

Poster presentation

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Eyeball assessment of left ventricular function, compared to a quantitative assessment by cardiac magnetic resonance

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Introduction

Visual analysis of left ventricular function is commonly performed, however the accuracy of this subjective method is not well established.

Purpose

We aimed to determine the accuracy of "eyeball" assessment of LV function with one or more left ventricle views using cardiac magnetic resonance images.

Methods

Cine cardiac MR imaging was performed on 44 subjects with a range of ejection fractions on a 1.5 T Siemens clinical scanner. Clinicians (N = 18) with varying degrees of cardiac MR experience (0 to 13 years) were shown cine images of a four chamber (horizontal long axis; HLA), two chamber (vertical long axis; VLA) and a stack of short axis stack (SAS) images. They were asked to visually assess the ejection fraction (EF) after seeing 10 cardiac cycles of a HLA alone, then HLA + VLA, then the HLA + VLA +SAS. These results were compared to a commercial available LV analysis package (Argus processing).

Results

There were strong correlations between the visual and Argus assessment for all three categories (HLA: 0.89 ± 0.01, HLA +VLA 0.91 ± 0.01 and HLA + VLA + SAS: 0.93 ± 0.01, all P < 0.01). Stronger correlations were observed when more views of the left ventricle were assessed (p < 0.01). However, the EF was underestimated in all categories

(by 8.4% for HLA, 8.4% for HLA +VLA and 7.9% for HLA +VLA +SAS, p all < 0.01). Underestimation of EF was less after all cine images were seen (p < 0.01). Underestimating the EF was most pronounced for subjects with normal cardiac function (-12%), compared to those with a non-ischaemic cardiomyopathy (-5.9%) and ischaemic cardiomyopathy, (-3.5%, all < 0.05). There was no correlation between years of cardiac MR experience and accuracy of visual assessment (r = 0.04).

Conclusion

Assessing more than one view of the heart improved eyeball assessment of left ventricular EF, however clinicians underestimated EF by 8.4% on average, with less accuracy in those with normal LV function, compared to those with cardiac pathology. Given the important clinical information provided by LV EF, quantitative analysis is required for accurate assessment by clinicians with all levels of experience.