

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

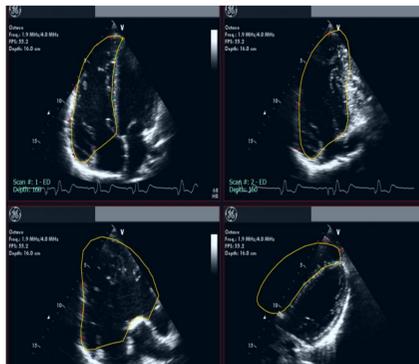
METHODS

- 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.

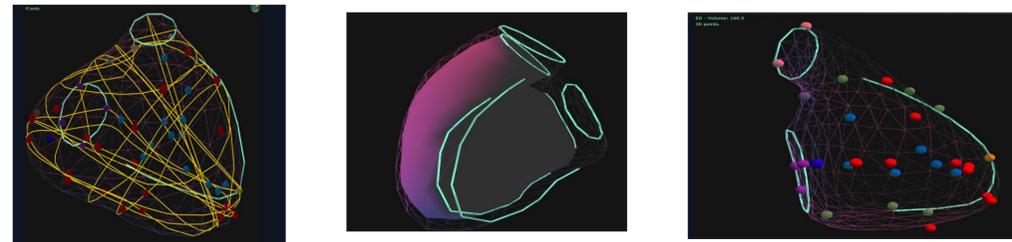
- Two cardiologists used 3DR to measure end diastolic (EDV), end systolic (ESV) volumes and ejection fractions (EF).

- An experienced observer measured MRI volumes (R.K.O. or M.R.F.)

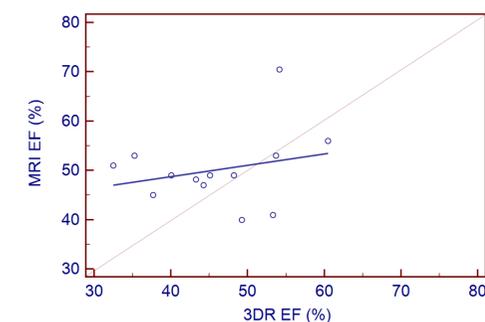
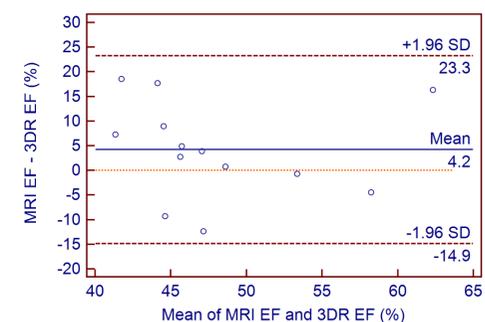
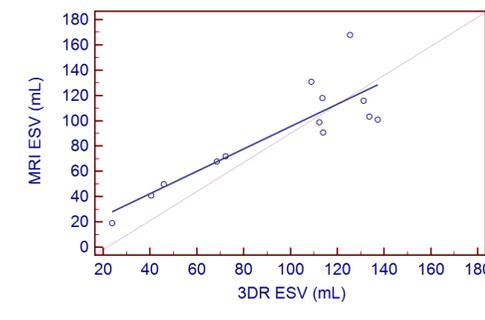
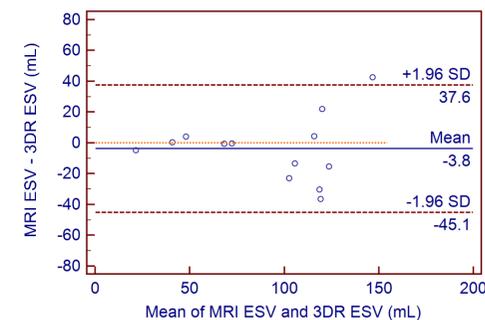
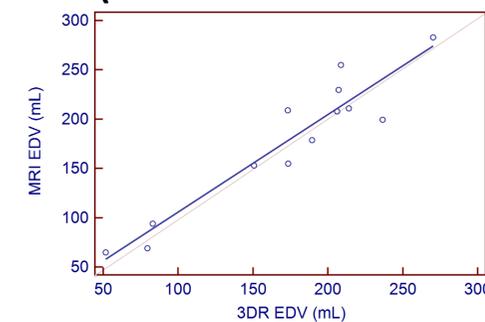
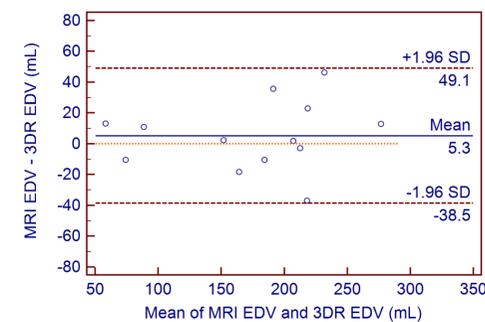


RESULTS

Examples of right ventricular 3DR volumes



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



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.

	RV EDV (mL)	RV ESV (mL)	RV EF (%)
MRI mean	177.7 ± 68.3	90.6 ± 40.3	50.1 ± 7.6
KBR mean	172.5 ± 65.2	94.3 ± 39.1	45.9 ± 8.3
Mean difference MRI-KBR (limits of agreement)	5.3 (-8.2, 18.8)	-3.8 (-16.5, 8.9)	4.2 (-1.7, 10.1)
p-value	NS	NS	NS
Correlation coefficient (r)	0.95	0.86	0.34

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