

Editorial



Atrial Strain as a Predictive Tool for Poor Exercise Capacity in Patients With Indeterminate Diastolic Function: The Utility and Challenges in Clinical Practice

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The diagnosis of left ventricular (LV) diastolic dysfunction (DD) according to the 2016 recommendations by the American Society of Echocardiography/European Association of Cardiovascular Imaging diastolic function working group¹⁾ remains a clinical challenge. This includes low diagnostic sensitivity and a significant proportion of patients being classified as indeterminate, approximately 20%. Indeed, one study demonstrated that the incidence of DD was 1.4% in 2016 guidelines, compared to 38.1% in the 2009 guidelines, with a higher rate of indeterminate diastolic function (15.2%).²⁾ Another study showed that 50% of subjects classified as DD grade 1 in the 2009 guidelines were reclassified as having normal diastolic function, and 31% of them were reclassified as having indeterminate diastolic function, ultimately leading to 23% of total enrolled subjects being classified as having indeterminate diastolic function.³⁾ Moreover, a parameter used for assessing DD, left atrial volume index (LAVI), can be enlarged in individuals with high stroke volume, such as athletes or those with atrial fibrillation, regardless of an increase in LV filling pressures. LAVI may also not effectively reflect acute changes in LV filling pressures, as it tends to increase or decrease compensatory and slowly in response to gradual changes in LV filling pressure.

Left atrial (LA) strain, including LA reservoir strain (LARS), has emerged as a promising tool for evaluating LVDD. Several studies have demonstrated that the LARS exhibits a robust correlation with LV filling pressure, as assessed by cardiac catheterization,⁴⁾ and is either comparable to or superior to the correlation observed between the E/e' ratio and LV filling pressures.⁵⁾ Furthermore, lower LARS has been independently associated with poor exercise capacity and cardiovascular adverse outcomes in patients with heart failure.^{6,7)} The study by Choi et al.⁸⁾ showed that low LARS was associated with poor exercise capacity, defined as a peak oxygen consumption <14 mL/kg/min during cardiopulmonary exercise tests, in subjects with indeterminate diastolic function. This finding suggests that LARS may offer additional insights to identify individuals with poor cardiovascular outcomes among those with indeterminate diastolic function.

While the clinical implications of incorporating LARS into routine assessment are promising, several challenges need to be addressed before its widespread implementation

Data Sharing Statement

The data required to reproduce these findings cannot be shared as this is an editorial.

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in real-world settings.⁹⁾ The accuracy of LA strain measurements heavily depends on image quality, which can be significantly affected by patient characteristics, respiratory conditions, and the expertise of the operator. The anatomical position of the LA poses specific challenges in obtaining high-quality images, such as the risk of foreshortening. Furthermore, variations in vendor-specific algorithms and software packages can produce differing results, making cross-platform standardization difficult. Therefore, similar to LV strain, the current clinical utility of LARS may be more appropriate as an auxiliary tool for early assessment of treatment efficacy and cardiovascular disease progression in specific patients, rather than as a diagnostic measure based on absolute values. To expand the utility of LARS as a diagnostic tool, research is needed to establish standardized measurement protocols and comprehensive normative reference values that account for age, gender, and ethnicity. Large-scale prospective studies are also warranted to validate the prognostic value of LARS in various clinical settings and patient populations. Despite current limitations, the findings from Choi et al.⁸⁾ suggest that LARS measurement could provide valuable prognostic information for patients with indeterminate diastolic function, potentially guiding treatment decisions and risk stratification for this challenging patient population. This work represents an important step forward in improving the assessment and management of patients with indeterminate diastolic function, where traditional parameters often fall short.

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