Tissue Doppler, Speckle Tracking and Strain Imaging

Subclinical left and right ventricular dysfunction in COVID-19 recovered patients using speckle tracking echocardiography

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Introduction: Myocardial injury during acute COVID-19 infection is well characterised however, its persistence during recovery is unclear.

Purpose: We assessed left ventricle (LV) global longitudinal strain (GLS) and right ventricular (RV) free wall longitudinal strain and RV global longitudinal strain (RV-GLS) using speckle tracking echocardiography (STE) in COVID-19 recovered patients (30-45 days post recovery) and studied its correlation with various parameters.

Methods: Of the 245 subjects screened, a total of 53 subjects recovered from COVID-19 infection and normal LV ejection fraction were enrolled. Routine blood investigations, inflammatory markers (on admission) and comprehensive echocardiography including STE were done for all.

Results: All the 53 subjects were symptomatic during COVID-19 illness and were categorized as mild: 27 (50.9%), moderate: 20 (37.7%) and severe: 6 (11.4%) COVID-19 illness. Reduced LV GLS was reported in 22 (41.5%), reduced RV-GLS in 23 (43.4%) and reduced RVFWS in 22 (41.5%) patients respectively. LVGLS was significantly lower in patients recovered from severe illness (mild: -20.3 ± 1.7%; moderate: -15.3 ± 3.4%; severe: -10.7 ± 5.1%; $P < 0.0001$). Similarly, RVGLS (mild: -21.8 ± 2.8%; moderate: -16.8 ± 4.8%; severe: -9.7 ± 4.6%; $P < 0.0001$) and RVFWS (mild: -23.0 ± 4.1%; moderate: -18.1 ± 5.5%; severe: -9.3 ± 4.4%; $P < 0.0001$) were significantly lower in subjects with severe COVID-19. Subjects with reduced LVGLS as well as RVGLS and RVFWS had significantly higher interleukin-6, C-reactive protein, lactate dehydrogenase and serum ferritin levels during index admission.

Conclusions: Subclinical LV and RV dysfunction was seen in majority of COVID-19 recovered patients. Patients with severe disease during index admission had far lower LV and RVGLS as compared to mild and moderate cases. Our study highlights the need for close follow-up of COVID-19 recovered subjects in order to determine the long-term cardiovascular outcomes.