Echocardiography markers of myocardial deformation as independent predictors of sinus rhythm maintenance after catheter ablation for paroxysmal atrial fibrillation

Katbeh A.; De Potter T.; Geelen P.; Iliodromitis K.; Balogh Z.; Albano M.; Barbato E.; Van Camp G.; Penicka M.

Olv Hospital Aalst, Aalst, Belgium

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Background: Speckle Tracking Echocardiography (STE) provides a comprehensive and quantitative assessment of myocardial function. However, the accuracy of STE-derived indices to predict maintenance of sinus rhythm (SR) following radio-frequency catheter ablation (CA) is still under debate. Therefore, the aim of the present study is to define the accuracy of STE-derived parameters to predict long-term maintenance of SR in patients with paroxysmal AF undergoing CA.

Methods: We prospectively enrolled 218 consecutive patients (age: 62 ± 10 years, 30% females) with paroxysmal AF undergoing first-CA. All patients with preserved ejection fraction (EF ≥ 50%) underwent comprehensive transthoracic echocardiography at baseline, including assessment of left ventricular (LV) global longitudinal strain (GLS), left atrial (LA) reservoir strain (LASr), LA conduit strain (LAScd) and LA contractile strain (LASct) using two-dimensional STE in apical views.

Results: At 12 months follow up, a total of 39 (18%) patients had a documented recurrence of AF. Among imaging parameters, LASr > 23% showed the largest area under the curve (0.80) to predict long-term maintenance of SR with sensitivity of 79% and specificity of 72%. Other parameters of LA function, LA diameter, maximum or minimum LA volume index, LV GLS or ejection fraction, and indices of LV diastolic function had lower area under the curve (Figure 1). Using multi-variable logistic regression, LASr (OR 1.19, 95% CI 1.10-1.23, p < 0.001) and LASct (OR 1.21, 95% CI 1.07-1.37, p = 0.002) were independently associated with long-term SR while maximum or minimum LA volume index was not.

Conclusion: In patients with paroxysmal AF undergoing radio-frequency CA, preserved LA reservoir and contractile strain is independently associated with long-term maintenance of SR, whereas LA diameter or volumes were not. LA strain may therefore be useful in management of patients with paroxysmal AF.

Figure 1: Receiver-operating characteristic curves of left atrial reservoir strain (LASr), LA conduit strain (LAScd), LA contractile strain (LASct), LA emptying fraction (LAEF), LA expansion index (LAEI), LA end-systolic (LAES) and end-diastolic (LAED) volume index (VI) to predict long-term maintenance of sinus rhythm.

Abstract Figure.