Echocardiographic findings in pediatric multisystem inflammatory syndrome associated with COVID-19 in the United States

ABSTRACT

BACKGROUND: Centers from Europe and United States have reported an exceedingly high number of children with a severe inflammatory syndrome in the setting of coronavirus disease 2019, which has been termed multisystem inflammatory syndrome in children (MIS-C). OBJECTIVES: This study aimed to analyze echocardiographic manifestations in MIS-C. METHODS: A total of 28 MIS-C, 20 healthy control subjects and 20 classic Kawasaki disease (KD) patients were retrospectively reviewed. The study reviewed echocardiographic parameters in the acute phase of the MIS-C and KD groups, and during the subacute period in the MIS-C group (interval 5.2 3 days). RESULTS: Only 1 case in the MIS-C group (4%) manifested coronary artery dilatation (z score¼3.15) in the acute phase, showing resolution during early follow-up. Left ventricular (LV) systolic and diastolic function measured by deformation parameters were worse in patients with MIS-C compared with KD. Moreover, MIS-C patients with myocardial injury were more affected than those without myocardial injury with respect to all functional parameters. The strongest parameters to predict myocardial injury in MIS-C were global longitudinal strain, global circumferential strain, peak left atrial strain, and peak longitudinal strain of right ventricular free wall (odds ratios: 1.45 [95% confidence interval (CI): 1.08 to 1.95],1.39 [95% CI: 1.04 to 1.88], 0.84 [95% CI: 0.73 to 0.96], and 1.59 [95% CI: 1.09 to 2.34], respectively). The preserved LV ejection fraction (EF) group in MIS-C showed diastolic dysfunction. During the subacute period, LVEF returned to normal (median from 54% to 64%; $p<0.001$) but diastolic dysfunction persisted. CONCLUSIONS: Unlike classic KD, coronary arteries may be spared in early MIS-C; however, myocardial injury is common. Even preserved EF patients showed subtle changes in myocardial deformation, suggesting subclinical myocardial injury. During an abbreviated follow-up, there was good recovery of systolic function but persistence of diastolic dysfunction and no coronary aneurysms. (J Am Coll Cardiol 2020;76:1947–61) © 2020 by the American College of Cardiology Foundation.

Keyword: Coronary artery abnormality; COVID-19; Deformation; Echocardiography; Multisystem inflammatory syndrome in children (MIS-C); myocarditis