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REAL-TIME 3-D ECHO GENERATED VOLUME/TIME CURVES: COMPARISON TO MAGNETIC RESONANCE IMAGING AND INTEROBSERVER CORRELATION

ACC Poster Contributions
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Session Title: Echocardiography: 3-D, TEE, and Intracardiac Echo
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Background: Echo assessment of LV function is limited by either providing a global number (EF), small sample volumes (Doppler) or single slices (2-D strain). Real time transthoracic 3-D Echo (RT-3DE) can generate change in global LV volume time curves (VTC).

Methods: 16 patients had cardiac MRI (CMR) and RT-3DE within 12 hours. To derive VTC’s by CMR, LV endocardial contours were traced for each slice throughout the cardiac cycle (Siemens). Apical RT-3DE’s were acquired with the iE33 (Philips). 2 cardiologists measured the LV volumes generated by RT-3DE throughout the cardiac cycle to generate VTC’s (QLab). We divided the VTC’s derived from both CMR and RT-3DE into six segments: 3 each for both systole and diastole and compared the slopes by each method. Additionally, we compared the RT-3DE VTC’s, peak emptying, and peak filling rates generated by the 2 cardiologists.

Results: Pts were from 18 to 72 yrs; LV EF 35 to 75%. There was no significant difference between the systolic and diastolic slopes of the VTC’s by RT-3DE and MRI (Figure). Correlation between the 2 methods for systole and diastole was r = .89, p<.001. Inter-observer correlation for RT-3DE slopes: r=0.8 for systole, 0.98 for diastole; r=0.88 for peak emptying rate, and r=0.93 for peak filling rate, all p<0.0001.

Conclusions: RT-3DE generated volume/time curves correlate well with CMR and have excellent inter-observer reliability. 3-D RT volume/time analysis could provide more robust insight into LV performance than current Echo methods.

![3D Echo vs Cardiac MRI](image-url)

Representative VTC’s generated by CMR and RT-3DE. Separate VTCs were generated for RT-3DE by two independent echocardiographers (Echo 1) and (Echo 2).