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Letter to Editor

Moving beyond ejection fraction: Exploring comprehensive approaches to assess cardiac function in cardiology

Mehrnoush Toufan-Tabrizi*, Leila Ghahremani-Nasab, Mehran Rahimi

Cardiovascular Research Center, Tabriz University of Medical Sciences, Tabriz, Iran

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Dear Editor,

Over time, numerous efforts have been invested in overcoming the limitations of ejection fraction (EF), as a common method for assessing heart systolic function in echocardiography labs.[1] EF, developed based on geometric models, has been extensively used, but it has its own constraints. Two widely employed methods for measuring left ventricular ejection fraction (LVEF), Teichholz and Quinones, rely on geometric assumptions: prolate ellipsoid ventricle with one-dimensional measurements, and prolate ellipsoid with symmetric thickening myocardium during systole and constant ventricle length in two-dimensional measurement, respectively.[2,3] The limitations inherent to LVEF encompass reduced accuracy in advanced stages of cardiovascular disease (CVD), lack of reliability in patients with LV hypertrophy (LVH) and reduced volume, as well as difficulties arising from inter- and intra-observer variability due to the factors like apical foreshortening and challenging endocardial border detection. [4]

While Simpson's rule has offered some guidance in evaluating systolic function and ventricular volume, it still possesses its own geometric limitations. More recently, speckle tracking echocardiography using 2D strain imaging has proven helpful but inconsistent in practice. [5] Parameters like global longitudinal strain (GLS) and global circumferential strain (GCS) have shown reduced values in heart failure with preserved EF (HFpEF), indicating worse outcomes, but the strain hasn't correlated well with traditional metrics like E/A or E/e'.[6] Measuring mitral annulus plane systolic excursion (MAPSE) and GLS goes beyond the limitations of LVEF and offers crucial insights into the myocardial contractile condition in hypertensive patients who do not have heart failure.[7]

Challenges persist with intervendor and operator variability, particularly for the cardiologists working in the imaging field.[8] Moreover, the myocardium is non-uniform, and strain measurements may be confounded by the changes in myocardial volume. This raises important questions for consideration: Is there a need for a more accurate method than EF to assess ventricular volumes and systolic function? Should evaluations incorporate myocardial volume changes? Could choosing a method that considers both blood pressure and volume, such as the cardiac power index, provide superior insights? Ultimately, it prompts us to contemplate whether it's time to move beyond EF and explore more comprehensive and refined approaches for assessing cardiac function. This calls for the continued research and innovation in the field of cardiology to enhance our understanding of heart function and provide more accurate diagnostic and prognostic tools.

Authors' Contribution

Conceptualization: Mehrnoush Toufan-Tabrizi.
Investigation: Leila Ghahremani-Nasab, Mehran Rahimi.
Writing–original draft: Leila Ghahremani-Nasab, Mehran Rahimi.
Writing–review & editing: Mehrnoush Toufan Tabrizi.

Competing Interests

None.

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***Corresponding Author:** Mehrnoush Toufan-Tabrizi, Email: mtoufan@gmail.com

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