

Kaplan Maier of PAF predictors

be elucidated. With these results, should we consider the change in the duration of the blanking period?

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Comparison of treatment efficacy between a hybrid procedure and radiofrequency catheter ablation for atrial fibrillation

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Aims: We compared the arrhythmic outcomes after a hybrid procedure, consisting of a thoracoscopic ablation followed by an endocardial radiofrequency catheter ablation (RFCA), versus RFCA alone in patients with atrial fibrillation (AF).

Methods and results: A total of 335 ablation-naïve patients underwent either the staged hybrid procedure (n=90) or RFCA alone (n=245) for drug-refractory non-valvular AF were enrolled. The median follow-up period was 2.1 years. The mean age was 52.7 years, and 84.8% of the patients were male. Patients with long-standing persistent AF, a history of congestive heart failure, and stroke were more likely to undergo the staged hybrid procedure than the RFCA alone. The left atrial volume index (LAVI) was larger in the hybrid group than in the RFCA group (47.86±14.31 mL/m² versus 38.07±11.87 mL/m², P<0.001). The 3-year recurrence rate of AF was significantly lower in the hybrid group compared to the RFCA group (24.3% versus 33.4%; adjusted hazard ratio [HR], 0.49; 95% confidence interval [CI], 0.28 to 0.87; P=0.02). In a propensity score matching analysis, the 3-year recurrence rate of AF was significantly lower in the hybrid group than in the RFCA group (20.4% versus 41.3%; HR, 0.50; 95% CI, 0.26 to 0.97; P=0.04). The benefit of the hybrid procedure in the reduction of AF recurrence was more prominent in patients who had persistent AF, irrespective of LAVI (Log Rank P=0.03).

Conclusions: Our data suggest that a staged hybrid procedure may be an effective alternative treatment option in patients with drug-refractory persistent AF.

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Modern ablation of paroxysmal atrial fibrillation: enabling an early patient outcome prognosis by combining classic and new concepts

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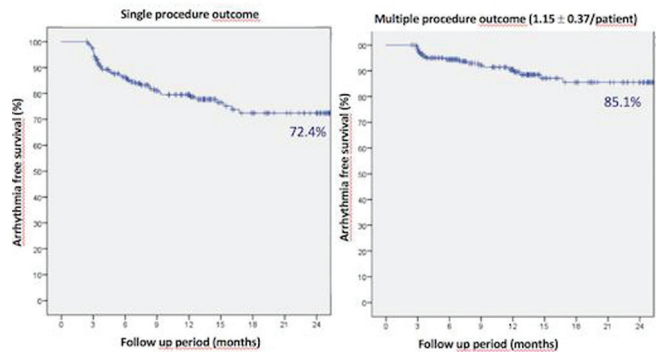
Background: Pulmonary vein isolation (PVI) in paroxysmal atrial fibrillation (PAF) patients is the cornerstone of catheter ablation. Contact force (CF) control, stability monitoring and adenosine testing for dormant reconnection were shown to reduce recurrence rates. Electroanatomic voltage mapping (EAVM) is an additional tool to screen for fibrotic substrate which is known to affect catheter ablation success.

Purpose: Aim of this study was to evaluate long term outcome results in a modern technology PAF ablation group and to find a marker to enable an early patient outcome prognosis which patients (pts) often ask for.

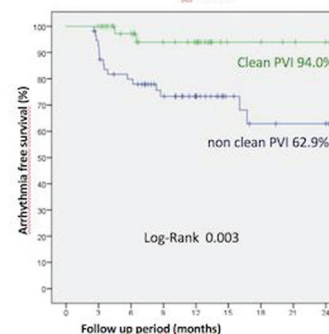
Methods: We retrospectively analyzed 200 pts (66 females, LA41±5mm, 62±11y, CHADS2VACS2 1,6±1.3) with symptomatic PAF that underwent initial catheter ablation in our center using CF (SmartTouch® Catheter) and the VisiTag™ Module (Carto) for circumferential PVI. In 160/200 pts (80%) an EAVM was performed in sinus rhythm, 113/200 pts (57%) received adenosine (12mg) post PVI. Pts were followed with 7d-holters at 0/3/6/12/24mo (recurrence = arrhythmia ≥30s). A "clean PVI" was defined as follows: 1) direct isolation of the left+right PV-group by "single circle" without touch up ablation 2) absence of dormant reconnection with adenosine, 3) no detection of very early arrhythmia recurrences during postinter-ventional holter.

Results: PVI alone was performed in 157/200 (78.5%) pts, additional box isolation of fibrotic areas (BIFA) in 43/200 (21.5%) based on the finding of atrial fibrosis (fibrotic atrial cardiomyopathy (FACM) class I=13, II=24, III=4, IV=2 pts). Isolation of both PV-groups by "single circles" was achieved in 124/200 pts (62%) (additional gap ablation in the remaining to achieve isolation). 17/113 (26.6%) pts showed dormant PV conduction with adenosine at one or both sides (right>left 20 vs 11 patients). 55/113 pts (27.5%) showed early recurrences during postinter-ventional holter. "Clean PVI" was achieved in 50/113 cases (44%). With a mean FU of 15.2mo single and multiple procedure success rates of all PAF pts (including pts with FACM) were 72.4% and 85.1% (1.15±0.37procedures/patient, 14% repeat procedures). "Clean PVI" was correlated with significantly better single procedure outcomes (94.0% vs. 62.9%, p=0.003) with the postinterventional holter being the strongest factor (holter + vs - p<0.001, single circle vs gap ablation p=0.484). Also, a higher grade FACM (3,4) compared to FACM 0 or low grade FACM (1,2) was sign associated with reduced outcome results (single procedure success 50.0% vs. 80.4%, p=0.024).

A) Outcome 24 months PAF, n=200



B) 24 months single procedure outcome PAF «clean PVI» vs «non clean PVI» n= 113



Conclusion: Modern ablation for PAF with contact force and stability guided PVI plus voltage mapping with potential substrate ablation results in clinically excellent outcomes after catheter ablation. "Clean PVI" seems to be an acute marker to enable an early patient outcome prognosis, whereas higher grade FACM is a negative predictor even in paroxysmal pts.

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The intracardiac speckle-tracking echocardiography as a method of the radiofrequency ablation efficacy assessment in patients with the atrial fibrillation

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Background: Valid methods for detection of transmural myocardial damage during application of radiofrequency energy are currently unavailable. In clinical practice, doctors use indirect signs such as a change in impedance under the tip of ablation electrode and a decrease in the amplitude of the potential on the electrogram registered on the catheter. The use of intracardiac echocardiography allows for intraoperative visualization of the pulmonary vein ostia and for the assessment of changes in the rate (speed) of tissue deformation of the pulmonary vein ostia using echocardiographic speckle tracking imaging.

Aim: The aim of the study was to implement measurements of tissue deformation of the pulmonary artery ostia in patients with atrial fibrillation (AF) during catheter-based treatment using intracardiac echocardiography to evaluate the effective isolation.

Materials and methods: The study comprised 30 patients (19 men (63%)) with persistent and paroxysmal forms of AF who received radiofrequency ablation (RFA) treatment with pulmonary vein isolation using intracardiac echocardiography. Age of patients was 51.2±7.6 years ranging from 38 to 65 years. During the procedure, intracardiac echocardiographic speckle tracking imaging was used.

Electrophysiology criterion for pulmonary vein isolation consisted in a disappearance of pulmonary vein potential on the Lasso electrode. During stimulation, "entrance block" and "exit block" were registered. Intracardiac echocardiographic speckle tracking imaging is based on the analysis of spacial pattern of speckles during ordinary 2D sonography. In our study, we assessed only longitudinal deformation of the muscular sleeves of the pulmonary veins. Longitudinal deformation of the myocardium is oriented from the pulmonary vein ostium towards the distal parts of the pulmonary veins. Recorded data were processed using special acoustic-tracking software.

Results: In our patients, mean deformation of the upper left pulmonary vein was $24.5 \pm 1.5\%$ before and $17.5 \pm 1.1\%$ after RFA; tissue deformation decreased by 7% ($p < 0.001$). Mean deformation of the lower left pulmonary vein was $21.5 \pm 0.9\%$ before and $14.4 \pm 0.9\%$ after RFA; tissue deformation decreased by 7,1% ($p < 0.001$). Mean deformation of the upper right pulmonary vein was $21.2 \pm 1.3\%$ before and $14.9 \pm 1.1\%$ after RFA; tissue deformation decreased by 6,2% ($p < 0.001$). Mean deformation of the lower right pulmonary vein was $20.5 \pm 1.1\%$ before and $14.4 \pm 1,1\%$ after RFA; tissue deformation decreased by 6,1% ($p < 0.001$). There were no AF recurrences during 6 months follow up after RF ablation procedure.

Conclusions: Providing that the electrophysiology criteria of the pulmonary vein isolation are met, tissue deformation significantly changes according to data of intracardiac echocardiography. This approach allows to use the parameters of changes in the speed of myocardial deformation to determine electrical isolation of the pulmonary veins.

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Can we successfully cure long-standing persistent lone atrial fibrillation? long-term results of thoracoscopic epicardial ablation: a perspective multicenter study

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Background: Minimally invasive thoracoscopic epicardial ablation (MIA) for the surgical treatment of stand-alone atrial fibrillation (AF) have gained popularity over the past decade however there is a paucity of data about the long-term results in particular in long standing AF.

Purpose: Aim of this multicenter perspective study is to evaluate outcomes of patients with long standing persistent AF underwent MIA.

Methods: Study population included 150 consecutive patients (female 27.3% (41/150) with long standing persistent AF, without any other structural heart diseases (lone-AF). MIA was performed via closed-chest, right-sided thoracoscopic ablation (box-lesion set) by means of uni-bipolar radiofrequency ablation devices. As Study intention-to-treat, left atrial appendage was left intact in all patients without any attempt of closure. Study primary endpoints were primary ablation success rate (stable sinus rhythm restoration according to HRS Criteria) at 12, 24 and 60months. Study secondary endpoints were all-cause of death – cardiac death and thromboembolic complications at 60months.

Results: Study population mean age was 60.9 ± 10.2 years, median AF duration was 60months and mean left atrial antero-posterior diameter of 49.8 ± 6.6 mm. The procedure was successfully performed in all patients via minimally invasive endoscopic approach except one patient which required conversion to mini-thoracotomy for bleeding (0.7%). Hospital mortality was 0%, major peri-operative complications included TIA, stroke occurred in 2 patients (1.3%) in second and third post-operative day, both patients had full functional recovery. There were no other major peri/postoperative complications. Patients were followed by means of ambulatory evaluations and 72-h Holter-ECG monitoring at 1, 3, 6 months and yearly. Actuarial freedom from AF recurrences (HRS Criteria) at 1, 3 and 5 years were 90.1% (95% CI: 87.6%-92.6%), $80.9 \pm 3.6\%$ (95% CI: 77.3%-84.5%) and 78.5% (95% CI: 74.6%- 82.4%) respectively (fig.1). All-cause mortality was 2.7%

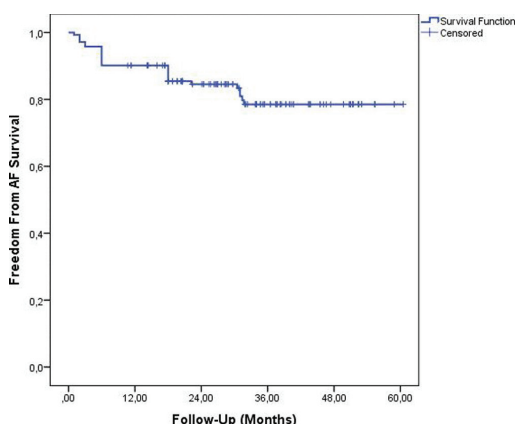


Figure 1

(4/150) while, there were no cardiac-related death or thromboembolic events during the follow-up period. In this subset of patients, multivariate Cox regression analysis identified female gender (HR: 3.03; CI=1.06–8.7; $p=0.039$) and left atrial AP diameter (HR: 2.1; CI=1.1–3.7; $p=0.045$) as independent risk factor for AF recurrences.

Conclusions: Totally endoscopic AF surgical ablation is safe and effective and provides excellent results in terms of sinus rhythm restoration at long-term, even in patients with long standing persistent AF. Despite no patients underwent surgical management of left atrial appendage there were no late episodes of thromboembolic complications at 5 years follow-up.

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The length but not the number of late-enhanced gadolinium MRI gaps was associated with increased risk of recurrences of atrial fibrillation (AF) after pulmonary vein isolation in paroxysmal AF patients

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Background: Pulmonary vein isolation (PVI) is an established treatment option for rhythm control in atrial fibrillation (AF). However, recurrence rate is high, and many patients need to undergo redo-procedures. Complete isolation of pulmonary veins (PV) seems to be important for durable success.

Purpose: To investigate the impact of anatomical gaps as assessed by late gadolinium-enhanced cardiac magnetic resonance (LGE-CMR) on AF recurrence rate after first PVI.

Methods: 53 patients (53±11 yrs, 85% male) underwent circumferential PVI by means of electroanatomical mapping and radiofrequency and were followed for 3, 6 and 12 months and every 12 months thereafter with 24-h-Holter. LGE-CMR was performed 3 months after PVI. Images were processed by ADAS-AF® software (Galgo Medical), applying previously established image intensity ratio thresholds that indicate dense atrial scarring. Perimeter of each PV was measured and number, absolute and relative lengths of anatomical gaps were calculated. 7 patients had to be excluded because of low quality CMR. A total of 179 PV were assessed.

Results: 26 patients had paroxysmal AF (PAF) (57%), 20 had persistent AF (Pers AF) (43%) before PVI. 5 patients (11%) had common trunk of the left PV. Mean follow-up duration was 21 ± 10 months. 36% of patients with paroxysmal AF and 55% of patients with persistent AF had recurrence of AF after a mean of 9.7 ± 6.8 months. There were no differences in age, sex, CHA2DS2VASc-score, left atrial diameter or left ventricular ejection fraction between the groups. In PAF patients, the length of gaps was significantly higher in patients with than without recurrence (54 ± 26 vs. $27 \pm 17\%$, $p=0.003$). A percentage of $>40\%$ gap had a sensitivity of 81% and specificity of 80% for recurrence of AF. In patients with Pers AF, relative gap length was non-significantly higher in patients without or with recurrence (52 ± 30 vs. $29 \pm 18\%$, $p=0.89$). Furthermore, mean number of gaps was not different in patients with or without recurrences (4.3 vs. 4.7 in paroxysmal AF, and 4.4 vs. 4.2 in persistent AF, $p=ns$).

Conclusion: In patients with PAF, length of anatomical gaps as assessed by LGE-CMR is associated with higher recurrence rate of AF after first PVI, whereas in patients with persistent gap length had no impact on recurrences of AF.

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The clinical impact of the timing of early recurrence after atrial fibrillation ablation: From Kansai Plus Atrial Fibrillation Registry

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Background/Introduction: Early atrial fibrillation recurrences (within 90 days after ablation, ERAF) are not always associated with late recurrences (>90 days after ablation). It is reported that the mechanism of ERAF probably differs from that of late recurrences and that ERAF is likely to be related to edema and inflammation.

Purpose: The present study aimed to evaluate the differences in the clinical impact depending on the timing of early recurrences.

Methods: We assessed the database from the Kansai Plus Atrial Fibrillation (KPAF) registry, which was a multi-center registry enrolling 5013 consecutive patients undergoing a first ablation of AF in the Kansai region of Japan between November 2011 and March 2014. ERAFs occurred in 2127 patients (42%), and they were divided into two groups, namely the ERAF0–30 group (ERAF terms; 0–30 days, $n=1881$), and ERAF31–90 group (31–90 days, $n=246$).

Results: In the two groups, Kaplan-Meier analyses showed poor outcomes after a 3 month blanking period compared with the group without ERAFs, but there was a statistically significant difference between the ERAF0–30 and ERAF31–90 groups (37.5%, 16.4% respectively, $p < 0.0001$, see figure). There was no difference in the baseline characteristics between them. However, a complex fractionated atrial electrogram (CFAE) ablation was more likely performed in the ERAF0–30 group