# The prognostic value of left ventricular mechanical dyssynchrony in predicting incident atrial fibrillation and ischemic stroke in the general population

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**Background:** Left ventricular mechanical dyssynchrony (LVMD) is a predictor of many cardiovascular outcomes including ventricular arrhythmias. However, the prognostic value of LVMD in predicting incident atrial fibrillation (AF) in participants from the general population is currently unknown.
**Purpose:** The aim of this study was to investigate if LVMD can be used to predict AF and ischemic stroke in the general population.
**Methods:** A total of 1282 participants (mean age 57±16 years, 42% male) from the general population underwent a health examination including two-dimensional speckle tracking echocardiography. LVMD was calculated as the standard deviation of the regional time-to-peak strain 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=84). The secondary endpoint consisted of the composite of AF and ischemic stroke.
**Results:** During a median follow-up of 16 years, 148 participants (12%) were diagnosed with incident AF and 88 (7%) experienced an ischemic stroke, resulting in 236 (19%) experiencing the composite outcome. The risk of AF increased incrementally with increasing tertile of LVMD, being approximately 2-fold higher in the 3rd tertile as compared to the 1st tertile (HR 1.79; 95% CI (1.22–2.63), p=0.003; figure).
LVMD was a univariable predictor of AF with 7% increased risk per 10ms increase in LVMD (per 10ms: HR 1.07; 95% CI (1.03–1.12), p<0.001).

The association remained significant even after multivariable adjustment for age, sex, body mass index, hypertension, diabetes, previous ischemic heart disease, systolic blood pressure, diastolic blood pressure, heart rate, smoking, plasma proBNP, left ventricular ejection fraction <50%, global longitudinal strain, left atrial volume index (LAVI) and E/e' (per 10ms increase: HR 1.06; 95% CI (1.01–1.12), p=0.018).
LVMD was also a univariable predictor of the composite outcome of AF and ischemic stroke (per 10ms increase: HR 1.07; 95% CI (1.04–1.11), p<0.001). After multivariable adjustment for the same clinical and echocardiographic parameters, LVMD remained an independent predictor of the composite outcome (per 10ms: HR 1.07; 95% CI (1.03–1.11), p=0.001).
Additionally, LVMD provided incremental prognostic information with regard to predicting AF as assessed by a significant increase in the net reclassification improvement (NRI) index beyond the CHARGE-AF score (continuous NRI, 0.300; 95% CI, 0.022–0.503). Furthermore, LVMD provided additional incremental prognostic information, when added to both the CHARGE-AF score and the LAVI (continuous NRI, 0.269; 95% CI, 0.004–0.499).
**Conclusion:** In a low risk general population, LVMD provides novel prognostic information on the long-term risk of AF and ischemic stroke. In addition, LVMD provides incremental prognostic information beyond the CHARGE-AF score and LAVI in predicting AF in the general population.

LVMD and risk of AF