Cardiac MR fingerprinting with a short acquisition window in healthy volunteers and 62 consecutive patients referred for clinical CMR

Introduction

Cardiac magnetic resonance fingerprinting (cMRF) has been demonstrated to be a robust and accurate technique. However, the common 250ms acquisition window of cMRF might leave it vulnerable to motion artifacts in patients with high heart rates. In order to compensate for this lack of precision, we propose a novel 150ms acquisition window that reduces the sensitivity to motion artifacts.

Method

The accuracy of cMRF with a short acquisition window was first compared to reference and clinical routine parameter mapping techniques (MOLLI[3]; T2* mapping, T1 mapping, T1-mapping and T2 mapping). The comparison was performed both in a small cohort of healthy volunteers and in a heterogeneous group of consecutive patients referred for clinical CMR.

Results

The phantom mapping demonstrated similar native and T2 mapping, and T2 mapping values were highly similar in in vivo, the overall average cMRF and routine relaxation times appeared to be highly similar in healthy volunteers (Table 1), the cMRF myocardial T1 values were used to assess accuracy in the phantom, while Student's t-tests and Bland-Altman analyses were used to assess differences between routine techniques and short acquisition window cMRF in vivo.

Discussion

cMRF with a short acquisition window and low-rank reconstruction is a promising technique that enables high-precision myocardial T1 measurement in vivo. In the present study, we demonstrated that cMRF with a short acquisition window was highly accurate and robust in both healthy volunteers and patients. The accuracy of cMRF with a short acquisition window was confirmed by the excellent agreement with reference techniques, while Student's t-tests and Bland-Altman analyses showed no statistically significant differences between cMRF and routine techniques.

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References

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