

WALKING POSTER PRESENTATION

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Free-breathing real-time cardiac cine MR for evaluation of left-ventricular function: Comparison to standard multi-breath-hold cardiac cine MR in 50 patients

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Background

Electrocardiogram (ECG)-gated breath-hold cardiac cine magnetic resonance imaging (MRI) is generally accepted as the gold standard for left-ventricular (LV) volume assessment. However, it may fail in patients with arrhythmia, impaired breath-hold capacity, and poor ECG gating. Recently, sparse real-time (RT) cine using a prototype sequence with sparse sampling and iterative reconstruction has been proposed to accelerate cine MRI (Kido et al. SCMR; 2015). The purpose of this study was to evaluate the diagnostic quality and accuracy of sparse free-breathing (FB) RT cine MRI for the quantification of LV function compared with standard multi-breath-hold cine MRI.

Methods

50 patients underwent both standard segmented cine MRI (Acc. factor 3) and sparse FB RT cine with a prototype sequence using sparse sampling and iterative reconstruction (acc. factor 12.8) on a clinical 3T MRI scanner (MAGNETOM Skyra, Siemens Healthcare, Erlangen, Germany). The cine images were obtained in a stack of 8 short-axis slices spanning the entire LV from base to apex (temporal/spatial resolution: 41 ms/1.7 × 1.7 × 6 mm³). The image quality, ejection fraction (EF), end-diastolic volume (EDV), end-systolic volume (ESV), stroke volume (SV), and LV mass for sparse FB RT cine and standard cine were compared.

Results

All sparse FB RT cine showed acceptable diagnostic image quality. Standard cine and sparse FB RT cine showed good agreement: EF (60.3 ± 10.3% for standard vs. 58.8 ± 10.7% for FB RT; p = 0.09); EDV (132.5 ± 36.7 ml vs. 133.9 ± 33.8 ml; p = 0.51); ESV (54.8 ± 27.4 ml vs. 57.3 ± 27.3 ml; p = 0.09); SV (77.6 ± 15.9 ml vs. 76.6 ± 14.3 ml; p = 0.53); LV mass (87.6 ± 33.7 ml vs. 81.3 ± 31.3 ml; p < 0.001). The intra-observer and inter-observer agreement for all parameters was good.

Conclusions

Sparse FB RT cine MRI evaluates LV function with good accuracy compared with conventional multi-breath-hold cine MRI. For patients with impaired breath-hold capacity, FB RT cine MRI may be clinically useful for quantitative assessment of LV function.

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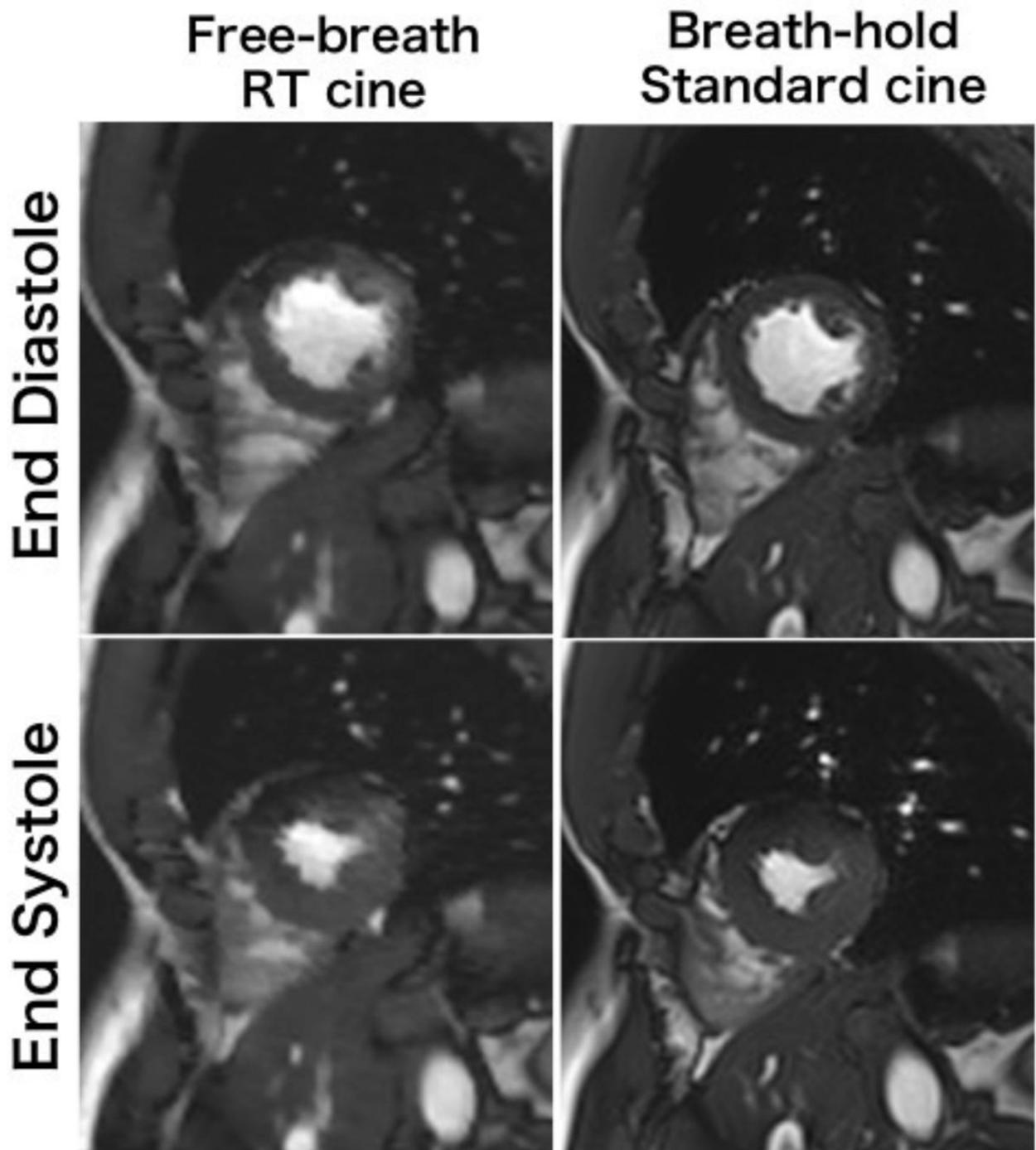


Figure 1