Letter to the Editor

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RE: Multi-Parameter CMR Approach in Acute Myocarditis to Improve Diagnosis and Prognostic Stratification

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Dear Editor,

We have read the article by Lee and colleagues entitled "Predictive Value of Cardiac Magnetic Resonance (CMR) Imaging-Derived Myocardial Strain for Poor Outcomes in Patients with Acute Myocarditis" with great interest (1). This manuscript has explored the predictive value of CMR radial strain and late gadolinium enhancement (LGE) to predict poor outcomes in patients with suspected acute myocarditis (AM). Previous studies showed that left ventricular deformation is impaired in AM, but few studies have explored its prognostic role in AM (2).

Lee's manuscript adds interesting diagnostic and prognostic elements that require some considerations. One of the major points is that the non-invasive diagnosis of AM is very challenging in clinical practice. Lee et al. (1) have included patients with suspected clinical myocarditis according to 1) typical symptoms, 2) evidence of structural or functional abnormalities (echocardiography or CMR), or elevated troponin, and 3) no evidence of coronary artery disease observed on coronary angiography in patients older than 35 years. Of the 37 patients enrolled, only 23 (62%) had a non-ischemic LGE pattern located on the mid-wall layer and/or epicardial layers suggesting AM (3-5).

In our opinion, this clinical approach is suitable. But CMR diagnosis of AM requires the presence of 2 of the 3 CMR Lake Louise criteria (LLC) (edema, hyperemia, and LGE). Additionally, LLC results in high specificity and positive predictive value (89% and 88% respectively) and in middle-low sensibility (63%) and negative predictive value (65%) for biopsy-proven myocarditis (6). Therefore, LLC CMR is highly specific for the diagnosis of AM. However, radial strain abnormalities are associated with low specificity, since they can be observed in other non-ischemic cardiomyopathies.

The authors have highlighted in limitation section, both the small sample size and the inclusion of clinically validated suspected cases of AM without endomyocardial biopsy are the major limitations of this study. However, we think that the approach to combine multiple parameters is a good way to assess patients with suspected AM. AM is a very heterogeneous diseases in which the prognosis is related to many factors as 1) clinical presentation (heart failure and/or arrhythmic AM presentations have a worse prognosis with respect to infarct-like AM presentation), 2) depressed ejection fraction, 3) presence of LGE, and 4) other additional factors derived from serology and/or histopathology. Additionally, in a recent multicentre study (Italian multicenter study on Acute MYocarditis [ITAMY]) considering 374 patients with AM, Aquaro et al. (7) observed not only the presence of LGE but also that the LGE localization in the mid-wall layer of the anteroseptal myocardial segments is associated with a worse prognosis than other patterns of presentation in patients with AM and preserved systolic function.

Acute myocarditis is a multifaceted disease with a complex diagnosis and prognosis due to a wide range of difference due to the heterogeneity of clinical presentation,

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LGE presence and localization, preserved or reduced ejection fraction, and endomyocardial biopsy findings. Therefore, we believe that a multi-parameter approach derived from CMR as proposed along with further tissue characterization as T1- and T2-mapping could have an incremental value in the non-invasive diagnosis of AM.

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