CLINICAL IMAGE

Utility of left ventricular longitudinal strain in the diagnosis and treatment monitoring of cardiac sarcoidosis

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A 55-year-old, otherwise healthy woman with a new right bundle branch block and first-degree atrioventricular block on electrocardiography was referred for echocardiography. Routine echocardiography showed normal left ventricular contractility. However, the 2-dimensional speckle-tracking method revealed a markedly decreased regional longitudinal strain in the basal segments (mainly septal, anteroseptal, and inferior; FIGURE 1A). The global longitudinal strain (GLS) was only slightly decreased (–18.2%; normal values of the global and regional longitudinal strain, at least –20%). Because of suspected cardiac sarcoidosis (CS), magnetic resonance imaging (MRI) was performed, but only after urgent implantation of an MRI-conditional pacemaker, as the patient developed acute complete heart block. MRI showed spotty intramural late gadolinium enhancement (LGE) typical of CS, with a distribution uncharacteristic of the coronary artery disease pattern. LGE occurred predominantly in the regions with decreased longitudinal strain (FIGURE 1B). The diagnostic workup was complemented by chest computed tomography and bronchoscopy. Control echocardiography performed after 6-month prednisolone therapy showed an increase in segmental longitudinal strain and improvement in synchronicity of the strain curves; GLS also increased to –22.1% (FIGURE 1C).

Sarcoidosis is a chronic multisystem disorder without defined etiology that is characterized by noncaseating granulomas, which may affect almost any organ.[1] Cardiac manifestations occur in approximately 2% to 7% of patients; however, silent cardiac involvement in patients with pulmonary or systemic sarcoidosis is estimated to be 4- to 5-fold higher. The basal septal and inferior segments of the left ventricle are the most frequent to be involved, while right ventricular location is very rare. CS is associated with high morbidity and mortality rates. Clinical presentation includes conduction abnormalities, ventricular arrhythmias, heart failure, and sudden cardiac death. Early detection of CS, when standard echocardiography has failed to show any impairment of left ventricular contractility, still remains a challenge. MRI and fluorodeoxyglucose positron emission tomography constitute accurate methods of CS imaging,[2,3] but are expensive and not always available; a biopsy can be misleadingly negative due to focal lesions in the myocardium.

Some recent publications have suggested that novel echocardiographic methods based on speckle-tracking techniques can improve CS detection rates, especially in patients with preserved left ventricular function.[3-5] These studies focused on decreased GLS, which can be associated with worse prognosis.[4,5] However, it seems that an individual analysis should essentially include a regional (segmental) assessment, which, in turn, may correspond with local changes presenting on MRI as LGE areas, and on positron emission tomography as areas with abnormal perfusion and metabolism.[3] If these lesions are not advanced, GLS values may be close to normal.

Treatment of patients with CS comprises implantation of a pacemaker or an implantable cardioverter–defibrillator. Moreover, corticosteroids are required and a prompt initiation of such therapy may improve the patient's outcome.[1,4] Considering the simplicity of the regional and global longitudinal strain assessment, it cannot be

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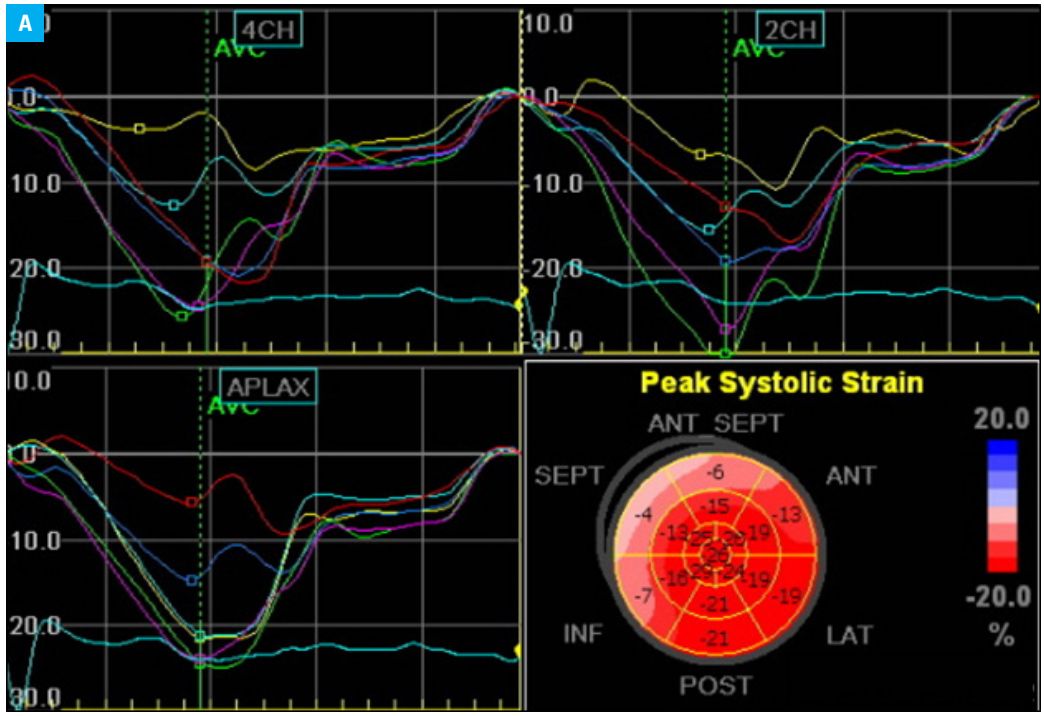


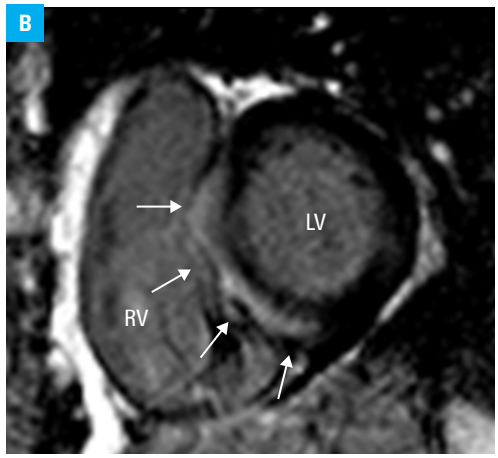
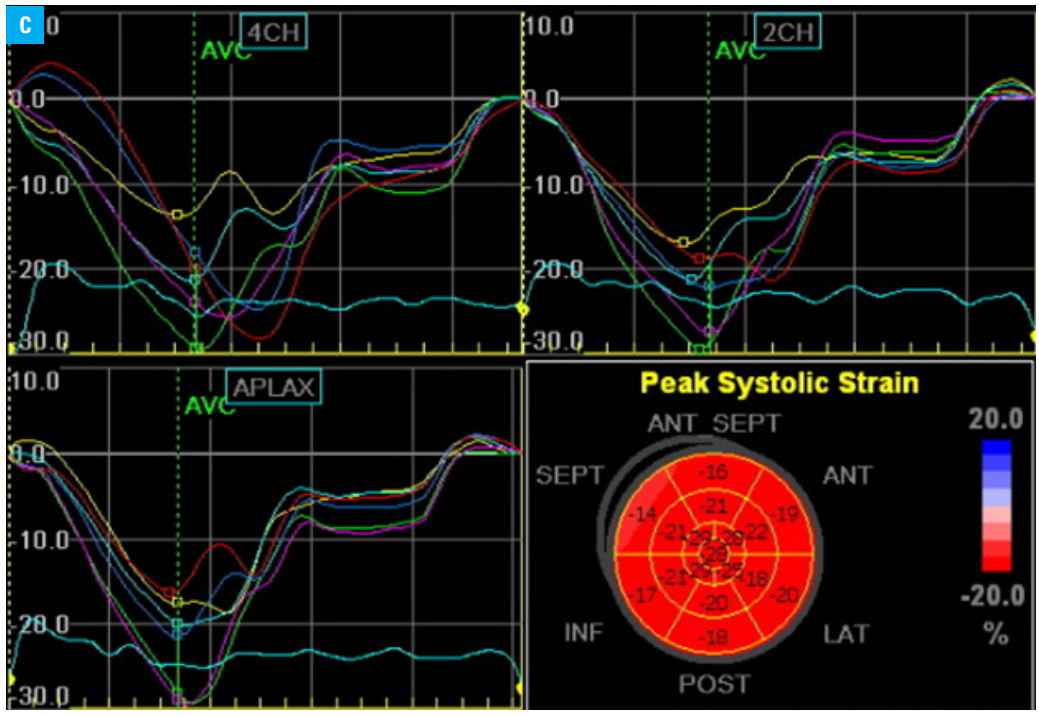


FIGURE 1 **A** – 2-dimensional speckle-tracking echocardiography showing decreased regional longitudinal strain in the basal segments in the curve and bull's eye presentations; **B** – cardiac magnetic resonance imaging showing the areas of late gadolinium enhancement in the basal septal and inferior segments in the transverse short-axis view (arrows); **C** – 2-dimensional speckle--tracking echocardiography showing improved regional and global longitudinal strain after prednisolone therapy
Abbreviations: 2CH, 2-chamber view; 4CH, 4-chamber view; ANT, anterior segment; ANT_SEPT, anteroseptal segment; APLAX, apical long-axis view; AVC, aortic valve closure; INF, inferior segment; LAT, lateral segment; LV, left ventricle; POST, posterior segment; RV, right ventricle; SEPT, septal segment



excluded that such repeated examination can be a useful tool in the monitoring of patients with CS. Nevertheless, further observations are needed because speckle-tracking echocardiography is still not a standard technique in CS today.

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