

Meeting abstract

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I 120 Detection of mechanical ventricular asynchrony by cine-MRI

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Introduction

Quantification of mechanical ventricular asynchrony is important for the prediction of outcome after cardiac resynchronization therapy (CRT). Purpose of the present study was to assess the ability of high temporal resolution cine-MRI (HTRC-MRI) to quantify mechanical ventricular asynchrony in patients with left bundle branch block (LBBB).

Methods

32 patients with (n = 17) and without (n = 15) LBBB in surface ECG underwent HTRC-MRI at 1.5 Tesla. For a temporal resolution of 6.3 ms, a shared-phases trueFISP sequence and parallel imaging was used. Time to peak contraction (TPC) was defined as the interval between R-wave and the peak of systolic contraction. Inter- and intraventricular delays in HTRC-MRI were calculated as the difference of TPC of lateral LV- to lateral RV-wall and lateral to septal LV-wall, respectively. 1) Analysis of inter- and intraobserver agreement for the assessment of HTRC-MRI delays was performed. 2) HTRC-MRI delays were compared between patients with and without LBBB. 3) HTRC-MRI delays were correlated with standard echocardiographic parameters in patients with LBBB.

Results

1) Mean interobserver difference was 4 +/- 23 ms (limits of agreement -42 to +49 ms) for the inter- and 6 +/- 21 ms (limits of agreement -48 to +36 ms) for the intraventricular delays. Mean intraobserver difference was 2 +/- 24 ms (limits of agreement -51 to +47 ms) for the inter- and 5 +/- 25 ms (limits of agreement -46 to +56 ms) for the intra-

ventricular delays. 2) The interventricular delay was 110 ± 50 ms in patients with and -1 ± 18 ms in patients without LBBB (P < 0.0001). The intraventricular delay was 336 ± 86 ms in patients and 40 ± 49 ms in patients without LBBB (P < 0.0001). 3) There was a good correlation and agreement of the interventricular delay between HTRC-MRI and echocardiography (r = 0.78, P = 0.0002; mean difference: 39 ± 36 ms). There was a moderate correlation and large difference of the intraventricular delay between HTRC-MRI and echocardiography (r = 0.66, P = 0.0042; mean difference: 257 ± 64 ms).

Conclusion

HTRC-MRI can detect and quantify inter- and intraventricular mechanical asynchrony. We present a new and simple approach to quantify mechanical asynchrony without the need for data post-processing. The comparison between HTRC-MRI and echocardiography requires further assessment and extensive comparison with other imaging methods. HTRC-MRI may become a valuable tool for the prediction of responders to CRT in a comprehensive MRI protocol with delayed enhancement MRI.