

Poster presentation

Comparison of real time 3-dimensional echocardiography with cardiovascular magnetic resonance for left ventricular volumetric assessment - a real world study

Christopher A Miller*, Keith A Pearce, Peter Jordan, Simon G Ray and Matthias Schmitt

Address: University Hospital of South Manchester, Manchester, UK

* Corresponding author

from 13th Annual SCMR Scientific Sessions
Phoenix, AZ, USA. 21-24 January 2010

Published: 21 January 2010

Journal of Cardiovascular Magnetic Resonance 2010, **12**(Suppl 1):P243 doi:10.1186/1532-429X-12-S1-P243This abstract is available from: <http://jcmr-online.com/content/12/S1/P243>

© 2010 Miller et al; licensee BioMed Central Ltd.

Study objective

To assess the accuracy and reproducibility of real time 3-dimensional echocardiography (RT3DE) for left ventricular (LV) volumetric assessment in consecutive, unselected patients.

Introduction

The accuracy and reproducibility of RT3DE for LV volumetric assessment has been demonstrated in a number of clinical trials. We aimed to assess the 'real-world' accuracy and reproducibility of RT3DE in consecutive, unselected patients.

Methods

Sixty patients undergoing clinically indicated cardiac magnetic resonance imaging (CMR) also underwent RT3DE. CMR images were obtained using a 1.5 T scanner (Siemens Avanto, Germany) equipped with a 32-channel surface coil. RT3DE images were obtained using an IE33 scanner (Philips, USA). LV volumes and ejection fraction (EF) were measured by 2 independent observers for both modalities. RT3DE measurements were compared to those obtained by CMR. Inter-observer reproducibility was assessed, and 25% of scans were re-analysed to assess intra-observer reproducibility. RT3DE image quality was independently graded as good, adequate and non-analysable.

Results

Only 13 patients (22%) were deemed to have good RT3DE image quality by both observers. In these patients, RT3DE measurement of EF correlated highly with CMR (mean+standard deviation $-2.0 + 4\%$, $r = 0.97$, Bland-Altman 95% levels of agreement (BA) -9 to 5%). LV volumes were underestimated by RT3DE (end diastolic volume (EDV) $-26 + 23$ mls, end systolic volume (ESV) $-10 + 19$ mls) in keeping with findings from other studies. Inter-observer reproducibility for measurement of EF was high ($1.2 + 3\%$, $r = 0.98$, BA -5 to 7%); as was intra-observer reproducibility ($0.1 + 2\%$, $r = 0.99$, BA -4 to 4%) (Table 1). 29 patients had adequate RT3DE image quality. In these patients, correlation of RT3DE and CMR measurement of EF was significantly lower ($-0.5 + 9$, $r = 0.82$, BA -19 to 18%). LV volumes were underestimated to a greater degree (EDV $-39 + 31$ mls, ESV $-11 + 31$ mls) and inter-observer ($-1.2 + 6\%$, $r = 0.84$, BA -13 to 10%) and intra-observer reproducibility ($0.5 + 4$, $r = 0.97$, -7 to 8%) were also considerably lower (Table). RT3DE image quality was deemed non-analysable in 18 patients (30%), with inadequate visualisation of the anterior wall alone being responsible in 10 (56%).

Conclusion

In this real-world study, RT3DE LV volumetric assessment was comparable to CMR when RT3DE image quality was good. However, image quality was good in only 22% of patients. In the remaining 78%, image quality was such

Table 1:

	Mean difference +/- SD (%)	p-value	Correlation coefficient (r)	Bland-Altman 95% limits of agreement (%)	Range of Bland-Altman Limits of agreement (%)
RT3DE versus CMR					
Good images	-2.0 +/- 4	0.87	0.97	-9 to 5	14
Adequate images	-0.5 +/- 9	0.78	0.82	-19 to 18	37
RT3DE Inter-observer reproducibility					
Good images	1.2 +/- 3	0.23	0.98	-5 to 7	12
Adequate images	-1.2 +/- 6	0.25	0.84	-13 to 10	23
RT3DE Intra-observer reproducibility					
Good images	0.1 +/- 2	0.87	0.99	-4 to 4	8
Adequate images	0.5 +/- 4	0.61	0.97	-7 to 8	15

that RT3DE assessment was either not possible or accuracy and reproducibility were significantly lower. Because CMR can obtain good image quality in a greater proportion of patients, it remains the gold standard for LV volumetric assessment.

Publish with **BioMed Central** and every scientist can read your work free of charge

"BioMed Central will be the most significant development for disseminating the results of biomedical research in our lifetime."

Sir Paul Nurse, Cancer Research UK

Your research papers will be:

- available free of charge to the entire biomedical community
- peer reviewed and published immediately upon acceptance
- cited in PubMed and archived on PubMed Central
- yours — you keep the copyright

Submit your manuscript here:
http://www.biomedcentral.com/info/publishing_adv.asp

