Left atrial strain and long-term risk of atrial fibrillation in hypertrophic cardiomyopathy

J. Kim1, H.J. Lee2, H.K. Kim2, S.C. Lee1
1Samsung Medical Center, Seoul, Korea (Republic of)
2Seoul National University, Division of Cardiology, Seoul, Korea (Republic of)

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Background: The prevalence of atrial fibrillation (AF) in hypertrophic cardiomyopathy (HCM) patients is higher than in the general population, and it is associated with an increased risk of adverse outcomes, such as stroke, heart failure, and mortality. The left atrium (LA) plays an important role in maintaining normal cardiac function, and alterations in its structure and function can contribute to the development of AF. LA strain, a surrogate of LA remodeling, has been suggested a predictor of future AF.

Purpose: The aim of this study was to explore risk factors of new onset AF highlighting LA strain in patients with HCM.

Methods: Among a prospective cohort of 865 HCM patients collected at two large tertiary centers, 696 with adequate echocardiographic images to measure LA strain without a history of AF were included in the analysis. LA strain was measured on apical four-chamber view at initial evaluation using vendor-independent speckle-tracking software. The primary endpoint was new onset AF during 10 years after initial evaluation.

Results: The median age was 55.0 years and 74.3% were male. A median value of LA reservoir strain (LARS) was 26.2 % [interquartile range 20.4, 33.3]. Among the 696 patients, 66 had new onset AF 10 years, with a 10-year incidence of 15.8%. The unadjusted risk factors for new onset AF were previous stroke, non-apical HCM, family history of HCM, non-sustained ventricular tachycardia, obstructive HCM, extensive late gadolinium enhancement, larger LA diameter, larger LA volume, and lower LARS. LARS remained an independent predictor of new onset AF in multivariable analysis. The best cut-off value of LARS was 17.9% (hazard ratio 4.00, 95% confidence interval 2.44–6.55, p<0.001). Compared with LARS ≥17.9%, LARS <17.9% was significantly associated with a higher incidence of new onset AF, irrespective of presence of clinical risk factors (Figure 1) and LA enlargement (Figure 2).

Conclusions: In patients with HCM, low LA strain is an independent predictor of new onset AF.
Figure 2. Incidence of new onset AF according to LA strain in patients with and without LA enlargement.

(A) LAVI <34 mL/m2
- LA strain <17.9%
- LA strain ≥17.9%

(B) LAVI ≥34 mL/m2
- LA strain <17.9%
- LA strain ≥17.9%

(C) LAD <45 mm
- LA strain <17.9%
- LA strain ≥17.9%

(D) LAD ≥45 mm
- LA strain <17.9%
- LA strain ≥17.9%