Usefulness of left atrial strain for predicting incident atrial fibrillation and ischemic stroke in the general population

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Background
Left atrial (LA) enlargement is an established independent predictor of incident atrial fibrillation (AF). However, the prognostic value of left atrial peak reservoir strain (LA RS) in predicting incident AF in participants from the general population is currently unknown. It is our hypothesis that decreased LA RS can reveal early atrial dysfunction.

Purpose
The aim of this study was to investigate if LA RS can be used to predict AF and ischemic stroke in the general population.

Methods
A total of 405 participants (mean age 56±16 years, 41% male) from the general population underwent a health examination including two-dimensional speckle tracking echocardiography of the LA. LA RS was calculated as the average from the three apical views. The primary endpoint was incident AF at follow-up. All participants with known AF and prior stroke at baseline were excluded (n=54). The secondary endpoint consisted of the composite of AF and ischemic stroke.

Results
During a median follow-up of 16 years (interquartile range, 13.6-16.2 years), 36 participants (9%) were diagnosed with incident AF and 30 (7%) experienced an ischemic stroke, resulting in 66 (16%) experiencing the composite outcome. The risk of AF increased incrementally with decreasing tertile of LA RS, being approximately 10-fold higher in the 1st tertile as compared to the 3rd tertile (HR 9.82; 95% CI (2.95-32.63), p<0.001; figure).

LA RS was a univariable predictor of AF with 41% increased risk per 5% decrease in LA RS (per 5% decrease: HR 1.41; 95% CI (1.18-1.67), p<0.001). However, the prognostic value of LA RS was modified by age (p=0.002 for interaction). After adjusting for clinical and echocardiographic parameters the LA RS predicted AF in participants aged <65 years (per 5% decrease: HR 1.86; 95% CI (1.20-2.90), p=0.006). In contrast, LA RS did not predict AF in participants aged >65 years (per 5% decrease: HR 0.95; 95% CI (0.73-1.23), p=0.69).

LA RS was also a univariable predictor of the composite outcome of AF and ischemic stroke (per 5% decrease: HR 1.29; 95% CI (1.14-1.46), p<0.001). After multivariable adjustment the LA RS predicted AF and ischemic stroke in participants aged <65 years (per 5% decrease: HR 1.33; 95% CI (1.03-1.72), p=0.030).

Furthermore, LA RS provided incremental prognostic information over the left atrial volume index (LAVI) with regard to predicting AF (Harrell’s C-statistics 0.69 vs. 0.75, p=0.044) and the composite of AF and ischemic stroke (Harrell’s C-statistics 0.59 vs. 0.66, p=0.027) in participants from the general population.
Conclusion
In a low risk general population, the LA RS provides novel prognostic information on the long-term risk of AF and ischemic stroke, especially in participants aged <65 years. In addition, LA RS provides incremental prognostic information over the LAVI in predicting AF and ischemic stroke in the general population.