The evaluation of myocardial function by tissue Doppler imaging in neonatal sepsis

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Objective: The aim of this study was to determine the cardiac effects of sepsis by tissue Doppler echocardiography in neonates.

Methods: The myocardial velocities and time intervals at interventricular septum (IVS) and left ventricular posterior wall (LVPW) before and after therapy were compared in 20 neonates with sepsis and 20 age and gender matched healthy neonates. The exclusion criteria were elevated cardiac enzymes and systolic dysfunction at conventional echocardiography, accompanying heart, lung or metabolic disease.

Results: The male/female ratio was 1.9 and mean age of patients was 21.7 days. The mean sepsis score used by Pennsylvania Hospital was 3.3 in patients. There were no significant differences for LVDd, EF and FS values of patients and controls before and after therapy. Myocardial velocities; Sm (3.7 vs. 5.5 cm/s) and Em (4.9 vs. 7.9 cm/s) at IVS and Sm (4.3 vs. 5.8 cm/s), Em (6.1 vs. 9.1 cm/s) and Am (5.1 vs. 6.9 cm/s) at LVPW were significantly lower (p<0.0001) in patients before therapy. Time intervals; isovolumic contraction time (ICT) (59.4 vs. 43.7 ms), isovolumic relaxation time (IRT) (52.6 vs. 41.5 ms) and ejection time (ET) (147.6 vs. 182.4 ms) at IVS and ICT (59.4 vs. 43.1 ms), IRT (53.4 vs. 41.7 ms) and ET (143.8 vs. 187.1 ms) at LVPW were significantly longer (p<0.0001) in patients before therapy. However, there were significant improvements (p<0.05) for Sm (4.7 cm/s), Em (6.6 cm/s), ICT (48.6 ms), IRT (46.1 ms) and ET (161.3 ms) at IVS and Sm (4.8 cm/s), Em (7.4 cm/s), Am (5.6 cm/s), ICT (48.2 ms), IRT (48.9 ms) and ET (164.3 ms) at LVPW after therapy in patients. The myocardial performance index (MPI) at IVS (0.77, 0.59 vs. 0.47) and LVPW (0.79, 0.61 vs. 0.45) were significantly higher in patients before (p<0.001) and also after (p<0.01) therapy. However, there were no correlations between sepsis scores and MPI values at both IVS and LVPW.

Conclusions: The results of this study revealed that sepsis causes myocardial depression in neonates even though the left ventricular systolic functions are normal with conventional transthoracic echocardiography. This depression resolves with therapy in a considerable time period.