

duction parameters and patient radiation dose (as calculated from per-procedural dose-area product levels) were evaluated.

Results: Low PV alignment errors in the entire patient group (n=60) indicated accurate 3D-fluoroscopy integration in both planes based on the landmark-based registration approach (median[IQR] total alignment error: RAO 2 [0.5-5] mm vs. LAO 2[0-4] mm, p=0.06).

The effects of ECG-gating and respiratory phase during CT-acquisition on integration accuracy were small and clinically irrelevant. Only the alignment error in the RAO-plane showed a borderline significant reduction for ECG-gated vs. non-gated CT-acquisitions (2[0-4] mm vs. 2[2-6] mm, p=0.05). ECG-gated CT however resulted in a very important increase in patient radiation dose vs. non-gated CT (17.3±5.2 mSv vs. 4.4±3 mSv, p<0.001).

The use of 3D augmented fluoroscopy in the 3D+ group resulted in a significant reduction of fluoroscopy time (61±18 min vs. 77±26 min, p=0.009) and a trend towards shorter procedure duration (230±67 vs. 257±58 min, p=0.06) vs. conventional procedures. The systematic use of non-gated cardiac CT in the 3D+ group resulted in an important reduction in total effective patient radiation dose from CT+fluoroscopy (4+14=18±8 mSv vs. 17+16=33±13 mSv, p<0.001).

Conclusion: Biplane 3D-augmented fluoroscopy can be used as a safe and accurate standalone method to guide AF ablation procedures. Use of non-gated cardiac CT substantially reduces total patient radiation dose while preserving integration accuracy.

P2630 Does pulmonary vein antrum isolation acutely increase esophageal acid levels in patients with atrial fibrillation?



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Introduction: Atrial fibrillation (AF) is a common arrhythmia associated with increased morbidity and mortality. Pulmonary vein antrum isolation (PVAI) has gained a tremendous interest since being recognized as a potential curative non-pharmacologic treatment of restoring sinus rhythm. Several complications of this procedure were described and included endoscopic findings of the esophageal wall, which ranged from erythema/esophagitis or necrosis/ulcer to atrio-esophageal fistula. We prospectively studied changes of the esophageal acid level pre and post PVAI.

Methods and results: In 25 patients (17 men, 62±12 years) with symptomatic AF, a 24-hour pH-metry was performed before (pre) and 1,3±1,6 days post PVAI. Therefore, a 2 mm probe was inserted through the nasal cavity down to the inferior part of the esophagus and the stomach to register pH-levels at defined intervals. The mean number of reflux episodes increased from 89±80 pre to 107±94 post PVAI. The mean percentage of time with esophageal pH<4 was lower post PVAI (108±193 min) as compared to pre PVAI (159±245 min). The DeMeester Score, indicating acidic gastroesophageal reflux in patients with esophageal symptoms in the absence of endoscopically visible lesions, significantly decreased from 49±68 pre PVAI to 31±41 post PVAI (p<0.05). There were 5 patients with erythema/esophagitis, 7 patients with necrosis/ulcer, but no patient with atrio-esophageal fistula.

Conclusion: Although there were endoscopic findings of esophageal wall changes, we could not prove an increase in esophageal acid levels post PVAI. The hypothesis of increased acid levels caused by stimulation of the right vagal nerve during isolation of the right upper pulmonary vein could not be confirmed. Therefore, AF itself might have an impact on higher esophageal acid levels in patients undergoing PVAI.

P2631 Long term follow up MRI angiographies before and after pulmonary vein isolation using a cryo balloon



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Introduction: Pulmonary vein (PV) isolation is the therapy of choice for trigger elimination in atrial fibrillation (AF). In up to 2 percent of cases relevant PV stenosis were reported after segmental radiofrequency (RF) ablation. The effect of cryo isolation (CI) of the PV ostia and antrum with a balloon with large tissue contact areas has not been investigated.

Methods: We examined 109 consecutive patients (pt) (mean age 59±10 y, range 24 – 81 y) who underwent CI of the PVs with the Arctic front cryo balloon (CryoCath Canada) for symptomatic, treatment refractory AF from August 2005 and completed a follow up of at least 6 months. All pts underwent MRI imaging of the PVs before and 3 and 12 months after ablation. In 6 cases CT scans were used because of implanted pacemakers. A mean of 2.4±0.7 cryo impulses of 6 minutes duration were applied per vein during the ablation.

Results: 97 pt underwent 3 month follow up MRI. In 2 cases (2.1%) asymptomatic stenosis of the left lower PV of 50% were described. In the first case the stenosis was probably caused by mechanical alteration with the guide wire and the tip of the catheter. In the area of balloon-tissue-contact no changes in the vessel lumen could be seen. No progression of this stenosis was seen in the 12 months follow up. The second pt underwent two more interventions using RF energy with sub-

strate modification after the initial CI because of symptomatic AF recurrence. In a third pt an asymptomatic 80% stenosis of the left lower PV after earlier segmental PV isolations using RF energy was detected in the MRI before CI. Reisolation of this PV with the cryo balloon did not cause any progression of this lesion in the long term follow up.

Of the 79 pt with 12 months follow up 51 (64.6%) underwent control MRI or CT. No new stenosis could be detected.

Conclusion: CI of the PVs using the Arctic front cryo balloon is a safe and effective treatment for AF. Large contact areas between balloon and PV and antrum tissue and temperature as low as -75 °C cause no detectable PV shrinking compared to RF application. Mechanical alterations of the vein intima with the catheter tip and combinations of different energy sources should be avoided.

P2632 Characterization of lesions in swine atrium using novel multi-electrode ablation catheters



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Introduction: Ablation for atrial fibrillation remains a lengthy and sometimes difficult procedure with varying success rates. We evaluated the feasibility of ablation with novel multi-electrode ablation catheters delivering duty-cycled RF energy in pigs.

Methods: In 6 anesthetized pigs (weight 83±4 kg) a circumferential decapolar pulmonary vein ablation catheter (PVAC) was positioned at the SVC-RA junction RF energy (target temperature of 60°C) was delivered at all electrodes with different bipolar:unipolar ratios at maximum energy of 10 W (3 pigs 4:1, 2 pigs 2:1 and 1 pig 1:1). In 5 pigs, additional lesions were made with a linear hexapolar catheter (TVAC) in the right and left atria (unipolar energy in 3 pigs, 1:1 in 1 pig and 2:1 in 1 pig).

Results: RF application with the PVAC at the SCV resulted in complete resolution of electrogram amplitude in all pigs. One pig died suddenly 1 hour after the experiment (no evidence for complications on section). All other animals survived and were sacrificed 7±1 day after the acute experiment. Macroscopy showed circular lesion at the SCV which were more extensive when 2:1 and 1:1 energy had been applied. In 1/3 pigs with 4:1 and 2/2 pigs with 2:1 energy the SVC lesion even reached the underlying aortic wall. Macroscopy showed transmural lesions in the thin walled SVC area (wall thickness approximately 2mm). TVAC applications also caused a marked decrease in local electrogram amplitude in all animals. Lesions which were created in the trabeculated left atrium were more marked with the unipolar compared to the 1:1 bipolar: unipolar energy ratio. However, in one animal in which 2:1 energy was applied to a relative thin part of the RA (between the ICV and SCV) an extensive transmural lesion was created reaching again the underlying aortic wall.

Conclusions: Duty-cycled bipolar-unipolar RF energy delivery at low power with multi-electrode ablation catheters is feasible and creates transmural lesions in thinner parts of the atrium (e.g SVC wall). Unipolar compared to bipolar RF energy ratios resulted in more extensive lesions.

P2633 Randomized placebo-controlled study of Warfarin for the prevention of transvenous lead-associated thrombosis in high risk patients



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Pacemaker and defibrillator transvenous leads frequently cause venous lesions, such as stenosis, occlusion or thrombosis. Previous temporary transvenous leads ipsilateral to the permanent implantation and lower left ventricular ejection fraction (LVEF) were associated with an increased risk of obstructions. The effect of prophylactic strategies to prevent these lesions remains controversial.

Purpose: This prospective, clinical, randomized, controlled and blinded study evaluated whether prophylactic treatment with six-month use of warfarin could prevent transvenous leads-associated thrombosis in high risk patients.

Method: Between February 2004 and September 2007, 101 patients were submitted to first transvenous devices implantation with previous ipsilateral temporary pacing and/ or LVEF ≤0.40 were evaluated. Patients with history of previous venous extremity thrombosis and pulmonary embolism, coagulation disturbances, and malignancy are not included. After device implantation, patients were randomly assigned, in a 1:1 ratio, to receive either placebo or warfarin (target INR, 2.0-3.5). Periodical clinical and laboratorial evaluations were performed to anticoagulant management. Following the six-month period, every patient was submitted to a digital subtraction venography. The primary end-point was venous obstructions and the secondary were morbidity and safety of anticoagulant therapy.

Results: Baseline clinical and procedures characteristics were similar in both groups. Venous obstructions of various degrees were observed in 46 (50.0%) of the 92 patients submitted to a venography. The frequency of venous obstructions in the Placebo Group was 60.4% compared with 38.6% in the Warfarin Group (P=0.018), corresponding to an absolute risk reduction of 22% (RR= 0.63, 95% CI= 0.013-0.42). Logistic regression analysis showed that only absence of anti-