consider adjunctive approaches to improve the ablation-success in this subset of AF patients.

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Significance of left atrial appendage isolation in patients with long-standing persistent atrial fibrillation undergoing catheter ablation

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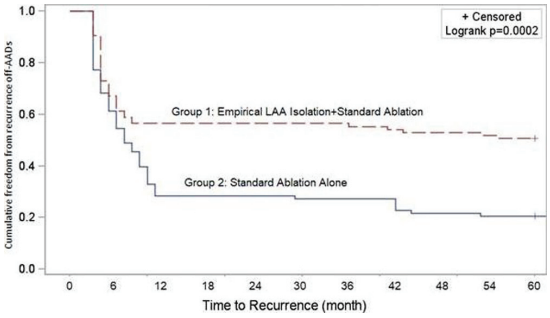
Background: Results from the randomized BELIEF trial showed superior success rate with empirical isolation of the left atrial appendage (LAA) compared to extensive ablation minus LAA isolation in patients with long-standing persistent AF (LSPAF) at 12 months follow-up.
Objective: In the current study we sought to assess the single-procedure success rate at 5 years of follow-up in the participants of BELIEF trial.
Methods: BELIEF trial enrolled 173 consenting LSPAF patients and randomly assigned them (1:1) to undergo empirical LAA isolation along with standard ablation (group 1, n=85) or standard ablation alone (group 2, n=88). Standard ablation included pulmonary vein isolation +isolation of posterior wall and superior vena cava + ablation of LA septum, roof + ablation of sustained arrhythmia from LAA and other non-PV foci detected by isoproterenol challenge. Patients were monitored for arrhythmia at office visits, ECGs, 7-day holter monitoring and event recorders.
Results: Single-procedure success rate of the index procedure at 1 year was, 56% in group 1 and 28% in group 2 (log-rank p=0.001) as reported earlier in the publication.
At 5 years from the index procedure, single-procedure success rate off-anti-arrhythmic drugs was 43 (51%) patients in group 1 and 17 (19%) in group 2 (log-rank p=0.0002, unadjusted hazard ratio 2.01 (1.37 to 2.96]) (figure).
No further thromboembolic events or other major complications were reported during the prolonged follow-up period.



Conclusion: Addition of empirical isolation of LAA significantly improved the success rate of standard ablation in LSPAF patients at 5 years, without increasing complications.

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Safety and efficacy of a cardiologist-only approach to deep sedation for electrical cardioversion: insights from a single-centre 14 years experience

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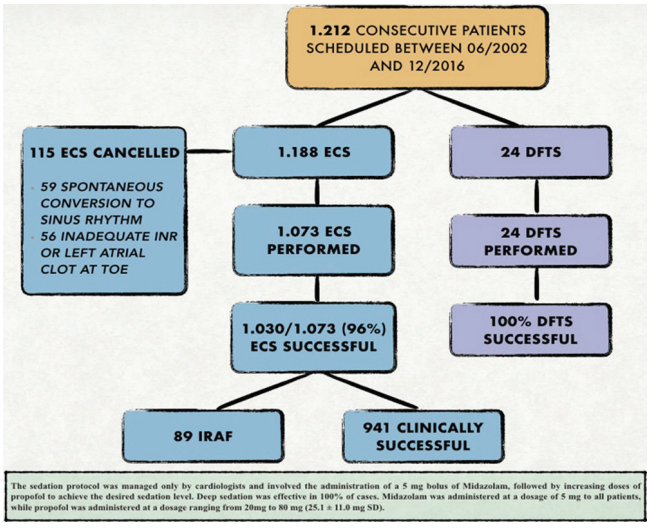
Introduction: Electrical cardioversion (EC) is still the preferred method to restore sinus rhythm (SR) in patients with atrial fibrillation (AF). The main disadvantage is that EC requires deep sedation, generally administered by anaesthesiologists, for safety concern. An exclusively cardiologic management of deep sedation should have the advantage to reduce resources and time consuming.
Methods: All consecutive patients admitted to our division with AF or atrial flutter (AFL) to undergo elective EC from June 2002 to December 2016 were included. The sedation protocol was managed only by cardiologists and involved the administration of a 5 mg bolus of midazolam, followed by increasing doses of propofol to achieve the desired sedation level. Exclusion criteria were strictly observed. Complications were recorded. A retrospective analysis on a deidentified database has been performed.
Results: A total of 1212 procedures, including 1188 ECs and 24 DFT, were scheduled in our centre. EC was performed in 1073 cases (90.3%) and DFT in all cases (100%). EC was successful in restoring sinus rhythm in 1030 (96.0%) patients. Immediate recurrence of atrial fibrillation (IRAF) occurred in 89 patients (8.3%). Deep sedation, according to our protocol, was effective in 100% of cases. Midazolam was administered at a dosage of 5 mg to all patients, while propofol was administered at a dosage ranging from 20mg to 80 mg (25.1±11.0 mg SD). No anaesthesia-related complications were observed, neither significant respiratory depression requiring intubation nor anaesthesiologist support.

Baseline characteristics

		Total ECs (1073)	Successful EC (941)	Unsuccessful EC (132)	p value
Age		67.2±9.8	67.2±10.0	67.0±7.8	0.727
Atrial flutter		76 (7.1%)	76 (8.1%)	0 (0.0%)	<0.001
AF relapse		425 (39.6%)	380 (40.4%)	45 (34.1%)	0.184
LVEF	≥50%	709 (66.1%)	618 (65.7%)	91 (68.9%)	0.391
	40–50%	159 (14.8%)	142 (15.1%)	17 (12.9%)	
	30–40%	119 (11.1%)	101 (10.7%)	18 (13.6%)	
	≤30%	86 (8.0%)	80 (8.5%)	6 (4.6%)	
LA enlargement (n=250)	Normal	32/250 (12.8%)	32/229 (14.0%)	0/21 (0.0%)	0.343*
	Mild	59/250 (23.6%)	49/229 (21.4%)	10/21 (47.6%)	
	Moderate	76/250 (30.4%)	71/229 (31.0%)	5/21 (23.8%)	
	Severe	83/250 (33.2%)	77/229 (33.6%)	6/21 (28.6%)	

AF: atrial fibrillation, LVEF: left ventricular ejection fraction, LA: left atrium.



Study flow chart

Conclusion: Exclusively cardiological procedural of deep sedation seems to be safe and effective.

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No support for additional left atrial substrate modification among patients with persistent atrial fibrillation at first PVI procedure - results from German Ablation registry

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Background: Pulmonary vein isolation (PVI) is the corner stone of interventional treatment of atrial fibrillation. Patients with persistent atrial fibrillation have a high recurrence rate after catheter ablation irrespective of treatment strategy.
Randomized data suggest that substrate modification added to PVI at first procedure does not improve arrhythmia free survival. Until now there are no real world data from experienced centers.
Methods: 909 patients with persistent atrial fibrillation and first ablation procedure were included in the German Ablation registry maintained by our Institut. Patients were treated with PVI only or PVI+substrate modification as lines or ablation of complex fractionated atrial electrograms. Endpoint was freedom from any atrial arrhythmia after 1 year documented by ECG or treated by a physician.
Results: 645 patients in the PVI-only group were compared with 264 patients in the PVI+ group. The age and the percentage of male gender were equal between groups (PVI-only: mean age 61.4±10 years, 73% male; PVI+: mean age 61.6±10 years, 76% male). The known cardiovascular risk factors (diabetes, renal function and stroke) were equal between groups. Only hypertension was significantly more common in the PVI+ group (82% vs. 55%, p=.001). About one third of patients in each group were in sinus rhythm at time of procedure. Radiofrequency was the predominant energy form (PVI-only 82% vs. PVI+ 98%), cryoenergy was the second most in the PVI-only group.

Mean procedure time was 186±68 min in the PVI-only group and 203±75 min in the PVI+ group (p=.002). The acute procedural success defined as complete PVI and bidirectional block in case of lines was 94% in the PVI-only group vs. 97% in the PVI+ group (p=.11).
The arrhythmia recurrence rate during index hospital stay was equal between groups (PVI-only 7.4% vs. 9.5%; p=.31) After a mean follow-up of 477±102 vs. 484±84 days the arrhythmia free survival was significantly higher in the PVI-only group compared to PVI+ group on antiarrhythmic drugs (57% vs. 41%, p=.001) as well as off antiarrhythmic drugs (43% vs. 31%; p=.002).
Conclusions: With the given difference in the prevalence of arterial hypertension, the analysis of the observational Germany Ablation registry does not support any additional substrate modification beyond pulmonary vein isolation among middle age patients presenting for the first ablation procedure for persistent atrial fibrillation.

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Prediction of very late arrhythmia recurrence after catheter ablation in patients with atrial fibrillation using APPLE and MB-LATER scores: the Leipzig AF ablation registry

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Background: Although catheter ablation is an established therapeutic strategy in atrial fibrillation (AF), arrhythmia recurrences thereafter remain an important management issue. Recently, the APPLE score had been introduced to predict rhythm outcomes within 12 months after catheter ablation in first and repeated procedures, while the MB-LATER score had been developed for the prediction of very late recurrences occurring after 12 months. The aim of this study was to compare both APPLE and MB-LATER scores and their predictive ability for very late recurrences after catheter ablation.
Methods: The study population included patients from The Heart Center Leipzig AF Ablation Registry, Germany undergoing first ablation between January 2007 and December 2011. The APPLE (one point for Age>65 years, Persistent AF, imPaired eGFR<60 ml/min/1.73m^2, LA diameter≥43 mm, EF<50%) and MB-LATER scores (one point for Male gender, Bundle branch block or QRS >120ms, Left Atrium diameter ≥47mm, AF Type (persistent AF), Early Recurrence <3 months) were calculated before and 3 months after ablation, respectively. Arrhythmia-free patients within 3–12 month after ablation were included into analyses.
Results: We studied 482 patients (age 60±10 years, 66% males, 40% persistent AF, median (IQR) APPLE 1 (1–3), MB-LATER 3 (1–5)). The median (IQR) follow-up was 39.5 months (IQR 35–50). There were 184 patients (38.3%) with arrhythmia recurrences within 13–60 months after ablation. On univariate analysis, both APPLE (OR 1.517, 95% CI 1.244–1.850, p<0.001) and MB-LATER (OR 1.356, 95% CI 1.219–1.508, p<0.001) scores were significantly associated with arrhythmia recurrences. In the ROC curve analysis, both scores demonstrated moderate prediction ability for arrhythmia recurrences (AUC 0.652, 95% CI 0.601–0.704, p<0.001 for MB-LATER, and AUC 0.609, 95% CI 0.553–0.664, p<0.001 for APPLE score). There was no difference between both ROC curves (p=0.188 De Long test).
Conclusions: Both APPLE and MB-LATER clinical scores were significantly associated with very late arrhythmia recurrences after ablation, with moderate predictive ability.

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First in-human data on multi-electrode contact mapping plus ablation for treatment of atrial fibrillation - the Global-AF trial

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Introduction: The critical question for the technological advancement of catheter ablation of atrial fibrillation (AF) is whether a creative new concept can combine the diagnostic mapping options of single-tip and basket catheters with the simplicity of using balloon catheters for ablation. Herein, we describe the first in-human experience with a single catheter offering such a unique and complete solution.
Methods and results: A new catheter with a distal multi-electrode array consisting of 16 ribs with 122 gold-plated electrodes was used prospectively in 60 patients (pts) (mean age 64±10 years, 58 pts with paroxysmal AF). Each electrode can record electrograms, ablate, pace, and can measure tissue contact, temperature, and current. Ablation can be done with up to 24 electrodes simultaneously. The amount of current delivered to each electrode to maintain the target electrode temperature (57 - 65°C) is automatically controlled. Immediate automatic downregulation of power is provided in case of intermittent loss of contact (e.g. deep breath).
Complete pulmonary vein isolation (PVI) was achieved in 234/236 veins (99.2%). Procedure time and fluoroscopy time measured 147±45 and 11±4 minutes, respectively. First 6- and 12-months follow-up data are currently gathered and will be provided at the congress. In 2 pts, cardiac tamponade was observed (3%), and no cases of stroke, PV stenosis, esophageal perforation, or phrenic nerve paresis were observed.
Conclusions: PVI could be performed with this new multi-electrode array in >99% of all veins offering the option for easy handling and fast "single-shot" PVI. In addition, several continuously updated mapping types (e.g. voltage mapping, activation mapping) from all 122 electrodes even in real-time during ablation demonstrate the unique capability to go beyond PVI for substrate description plus ablation, and for rotor mapping plus rotor ablation with a single catheter.
Funding Acknowledgements: Research Grant from Kardium

RISK OF SUDDEN DEATH IN HYPERTROPHIC CARDIOMYOPATHY

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Prognostic role of late gadolinium enhancement in patients with low-intermediate 5 year HCM SCD risk score: a multicenter study

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Background: Hypertrophic cardiomyopathy (HCM) is a familiar disease with a heterogeneous clinical expression and variable prognosis. Sudden cardiac death (SCD) is the most life-threating complication of HCM. Nowadays, cardiac magnetic resonance (CMR) is affirmed as fundamental imaging technique for diagnosis of HCM and for not invasive detection of myocardial fibrosis, expressed as late gadolinium enhancement (LGE). ESC Guidelines suggest the implantation of a ICD in primary prevention according to a 5-year Risk SCD score ≥6%. Unfortunately when the Risk SCD score is intermediate there is not a clear recommendation for therapeutic strategy.
Purpose: The aim of the study is to evaluate the prognostic role of LGE in a population with a low-intermediate 5-year Risk SCD score according to the current ESC Guidelines.
Methods: From 2008 to 2017 patients with HCM underwent a consecutive CMR scan. This study was multicenter investigation, including data from 5 hospitals. The examination was performed using 1.5 Tesla systems with cardiac phased array multichannel coil. LGE images were acquired 10 min after the administration of Gd-DTPA with a dosage of 0.2 mmol/kg for the short axis views. The extent of LGE was measured using a previously validated method (1) and expressed in percentage of LV mass. The 5-years Risk SCD score was calculated in entire population and patients with an intermediate-low Risk SCD score <6% were enrolled in the study. At follow up hard cardiac events included SCD, resuscitated cardiac arrest, appropriate ICD shock, adequate anti-tachycardia pacing, sustained ventricular tachycardia on Holter electrocardiogram monitoring.
Results: The final population of the study comprised of 354 patients with 5-year ESC risk SCD score <6% (257 males, age 54±17). Two hundred and thirty (65%) patients were positive for LGE at visual assessment. Episodes of hard cardiac events occurred in 22 patients; LGE was detected in a high proportion (92%) of patients who experienced of a malignant arrhythmic event. The worst prognosis was found in patients with extreme LV hypertrophy (p=0.04), higher indexed LV mass (p=0.034) and higher extent of myocardial fibrosis (p=0.002), while, based on HCM risk SCD score, no differences between the group with cardiac events and those without were detected (p=0.6). Based on the logistic regression analysis, LGE extent was the best independent predictor of hard cardiac events (HR 1.05; 95% CI 1.03–107; p<0,0001) and at Kaplan-Meier curves patients with LGE >10% had a worst prognosis than those with lower extent (p<0.0001).
Conclusions: This is the first manuscript that demonstrates as the extent of LGE is able to recognize additional patients at increased risk for malignant arrhythmic episodes in a population with low-intermediate 5-year ESC risk SCD score.

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Implantable cardioverter defibrillator in patients with hypertrophic cardiomyopathy - A nationwide study

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Background: Implantable cardioverter defibrillators (ICD) have been indicated in all patients with Hypertrophic Cardiomyopathy with a prior cardiac arrest. It has also been indicated for primary prevention in selected HCM patients with major risk factors as per guidelines.
Purpose: This study intends to investigate the utilization and in-hospital complications of ICD implantations in patients with HCM.
Methods: The data was obtained from the Nationwide Inpatient Sample (NIS) over a 7-year duration from 2008 to 2014. The NIS is the largest all-payer inpatient database of hospital discharges in the United States.