

Predictors of Left Atrial Fibrosis in Patients with Atrial Fibrillation Referred for Catheter Ablation

Valentina A. Rossi^{*a}, Iva Krizanovic-Grgic^{*a}, Jan Steffel^a, Daniel Hofer^a, Thomas Wolber^a, Corinna B. Brunckhorst^a, Frank Ruschitzka^a, Firat Duru^{a,b}, Alexander Breitenstein^a and Ardan M. Saguner^a

^a Department of Cardiology, University Heart Center, University Hospital Zurich, Switzerland

^b Center for Integrative Human Physiology, University of Zurich, Switzerland

*Valentina Rossi and Iva Krizanovic-Grgic contributed equally to this work

Introduction: Left atrial (LA) fibrosis in patients with atrial fibrillation (AF) is associated with an increased risk of AF recurrence after catheter ablation. Therefore, we searched for clinical risk factors that confer an increased risk of LA fibrosis, which can influence the treatment strategy.

Methods: We included 94 patients undergoing three-dimensional electroanatomical voltage mapping-guided catheter ablation of AF. LA low-voltage areas during sinus rhythm as a surrogate parameter of fibrosis were measured with the CARTO3-mapping system and adjusted for LA volumes obtained by computed tomography. Blood tests including NT-proBNP and echocardiographic parameters of left ventricular function were analyzed as well.

Results: Patients were 62.5±11.4 years old and 29% were female. LA fibrosis was present in 65%, with 50% having a fibrotic area of >5% (≥Utah-Stage1). Mean left ventricular ejection fraction (LVEF) was 53.9%±10.5. Patients with LA fibrosis had higher serum NT-proBNP levels (869±1056vs.552±859ng/l, p=0.001) and larger LA volumes (BSA-corrected 63.3±19.3vs.80±27.1ml/m², p=0.003). In univariable analyses, LA fibrosis was significantly associated with female gender, older age, increased LA volumes, hypertension, statin therapy, higher NT-proBNP values, and echocardiographic E/e'. In bivariable analyses, higher NT-proBNP, echocardiographic parameters of diastolic dysfunction, female gender, older age and higher DR-FLASH scores remained as independent predictors of LA fibrosis.

Conclusions: In this single-center longitudinal study, surrogate parameters of elevated left-sided cardiac filling pressures such as higher serum NT-proBNP levels and higher echocardiographic E/e' values as well as female gender independently predicted the prevalence of LA fibrosis in patients referred for catheter ablation of AF.