

Supplementary material

*Lizewska-Springer A, Dąbrowska-Kugacka A, Lewicka E, et al. Biatrial strain as a new predictive marker of successful pulmonary vein ablation in patients with atrial fibrillation and preserved left ventricular function. Kardiol Pol. 2019; 129: 471-474.
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Radiofrequency Catheter Ablation

All patients underwent the first-time RFCA session. The procedure was performed under local anesthesia with conscious sedation. A diagnostic catheter was introduced via the left femoral vein into the coronary sinus and the region of His bundle. A double transseptal puncture was performed via the right femoral vein and an ablation catheter (ThermoCool, SmartTouch, Biosense-Webster, CA, USA) and a multipolar catheter (Lasso, Biosense-Webster, CA, USA) were positioned in the LA. A 3-dimensional electroanatomical map was constructed using the CARTO-3 system (Biosense-Webster, CA, USA). An extensive encircling pulmonary vein isolation (PVI) using a maximum power of 20-30 Watts was performed. The activated clotting time was controlled during the procedure and was maintained above 300 s. Bi-directional electrical PVI was considered the endpoint of RFCA. The outcome was confirmed by complete disappearance of pulmonary veins potentials recorded from the circular catheter and absence of veno-atrial conduction during intra-pulmonary vein pacing. In 1 patient (2%) with documented atrial flutter episodes a cavo-tricuspid isthmus block line was additionally created.

Echocardiographic study

Each patient underwent a transthoracic echocardiographic examination before the RFCA using a Vivid E9 ultrasound system (General Electric Medical Health). Echocardiographic

measurements were obtained according to the recommendations [9]. All images were recorded and transferred to a workstation for off-line analysis (EchoPac 201, GE). LA emptying fraction (LAEF) was calculated according to the formula: $[(\text{maximum} - \text{minimum LA volume}) / \text{maximum LA volume}] \times 100$. Both the LA and RA volumes were indexed to body surface area (LAVI and RAVI). Strain measurements from the LA, RA and right ventricle (RV) were performed according to the consensus document standardizing deformation imaging [10]. To assess longitudinal deformation of the LA and RA, the LA strain and RA strain were calculated on apical 4-chamber view (during ventricular systole) with the reference point set at the onset on the QRS complex of the surface ECG. Additionally, the endocardial border of LA and RA free wall was traced to obtain Biatrial strain (excluding the inter-atrial septum) (Figure S1C-D). The RV strain was calculated from 6 segments of both, the RV free wall and inter-ventricular septum. Finally, the LV global longitudinal strain (LV-GLS) was obtained according to the recommendations for cardiac quantification [9].

9. Lang RM, Badano LP, Mor-Avi V, et al. Recommendations for cardiac chamber quantification by echocardiography in adults: an update from the American Society of Echocardiography and the European Association of Cardiovascular Imaging. *Eur Heart J Cardiovasc Imaging*. 2015; 16(3): 233-271, doi: 10.1016/j.echo.2014.10.003

10. Badano LP, Kolas TJ, Muraru D, et al. Standardization of left atrial, right ventricular, and right atrial deformation imaging using two-dimensional speckle tracking echocardiography: a consensus document of the EACVI/ASE/Industry Task Force to standardize deformation

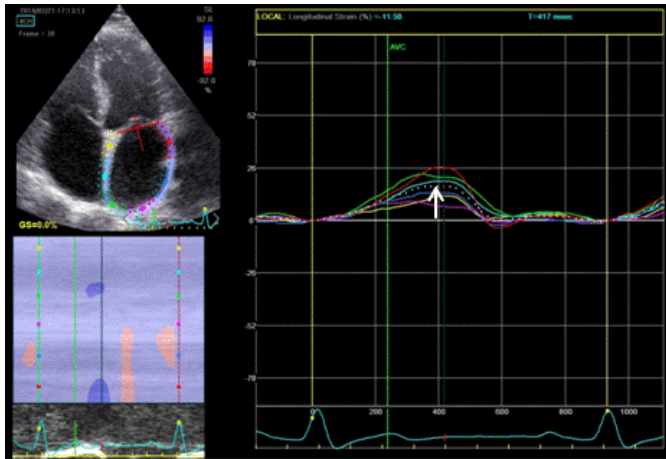
imaging. Eur Heart J Cardiovasc Imaging. 2018; 19(6): 591-600,

doi.org/10.1093/ehjci/jey042.

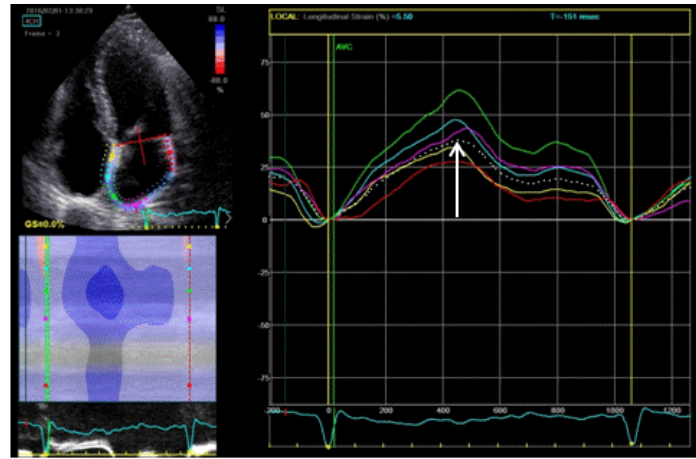
Supplementary Table S1. Predictors of atrial fibrillation recurrence after the radiofrequency catheter ablation

	Univariate		Multivariate	
	Odds ratio (95% CI)	<i>P</i> value	Odds ratio (95% CI)	<i>P</i> value
LVEF	1.10 (0.98-1.24)	0.100	1.07 (0.93-1.22)	0.339
LA min. volume	0.93 (0.87-0.99)	0.020		
LA max. volume	0.96 (0.92-1.00)	0.039	0.96 (0.91-1.01)	0.118
LAVI	0.94(0.89-1.003)	0.062		
LAEF	1.09 (1.01-1.17)	0.023		
LA strain	1.21 (1.04-1.41)	0.013		
Biatrial strain	1.25 (1.07-1.45)	0.004	1.21 (1.05-1.41)	0.011

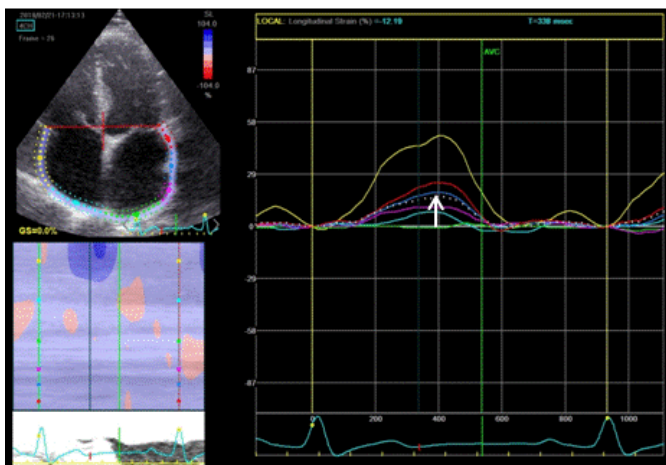
Abbreviations: LA, left atrial; LAVI, LA volume index; LVEF, left ventricular ejection fraction



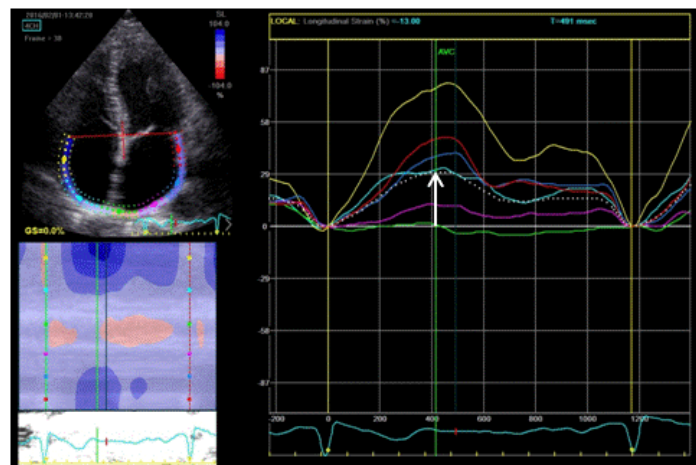
A. LA strain (17%) in a patient with high risk for AF recurrence



B. LA strain (37%) in patient with low risk for AF recurrence



C. Biatrial strain (17%) in a patient with high risk for AF recurrence



D. Biatrial strain (30%) in a patient with low risk for AF recurrence

Supplementary Figure S1