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Biventricular function in human immunodeficiency virus infection in adolescents and young adults: A three-dimensional speckle tracking echocardiographic study

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Background: The pathogenesis of left ventricular (LV) dysfunction in HIV patients includes cardiac direct effects of HIV, the presence of autoantibodies, myocardial inflammatory response to viruses, other infections related to the immune status of patients and side effects associated with antiretroviral drugs or other drugs used for the management of HIV. The purpose of our study was to evaluate biventricular parameters of wall deformation with three-dimensional speckle tracking echocardiography (3DSTE) in HIV-infected patients on antiretroviral therapy to detect a possible subclinical myocardial dysfunction.

Methods: Seventeen patients aged 12 to 32 years with human immunodeficiency virus infection and 17 normal controls of the same age and sex were studied with 3DSTE. All patients were stable in terms of HIV infection, with no history of heart disease or other chronic systemic disease except HIV infection. Patients were on HAART with good immunological control. Standard echocardiographic measures of LV-RV function were assessed. Tricuspid annular systolic plane excursion (TAPSE) was measured by M-mode of the lateral tricuspid valve annulus. LV global longitudinal, circumferential and radial strains were calculated. Global area strain (GAS) was calculated by 3DSTE as percentage variation in surface area defined by the longitudinal and circumferential strain vectors. Right ventricular (RV) 3D global and free-wall longitudinal strain was obtained. Data analysis was performed offline.

Results: LV global longitudinal strain and GAS were lower in HIV patients compared to normal controls (-15.8% vs -19.3%, p=0.016, and -33.6% vs -38.8%, p=0.003, respectively). There were no significant differences in ejection fractions between the groups. There was a trend toward reduced TAPSE in HIV patients compared to controls (20.1±2.4 mm vs 23.2±2.5 mm, p=0.08). RV free-wall longitudinal strain was significantly reduced in HIV patients when compared with the control group (-19.7% vs -23.9%, p=0.019). No patient had pulmonary systolic pressure higher than 35 mmHg. There was no correlation between echocardiographic parameters and selected biomarkers and inflammatory markers.

Conclusions: Three-dimensional speckle tracking echocardiography may help to identify HIV patients at high cardiovascular risk allowing early detection of biventricular dysfunction in the absence of pulmonary hypertension.

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