IMAGING AND DIAGNOSTIC TESTING

AUTOMATED CONTOUR CORRECTION WITH INSTANTANEOUS REAL-TIME 3D-VOLUME TRANSTHORACIC ECHOCARDIOGRAPHY IMPROVES ACCURACY OF LEFT VENTRICULAR VOLUME MEASUREMENTS IN PATIENTS WITH SYSTOLIC DYSFUNCTION: COMPARISON TO CARDIAC MRI

ACC Poster Contributions
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Background: We applied an automatic endocardial contour correction algorithm based on the difference between the leading trabecular edge and the border of the compacted myocardium during real-time, volume transthoracic echocardiography (VTTE), to test whether this reduced the discrepancy between 3-D Echo and MRI volume estimates.

Methods: 26 patients had both VTTE (Acuson SC2000, Siemens Healthcare, Ultrasound) and cardiac MRI. Automated endocardial leading-edge contouring and a 1mm virtual contour, external to the automatic contour, was applied to measure EDV, ESV and EF (Figure) by VTTE. Manual contour tracing was used in MRI.

Results: In 14 patients with EF>50% the r values between VTTE and MRI for EDV, ESV and EF were 0.95, 0.89, and 0.64 respectively, p < 0.01. The EDV and ESV were underestimated by 8.7 and 1.8ml, while the EF was underestimated by 0.02%. Contour corrections did not change the correlations for volumes or EF. In 12 patients with EF <50%, the respective r values were 0.96, 0.97, 0.97, p<0.01. However, the EDV, ESV, and EF were underestimated by 32.9ml, 24.8ml, and 0.01%. With contour correction the EDV and ESV underestimation was decreased to 14.6 and 9.3ml (within 6% of MRI volumes); EF did not change.

Conclusion: 3D-VTTE, with an automated leading-edge endocardial contouring algorithm yields accurate EDV, ESV and EF, in normal LV function. In LV systolic dysfunction, the use of an automatic virtual contour (compacted myocardium) significantly improves the accuracy of 3-D LV EDV and ESV.

![Automated Leading Edge Contour](image-url)
![Virtual Contour (compacted myocardium)](image-url)

MRI Measurements:
- EDV = 167ml
- ESV = 135ml
- EF = 31%

![Automated Leading Edge Contour](image-url)
![Virtual Contour (compacted myocardium)](image-url)

MRI Measurements:
- EDV = 149ml
- ESV = 121ml
- EF = 33%