

## MP2-11

### Right Ventricular Systolic Function in HLHS: A Comparison of manual and automated software to measure fractional area change

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**Introduction:** Quantitative echocardiographic assessment of right ventricular function is important in children with hypoplastic left heart syndrome (HLHS). Previous work from our group has demonstrated that fractional area change (FAC) measured on echocardiography had the closest correlation with magnetic resonance imaging (MRI) derived ejection fraction (EF) when compared to other echocardiographic measures such as myocardial velocity or longitudinal strain. The aim of this study was to examine repeatability of different echocardiographic techniques, both manual and automated, to measure fractional area change (FAC) in HLHS patients and to compare these measurements to MRI.

**Methods:** Children with HLHS underwent transthoracic echocardiogram and cardiac MRI under the same general anesthetic as part of routine interstage assessment. FAC was measured from apical 4-chamber view using three different techniques: Velocity-vector-imaging (VVI) (Syngo USWP 3.0, Siemens Medical Solutions), 2D automated analyzing program (QLAB R 10.0, Philips) and manual endocardial contour tracing (Xcelera, Philips). Intra and interobserver variability was calculated using intraclass correlation coefficient. MRI EF was calculated in the standard way and compared to echocardiography derived FAC.

**Results:** Forty-nine patients had studies available for analysis. Intraobserver variability was good for all methods (Table). Interobserver variability was good for all parameters except the manually computed FAC where it was poor, particularly with regards to the end systolic area. All techniques used to calculate FAC correlated with MRI derived EF (Table). The highest correlation was found with the automated techniques. **Conclusions:** Automation improves reliability in measuring right ventricular systolic function in HLHS and correlates better with MRI. There are some differences between automated softwares in terms of correlation with MRI derived EF. In clinical practice, a single automated technique appears optimal.

Table. Inter and intraobserver correlation and comparison to MRI EF for FAC from VVI, QLAB and manual tracing.

Technique	Intraclass correlation coefficient Intra observer / Interobserver	Correlation to EF MRI
Automated technique		
VVI	0.997 (0.989-0.999) / 0.976 (0.902-0.994)	0.7 (p<0.0001)
QLAB	0.976 (0.903-0.994) / 0.891 (0.561-0.973)	0.6 (p=0.001)
Manual technique	0.774(0.427-0.922) / -0.205 (-0.498-0.269)	0.4 (p=0.003)