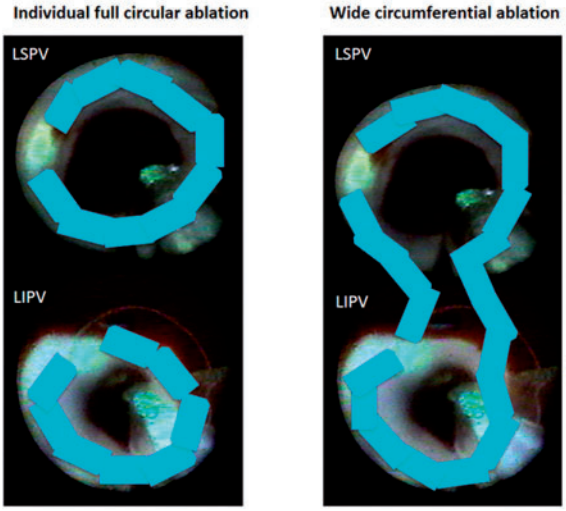
Abstract P346 Table.

	Wide circumferencial ablation	Circular ablation	
Energy for bilateral isolation(J)	12546.43±1249.65	16644.07±2461.8	p <0.001
Energy for lateral side (J)	6882±1342.8	9391.7±3180.3	p =0.003
Energy for septal side (J)	6185.2±1482	8833.06±1426.3	p <0.001
Additional lesions forisolation	2	12	p =0.02
Total duration (min)	28.3±5.2	41.5±12.1	p <0.001
Duration of the lateral side(min)	15.5±4.8	22±9.4	p =0.007
Duration of the septal side(min)	13.5±3.6	24.3±9.5	p <0.001



Abstract P346 Figure.

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The effect of catheter ablation on visualized sympathetic innervation activity patterns by iodine-123 meta-iodobenzylguanidine in patients with atrial fibrillation

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Background: A novel cardiac gamma camera utilises the radiopharmaceutical Iodine-123 Meta-iodobenzylguanidine (123I –mIBG) to visualise cardiac sympathetic innervation. Physiologic uptake of 123I –mIBG provides anatomical quantification of autonomic nervous system (ANS) structures, with discrete uptake areas (DUA) located in the left atrium (LA) corresponding to main ganglionated plexi (GP) clusters that have previously not been able to be visualised.
Purpose: The purpose of this study is to visualise cardiac sympathetic innervation patterns in AF patients and to assess the influence of radiofrequency (RF) ablation on DUA sites in the LA during 6 month follow up.
Methods: Forty five AF patients (30 non-paroxysmal; 20 female, mean age 55±10) underwent cardiac computed tomography (CT) and 123I –mIBG nuclear imaging after isotope injection. Nuclear datasets were merged with the pre-acquired CT to generate a detailed anatomical map of cardiac sympathetic activity. The processed maps were imported to a 3D electroanatomical mapping system. High frequency stimulation (HFS) was performed using current recommended output settings at DUA sites indicating GP location and followed by targeted RF ablation. Additionally, HFS was performed in the expected anatomical GP areas. Circumferential pulmonary vein isolation with exit and entrance block confirmation was performed in all patients after DUA ablation. Follow up nuclear imaging was acquired after 5 – 7 days post ablation and rhythm status at 6 month of follow up.
Results: A total of 143 DUA in the LA were identified in 45 patients, 3.2 ± 1.3 per patient.
The mean DUA activity was 1329±290 cnt/s/ml. Positive HFS response at DUA sites was achieved in 24 (53.3%) patients. There was no response to HFS in additional sites of the LA outside DUA locations before ablation. 5.2±0.8 RF applications per each DUA were performed in all patients. After ablation there was no HFS response at DUA sites. On follow up images 7 DUA sites in the LA were identified (0.2± 0.4 per patient; p< 0.001 vs baseline).
The mean DUA activity decreased to 872.2±272 cnt/s/ml (p<0.001). In 37 patients (82%) DUA were not visualised compared to baseline images. 37 (82.2%) out of 45 patients had no AF/AT/AFL recurrences during 6 month follow up.
Conclusion: The cardiac sympathetic innervation patterns of the LA can be visualised by physiological localised uptake of 123I –mIBG. RF catheter ablation can precisely and effectively target the identified sympathetic innervation structures in AF patients.

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Mini electrodes and arrhythmogenic substrate - Influence of tip-to-tissue angulation and irrigation on signal quality

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Background: Use of mini electrodes with a small surface and narrow electrode-to-electrode spacing is thought to gain higher electrical resolution when mapping and ablating myocardial arrhythmogenic substrate. Thereby arrhythmia mechanisms and ablation success may be determined more effectively compared to conventional electrode design. Until now it is unknown which impact tip-to-tissue angulation and irrigation do have on signal quality.
Methods: A beating heart of an open-chest pig was examined mainly epicardially controlling angulation and contact of catheter-tip to myocardial tissue as well as irrigation of the catheter tip. The mini electrodes were mounted on a commercially available 8 mm non-irrigated and 4 mm irrigated tip catheter. Different electrode interconnections, angulations, contact forces and irrigation flow were analyzed and compared to signals recorded from conventional electrodes on the same catheter.
Results: 63 electrode samples of 21 defined, stable settings each lasting 30 seconds were analyzed. (1) Tissue contact of mini electrodes was given as soon as conventional tip electrode showed tissue contact. It was not possible to have conventional tip electrode contact at the beating heart and no tissue contact of mini electrodes. (2) The angulation of the tip-to-tissue contact (90°, 45°, tangentially) did not significantly influence signal quality of mini electrodes. (3) Irrigation flow in different rates surrounding the mini electrodes did not influence amplitude, integral, curtosis or duration of signals derived from mini electrodes whereas conventional electrodes showed less sharp signals and signals with a longer duration under higher irrigation (Signal duration 2ml flow 33±25 msec vs 10 ml flow 77±271 msec; p=.03; Signal curtosis 2ml flow 22±3 msec vs 10 ml flow 17±8 msec; p=.04) (4) Mini electrodes have the ability to detect local conduction delay that cannot be detected by conventional electrodes at the same local area.
Conclusion: Mini electrodes are robust to angulation, contact force and irrigation flow regarding signal quality whereas signals of conventional electrodes are affected by irrigation flow leading to substantial changes in signal duration and curtosis. Detection of local conduction delay characterized by longer signal duration was more stable detected by mini electrodes compared to conventional electrodes.

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Catheter ablation of AF recurrences after PVI: only Re-PVI or further substrate modification? A retrospective long term follow up analysis

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Background: Catheter ablation with the goal of pulmonary vein isolation (PVI) is an accepted rhythm control strategy for symptomatic atrial fibrillation (AF). However there are patients that require a second catheter ablation procedure during follow up. The ideal catheter ablation strategy in these patients is ill defined.
Purpose: To compare baseline characteristics, procedural data and follow up in patients treated with a simple Re-PVI strategy versus patients treated with a more extensive Re-PVI associated with further substrate modification (re-PVI+).
Methods: Consecutive patients undergoing a second catheter ablation procedure because of AT/AF recurrence were collected and analysed. Only patients with at least one PV reconnected were selected. Two groups were defined: the REPVI group included patients where solely PV re-isolation was performed; the REPVI+ group included patients where operators additionally performed a linear substrate modification or ablation of complex atrial electrograms.
Results: Data from 175 repeat procedures were analysed: 114/175 (65,1%) patients were male, 65,4±10,2 years old, 94/175 (53,7%) with history of paroxysmal AF (PAF). 98/175 patients were treated with a simple pulmonary vein reisolation (Group REPVI), 77/175 received a further substrate modification (Group REPVI+). In the REPVI group patients presented often PAF (70,4% vs 32,5%, p<0,001); patients in the REPVI+ group were older (67,5±9,4 vs 63,7±10,5 y.o., p=0,015), presented bigger atria (117±35 vs 102±37 ml; p=0,016), lower ejection fraction (58,1±10,1 vs 63,0±6,3; p<0,001) and had more frequently heart failure symptoms (25/77 (32,5%) vs 14/98 (14,3%); p=0,004). REPVI+ procedures were significantly longer (123,4±41,7 vs 92,8±32,5 min; p<0,001) and associated to a numerical higher number of cardiac tamponade (3,8% vs 1%, p=0,314). During a median follow up of 1546 (Q1:Q3 913:1802) days an AF recurrence survival analysis revealed no difference among the two groups: at one, two and three years of follow up the AF free survival rate was 76% vs 75%, 65% vs 53%, 56% vs 43% in the REPVI vs REPVI+ group, respectively (logrank p=0,1167).
Conclusion: Patients treated with a pulmonary vein reisolation and further substrate modification show a higher cardiac risk profile. A further substrate modification during a repeat procedure brings to identical one-year success; however, long term follow up shows a trend toward a worser outcome compared to patients treated with a simple rePVI.