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Three vs. six long axis views to assess left ventricular function

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Introduction

In contrast to CMR imaging with contiguous short axis views for assessing left ventricular volumes, the use of long axis views does not suffer from frequent difficulties to correctly determine the mitral valve plane and the apex. Consequently, a radial long axis approach with six radial planes was shown to be as accurate as and even more reproducible than short axis views. Long axis views with less slices may save additional time; it is however unknown whether this would provide similar results in clinical settings. We compared three vs. six long axis views.

Purpose

To compare cine steady state free precession (SSFP) imaging using three (3RL) vs. six (6RL) radial long axis planes.

Methods

We randomly selected 100 patients across a broad range of pathology, in whom cine SSFP images in six radial long axis planes were acquired for clinical purposes.

Volumetric and functional parameters were evaluated before (6RL) and after (3RL) removing three long axis views from the analysis. Statistical analysis was performed using a Bland Altman test. Clinically relevant cutoffs for ejection fraction (EF), enddiastolic volume index (EDVI), mass index (MI) and cardiac index (CI) were defined to assess the potential clinical impact of using 3RL as compared to 6RL.

Results

The mean difference (limits of agreement, coefficient of correlation) for 3RL vs. 6RL was 0.7 ± 2.8%(0.996) for enddiastolic volume, -0.2 ± 5.8% (0.989) for EF, 0.1 ± 4.5% (0.987) for mass, 0.5 ± 2.9% (0.996) for EDVI, 0.1 ± 4.5%(0.986) for MI, 0.5 ± 6.5%(0.996) for cardiac output (CO) and 0.2 ± 7.3% (0.957) for CI.

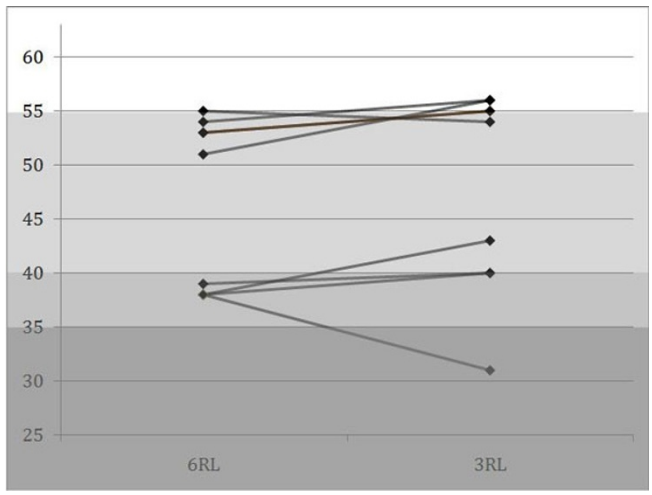

Figure 1
Clinical impact - change in EF(%) in those 9 of 100 studies with a change of clinical EF-class (EF < 35% EF 35-40% EF > 55%) BY 3RL as compared to 6RL.

More than 90% of patients were classified identically by the two methods with respect to EF class, the presence of hypertrophy, left ventricular dilation and reduced CI, although the Bland Altman analysis showed less agreement for low ejection fraction values. Using a threshold of LVEF < 35%, all patients were classified identically by 3RL and 6RL Figure 1.

Conclusion

In patients with various cardiac diseases, we compared the use of 3 vs. 6 long axis views to assess left ventricular function. 3 long axis views were found to be sufficiently accurate for clinical decision making.