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EDITORIAL COMMENT

Two-dimensional speckle tracking strain in follow-up of adults with transposition of the great arteries: Should it be used in daily clinical practice?

Strain longitudinal por *speckle tracking* no seguimento dos adultos com transposição das grandes artérias: deve ser usado na prática clínica diária?

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Strain imaging by non-invasive speckle tracking echocardiography (STE) is a reliable technique for angle-independent tracking of myocardial deformation. This technique has become an important quantitative tool for assessment of left (LV) and right ventricular (RV) function and is increasingly applied in clinical practice.[1,2] Global longitudinal strain (GLS) averaged from the apical views is the most robust and reproducible of LV deformation parameters. It has been shown to be a powerful diagnostic and prognostic tool[2,3] and is now recommended for the quantitative assessment of LV and RV function.[2]

Two reviews published in 2017 demonstrated that GLS is particularly valuable for the assessment of chemotherapy-induced cardiotoxicity, undifferentiated left ventricular hypertrophy and ischemic heart disease, and has also been shown to have superior prognostic value in valvular heart disease and various cardiomyopathies.[1,4]

Analysis of RV longitudinal strain derived from the RV free wall is currently recommended for the assessment of RV function in patients with suspected RV dysfunction due to conditions such as pulmonary arterial hypertension, pulmonary thromboembolism, arrhythmogenic RV cardiomyopathy, and congenital heart disease (CHD).[3]

Dextro-transposition of the great arteries (d-TGA) is one of the most common types of cyanotic CHD.[5] The arterial switch operation is currently the procedure of choice.[6] Before its introduction, d-TGA was repaired with an atrial switch operation using the Mustard or Senning technique. Most of these patients are now adults and pose a challenge to clinicians, since systemic RV dysfunction often complicates their clinical course.[7] Echocardiography is the first-line diagnostic technique and provides information on systemic ventricular size and function. However, the complex geometry of the right ventricle makes this assessment difficult and mainly qualitative. For assessment of subpulmonary and systemic RV volumes and function, cardiovascular magnetic resonance (CMR) is considered the gold standard.[8] However, routine CMR assessment of the right ventricle may not be feasible for a significant number of patients. In addition, its availability may be limited outside tertiary referral centers and in middle- and low-income countries.[9]

Experience with two-dimensional (2D) STE to assess systemic RV function in patients with TGA is limited,[10–12] and no solid evidence is available on the use of this technique for follow-up of these patients. In this issue of the *Journal*,

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Timóteo et al.[13] report their experience using longitudinal 2D-STE to assess ventricular function in adults with TGA. In this retrospective analysis of echocardiograms performed in 26 adult patients (15 with TGA and atrial switch, six with TGA and arterial switch, and five with congenitally corrected TGA [ccTGA]) plus a control group of 14 healthy individuals, the authors show that systemic RV strain was significantly worse in atrial switch patients than pulmonary RV strain in arterial switch patients. In the overall population, systemic RV parameters were significantly less negative than pulmonary RV parameters, and these were also less negative than in controls. Left ventricular parameters were similar across groups, except for pulmonary LV strain, which was worse than in controls as well as in patients with a pulmonary right ventricle. Overall, these results are in agreement with previous studies using 2D-STE, which showed that in patients with d-TGA treated by atrial switch and in those with ccTGA, global peak systolic strain in the systemic right ventricle was significantly reduced compared with the systemic left ventricle or normal right ventricle in control individuals.[10,11,14,15] Another important observation by Timóteo et al.[13] is the high reproducibility of the technique, which has also been reported by other authors, confirming 2D-STE as a robust tool for the assessment of ventricular function.

Several studies have demonstrated the prognostic value of systemic RV function assessment derived from 2D-STE.[14,16] In addition, GLS-derived measurements also correlate well with CMR-assessed systemic RV ejection fraction (RVEF) in patients with d-TGA[9] and also in those with ccTGA.[17] Furthermore, a negative association of GLS with levels of N-terminal pro-brain natriuretic peptide has also been observed.[15] Finally, a recent study by Ladouceur et al.[18] showed that longitudinal 2D-STE measurements correlated better with exercise intolerance than systemic RVEF assessed by CMR.

Some limitations of 2D-STE should be emphasized. First, speckle tracking analysis can generally only be obtained from high-quality images. It is therefore important to provide data regarding feasibility.[19] Second, there is significant variability between different software and vendors.[20]

In conclusion, there is growing evidence in the last 10 years confirming the value of 2D-STE in the diagnostic and prognostic assessment of patients with TGA. Despite the limitations referred to above, this technique should be part of the routine clinical follow-up of patients with this condition.

Conflicts of interests

The author has no conflicts of interest to declare.

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