P905

Anterior mitral lines for perimitral flutter ablation: are we ablating down the right path?

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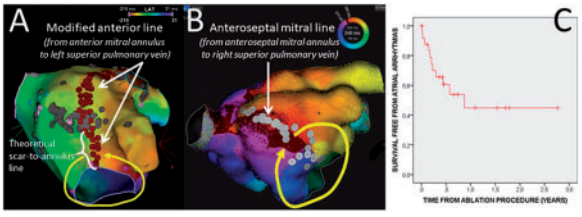
Background: and objective. Anterior mitral lines (AML) have been suggested as an alternative to mitral isthmus ablation for perimitral flutter (AFL) treatment. The aim of this study was to test the efficacy of AML (i.e.: the modified anterior line (MAL, figure, panel A), the anteroseptal line (ASL, panel B), and lines between scar tissue and anterior mitral annulus) for perimitral AFL ablation.
Methods: From May 2014 to October 2017, all consecutive patients with perimitral AFL received AML and were included in the study. Activation and voltage mapping were used to define AFL circuits and substrate. After perimitral AFL was diagnosed, an AML (type depending on expected efficacy) was performed until AFL termination. Programmed atrial stimulation was repeated to test AFL inducibility, and any sustained induced atrial arrhythmia was ablated. Follow-up included visits with ECG and/or 24h Holter-ECG at 3 and 12 months, and a final telephone call.
Results: 25 patients, 13 male (52%) 70.4 ± 13.7 y/o, were included. Successful ablation with AML was achieved in 24 patients (96%), 1 patient developed cardiac tamponade with interruption of the procedure. After perimitral AFL termination, other AFL (15 patients) or atrial fibrillation (AF, 1 patient) were induced and successfully ablated in all cases except in 1 patient. At a mean follow-up of 7.4 ± 8.2 months, 3 patients (12%) recurred with a perimitral AFL, 4 with AF and 5 with other AFL. During follow-up, 14 patients (56%) were free from recurrence, with a mean survival free from atrial arrhythmias of 0.87 years (95%CI: 0.2-1.5 years) (figure, panel C). Possible predictors of arrhythmia recurrence were analysed. Among clinical variables, there was no difference in left ventricular ejection fraction, indexed left atrial volume or history of cardiac surgery between patients with or without arrhythmia recurrence; nevertheless, history of AF was more frequent in the group with recurrence compared to the group without it (7 cases, 63.7%; versus 3 cases, 21.4%; p=0.032), as it was the history of prior ablation procedures (7 cases, 63.7%; versus 2 cases, 14%; p=0.011). Among procedural aspects, a trend towards lower use of contact force ablation catheter was noted in the group with arrhythmia recurrence compared to the group without it (1 case, 9%; versus 6 cases, 42.9%; p=0.062). A trend was also noted towards higher use of ASL in the group without recurrence, compared to a higher use of MAL in the group with recurrence (1 MAL, 7.1%; 8 ASL, 57.1%; 5 scar-to-annulus line, 35.7%, in the former; 5 MAL, 45.4%; 4 ASL, 36.4%; 2 scar-to-annulus, 18.2%, in the latter; p=0.082).
Conclusion: AML were highly successful to terminate perimitral AFL, although recurrence of other atrial arrhythmias was frequent. History of AF and prior ablation procedures were more frequent in those with arrhythmia recurrence, while use of contact force ablation catheter and ASL was higher in those without it.



Abstract P905 Figure.

P906

How to reduce radiation exposure during left-sided ablation procedures: a single centre experience of using a radiofrequency needle for transseptal access

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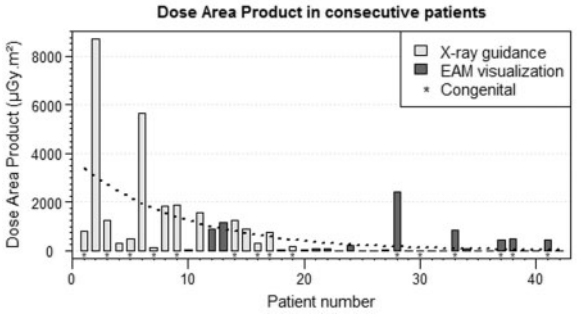
Introduction: Transseptal puncture (TSP) is a routine access route in patients with left-sided ablation substrates and is performed safely using fluoroscopy (+/- echocardiographic guidance). We report on our experience using a radiofrequency (RF) needle in an unselected group of patients to demonstrate the usefulness of direct tip visualization on the 3D electroanatomical mapping (EAM) system with specific emphasis on fluoroscopy exposure.
Methods and Results: we retrospectively reviewed 42 left sided RF ablation procedures with TSP performed using a RF needle guided by fluoroscopy and/or EAM visualization. The procedures included atrial fibrillation (n=33), atrial tachycardia (n=8) and ventricular tachycardia (n=1) ablations. Fifteen of 41 patients had congenital heart disease (CHD), including 9 pts with artificial septal closure (surgical or device). Twenty-four patients had at least one previous transseptal attempt. All the TSPs were performed successfully and without complications. Multiple previous attempts with a conventional needle and/or complex congenital diseases (mainly through artificial patch material) were associated with greater fluoroscopy exposure. The overall median fluoroscopy time amounted to 3.2 min and median exposure of 199.5 μGy.m^2. In a subgroup of patients the RF needle was also visualized on the EAM system which facilitated the procedure and reduced significantly both fluoroscopy time (FT, median 0.88 min [InterQuartile Range 0-3.4] vs 6.7 [IQR 5-14.4min], p<0.001) and exposure (DAP, median 33.5 [IQR 0-324.8] vs 906 μGy.m^2 [IQR 406.2-1696], p<0.001). A learning curve was demonstrated: when analysing patients with structurally normal heart, there was a significant decrease of both FT and DAP (median FT of 6.2 min [IQR 5.3-17.6] and DAP of 36.8 min [IQR 33.5-104.7] for the first 5 cases versus FT and DAP of 0.0 [0.0-0.0] for the last 5 cases, P<0.001 and P<0.05 respectively).
Conclusions: RF needle constitutes a safe and effective alternative to the conventional Brockenbrough needle, particularly in challenging patients with multiple previous TSPs or artificial patches. Moreover, the RF needle tip visualization on EAM allows a low, or even zero, fluoroscopy approach.



Abstract P906 Figure.

P907

Atrial septum dissection following transseptal puncture for left atrial ablation: an underestimated complication

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Introduction: Transseptal puncture (TP) is a crucial step during left atrial (LA) ablation. LA access can be achieved by TP using a transseptal needle through the interatrial septum at the fossa ovalis. A second access of the LA can be achieved either by a second TP (the double-transseptal technique) or by catheter probing through the initial puncture site (the one-puncture, double-transseptal catheterization technique). Although advancement of the catheter through the initial puncture site seems to be an effective and safe method for the second LA access, a septum dissection, a rare but serious complication has been reported.
Methods and results: A total of 1200 LA ablations were performed from 2009 to 2017. The main indication of LA ablation was symptomatic atrial fibrillation or atrial tachycardia. The one-puncture, double-transseptal catheterization technique was used in all cases. 215 patients (18%) presented with patent foramen ovale (PFO) and the LA access was gained without TP. Among 985 patients with intact interatrial septum, septum dissection was observed in 5 patients (0.5%), caused by advancement of the assembly sheath-dilator-needle towards the septum in three cases and advancement of the probing catheter in the rest two cases.
In the first three cases, the assembly sheath-dilator-needle was easily advanced towards the septum and gave the impression of a PFO. The angioplasty guidewire could not be advanced into the LA and damaged within the septum revealing an accordion shape in fluoroscopy in two of these cases. In the other case, the angioplasty guidewire passed into the pericardial space. Contrast agent revealed the dissection of the septum in all cases, while in 3 cases the contrast agent diffused into a limited vertical area of the pericardial space in the upper septum. After withdrawal of the assembly or the probing catheter, repeated echocardiograms did not reveal any pericardial effusion in any of the patients.
Discussion: Repeat AF ablation, LA dilation and the presence of a right-sided pouch are associated with an increased risk of septum dissection during TP, although the number of reported cases to obtain safe results are limited. During TP or catheter probing for the second transseptal approach, the assembly sheath-dilator or the catheter may get trapped into a right-sided pouch. Gentle advancement of the assembly might lead to septum dissection and propagate into the pericardial space (figure 1). There is also a risk of hematoma development and rarely pericardial effusion/tamponade. Diagnosis of the above complications can be established by echocardiography, cardiac computed tomography or magnetic resonance imaging. TP under echocardiographic guidance limits the risk of this complication.

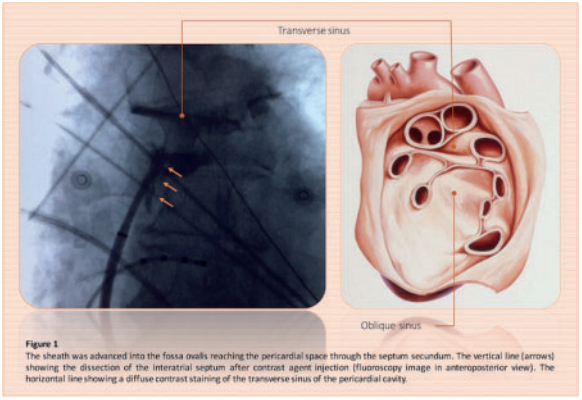

Figure 1
The sheath was advanced into the fossa ovalis reaching the pericardial space through the septum secundum. The vertical line (arrows) showing the dissection of the interatrial septum after contrast agent injection (fluoroscopy image in anteroposterior view). The horizontal line showing a diffuse contrast staining of the transverse sinus of the pericardial cavity.

Abstract P907 Figure.

P908

Initial experience of pulmonary vein isolation for atrial fibrillation with the new generation laser balloon: Excalibur

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Background: Laser balloon is an effective technology for pulmonary vein (PV) isolation (PVI) for drug-refractory atrial fibrillation (AF). Recently, the new generation laser balloon, "Excalibur", has become available in clinical practice. Excalibur is more compliant and is expected to improve PV obstruction. Also, the arc mark on the lesion generator was newly added to help energy titration behind the blind spot in the endoscopic view. However, the procedural data of Excalibur remains unclear.
Purpose: The objective of this study was to evaluate the procedural data of PVI using Excalibur in patients with AF.
Methods: In October 2017, consecutive 9 patients (36 PVs) with AF underwent PVI using Excalibur (male: 3 patients; age: 70±12 years old; paroxysmal AF: 4 patients; left atrial diameter: 42±4 mm). All the operators were experienced in the previous laser balloon ablation. PVI was the endopoint of all the procedures. We evaluated all 36 PVs of 9 patients regarding the procedural parameters. Laser energy was targeted for high dose protocol (8.5-12W). Excalibur was expanded largely as long as proper PV occlusion was kept and the atrial antral side was targetted for energy titration rather than PV ostium as far as possible. If the gap ablaion was not possible with the balloon catheter, we performed an irrigated radiofrequency catheter touch-up ablation.
Results: All 36 PVs (100%) were successfully isolated with optimal balloon occlusion. 29 of 36 PVs (81%) were isolated after first round with Excalbur ablation. In 4 PVs (11%) (3 patients), irrigated radiofrequency current catheter touch-up were needed because of difficult PV occlusion in 1 PV (3%) (1 patient) and pinholl balloon rupture in 3 PVs (8%) (two patients). In 25 PVs (69%), high dose protocol was applicable and 12 PVs (33%) were successfully ablated with no repositioning of balloon catheter during first round. In 6 of 9 patients (67%), esophageal temperature probe rised over 39°C. The mean procedure time, the mean ablation time (time from first energy titration to last energy titration end), mean fluoro scopic time and mean dose area product were 112±46 minutes, 92±42 minutes, 12±6 minutes, and 1239±782 μGym2, respectively. There were no significant complications related to the procedure.
Conclusion: The new generation balloon was also effective for PVI. The enhanced balloon compliance and the newly added arc mark may have led to high rate of high dose protocol achievement and less repositioning number. On the other hand, the risk of pinhole balloon rupture and esophageal temperature rise rate might be high because of relatively large balloon expansion. Further investigation is necessary.

SUBCUTANEOUS ICD

P909

Eligibility of CRT Patients for Subcutaneous Implantable Cardioverter Defibrillators

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Background: Before subcutaneous implantable cardioverter defibrillator (S-ICD) implantation, the adequacy of sensing is required to be verified through a surface electrocardiogram (ECG) screening based on a dedicated ECG morphology tool. Previous studies have shown that 4–10% of patients are not eligible for the S-ICD in the general population of S-ICD candidates.
Purpose: We sought to determine whether S-ICD can be considered as supplementary therapy in patients who are receiving biventricular (BIV) pacing.
Methods: We evaluated patients with BIV devices to determine S-ICD candidacy during intrinsic conduction (left bundle branch block – LBBB), BIV pacing, right ventricular (RV) pacing, left ventricular (LV) pacing using the automated screening tool. ECG leads were placed in the left parasternal configuration. Eligibility was defined by the presence of at least one appropriate vector in the supine and in standing position.
Results: 48 patients were evaluated. At least 1 suitable vector in both postures was identified in 34 patients (71%) during BIV. In patients screened-out, QRS duration was longer (p=0.035) and ischemic cardiomyopathy was more frequent (p= 0.018). LV only pacing was associated with a lower passing rate (46%) (p<0.001 versus BIV). The LBBB QRS morphology during inhibited ventricular pacing was acceptable in 51% of patients. The QRS generated by RV pacing was acceptable in 25% of patients. Among the patients who passed the screening during BIV, the QRS was not acceptable in 76% during RV pacing (i.e. accidental loss of LV capture). The concomitant adequacy during inhibited ventricular pacing (i.e. possible intrinsic conduction: rapidly conducted atrial fibrillation, inappropriate programming of AV delay, etc.) was not verified in 40% of patients.
Conclusions: S-ICD implantation may be a supplemental therapy in the majority of CRT patients. Among them, the standard BIV pacing should be preferred to the LV only pacing mode, as it is more frequently associated with adequacy of S-ICD sensing. Spontaneous LBBB and RV paced QRS morphologies are frequently inadequate. Therefore in patients selected for concomitant S-ICD and CRT implantation, accidental loss of LV capture or possible intrinsic conduction must be prevented.

P910

Insight into screening results and post-implantation exercise testing in recipients of a subcutaneous Implantable cardioverter defibrillator

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Background: The Subcutaneous Implantable Cardioverter Defibrillator (S-ICD) is gaining popularity as a viable alternative to transvenous ICDs, mainly in selected populations. One significant issue is the high rate of inappropriate shocks (IAS) reported in the literature, mainly due to T wave oversensing. To address this problem, the manufacturer recommends pre-implantation screening as well as post-implantation exercise testing with template acquisition at peak effort. Results of these measures are not well documented in the literature.
Purpose: We sought to analyze results of pre-implantation screening as well as post-implantation exercise testing, and to uncover any association with risk of IAS.
Methods: We analyzed screening data and post-implantation exercise testing results in a monocentric cohort of adult pts implanted with the S-ICD.
Results: The cohort consisted of 75 patients. Screening data was available for 42 pts and was tested with electrodes both on the left and right sternal border. The number of pts with 0, 1, 2 and 3 acceptable vectors using left sternal border were 2, 0, 24 and 16 respectively (4.8%, 0%, 57.1% and 38.1%). Using the right sternal border, we found the number of patients to be 0, 6, 22 and 14 respectively (0%, 14.3%, 52.4% and 33.3%). Overall, >95% had at least 2 acceptable vectors on the left sternal border and >85% on the right sternal border. The primary vector was the most likely to be acceptable in 95.2% of pts using the left sternal border and 97.6% using the right sternal border, The secondary vector was next with 83.3% and 90.5% respectively and supplementary vector was least likely to be acceptable with 47.6 and 35.7% of patients. There was no statistical association between type or number of vectors acceptable during screening and presence of IAS or AS. S-ICD detection vector programmed after implantation was with the primary vector in 53 patients (71%), secondary in 21 (28%) and supplementary in 1 pt (1%). Exercise testing was performed in 47 patients. Overall, 4 patients (8.5%) required a change of vector following exercise testing, 2 for TWOS and 2 for myopotential oversensing. The vector requiring change was the secondary vector in 3 patients (2 from secondary to primary vector, 1 from secondary to alternate and 1 from primary to secondary). There was no association between the need for change of vector and rates of IAS.
Conclusion: Over 85% of patients implanted with an S-ICD had at least 2 acceptable vectors on screening either using the right or left sternal borders. Most patients were programmed using the primary vector after implantation. A significant number of patients (8.5%) had their vector modified after exercise testing, underlying the potential utility of this procedure.

P911

Universal S-ICD eligibility: eliminating the need for pre-implant screening using mathematical vector rotation and a gradient filter

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Introduction: S-ICD eligibility is determined by ECG morphology across three sensing vectors; primary (P), secondary (S) and alternate (A). Small R:T ratios and low amplitude signals confer an unacceptable risk of oversensing and are unsuitable. The vector score is a composite measure of signal amplitude and R:T ratio calculated using an S-ICD simulator. Eligibility requires a single vector to score > 100. Around 5% of ICD patients have no suitable vector, this rises to 13-16% in some patient groups (ACHD, hypertrophic cardiomyopathy). Mathematical vector rotation is a novel technique which can generate vectors, at any given angle of observation, using signal recorded in the current S-ICD position. Vector rotation alters the relative amplitudes of both R and T such that for