

Evaluation of treatment outcomes in patients with acute viral myocarditis by speckle tracking and tissue Doppler methods

Gursu H.A., Cetin I.I., Azak E., Kibar A.E., Ari M.E., Surucu M., Orgun A.

Ankara Children's Hematology Oncology Education and Research Hospital, Ankara, Turkey

Objectives: The aim of this study was to assess the myocardial deformation and function by speckle tracking echocardiography (STE) and tissue Doppler imaging (TDI) in patients with acute viral myocarditis.

Methods: Seven patients (mean age 12 years, 6 male) diagnosed acute viral myocarditis and ten healthy children (mean age 11.9 years, 9 male) were studied prospectively. The STE and TDI were performed in patients before and after IVIG treatment. The left ventricular longitudinal global strain (LVLGS) and strain rate (LVLGSR), left ventricular circumferential global strain (LVCGS) and strain rate (LVCGSR) and right ventricular longitudinal global strain (RVLGS) and strain rate (RVLGSR) were examined by STE. The myocardial velocities (Sm, Em and Am) and time intervals [isovolumic contraction time (ICT), isovolumic relaxation time (IRT) and ejection time (ET)] at interventricular septum (IVS), left ventricular posterior wall (LVPW) and right ventricular lateral wall (RVLW) were examined by TDI.

Results: Sm (5.2 vs. 8.5 cm/s) and Em (11.1 vs. 14.6 cm/s) at IVS, Sm (4.7 vs. 8.2 cm/s) and Em (11.2 vs 15.8 cm/s) at LV, ET (223.4 vs. 261.7 ms) at IVS and ET (220.5 vs. 267.7 ms) at RV were significantly lower in patients before treatment than controls ($p < 0.05$). LVLGS (-18.4 vs. -23.3%), LVLGSR (0.17 vs. 0.83 s⁻¹), LVCGS (-15.6 vs. -27.5%) and LVCGSR (0.3 vs. 1 s⁻¹) were significantly decreased in patients before treatment than controls ($p < 0.05$ for LVLGS and LVLGSR, $p = 0.001$ for LVCGS and LVCGSR). There were significant improvements for LVCGS ($p = 0.001$) and LVCGSR ($p = 0.001$) in patients after treatment. Sm (5.2 vs. 6.2 cm/s) at IVS, LVCGS (-15.6 vs. -21.9%) and LVCGSR (0.3 vs. 0.6 s⁻¹) were significantly lower in patients before treatment than in patients after treatment ($p < 0.05$). In spite of improvements, Sm (6.2 vs. 8.5 cm/s) and ET (226.7 vs. 261.7 ms) at IVS, LVCGS (-21.8 vs. -27.5%) and LVCGSR (0.6 vs. 1 s⁻¹) were significantly lower in patients after treatment than controls ($p < 0.05$).

Conclusions: The STE and TDI were useful methods for the evaluation of treatment outcomes in patients with acute viral myocarditis. The LVCGS and LVCGSR especially adds important information supporting both clinical and laboratory improvements.