < 0.001$), LVEF ($p = 0.001$), serum urea ($p = 0.047$), and 6-min walking test ($p < 0.001$) were independent predictors. On the other hand, AF ($p = 0.005$), LVEF ($p = 0.015$), as well as hypertrophy ($p = 0.01$) were independent predictors of arrhythmic death. Interestingly, the presence of AF was associated with a 4-fold increased risk in all-cause mortality and an 11-fold risk in SCD or sustained VT. It is also remarkable that hypertrophy was related with an almost 13-fold risk of SCD or sustained VT. **Conclusion:** In patients with heart failure, a reduced LVEF is equally predictive of long-term all-cause and arrhythmic mortality, while the presence of AF or LV hypertrophy increases significantly the risk of life-threatening ventricular tachyarrhythmias. More studies are needed to test the clinical utility of these findings.

O097

NO INFLUENCE OF SCAR TISSUE ON MICROVOLT T-WAVE ALTERNANS

Kraaier K; Olimulder MAGM; Galjee MA; van Dessel PFHM; van der Palen J; Wilde AAM; Scholten MF; Twente ICD Cohort Study (TICS)
Medisch Spectrum Twente, Enschede, The Netherlands

Background: Microvolt T-wave Alternans (TWA) is an electrocardiographic marker for predicting sudden cardiac death. In this study, we aimed to study the relation between TWA and scar assessed with cardiac magnetic resonance imaging (CMR) in patients with ischemic (ICM) or dilated cardiomyopathy (DCM). **Methods:** Sixty-three patients with positive or negative TWA and complete CMR examination were included. Using CMR and the delayed enhancement technique, ejection fraction (LVEF), end-diastolic volume (LVEDV) and scar characteristics were assessed. **Results:** Overall, positive TWA (n = 29) was related to male gender ($p = 0.01$), lower LVEF ($p = 0.05$) and increased LVEDV ($p < 0.01$). After multivariate analysis, male gender ($p = 0.01$) and lower LVEF remained significant ($p = 0.04$). Scar characteristics (presence, transmurality, and scar score) were not related to TWA (all $p > 0.5$). In the patients with ICM (n = 35) scar was detected in 32. Positive TWA (n = 14) was related to older infarct age (median 17 years, range 2–32 versus median 5 years, range 0–21, $p = 0.05$). Trends were found for male gender ($p = 0.07$) and higher LVEDV ($p = 0.09$). In patients with DCM (n = 28), scar was detected in 11. Trends were found between positive TWA (n = 15) and male

gender ($p = 0.10$), lower LVEF ($p = 0.10$), and higher LVEDV ($p = 0.09$). In both subgroups, the presence, transmurality or extent of scar was not related to TWA (all $p > 0.45$). **Conclusion:** Neither in patients with ICM or DCM a relation was found between the occurrence of TWA and the presence, transmurality or extent of myocardial scar. Overall there was a significant relation between heart failure remodeling parameters and positive TWA.

O098

QT COMBINED WITH TIME DOMAIN-TWA AND T-WAVE MORPHOLOGY COULD PREDICT COMPLETE HEART BLOCK RELATED TORSADE DE POINTES

Simeonidou E; Kastellanos S; Varounis C; Michalakeas C; Koniari C; Nikolopoulou A; Anastasiou-Nana M
2nd Cardiology Dept, Attikon University Hospital, Athens, Greece

Purpose: It is known that complete heart block (CHB) predisposes infrequently to torsade de pointes (TdP), mainly through QT prolongation with consequences even after permanent pacemaker implantation (PPM. T-wave alternans (TWA) is linked to vulnerability to life-threatening arrhythmias and an increase in TWA precedes the onset of ventricular tachyarrhythmias. Purpose of the study was to examine the contribution of the time domain TWA (TD-TWA) combined with ECG T-W morphology in prediction of TdP during CHB. **Methods:** 60 consecutive patients (pts), (35w, 25m), mean age 77 ± 7 years, referred for PPM implantation because of CHB underwent 12 leads ECG assessment and 24h Holter monitoring, if their escape rhythm was satisfactory with temporary pacing back-up. TD-TWA was assessed by the MMA method on a MARS Holter analyser. The maximum TD-TWA in either modified lead V1, V2, V3 was derived and its value defined as positive when the voltage was ≥75 uV. T-wave morphology was defined as broad, notched, small and late, deep inverted. The longest QT in any of the 12 ECG leads was measured. **Results:** There were not reversible causes of CHB. Nineteen out of 60 pts (33%) developed mainly short runs of TdP and bradycardia was the only cause. Neither the escape rhythm HR nor the QRS width predicted the risk of TdP. TWA (OR 1.171 with 95% CI: 1.057–1.310, $p = 0.003$), QT (OR 1.034 with 95% CI:1.012–1.056, $p = 0.002$), and notched TW morphology (OR = 8.00 with 95% CI:1.36–46.81, $p = 0.021$) were correlated with greater risk of TdP. All pts needed PPM implantation. In the TdP group LPR was programmed to 80 bpm. Pts were followed up for 1 year and interrogation of each pts data was negative for TdP. **Conclusions:** In CHB pts positive TD-TWA, prolonged QT and notched T-waves are associated with increased risk for TdP. Prediction of this risk is helpful in precautionary PPM programming to avoid recurrence of TdP after PPM implantation until the QT shortens to normal.

O099

J WAVE AND FRAGMENT QRS ON ECG ASSOCIATED WITH ALL-CAUSE MORTALITY AND SUDDEN CARDIAC DEATH IN PATIENTS WITH CHF

Pei J; Li N; Chen J; Gao Y; Zhang Y; Zhang P; Cao K-J; Pu J
Fuwai Cardiovascular Hospital, Peking Union Medical College,Chinese Academy of Medical Sciences

Objective: Although sudden cardiac death (SCD) secondary to J wave and fragment QRS (fQRS) is not a rare phenomenon in patients without structure heart diseases, whether they are risk factors for SCD in chronic heart failure (CHF) patients is not known. The aim of this study was to investigate the prevalence and predictive values of J wave and fQRS for SCD in patients with CHF. Methods: The electrocardiograms of 1570 hospitalized CHF patients with dilated cardiomyopathy (DCM, 572 cases) and ischemic cardiomyopathy (ICM, 998 cases) aged from 18 to 79 years were analyzed regarding the relationship between ECG characteristics and all-cause mortality, SCD and Non-SCD (NSCD). Results: During a median follow-up period of 36 months, 21.49% patients died, of whom 35.84% died of SCD. The prevalence of J wave and fQRS in the inferior leads of patient group were significantly higher than that of control group ($p < 0.01$). After adjustment for age, gender, heart failure classification, QRS width, QTc interval, 24-hour average heart rate, left or right bundle branch block, and medications, Cox regression analysis revealed that J wave in the inferior leads was associated with all-cause mortality (HR, 2.655; 95% CI, 1.774–3.973), NSCD (HR, 2.122; 95% CI, 1.265–3.560) and SCD (HR, 4.095; 95% CI, 2.132–7.863), in DCM respectively, However, in ICM, only fQRS in the inferior leads was associated with all-cause mortality (HR, 1.889; 95% CI, 1.444–2.471), NSCD (HR, 1.441; 95% CI, 1.001 –2.079) and SCD, (HR, 2.714; 95% CI, 1.809–4.072] respectively. Detailed analysis showed that the HR in men was higher

than that in women for the NSCD and SCD groups. Conclusions: The presence of J wave and/or fQRS in the inferior leads of CHF patients indicated 2 to 4-fold higher risk of all-cause mortality, NSCD and SCD. They may serve as the independent predictors for the prognosis in this population.
Key Word: J wave, fQRS, sudden cardiac death, chronic heart failure

O100

ARRHYTHMIA RISK STRATIFICATION WITH NON-INVASIVE DEPOLARIZATION AND REPOLARIZATION ARRHYTHMIC RISK MARKERS IN ASYMPTOMATIC YOUNG INDIVIDUALS WITH INCIDENTALLY FOUND PROMINENT J-WAVE

Simeonidou E; Michalakeas C; Kastellanos S; Varounis C; Koniari C; Dai C; Psarogiannakopoulos P; Stassinos V; Anastasiou-Nana M
2nd Cardiology Dept, Attikon University Hospital, Athens, Greece

Purpose: The J-point elevation is a common electrocardiographic variant considered for years as benign ECG manifestation. Recently a high prevalence of this pattern was found in patients (pts) with idiopathic VF. Although the J wave is synonymous to early repolarization, recently there was some evidence that maybe is a delayed depolarization abnormality. Aim of the study was to evaluate the prevalence of late potentials (LPs) testing (depolarization marker) and time domain T-wave alternans (TD-TWA) (repolarization marker) in healthy young individuals with prominent J-wave. **Methods:** The study population was consisted of 77 consecutive healthy young individuals (13 w, 62 m), mean age 30 ± 13 years, with incidental discovery of J-point elevation on the 12 lead ECG. Eighty consecutive healthy young individuals with normal ECG served as control population. All pts consented to LP testing by SAECG and time domain T-wave alternans (TD-TWA) by 24 hours Holter monitoring. LPs were considered positive when at least 2 criteria were met. The greater TD-TWA was chosen for assessment and it was defined as positive when the max voltage was >75 uV. **Results:** On 360 ± 85 days follow-up (fu)nobody developed significant arrhythmias. The ECG localization of J-wave was 17 inferior, 43 anterior and 15 diffuse. LPs were positive in 22 pts (28%) and TD-TWA in 11 pts (15%). Prevalence in healthy subjects with normal ECG 4% and 3.2% respectively. Neither max TWA ($p = 0.751$) nor LPs ($p = 0.493$) were correlated to J- point ECG localization. **Conclusions:** In our population of healthy young individuals with prominent J-point, the prevalence especially of the depolarization marker LPs is significantly higher than in healthy subjects without prominent J-wave, without any arrhythmic consequences in one year's fu. Validation in larger population and longer fu is needed.

O101

ARRHYTHMOGENESIS FACTORS IN NEWBORNS

Kovalev I; Svintsova L; Child's Heart Center Institute of Cardiology

Objective: To determine risk criteria of formation and advance of heart rhythm disturbances in newborns. **Results:** 102 patients (14 healthy incl.) were examined. Extrasystoles – 32,4%, bradyarrhythmias – 25,7%, tachyarrhythmias – 22,9%, WPW syndrome – 18,9%. Rhythm disturbances preserve only in 5,4% by the sixth month of life. Longer persistence is typical for extrasystole and WPW syndrome. Heart rhythm disturbances are marked much more often in newborns whose mothers had acute respiratory disease during pregnancy ($p = 0,049$), and who were born from the primipregnancy ($p = 0,041$). Bradyarrhythmias and tachyarrhythmias have similar factors which can potentially favor arrhythmia manifestation: intracranial hypertension according to neurosonography and changes of hormonal profile of thyroid body towards hypofunction. Established fact that higher value of systolic pressure in the right ventricle ($p = 0,047$) is the peculiarity of intracardiac hemodynamics in the group of newborns with heart rhythm disturbances. Presence of extrasystole in newborns is related with increase of troponin level I ($p = 0,015$) and activation of parasympathetic link of vegetative nervous system (increase of pNN50 ($p = 0,009$) and SDNNi ($p = 0,037$). Association of bradyarrhythmias with level of myocardial antinuclear antibodies in blood ($x2 = 4,89$; $p = 0,027$) are marked for fact in newborns. **Conclusion:** Thus, autoimmune component is important link of bradyarrhythmias pathogenesis, which, probably, is formed into antenatal period with the help of maternal antibodies. Destructive processes in myocardium, accompanying by increase of troponine I level in blood serum, and also activation of parasympathetic link of vegetative nervous system during extrasystole depend, on the contrary, on factors connecting with intra- and postnatal periods. Infection during pregnancy can influence, indirectly, on the process abnormality of obliteration of additional conduction tracts at WPW syndrome.

O102

REDUCED DECELERATION CAPACITY OF HEART RATE RISK STRATIFIES PATIENTS PRESENTING WITH PRESERVED LEFT VENTRICULAR EJECTION FRACTION (LVEF>35%) FOR SUDDEN CARDIAC DEATH

Arsenos P; Gatzoulis K; Manis G; Dilaveris P; Gialernios T; Archontakis S; Tsiachris D; Aggelis A; Kartsagoulis E; Stefanadis C; APRET
First Department of Cardiology, Medical School, National & Kapodistrian University of Athens, Greece

Purpose: Previous studies reported that the cut off point of ≤2.5 ms from the Deceleration Capacity (DC) of heart rate is a powerful predictor of mortality in post myocardial infarction patients (pts). We used the same cut off point to examine whether it is an adequate sudden cardiac death (SCD) risk predictor in patients with preserved left ventricular systolic function (LVEF > 35%). **Methods:** We prospectively screened 104 pts (age: 64 ± 14.0 years, male: 84%, NYHA class: 2.1 ± 0.4, LVEF: 41.7 ± 6.5, CAD: 84%, DCMP: 16%) with ECG, SAECG, ECHO and 24-hour HOLTER. After 15.5 ± 13.7 months of follow up, patients were classified into the High risk (12 pts, mean LVEF: 39 ± 5.5%) and the Low risk (92 pts, mean LVEF: 42 ± 6.5%, p = 0.1) groups according to three SCD events/surrogates: 1. clinical VT/VF (5 pts) 2. ICD's appropriate activation (2 pts) 3.confirmed SCD (5 pts). LVEF, filtered QRS (SAECG), DC ≤ 2.5 ms, NSVT > 1/24 hour, VPBs > 240/24 hour, mean Heart Rate (HR) and SDNN /HRV (24-hour HOLTER), were calculated and statistically analyzed for the two groups. **Results:** DC ≤ 2.5 ms was a statistically significant predictor of SCD (Long rank test p = 0.02). After Cox regression analysis adjusted for LVEF, fQRS, NSVT > 1/24 hour, VPBs > 240/24 hour, HR and SDNN /HRV (24 hour HOLTER), the cutoff point of DC ≤ 2.5 ms remained an important and independent SCD predictor with HR 6.007 (p = 0.01) 95% CI: 1.513–23.854. **Conclusions:** In the present pts cohort, the cut off point of DC ≤ 2.5 ms was an important and independent predictor of SCD. Further evaluation of the reduced DC of heart rate in a larger population with longer follow up is justified.

O103

CLINICAL PROFILE OF PATIENTS WITH ELECTRICAL VENTRICULAR TACHYCARDIA/ FIBRILLATION STORM: A TWO-YEAR REVIEW OF CLINICAL PRESENTATIONS, RISK FACTORS AND OUTCOMES

Ona RL; Ramirez MF
University of Santo Tomas Hospital (USTH), Espana, Manila, Philippines

Electrical storm refers to multiple occurrences of ventricular tachycardia or fibrillation occurring three or more times in a 24 hour period. We reviewed the clinical profile and outcome of patients admitted for electrical storm at the USTH from June 2008 to February 2011. Ten patients, 6 males and 4 females aged 30 to 72 years old were included in the study. There were 3 cases of acquired long QT syndrome, 2 cases of congenital long QT syndrome, 1 case of ischemic and 2 cases of dilated cardiomyopathy s/p ICD implantation and 2 cases of NSTEMI (anterior wall). Seven of the nine patients presented with mild to severe hypokalemia. Four had mild hypocalcemia. Most of the patients were managed medically with antiarrhythmics, a combination of intravenous amiodarone and lidocaine. Four patients underwent temporary pacemaker insertion for overdrive pacing. One patient with NSTEMI developed the electrical storm after emergency coronary bypass surgery. Among the 2 patients with congenital long QT syndrome, one underwent implantation of an internal cardioverter-defibrillator(ICD) while the other one, while awaiting funds for device therapy, is being managed medically. Two patients with cardiomyopathy and CHF underwent ICD implantation while the other patient with already a previous implant developed storm with multiple ICD shocks. Eight patients were discharged from the hospital improved, all of whom are still following up and stable. Two patients with electrical storm had multiple organ failure and died. These were the cases of NSTEMI who developed electrical storm after coronary bypass surgery and a case of electrical storm secondary to acquired long QT syndrome due to severe hypokalemia and drugs. In our 2 year review of electrical storm patients, the major etiologies include long QT syndrome, and ischemic cardiomyopathy with heart failure. Hypokalemia and hypocalcemia were the common electrolyte abnormalities associated with the occurrence of electrical storm.

SUPRAVENTRICULAR TACHYCARDIAS

O104

THE ROLE OF NON-CORONARY CUSP ABLATION APPROACH IN THE TREATMENT OF

PERINODAL ATRIAL TACHCARDIAS: PREFERENTIAL OR ADJUNCTIVE?

Ju W; Chen M; Yang B; Chen H; Zhang F; Yu J; Cao K
Department of Cardiology, the First Affiliated Hospital of Nanjing Medical University, Nanjing, 2100

Backgroud: Ablation in the noncoronary aortic cusp (NCC) potentially has a role in the treatment of perinodal atrial tachycardias (ATs). **Objectives:** To characterize the role of NCC ablation in the treatment of perinodal ATs among a cohort of patients with perinodal ATs. **Methods:** One hundred and seven patients with focal ATs who underwent electrophysiologic study and radiofrequency catheter ablation were enrolled in the study. The electrophysiological characteristics and the target electrograms of those who need NCC ablation and other patients of perinodal ATs were compared. **Results:** Totally 18 cases were revealed to have the focal ATs located in the perinodal area. Among them, only 4 cases (22%) warrant ablation in the NCC, whereas the remainder could be successfully eliminated by ablation from the endocardial right atrium at the perinodal region. There were no clinical and electrophysiological clues observed to have the potential to predict the true original site, including the onset behavior, the earliest activation site in the right atrium, the configuration of the unipolar recording, as well as the time to termination during the ablation in the perinodal area. **Conclusions:** Approximately one fifth of the perinodal ATs warrant ablation in the NCC. However, no clinical and electrophysiological clues could predict the potential site of the perinodal ATs. The NCC ablation may serve as a adjunctive role in the treatment of the perinodal ATs.

O105

DIRECT MID-ISTHMUS APPROACH FOR RADIO-FREQUENCY ABLATION OF CAVO-TRICUSPID ISTHMUS-DEPENDENT ATRIAL FLUTTER

Cheng T; Liu Y; Kongstad O; Hertervig E; Yuan S
Department of Arrhythmias, Lund University Hospital, Lund, Sweden

Aims: To test the feasibility and efficacy of the direct mid-isthmus (DMI) approach for ablation of cavotricuspid isthmus- (CTI-) dependent atrial flutter (AFL). **Methods:** Patients were randomly assigned to receive either conventional linear radio-frequency (RF) ablation between the tricuspid annulus and inferior vena cava (the linear approach) or RF ablation at sites with the highest electrical signals, usually in the middle of the CTI (the DMI approach). Sustained, bi-directional CTI block was the endpoint. Procedure parameters and follow-up data were obtained. **Results:** In total, 80 patients were included, 40 each for the linear approach and the DMI approach. To achieve sustained bi-directional CTI block, the linear approach needed 841 ± 594 S or 14.0 ± 9.9 RF applications, with total fluoroscopy time of 18.6 ± 9.4 min and total procedure time of 152 ± 58 min, as compared to the DMI approach which needed 350 ± 319 s ($p < 0.0001$) or 5.8 ± 5.3 RF applications ($p < 0.0001$), with total fluoroscopy time of 14.8 ± 6.0 min ($p < 0.05$) and total procedure time of 111 ± 36 min ($p < 0.0005$). The CTI block was obtained with 3 or less RF applications in 18 patients in the DMI group (45%), but only in 2 patients in the linear ablation group (5%). During follow-up of 28 ± 14 months, recurrence cases were 2 in the linear and 1 in the DMI group (NS). **Conclusions:** During RF ablation of typical AFL, directly targeting the muscular bundles in the middle of the CTI can significantly reduce the amount of RF energy needed for bi-directional CTI block, with shorter fluoroscopy and procedure times. This direct mid-isthmus approach may be recommended for clinical use to replace the conventional linear approach.

O106

DEPRESSION OF ST SEGMENT AS PROGNOSTIC VALUE IN SUPRAVENTRICULAR TACHYCARDIAS

Scazzuso FA; Rivera S; Gomez L; Albina G; Laino R; Sammartino V; Giniger A
Instituto Cardiovascular de Buenos Aires (ICBA)

Background: ST depression is a known high risk marker in acute coronary syndromes, accounting for higher mortality and infarction rates in this subgroup. However, it is unknown weather this phenomenon has similar implications during supraventricular tachycardia. **Objective:** To determine accuracy of ST depression to predict further coronary events, myocardial revascularization need, cardiac heart failure, and all cause mortality in supraventricular tachycardia (SVT). **Methods:** Patients eligible for radiofrequency ablation of SVT were included. Only the ones presenting nodal re-entrant tachycardia were considered. Pre-existing bundle branch blocks and AV re-entrant tachycardia were excluded. ST morphologies and cycle length variations during tachycardia were analyzed. Follow up (6 months to 5 years) determined: Mortality rates (total and

cardiovascular), MI and unstable angina incidence, CABG or PTCA need. Two groups were compared: the ones which developed pathologic ST depression (descendent or horizontal ST morphology) and the ones that did not develop ST depression or developed a non pathological ST depression (ascendant). **Results:** Total of 68 patients, age (49,57 ± 13 years); 66,3% males. Incidence of UA was 8.82%; 7,35% required percutaneous angioplasty; 2,94% total mortality (non cardiac); 1,47% developed cardiac insufficiency. The group that developed non pathologic ST or non ST depression were older (55.47 ± 11,1 years); males (82,76%) and showed a higher incidence of UA (15,38%); CABG or PTCA requirement (12.82%); CI (2,56%) and all cause mortality (5,12%). **Conclusions:** ST segment depression failed to predict higher mortality rates and CAD in this subgroup. This study suggests that ST depression is not a high risk marker in SVT and has no prognostic value in this subgroup.

O107

RISK OF MALIGNANT ARRHYTHMIAS IN INITIALLY SYMPTOMATIC PATIENTS WITH WPW SYNDROME: RESULTS OF A PROSPECTIVE FOLLOW-UP STUDY

Pappone C; Vicedomini G; Petretta A; Vitale R; Saviano M; Pappone A; Baldi M; Cuko A; Giannelli L; Santinelli V
Maria Cecilia Hospital

Objectives: This study was designed to assess characteristics and predictors of malignant arrhythmias (MA) in initially symptomatic patients with WPW syndrome. **Background:** The available amount of detailed long-term data in patients with WPW syndrome is limited and no prospective electrophysiological studies looking at predictors of MA are available. **Methods:** Among 8575 symptomatic WPW patients with atrioventricular reentrant tachycardia (AVRT) referred for EPT, 369 (mean age, 23 ± 12.5 years) declined catheter ablation and were followed. Primary endpoint of the study was to evaluate over a 5-year follow-up predictors and characteristics of patients developing MA. **Results:** After a mean follow-up of 42.1 ± 10 months, MA developed in 29 patients (mean age, 13.9 ± 5.6 years, 26 M) resulting in presyncope/syncope (25 patients) or resuscitated cardiac arrest (4 patients). Of the remaining 340 patients, 168 (mean age, 34.2 ± 9.0 years) remained asymptomatic up to 5 years and 172 (mean age, 13.6 ± 5.1) had benign recurrence including sustained AVRT (132 patients) or AF (40 patients). As compared with no-MA group, MA group showed shorter AP-AERP ($p < 0.001$), more often exhibited multiple AP ($p < 0.001$) and AVRT triggering sustained preexcited AF (AVRT-AF) was more frequently inducible ($p < 0.001$). Multivariate analysis demonstrated that short AP-AERP ($p < 0.001$) and AVRT-AF ($p < 0.001$) were independent predictors of MA. **Conclusions:** Most initially symptomatic WPW patients remain asymptomatic or may have benign recurrences, but a minority of them may experience MA. Short AP-AERP and AVRT triggering AF are independent predictors, which emphasizes the need of contextual catheter ablation in patients at highest risk.

O108

RFA OF DRUG-REFRACTORY TACHYARRHYTHMIAS IN SMALL CHILDREN

Svintsova L; Kovalev I; Murzina O; Popov S;
Child's Heart Center
Institute of Cardiology

Materials: Twelve RFA of tachyarrhythmias were performed to children of 1–12 months in our clinic during for the last five years. The minimum age of effective RFA is 48 days, the minimum weight is 3800 gr. Tachycardia was first disclosed in three children antenataly. In 8 cases tachycardia had the persistent paroxysmal course; in 4 cases it was paroxysmal. The presence of arrhythmogenic cardiomyopathy, accompanied by blood insufficiency, and also ineffectiveness of antiarrhythmics combinations including amiodarone were the indications of RFA performance in all cases. **Results:** WPW syndrome was diagnosed in five children: concealed WPW was in four of them, and manifest WPW was in one. Localization of accessory pathway: left posterior (n = 2), left anterolateral (n = 2) and right posteroseptal (n = 1). In all cases of left sided localization of accessory pathway an approach into the left atrium was carried out through the patent foramen oval. Intra-atrial tachycardia was diagnosed in seven children. Localization of atrial ectopic focuses was determined in the area of right atrial auricle basis (n = 2), in the area of right atrial anterior wall (n = 3), in the area of His band (n = 1). The atrial reentry tachycardia happened in the area of the patent foramen oval in one case. The intra- and postoperative period in all patients was without complications. According to the Echo data reduction of atrium sizes, increase of left ventricle contractile function was marked in 5 – 10 days ($p < 0,05$). Follow-up was from one month to five years. Tachycardia relapses were not disclosed. As a result of Echo investigations,

pathology was not uncovered. **Conclusion:** RFA is an effective and safe method of tachyarrhythmia treatment including infants. All children of early age with hemodynamic and clinically significant tachycardias, refractory to antiarrhythmic therapy should be turned to specialized centers, having RFA experience at the given age.

SYNCOPE

O109

ADDITIONAL DIAGNOSTIC VALUE OF VERY PROLONGED OBSERVATION BY IMPLANTABLE LOOP RECORDER IN PATIENTS WITH UNEXPLAINED SYNCOPE

Furukawa T; Maggi R; Bertolone C; Fontana D; Brignole M; Department of Cardiology
Ospedali del Tigullio, Lavagna, Italy

Introduction: In the literature, the average diagnostic yield of the implantable loop recorder (ILR) is reported to be 35% over an observation period generally less than 18 months. The aim of this study was to evaluate the diagnostic value of ILR during very prolonged observation. **Methods and Results:** Consecutive patients who had received one or more (in the case of battery exhaustion before diagnosis) ILR (Reveal/plus/DX, Medtronic. inc) from 2001 to 2010 were included. The diagnostic ECG was classified according to the ISSUE classification. We analyzed 157 patients (87 males, 69 $\pm$ 14 years): 70 of these were followed up for $\geq$18 months. The estimated cumulative diagnostic rates were 30%, 43%, 52% and 80% at 1, 2, 3 and 4 years, respectively; 26% of diagnoses were made after 18 months. The diagnostic yield was independent of structural heart disease, bundle branch block, number of syncopes, age and gender; the median time to diagnosis of ISSUE type 1 patients was shorter than that of the others (4 [2;10] v.s. 16 [6;23] months; $p = 0.003$). During the observation period, 3 patients (1.9%) died and none suffered arrhythmic death. **Conclusions:** Prolonging observation up to 4 years increased the diagnostic value of ILR in syncopal patients and was safe. A quarter of patients diagnosed needed more than 18 months of follow-up. As consequence, when a strategy of prolonging monitoring is chosen, monitoring should be maintained even for several years until diagnosis is established.

O110

SYNCOPE DUE TO IDIOPATHIC PAROXYSMAL AV BLOCK: LONG-TERM FOLLOW-UP OF A DISTINCT FORM OF AV BLOCK

Brignole N; Deharo JC; De Roy L; Menozzi C; Blommaert D; Dabiri L; Ruf J; Guieu R; Department of cardiology
Ospedali del Tigullio, Lavagna, Italy

Objectives: We present data on patients with syncope due to paroxysmal atrioventricular (AV) block unexplainable in terms of currently known mechanisms. **Background:** Paroxysmal AV block is known to be due to intrinsic AV conduction disease or to heightened vagal tone. **Methods:** We evaluated 18 patients presenting with unexplained syncope who had: 1) normal baseline standard ECG; 2) absence of structural heart disease; and 3) documentation, by means of prolonged ECG monitoring at the time of syncopal relapse, of paroxysmal third-degree AV block with abrupt onset and absence of other rhythm disturbances before or during the block. **Results:** The study group consisted of 9 males and 9 females, aged 55 $\pm$ 19 years, who had suffered from recurrent unexplained syncope for 8 $\pm$ 7 years and were subsequently followed up for up to 14 years (4 $\pm$ 4 years on average). The patients had no structural heart disease, standard ECG was normal and electrophysiological study was negative. In all patients, prolonged ECG monitoring documented paroxysmal complete AV block with one or multiple consecutive pauses (mean longest pause: 9 $\pm$ 7 sec) at the time of syncope; AV block occurred without P-P cycle lengthening or PR interval prolongation. During the observation time no patient developed permanent AV block; on permanent cardiac pacing, no patient had further syncopal recurrences. **Conclusions:** Common clinical and electrophysiological features define a distinct form of syncope due to idiopathic paroxysmal AV block characterized by a long history of recurrent syncopes, absence of progression to persistent forms of AV block and efficacy of cardiac pacing therapy.

O111

SUPINE VASOCONSTRICTION AND VASOVAGAL SYNCOPE

Flevari P; Stergiou P; Leftheriotis D; Dagres N; Lekakis J; Anastasiou-Nana M
2nd Department of Cardiology, Attikon University Hospital, Athens, Greece

Background: Vasovagal syncope (VVS) is characterized by a reduced vasoconstrictor reserve during sustained orthostatic stress. It has also been suggested that VVS is associated with forearm vasoconstriction during supine rest. The study addressed whether supine forearm vascular resistances (FVR) are related to the vasoconstrictor

reserve during head-up tilt test and its result. **Methods:** We studied 37 pts with recurrent VVS (at least 2 syncopal episodes during the last 6 months), mean aged (±SE) 46.5 ± 3.6 years who underwent 2 head-up tilt tests (HUTs): an initial, positive examination, and a second one, 3 months later (with or without drugs. Group A patients comprised 28 patients with a subsequently negative HUT, while Group B consisted of the remaining 9 patients with a second, positive HUT. Strain-gauge venous occlusion plethysmography was used to assess right forearm blood flow (FBF) and FVR i) at rest, in the supine position, just prior to HUT, ii) during the first 10 mins of HUT, every 30 sec. FBF was expressed as ml per min per 100 ml of forearm tissue volume and FVR was calculated as the mean blood pressure divided by FBF. Vasoconstrictor reserve was assessed as the mean% reduction in supine FVR. **Results:** In patients whose HUT remained positive, no changes were observed in supine FVR or vasoconstrictor reserve between the 2 examinations. On the contrary, in patients with a subsequently negative HUT, a decrease was observed in supine FVR (18.7 ± 1.7 vs 27.8 ± 1.8 at baseline, $p < 0.05$). An increase was observed in their vasoconstrictor reserve during the second HUT (122 ± 3.6 vs 109 ± 3.1 at baseline, $p < 0.05$). The % reduction in FVR between tests was associated with the% increase in vasoconstrictor reserve. **Conclusion:** VVS is characterized by vasoconstriction in the supine position. This increase in forearm FVR is pathophysiologically significant and seems to be the reason for the impaired vasoconstrictor reserve observed in this syndrome.

O112

COMPARISON OF THE TILT TABLE TEST RESULTS IN ELDERLY AND IN NON-ELDERLY PATIENTS

Zimerman A; Pimentel M; Magalhães APA; Zimerman LI
Hospital de Clínicas – Federal University of Rio Grande do Sul

Introduction: The tilt table test is a useful diagnostic method in the evaluation of syncope. The comparison of the results between elderly and non-elderly patients has not been elucidated. **Objectives:** To compare the results of the tilt table test in elderly and non-elderly patients. **Methods:** A total of 640 tilt table tests were analyzed and patients were separated in two groups: elderly (≥65 years old) and non-elderly (<64 years old). Tilt table test response was compared between groups. The protocol had a passive phase (20 minutes; 70 degrees inclination) and an active phase (1.25 mg sublingual nitrate and inclination during 10 minutes). Chi-square test was used for statistical analysis, and $p < 0.05$ was considered significant. **Methods:** The tilt table test results of 640 patients were analyzed. The protocol used in the test was 20 minutes with an inclination of 70 degrees. In case there was no alteration, pharmacologic sensibilization was made with sublingual nitrate during ten more minutes. Patients whose age was ≥65 were considered to be elderly. **Results:** Patients were mostly females (63.8%) and mean age was 49.1 ± 22.2 years old. The tilt table test was considered positive in 334 patients (51.9%), from which 63.6% after nitrate use. The most frequent positive response was the mixed type (72.3%). The comparison of the results between elderly and non-elderly patients is shown below.

Test result	Elderly	Non-elderly
Positive	93 (45.8%)	241 (54.9%)
Negative	110 (54.2%)	196 (45.1%)
Total	203	437

$p = 0.03$.

A greater proportion of negative results among elderly was observed both in men and in women, but was only significant in the second group. **Conclusions:** Elderly patients had significantly less positive results in the tilt table test. The greater presence of other causes of syncope in this age group may have contributed for this finding.

TELEMONITORING FOR CARDIAC RHYTHM MANAGEMENT DEVICES

O113

INTEGRATING OUT-PATIENT AND REMOTE FOLLOW-UP OF CARDIOVASCULAR IMPLANTABLE ELECTRONIC DEVICE PATIENTS

Chronaki C (1); Sfakianakis S (1); Petrakis Y (1); Yang M (2); Radulescu M (3); Eichelberg M (2); Laleci G (4); Hinterbuchner L (5); Arbelo E (6); Dogac A (5); iCARDEA project
(1) FORTH, Gr (2) OFFIS, De (3) SFRG, A (4) SRDC, Tr (5) SALK, A (6) HCPB, ES

Introduction: Annual costs of CVD in the European Union estimated at 192B€, comprise direct healthcare costs (57%), productivity losses (21%), informal care (22%). Health providers and CIED patients can benefit from integrated care

engaging health teams in tele-monitoring and e-visits in responding to patient-reported or device-recorded events or replacing hospital followup. Guideline-driven services based on consistently implemented standards have the potential to enable integrated care leading to productivity gains and potentially cost savings. The iCARDEA care planner employs AF and VT practice guidelines linked to hospital records, personal health records, and telemonitoring reports to reduce information overload and improve decision support. Thus, interoperability testing is critical for iCARDEA. **Methods:** IHE integration profiles specs constrain standards and terminologies to achieve interoperability. The care planner uses CM to subscribe and receive patient data, IDCO to process CIED reports, XPHR to exchange personal health data, XDS to share standardized clinical content, PIX/PDQ to cross-reference patient IDs, and ATNA for security and auditing. Of-the-shelf testing tools for IHE profiles were collected and evaluated. Custom tools and anonymised data filled gaps. **Results:** Comprehensive survey and analysis noted limited test tools, benchmarks, and data sets for complex workflows. The IHE MESA and NIST tools cover most profiles. TestBATN can support testing complex business processes for multiple profiles. Off-the-shelf and custom tools with sample datasets were successfully used in testing iCARDEA. **Conclusions:** A guideline-driven care planner and supporting components for AF and VT can support integrated healthcare processes for remotely managing CIED patients. Adhoc interoperability testing may works, but to ripe the benefits of integrated care, certified data sets, interoperability testing and benchmarking tools for eHealth must be adopted.

VENTRICULAR TACHYARRHYTHMIAS

O114

VENTRICULAR ARRHYTHMIAS ARISING FROM THE EPICARDIAL VENOUS ANATOMY: PREVALENCE, MAPPING AND ABLATION

Mountantonakis S; Jauregui M; Dixit S; Hutchinson M; Riley M; Lin D; Garcia F; Gerstenfeld E; Callans D; Marchlinski F
Electrophysiology Section, Division of Cardiology, University of Pennsylvania, Philadelphia, PA, USA

Introduction: The purpose of this study is to examine the prevalence, mapping, and limitations in ablation of ventricular tachycardias or ventricular premature complexes (VT) arising from the coronary venous anatomy. **Methods:** Retrospective analysis of patients (pts) referred for ablation of VT who underwent detailed activation and pace mapping of ventricular outflow tracts, coronary venous system (CVS) and coronary cusps. **Results:** Among 294 pts with VT referred from catheter ablation, 37 (16 males, age 52 ± 16 years) had earliest activation in the CVS (41 ± 20 ms pre QRS). Of those, 16 (43%) had earliest in the distal great cardiac (GCV), 19 (51%) in the anterior interventricular vein (AIV) and 2 (5%) in the middle cardiac veins. In all cases, pacemaps generated from the vein system were better match then those from the cusps or endocardium. Successful RF ablation within vein was achieved in 23/37 patients (62%). Proximity to coronary vessel precluded adequate energy delivery in 14 pts (38%) and in 2 pts (5%) the ablation catheter could not be passed to the site of earliest activation identified by a 6 F catheter. Successful ablation was achieved at adjacent epicardial sites in 2 pts, from the adjacent left coronary cusp (LCC) in 6 pts and from the opposite endo in 2 pts to avoid coronary damage for overall success of 84%. Typically, longer ablation times with increased power were used/required at adjacent sites to achieve success. **Conclusions:** VTs commonly (13%) arise from the CVS and can be effectively eliminated with RF delivery within the veins in the majority of pts (62%). Limitations include presence of coronary arteries, adequate power delivery and decreased ability to position the ablation catheter at an earlier distant venous site. Ablation from the LCC and less frequently on the endocardial site opposite earliest recorded venous site can be alternatives sites of effective and safe ablation to improve overall outcome to >80%.

O115

"CHANNELS" IDENTIFIED DURING SUBSTRATE MAPPING OF VENTRICULAR TACHYCARDIA (VT): ISTHMUS OR BYSTANDER?

Mountantonakis SE; Park RE; Hutchinson M; Dixit S; Cooper J; Marchlinski F; Gerstenfeld E
Electrophysiology Section, Division of Cardiology, University of Pennsylvania, Philadelphia, PA, USA

Introduction: Substrate mapping in patients (pts) with ischemic cardiomyopathy (ICM) and VT may involve lowering the voltage cutoff that identifies scar (<1.5 mV) to identify "channels" within scar that contain the VT circuit. However, the number of "channels" present and their relationship to the VT isthmus is unknown. We assessed the

relationship of "channels" to the VT isthmus in pts with mappable VT. **Methods:** Detailed bipolar endocardialvoltage maps (396 ± 140 points) from 20 males (age 69 ± 9 yrs) with ICM(EF 32 ± 9%) and tolerated VT were reviewed. Endocardial scar was defined by voltage < 1.5 mV. The voltage cutoff was reduced in steps of 0.1 mV until the maximum number of channels were seen. The VT isthmus was identified by entrainment criteria and tagged on the map. The first channel to appear and proximity to the VT isthmus was measured. **Results:** Inferior/anterior scar was present in 16/4 pts, respectively (scar area = 38 ± 20 cm 2). With lowering of the voltage cutoff, 25 "channels" through scar were identified in 15 pts (75%) at high/low voltage cutoffs = 0.97 ± 047 mV/0.50 ± 0.40 mV). The clinical isthmus was included in a channel in 11/20 pts (55%) or 11/25 (44%) channels. In 7/11 pts, the isthmus was included in the first channel to appear. **Conclusions:** Channels can be identified in 75% of patients by adjusting the voltage limits of bipolar maps, however only 44% harbor a clinical VT isthmus.

O116

REVERSAL OF OUTFLOW TRACT VENTRICULAR PREMATURE DEPOLARIZATION INDUCED CARDIOMYOPATHY WITH ABLATION: EFFECT OF RESIDUAL ARRHYTHMIA BURDEN AND PRIOR CARDIOMYOPATHY ON OUTCOME

Mountantonakis SE; Frankel DS; Garcia F; Lin D; Gerstenfeld E; Riley M; Hutchinson M; Dixit S; Callans D; Marchlinski F

Electrophysiology Section, Division of Cardiology, University of Pennsylvania, Philadelphia, PA, USA

Introduction: Outflow tract premature ventricular complexes (OTVPDs) can be associated with reversible left ventricular cardiomyopathy (LVCM). Limited data exists regarding outcome with ablation of OTVPDs and LVCM in patients with residual VPDs after ablation and preexisting LVCM. **Methods:** 69 patients (43 men; mean age 51 ± 16 years) with non-ischemic LVCM (LVEF 35 ± 9%, diastolic diameter 5.8 ± 0.7 cm) were referred for ablation of frequent OTVPDs (29 ± 13% per 24 hours). Nineteen (28%) patients had more than one VPD morphology whereas the presence of LVCM was diagnosed prior to the occurrence of VPDs in 20 (29%) patients. **Results:** VPDs originated in the right or left ventricular outflow tract in 27 (39%) and 42 (61%) pts respectively. Ablation was not successful in 5 pts (7%) primarily due to proximity to coronary vessel. After a follow up of 11 ± 6 months, 44 (66%) patients had no VPDs (<1%), 15 (22%) had decreased (>80%) VPD burden and 8 (12%) had no clinical improvement with persistent (5 patients) or recurrent (3 patients) VPDs. Only patients with either complete resolution or decreased VPD burden had a significant improvement in their LV function and size (ΔEF 13 ± 9%, $p < 0.001$; ΔLVDD 0.4 ± 0.8 cm, $p < 0.04$). Although, the degree of LVEF improvement correlated negatively with the burden of residual VPDs (r-0.574, $p < 0.001$) no significant difference was found between patients with complete elimination vs significant suppression of VPD burden. Patients with preexisting LVCM, had a more modest but significant improvement in LV function (ΔLVEF 8%, $p < 0.001$; ΔLVDD 0.3 mm, p 0.013). **Conclusions:** 1) Significant reduction and not complete elimination of VPD burden seems to be important in improvement of LVEF in patients with VPD-related LVCM. This implies that in patients with pleomorphic VPDs, targeting the dominant focus (foci) may suffice as an endpoint. 2) Elimination of VPDs is beneficial even in pts with preexisting LVCM.

O117

CHARACTERISTICS OF UNSUCCESSFUL CATHETER ABLATION OF VENTRICULAR ARRHYTHMIA

Ban J-E; Park Y-M; Choi J-I; Lim H-E; Park S-W; Kim Y-H

Arrhythmia Center, Korea University, Seoul, Korea

Background: This study was to identify the electrophysiologic characteristics of unsuccessful catheter ablation (CA) of ventricular arrhythmias (VAs). **Methods:** Out of 302 patients undergoing CA of VAs, 43 consecutive patients (14.2%, 43 ± 14 years) who attempted but failed to eliminate VAs with the first CA (US group). US group was compared with successful CA group (S group) to assess predictors to affect unsuccessful ablation. **Results:** US group included 8 patients underwent unsuccessful CA and 35 patients underwent repeated CA due to arrhythmia recurrence. Presenting VA was ventricular tachycardia (VT) in 24 patients (55.8%) but premature ventricular complex in only 13 patients (30.2%). VT was more common in US group (55.8%) than that of S group (39.0%, $P = 0.03$). The ejection fraction of the left ventricle (LV) was

lower in US group (38.0 ± 7.2%) than in S group (43.7 ± 6.9%, P = 0.02). The earliest activation time (EAT) prior to QRS onset in US group (29.8 ± 7.8 ms) was later than S group (37.4 ± 8.4 ms, P = 0.04). There was a significant difference in VAs origin from-right ventricular outflow tract (RVOT) (41.8% in US group vs. 60.2% in S group, P = 0.02). There were no significant differences in QRS width during VAs between two groups. **Conclusions:** A VT as presenting VAs, the severity of LV dysfunction, later EAT and non-RVOT origin were associated with unsuccessful CA, in whom repeated CA was often required.

OTHER

O118

USE OF THE LATITUDE PATIENT MANAGEMENT SYSTEM FOR HEART FAILURE PATIENTS: A SINGLE-CENTER PROSPECTIVE STUDY

Guarracini F; Zuccaro LM; Rebecchi M; de Ruvo E; Sciarra L; Fagagnini A; De Luca L; Martino A; Sforza M; Calò L
Division of Cardiology, Policlinico Casilino, Rome, Italy

Background: The risk stratification for hospitalization in heart failure (HF) patients is traditionally assessed during clinical visits. Latitude patient management System (LS) is the first HF management tool using wireless telemetry present in implantable cardioverter defibrillators (ICDs) and biventricular defibrillators (CRT-D) that is linked to remotely collected blood pressure (BP) and body weight measurements. The aim of the present study was to evaluate the ability of LS to improve the clinical management of HF episodes in patients with implanted ICDs and CRT-D devices. **Methods and Results:** This single-center prospective study enrolled a population of 40 HF patients (mean age 66.6 ± 13.4, years, 31 males) who underwent CRT-D or ICD implantation between September 2009 and June 2010 in our Hospital. All patients received a communicator and home-monitoring equipment (including a weight scale and BP monitor) and underwent training. Significant clinical events were reported in 18 (45%) patients at a mean follow-up of 12 ± 3 months. Pharmacological therapy optimization via telephone contact was sufficient to resolve clinical problems in 11 (61.2%) patients. An in clinical office evaluation was necessary to optimize the management or device-programming in 2 (11.1%) patients. Five patients (27.7%) were hospitalized because they needed intravenous pharmacological therapy or interventional therapy for atrial or ventricular arrhythmias. No hospitalization for acute HF was present. High satisfaction was expressed by physicians who participated in the study. **Conclusions:** Our results suggest that LS may improve the clinical management of HF patients with an implanted ICD or CRT-D. Further studies are needed to compare the clinical impact of LS with standard care methods.

O119

REDUCED DECELERATION CAPACITY OF HEART RATE PREDICTS TOTAL MORTALITY IN HEART FAILURE PATIENTS

Arsenos P; Gatzoulis K; Dilaveris P; Gialernios T; Archontakis S; Tsiachris D; Aggelis A; Pietri G; Kartsagoulis E; Stefanadis C; APRET
First Department of Cardiology, Medical School, National & Kapodistrian University of Athens, Greece

Purpose: Previous studies reported that the Deceleration Capacity (DC) analysis of heart rate is a powerful predictor of mortality (TM) in post myocardial infarction patients. We examined whether DC is an adequate TM predictor in heart failure patients [mean Left Ventricular Ejection Fraction (LVEF) = 32.6 ± 10.1%], as well. **Methods:** We prospectively screened 230 patients (age: 64 ± 13.4 years, male: 83%, NYHA class: 2.3 ± 0.5, CAD:82%, DCMP: 18%) under optimum treatment with ECG, SAECG, ECHO and 24 hours HOLTER. After 17 ± 16.1 months of follow up, 37 deaths occurred (arrhythmic = 13, pump failure = 17, non cardiac = 7). Echocardiographically determined LVEF, filtered QRS (SAECG), NSVT episodes > 1/24 hours, VPBs > 240/24 hours, DC, mean Heart Rate, SDNN/HRV, mean QTc (24 hour HOLTER), were calculated and statistically analyzed for the two groups. **Results:** In univariate analysis, DC was a statistically significant predictor of TM (Log rank test p = 0.007). Furthermore after Cox regression analysis adjusted for LVEF, fQRS, NSVT episodes >1/24 hours, VPBs > 240/24 hours, mean Heart Rate, SDNN, and QTc (24 hour HOLTER), DC remained an important and independent TM predictor with Hazard Ratio: 0.862 (p = 0.01) 95% CI: 0.764–0.973. A cut off point of DC < 2.5 presented Hazard Ratio: 2.925 (p = 0.01) 95% C.I.: 1.287–6.647. **Conclusions:** In our patients cohort with impaired systolic function and short term follow up, DC was an important and independent predictor of TM. Further evaluation of the reduced DC of heart rate in a larger population with longer follow up is needed.

O120

ATRIAL SENSING PERFORMANCE OF ICD LEADS WITH FLOATING ATRIAL DIPOLE

Schirdewan A[1]; Safak E[1]; Schmitz D[2]; Konorza T[3]; Wende C[4], on behalf of the Linox[smart] S DX Master Study Investigators
[1]Charité Berlin, [2]Elisabeth Hospital Essen, [3]University Hospital Essen,[4]Marien Hospital Papenburg (Germany)

Purpose: In this clinical investigation the atrial sensing quality of the single-coil ICD lead Linox[smart] S DX has been investigated. This ICD lead has an additional floating atrial dipole which enables the detection of right atrial signals. Therefore IEGM-recording and statistics of the atrium in a single chamber ICD system can be provided.
Methods: The Linox[smart] S DX ICD lead has been implanted with a Lumax VR-T 540 DX ICD of BIOTRONIK in 116 patients in 7 European countries. Atrial sensing was investigated at prehospital discharge, 1, 3 and 6 month follow-up. The patients were asked to take three body positions: lying dorsal and normal breathing, sitting and palms pressing together, and sitting with Jendrassik manoeuvre. The atrial sensing performance was observed in all three positions. The atrial senses were analyzed using the respective IEGMs.
Results: In 1074 out of 1163 atrial sensing tests, appropriate atrial sensing performance was determined by the investigator. This results in a rate of appropriate atrial sensing of 92.3%.

	Appropriate atrial sensing	Under-sensing	Over-sensing	Rate of appropriate atrial sensing
Lying dorsal, normal breathing	364/388	11/388	13/388	93.8%
Sitting, palms together	354/388	14/388	20/388	91.2%
Sitting, Jendrassik Manoeuvre	356/387	12/387	20/387	92.0%
Total	1074/1163	37/1163	53/1163	92.3%

In six patients necessary ICD lead repositionings were successfully performed.
Conclusion: This clinical investigation showed that the ICD lead Linox[smart] S DX with an additional floating atrial dipole provides an appropriate atrial sensing rate of 92.3%.

O121

MESH ABLATOR VERSUS CRYOBALLOON PULMONARY VEIN ABLATION OF SYMPTOMATIC PAROXYSMAL ATRIAL FIBRILLATION

Koch L[1]; Haeusler KG[2,3]; Herm J[2,3],;Safak E[1]; Fischer R[1]; Heuschmann PU[3]; Werncke T[4]; Endres M[2,3]; Fiebach JB[3]; Schultheiss H -P[1]; Schirdewan A[1]
[1]Department of Cardiology and Pneumology, Charité Campus Benjamin Franklin Berlin, Germany; [2]Department of Neurology, Charité - Universitaetsmedizin Berlin, Germany; [3] Center for Stroke Research, Charité - Universitaetsmedizin Berlin, Germany; [4]Department of Radiology, Charité - Universitaetsmedizin Berlin, Germany

Background: Catheter ablation of the pulmonary veins (PV's) is a promising therapeutic approach for symptomatic atrial fibrillation (AF). The prospective randomized single-center study "Mesh Ablator versus Cryoballoon Pulmonary Vein Ablation of Symptomatic Paroxysmal Atrial Fibrillation" (MACPAF) compared the efficacy and safety of two balloon-based pulmonary vein ablation systems. **Methods:** Patients with symptomatic paroxysmal AF were randomized 1:1 for a first procedure of PV ablation using the Arctic Front® (Medtronic, Inc.) or the HD Mesh Ablator® catheter (C.R. Bard, Inc.). The primary endpoint was complete PV isolation (PVI). **Results:** Overall, 32 (mean age 62.3 ± 8.4 years, 40.6% female; median CHA_2DS_2-VASc score 2.0 (1–3) underwent PV ablation according to study criteria. Complete PVI was achieved in 13 (76.5%) of 17 Arctic Front® patients but in none of the 15 HD Mesh Ablator® patients ($p<0.0001$). There were one major and two minor complications in each study arm but no clinically evident stroke. Postprocedural AF recurrence was detected within hospital stay in 2 (11.8%) Arctic Front® patients and in 7 (46.7%) HD Mesh Ablator® patients ($p = 0.049$).
Conclusions: The MACPAF study revealed a superiority of the Arctic Front® catheter concerning complete PVI. Because of the insufficient efficacy of the HD Mesh Ablator® catheter, the safety board decided to stop the MACPAF study prematurely.