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Title: Myocardial mechanics for the early detection of cardiac sarcoidosis

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Body: Background: Speckle tracking has emerged as valuable tool for comprehensive assessment of regional myocardial function, providing angle-independent measurements of ventricular strain. Aim of this study was to evaluate left ventricular (LV) function in patients with newly diagnosed sarcoidosis, utilizing the novel method of 2D speckle tracking. Methods: Forty one patients with sarcoidosis and unremarkable medical history of cardiovascular disease, as well as 20 healthy age- and gender-matched controls underwent echocardiographic study. Apical 4-,2-,3- chamber as well as short axis acquisitions were made. In addition to conventional 2D, Doppler and TDI measurements, speckle tracking echocardiography was applied and LV global longitudinal strain was derived from the obtained images. Moreover, LV base and apex rotation angles were assessed from which LV twist was derived. Results: The mean age of patients (17 men) was 41 ± 6.5 years old. Compared with controls, patients had similar conventional 2D and Doppler measurements. TDI revealed increased E/E' in the patient group vs control group (8.72 ± 1.65 vs 4.6 ± 1.32 , $p < 0.05$). Strain analysis demonstrated reduced global longitudinal strain values in the patient vs control group ($18.86 \pm 1.79\%$ vs $21.88 \pm 2.18\%$, $p < 0.05$). Furthermore, LV twist was increased in the patient group as compared to the healthy individuals ($12.5 \pm 2.6^\circ$ vs $10.2 \pm 1.8^\circ$, $p < 0.05$). Conclusions: Speckle tracking echocardiography revealed impaired strain and rotational indices, implying elevated filling pressures of the left ventricle. This may represent a sign of myocardial involvement in patients with sarcoidosis. Therefore deformation imaging could be valuable adjunct for screening.