

Poster presentation

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3D echo systematically underestimates right ventricular volume compared to cardiac magnetic resonance in a population with adult congenital heart disease

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Introduction

Measurement of RV size & function is an essential part of serial monitoring in many patients with congenital heart disease. CMR has been regarded as the gold standard for this purpose but is not widely available. 3D volumetric echo might be an acceptable alternative.

Purpose

To assess the accuracy of 3D transthoracic echo vs CMR for the measurement of RV size and function in patients with enlarged right ventricles.

Methods

Prospective consecutive enrollment of adult patients expected to have enlarged right ventricles - principally patients with repaired tetralogy and transposition. Patients underwent both CMR and 3D echo within a mean of 12 weeks. Volumetric stacks were contoured by experienced observers for both techniques to determine end diastolic volume and ejection fraction of the RV. Systematic bias was assessed by Bland Altman analysis.

Results

25 patients completed the study. In all patients, the mean right ventricular end diastolic volume was significantly larger when calculated by MRI than by volumetric 3D echo with a mean difference of 84 ml (95% CI 28-139 cc), $p < 0.005$. The end systolic volume was also significantly larger when measured by MRI (mean difference 64 ml

95% CI 18-109 cc, $p < 0.001$). A significant difference also existed for calculated right ventricular ejection fraction where the mean difference between techniques was 6% (95% CI 2.2 -12% $p < 0.05$) with a tendency for echo to systematically over-estimate RV EF Figure 1.

Conclusion

3D echo systematically and significantly underestimates RV EDV compared to CMR. 3D echo may not be an adequate replacement for CMR in patients with known or likely RV enlargement.

EDV (Bland-Altman): MRI - Echo

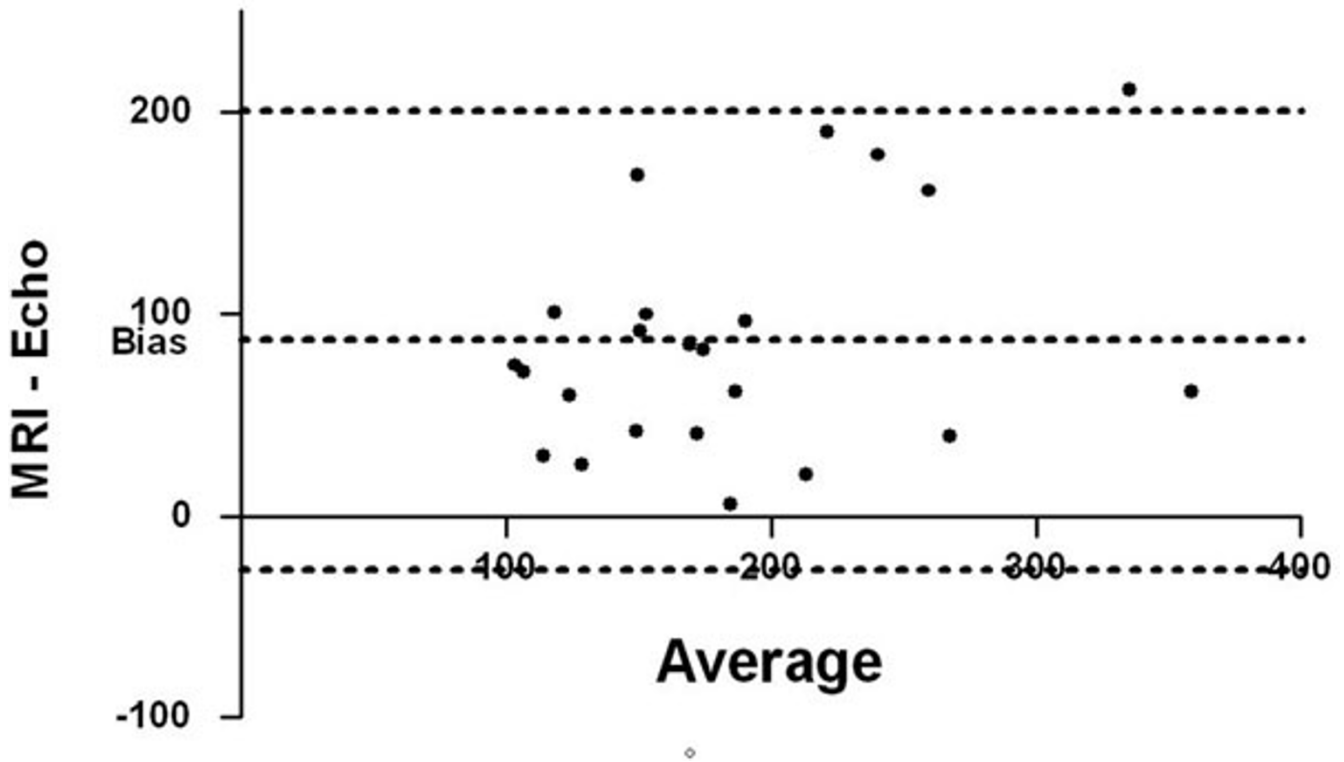


Figure 1

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