EDITORIAL

Beyond Ejection Fraction and Fibrosis in Hypertrophic Cardiomyopathy. Global Strain by Nuclear Magnetic Resonance

Más allá de la fracción de eyección y la fibrosis en la miocardiopatía hipertrófica. Strain global por resonancia magnética cardíaca

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Hypertrophic cardiomyopathy (HCM) is considered the most prevalent inherited disease in the population, with an incidence of 0.2%, similarly affecting men and women. (1) It is a dominant autosomic disease with incomplete penetration and heterogeneous expression, (2) defined as left ventricular hypertrophy unexplained by abnormal overload conditions. Hypertrophic cardiomyopathy has been described in more than 50 countries worldwide with an annual mortality ranging between 0.5% to 1%. (3)

Initially referred as probable tumor of cardiac origin by Dr. Donald Teare in 1958, (4) the disease was intensely studied by Dr. Braunwald in the "National Institutes of Health (Bethesda, Maryland)" during the following decade. The methods initially available for the diagnosis were the clinical history and exam, the electrocardiogram and the hemodynamics laboratory. (5) In the 70s, the incorporation of echocardiography to clinical practice (M mode) initiates the transition to new non-invasive methods to diagnose and undertand the disease. (6) In the following years, the advent of two-dimensional echocardiography allowed better knowledge of the pathophysiology of HCM as well as progress in the treatment (prevention of sudden death) and familial screening. In the 80s, the development of cardiac magnetic resonance (CMR) expands the definition of HCM and the classification of new subtypes of patients. Moreover, myocardial fibrosis assessed by delayed gadolinium enhancement (DGE) is associated with ventricular arrhythmia, diastolic dysfunction, heart failure and sudden death.

Delayed myocardial enhancement after gadolinium contrast injection gains support in the literature as additional parameter for the prognostic evaluation of these patients. Recently, global evaluation of left ventricular (LV) systolic function by percent deformation (strain) quantification has become a new method of study, that attempts to establish diagnostic and prognostic values in different cardiac diseases, as HCM. The current reference method to measure LV strain is high-resolution two-dimensional speckle tracking echocardiography (STE), with global and regional longitudinal, circumferential and radial function evaluation. (7) This technique has excellent temporal resolution, but low spatial resolution, with important limitation in patients with poor acoustic window. (8) The most widely used standard in CMR up to the present has been myocardial tissue tagging or simply tagging -cine gradient echo sequence labeled with saturation lines, which demands longer breath-holds and acquisiton time, in addition to longer analysis with specific and poorly available software. Recently, feature tracking (FT) assessing wall movement from steady-state free precession (SSFP) cine images has been developed to evaluate strain, without the need of performing specific tagging sequence. Another advantage of FT is its high availability and applicability, not requiring specific programs from each vendor. (9) Several studies have already shown its good correlation with tagging. (19, 11)

However, FT still presents great variability, global longitudinal strain (GLS) being the most robust, reproducible and a diagnostic and prognostic tool within LV deformation parameters. Guidelines suggest a LV peak systolic GLS of approximately -20% in healthy subjects, as there is yet great variability in the cut-off point (-17.3% to 21.5%) which could be reduced in male gender, old age and increased heart rate. (8)

Nonetheless, global, radial and circumferential strain analyses are very variable compared with STE, probably because the short-axis parasternal ultrasound window cannot be easily aligned due to the narrow intercostal space, resulting in difficult probe angulation. (7)

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Andre F et al. recently reported the results of FT evaluation according to sex and age. Men presented greater radial strain and lower circumferential and longitudinal strain than women. In addition, LV systolic function radial strain increased significantly with age.

In their article published in this issue of the Revista Argentina de Cardiología, Ludueña Clos et al. evaluated 40 patients with average age of 52 years and male gender predominance, 15% of whom had atrial fibrillation. The evaluation of this parameter in patients with HCM is still incipient in the world literature, and the authors should be congratulated for this important and innovative research. Specifically, the evaluation and comparison of the FT technique, with great potential applicability in the future clinical routine as the gold standard for tagging is an uncommon report in the HCM literature, and is probably completely original for the population of Latin American patients with HCM, with possible specific genotype. and fenotype for our geographical region. Despite the heterogeneous nature of the patients evaluated in this study, this seems not to have affected attaining reduced global radial, longitudinal or circumferential strain values analyzed with recently validated and approved software. (12) The clinical variability of study patients and the agreement with the few published data (8, 13) encourage its use in clinical practice and in new studies. Another importante point of the article that could be better explored in a new clinical trial is the correlation between ventricular arrhythmia and strain.

Conflicts of interest

None declared.
(See authors' conflicts of interest forms in the website/Supplementary material).

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