Cardiovascular magnetic resonance-based evaluation of myocardial rotational mechanics

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WE READ WITH GREAT INTEREST the article by Nucifora et al. (3), published in a recent issue of the American Journal of Physiology-Heart and Circulatory Physiology, which demonstrates different behaviors of left ventricular (LV) rotational mechanics in patients with hypertrophic cardiomyopathy and cardiac amyloidosis and their relations with the presence of fibrosis as determined by cardiovascular magnetic resonance (CMR) feature tracking and late gadolinium enhancement imaging. The use of CMR feature tracking represents a promising method for easy and fast quantification of myocardial deformation from routine cine images, and Nucifora et al. now use this technique to quantify LV rotational dynamics.

Specifically, they studied the LV systolic twisting and diastolic untwisting motion, which result from apical counterclockwise and basal clockwise rotation during systole (when viewed from the apex). It is important to note that different definitions to capture LV rotational mechanics exist. Alternatives to simple twist involve torsion (twist normalized to cardiac longitudinal size) and circumferential-longitudinal shear angle (twist normalized to cardiac longitudinal and radial size). Importantly, there are inherent limitations associated with simple myocardial twist/untwist quantification that suffer from the lack of standardization. Usually, simple twist is applied when using two-dimensional speckle-tracking echocardiography because the interslices distance between basal and apical slices cannot be reliably quantified with echocardiography (7). Consequently, results are difficult to compare between patients with different anatomy and are associated with considerable variability potentially limiting their value in longitudinal studies (1, 4). Conversely, such limitations do not exist with CMR, as the geometry of the acquired slices (including slice gaps) is precisely defined allowing the calculation of torsion and shear angle that are supposed to correct for variable anatomy (6). In fact, torsion can be easily quantified with CMR-FT (2). Taking the various anatomy of the patients studied by Nucifora et al. into consideration, LV rotational mechanics should have rather been captured by torsion or the circumferential-longitudinal shear angle definition that potentially account for this variability (5).

REFERENCES