

## The Effect of Left Ventricular Size On Right Ventricular Hemodynamics in Children with Hypoplastic Left Heart Syndrome

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**Introduction:** Hypoplastic left heart syndrome (HLHS) is a congenital heart condition in which the left heart including chambers and valves are underdeveloped. Without surgical treatment (consisting of 3 stages), this condition is fatal, usually within a few weeks. Despite always being small, the relative degree of left ventricular development is variable ranging from a very small (walnut-sized) chamber to a mildly hypoplastic ventricle. Recent studies have shown the right and left ventricle influence the functionality of the opposite ventricle in both normal and pathologic conditions via mechanical coupling. The specific aim of this study was to determine the impact of left ventricular size on right ventricular hemodynamics in HLHS patients throughout the staged surgical reconstruction. **Methods:** This study used four specific time points for echocardiographic evaluation: before the first stage of the surgical reconstruction, between the stages one and two, between stages two and three, and after the third stage of the reconstruction. The left ventricular size indices were apical cross sectional area, short axis cross sectional area, and volume at end systole and end diastole. The Tei index, short axis fractional area change, apical fractional area change and end-diastolic pressure were used as a measure of right ventricular function. Correlation analysis was done on all measured indices to evaluate the effect of left ventricular size on right ventricular function. **Results:** Tei was elevated throughout all surgical stages. However, correlation analysis failed to show a statistically significant relationship between left ventricular size measurements and this increased Tei value. Also, the data did show a change in the right ventricular functional measurements over the course of the 4 time points but these changes were not significant. **Conclusions:** Although an elevated Tei exists during all stages of the reconstruction, the elevated Tei value alone is not sufficient evidence of right ventricular dysfunction. Also, the size of the left ventricle does not appear to impact the Tei value or other indices of right ventricular function. And while ventricular interaction is a well documented concept, the size of the nonfunctional left ventricle is not an influential factor in the interaction of HLHS patients. The data in this study show that left ventricle size appears to be an inconsequential variable in a surgical differential for hypoplastic left heart patients.