

## **Echocardiographic evaluation of pulmonary vascular resistance and reactivity in children with pulmonary hypertension**

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**Introduction and Aim:** Pulmonary vascular resistance and vasoreactivity are the most important prognostic factors in childhood pulmonary hypertension. The present study aims to determine the power and effectivity of transthoracic Doppler echocardiography in diagnosis of pulmonary vascular resistance and vasoreactivity by performing transthoracic echocardiography and cardiac catheterization simultaneously.

**Materials and Methods:** The present study reviews 40 healthy controls and 30 children with pulmonary hypertension as diagnosed by cardiac catheterization. For each subject, transthoracic Doppler echocardiography was done simultaneously during the period cardiac catheterization was performed. When examination by transthoracic echocardiography was carried out at the distal region of the right ventricle outflow tract, Doppler determining indices including acceleration time (AcT), inflection time (InT), deceleration index (DI), deceleration time (DecT), right ventricle ejection time (RVET), AcT/RVET, TRPG/RVOTVTI, Ts/RVOTVTI, PAB/HRRVOT and their values adjusted for heart beat rate were recorded. Vasoreactivity test by O<sub>2</sub> was done in children with pulmonary hypertension so that any alteration in the parameters could be specified.

**Results:** The mean age of the children with pulmonary hypertension was 77.6±93.2 months while the mean age of the healthy control subjects was 77.6±64.8 months. The AcT, AcTc, InT, InTc, DI, DIc, DecT, DecTc, AcT/RVET parameters of the children with pulmonary hypertension were statistically different from those of the healthy control subjects (p<0.001; p<0.001; p<0.001; p<0.001; p=0.02; p=0.01; p<0.001). Children with pulmonary hypertension were grouped into three according to their pulmonary vascular resistance (namely 0-3, 3-10 and >10). It was also found that AcTc, TRPG/RVOTVTI, Ts/RVOTVTI, and PAB/HRRVOT were indicators of an increase in pulmonary vascular resistance (p=0.009; p=0.009; p=0.003; p=0.004). Moreover there was a statistically significant difference in the parameters of AcTc, DIc, DecT, TRPG/RVOTVTI, Ts/RVOTVTI, and PAB/HRRVOT of the patients who responded to the vasoreactivity test (p=0.005; p=0.009; p=0.014; p=0.004; p=0.002; p<0.001).

**Discussion:** Pulmonary vascular resistance and vasoreactivity can be evaluated by the examination of pulmonary artery flow-velocity curves with the help of transthoracic Doppler echocardiography. Transthoracic Doppler echocardiography seems to be an effective test for screening increased pulmonary vascular resistance and vasoreactivity in children with pulmonary hypertension.