Three-Dimensional Echocardiographic Reconstruction Accurately Measures Pediatric Right Ventricular Volumes: Preliminary Experience in a Single Institution
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BACKGROUND
• Due to geometry, right ventricular (RV) volumes (RVV) by traditional 2D echocardiography are not as precise as those obtained by cardiac magnetic resonance imaging (MRI).
• Three-dimensional RV reconstruction (3DR) using the VentriPoint (Seattle, WA) system is an echocardiographic technique that is used clinically in Canada and Europe.

OBJECTIVES
• To compare the accuracy and reproducibility of right ventricular volumes by 3DR with those obtained by MRI
• Document the “learning curve” by evaluating our initial experience with 3DR

METHODS
• Training took place Spring 2012. After this period, no feedback occurred until after study completion.
• From July 2012 to January 2013, 18 patients (median age 12 years, range 6-20) undergoing clinically indicated MRI were prospectively enrolled and underwent a 3DR echo the same day as MRI.
• Two cardiologists used 3DR to measure end diastolic (EDV), end systolic (ESV) volumes and ejection fractions (EF).
• An experienced observer measured MRI volumes (R.K.O. or M.R.F.)

RESULTS
• 13 patients were included in the analysis. Echocardiographic windows were suboptimal for 4 of the 13 patients but were included to more accurately reflect the learning curve at our institution.
• For interobserver variability, ICC for EDV, ESV and EF were 0.91, 0.89 and 0.32 respectively.
• Average times for volume measurements were less for 3DR than for MRI (12 minutes vs. 20 minutes).
• When compared with MRI there are no statistically significant differences for 3DR-derived EDV, ESV or EF.

Bland-Altman and Regression (3DR vs. MRI RV Volumes)

CONCLUSIONS
• RV volumes by 3DR compare well with those obtained by MRI.
• Even when factoring in our initial and early experiences, 3DR yields RVV that can be clinically useful.

REFERENCES