P-42

Cardiotrophin-1 is differentially induced in the myocardium of infants with congenital cardiac defects depending on hypoxemia

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Objective: To test if cardiotrophin (CT)-1 is differentially induced in the myocardium of infants with congenital cardiac defects depending on hypoxemia.
Background: CT-1 is up regulated by hypoxemia and hemodynamic overload and induces cardiac hypertrophy via the janus kinase / signal transducer and activator of transcription pathway.
Methods: Infants with tetralogy of Fallot (TOF) or with large ventricular septal defect (VSD) undergoing corrective surgery were investigated. Expression of CT-1 was assessed at mRNA- and protein level in the right atrial and -ventricular myocardium. We measured the activation of the signal transducer and activator of transcription (STAT)-3, vascular endothelial growth factor (VEGF)165, phosphorylated extracellular regulated kinase (ERK)-1/2 MAP kinase and heat shock proteins (HSP)-70 and -90. Degradation of cardiac troponin (cTn)-I served as a marker of myocardial damage.
Results: CT-1 was detected in all patients. Infants with TOF showed significantly higher protein levels of CT-1 than those with VSD. In all patients, levels of CT-1 negatively correlated with arterial oxygen saturation. Patients with TOF showed higher levels of phospho-STAT-3 and VEGF165 and higher levels of cTn-I. In contrast, the activation of ERK1/2 MAP kinase and levels of HSPs were not different in both groups.
Conclusions: Our results show that CT-1 is differentially expressed in the myocardium of infants with heart defects. Higher CT-1 expression in patients with TOF is associated with activation of the Jak/STAT pathway and higher cTn-I degradation. CT-1 might mediate myocardial hypertrophy and myocardial dysfunction in infants with congenital cardiac defects, particularly in those with hypoxemia.