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Would Left Atrial Strain Provide a Role as a New Prognostigator for Atrial Fibrillation?

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REFER TO THE PAGE 20-27

Atrial fibrillation (AF) is the most common arrhythmia in clinical practice, which increases in prevalence with advancing age. Importantly, AF is associated with increased stroke as well as heart failure and mortality. Accordingly, medical costs related to this arrhythmia have been increasing in modern society.

Cardiovascular imaging plays a central role in assessing the etiology, pathophysiology and risk stratification in the patients with AF and provides therapeutic guide in certain circumstances.[1)2)] Undoubtedly, echocardiography is the most widely used tool in evaluating these patients. Evaluation of left atrial (LA) size and function is now feasible in clinical practice. Many studies have utilized volumetric or functional assessment of LA for correlation with or prediction of cardiovascular events such as AF or heart failure.[3)] However, there is currently no accepted gold standard parameter for evaluation of LA function in contrast to left ventricular function. Conventional parameters such as assessment of phasic atrial activities using LA volumes, transmitral Doppler peak late diastolic velocity and its time velocity integral, LA ejection force and LA appendage function can be used in assessing LA function. More recently, development of new echocardiographic techniques has enhanced the ability to assess myocardial properties in detail.[4)] Tissue Doppler imaging and strain imaging have been incorporated in evaluating LA global and segmental function, which might provide a better insight into LA function with higher sensitivity. Deformation measurement by speckle tracking can offer advantages over the Doppler-derived measurement given its angle independency and avoidance of tethering by the left ventricle.

In this issue of the Journal, Kim et al.[5)] nicely demonstrated that global LA longitudinal strain by speckle tracking echocardiography can predict AF occurrence in 228 patients with acute ischemic stroke independently of LA size. They suggested global LA longitudinal strain < 14.5% for post-stroke AF development with sensitivity of 60% and specificity of 95%. While the exact pathogenesis of AF still remains unclear, both hemodynamic and non-hemodynamic factors would contribute to AF development. Previous studies have shown that LA strain is a predictor of adverse events over CHA_2DS_2-VASc score and it can be an important determinant for restoration and maintenance of sinus rhythm by catheter ablation or cardioversion in AF patients.[6-8)] Impaired LA strain can indicate reduced LA compliance or reservoir function and may indirectly reflect high fibrosis content.[9)] Early detection of LA dysfunction might provide the opportunities to modify the risk and improve clinical outcome. However, the suggested value of LA strain by Kim et al.[5)] had somewhat low sensitivity to use in clinical practice. Also, global LA strain in this study was lower than other previous data as the authors mentioned in the discussion and it could not extrapolate to general population for AF development.[10-12)]

Although there have been considerable advances in understanding LA function using non-invasive imaging, pitfalls as well as advantages of each method should be considered in clinical applications. Speckle tracking echocardiography also has a challenge to be applied to the LA which is located in a far-field and has a very thin wall with the appendage and pulmonary veins. Further studies would be warranted to increase our understanding of the pathophysiologic changes regarding LA function and detect its subclinical condition.

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