

Right ventricular function is impaired one week after corrective surgery of an atrial septal defect

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Introduction: Before surgery the heart of an atrial septal defect (ASD) patient is characterized by an increased volume load of the right ventricle. After closure of an ASD long-term results show a small impairment in right ventricular function. The time course of ventricular adaptation shortly after surgery is as yet unknown. Consequently the possible role of an earlier impairment of ventricular function in the development of long term dysfunction is indistinct. Novel echocardiographic Tissue Doppler Imaging (TDI) enables sensitive quantitative assessment of ventricular function. Using TDI we studied ventricular function before and shortly after surgical ASD closure.

Methods: The study population consisted of 26 children with an ASD (0 -17 years). Complete echocardiographic studies were performed before surgery and at discharge (6±1 days after surgery). Special attention was paid to systolic and diastolic left and right ventricular function, including TDI. Age matched controls (N=41) were used for comparison.

Results: Right ventricular (RV) systolic function was impaired at discharge, as assessed by both Tricuspid Annular Plane Systolic Excursion (patients versus controls 10±2mm versus 19±4mm; $P<0.001$) and systolic TDI measurements of the RV free wall (patients versus controls 5.5±1.9cm/s versus 13.1±2.7cm/s; $P<0.001$). Right ventricular diastolic function was impaired at discharge as well, as assessed in patients versus controls by E' (6.5±2.5cm/s versus 17.7±3.7cm/s), A' (4.6±1.9cm/s versus 10.5±1.9cm/s) and E/E' (12.3±9.2 versus 4.3±1.5; all $P<0.001$) of the RV basal free wall. In contrast, left ventricular (LV) systolic and diastolic function was normal in patients compared to controls at discharge, as assessed by LV basal free wall S' (6.6±1.8cm/s versus 6.5±1.6cm/s), A' (4.7±2.1cm/s versus 5.7±1.7cm/s) and E/E' (9.4±3.6 versus 8.1±2.7; all NS).

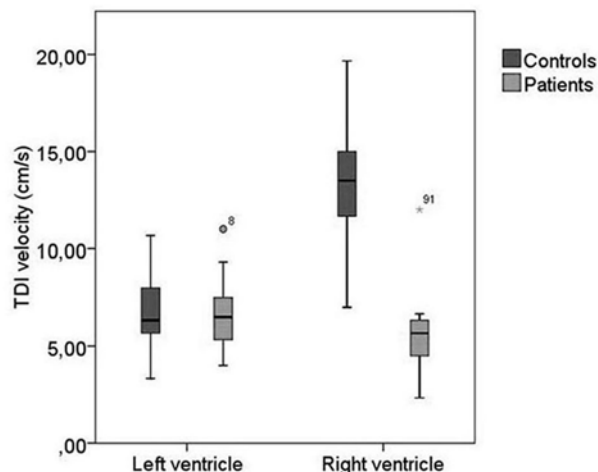


Figure 1. Boxplot presenting the systolic TDI velocity of the LV and RV in patients at discharge versus controls.

Conclusions: In contrast to left ventricular function, which was normal at discharge after surgical ASD closure, right ventricular systolic and diastolic function were impaired at discharge. These findings may be due to the preoperative RV volume load, the effects of surgery or the use of cardiopulmonary bypass. The relation between these short-term changes and long-term outcome has further to be elucidated.