

POSTER PRESENTATION

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Serial assessment of left atrial deformation in patients undergoing pulmonary vein isolation: a cardiovascular magnetic resonance feasibility study

Leonard Bergau^{1*}, Tobias Tichelbaecker¹, Johannes T Kowallick², Lars Lühthje¹, Thomas H Fischer¹, Christina Unterberg-Buchwald^{1,2}, Joachim Lotz², Markus Zabel¹, Gerd Hasenfuss¹, Wieland Staab², Andreas Schuster¹

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Background

Left atrial (LA) performance quantification using Cardiovascular Magnetic Resonance (CMR) is of growing interest. There is evidence that declined left atrial function is associated with a poorer outcome following pulmonary vein isolation (PVI) in atrial fibrillation (AF). Furthermore, the influence of PVI on left atrial performance has not yet been investigated comprehensively. This study was designed to investigate the feasibility of CMR using comprehensive myocardial feature tracking (CMR-FT) and volumetric analyses for serial investigation of atrial performance before and after PVI.

Methods

Eight consecutive patients (age 59 ± 11 years, 50 % male, 38 % persistent AF) undergoing PVI was included. All patients received manually guided PVI using open-irrigated radiofrequency ablation catheters. All patients underwent CMR (either 1.5 or 3T) ahead of PVI and 3 months afterwards. LA longitudinal strain and strain rate (SR) parameters as well as fractionated LA-volume changes were derived from long-axis 2- and 4-chamber cine images using dedicated software (2D CPA MR, TomTec, Germany and QMass Version 7.6, Medis Medical Systems, The Netherlands). LA performance was assessed calculating LA reservoir function (total strain [ϵ_s], peak positive SR [SRs]), LA conduit function

(passive strain [ϵ_e], peak early negative SR [SR_e]) and LA booster pump function (active strain [ϵ_a], late peak negative SR [SR_a]).

Results

CMR was obtained in stable sinus rhythm in all studies. CMR-FT atrial performance analysis was feasible in all patients. There was no statistical significant difference in atrial phasic performance based on volumes, strain and strain rate before and after PVI (see Figure 1). However, deterioration of left atrial performance appeared to be more likely in patients with repeated ablations, whereas atrial performance following a single PVI remained stable.

Conclusions

Serial assessments of atrial phasic performance using CMR is feasible before and after PVI. Future studies will need to relate changes in these novel quantitative parameters to atrial fibrosis and outcome to define their incremental clinical merit.

Authors' details

¹Cardiology and Pneumology, University Medical Center Goettingen, Goettingen, Germany. ²Institute for Diagnostic and Interventional Radiology, University Medical Center Goettingen, Goettingen, Germany.

¹Cardiology and Pneumology, University Medical Center Goettingen, Goettingen, Germany

Full list of author information is available at the end of the article

	Volumetric Index (%)	Pre-PVI	Post-PVI	p-value
Reservoir	EF total	44.11±14.68	44.49±15.52	0.89
Conduit	EF passive	22.38±9.80	25.86±9.97	0.17
Booster pump	EF Booster	28.91±12.18	26.44±13.97	0.40
Strain (%)				
Reservoir	ϵ_s	19.7±5.5	16.7±5.8	0.21
Conduit	ϵ_e	10.7±2.9	9.9±3.9	0.25
Booster pump	ϵ_a	9.0±3.8	6.9±3.2	0.34
Strain Rate (s^{-1})				
Reservoir	SR_s	0.8±0.2	0.7±0.2	0.31
Conduit	SR_e	-0.5±0.1	-0.5±0.1	0.40
Booster pump	SR_a	-0.6±0.2	-0.6±0.2	0.94

Figure 1

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