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Poster presentation

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Diastolic untwisting is altered in patients with congenital heart disease: a novel MR speckle tracking method for cine-MRI

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Introduction

In patients with CHD (CO, ASD, VSD and ToF) satisfactory post-op outcome is not solely dependent on systolic RV and LV function. Early signs of LV diastolic dysfunction might need to be emphasized in this patient group.

Purpose

We used a novel MR speckle tracking method for MR gradient-echo loops to evaluate the LV for early signs of diastolic dysfunction, namely length of LV diastolic untwisting.

Methods

We studied 15 pts with TOF (6 mon-45 y) post repair, 15 pts with ASD, VSD and CO (5 y-37 y) and 8 healthy adults (24-35 y). MR images were acquired with an ECG gated 1.5/3 T Magnet with segmented gradient-echo cine-loop sequences (short/long/rotated axis) to cover the entire RV and LV. Images were analyzed offline by VVI (Siemens). RV size and function was correlated for each patient). LV myocardial strain, direction of twist and untwisting, time to peak twist and length to peak diastolic untwisting were measured and compared for each patient.

Results

In the CHD group a decrease in LV circ. strain (m-14.6% ± 5.3%), and twist (m-7.2° ± 2.8°) were found. Time to peak systolic twist was prolonged and more heterogeneous in CHD pts than in controls. Apical twist direction remained counterclockwise (ccw), but a loss of septal twist initiation was found. Time to peak diastolic untwisting was decreased and more variable in CHD pts (m 380 ms ± 165 ms, p = 0.05). In healthy controls LV circ.strain was measured at -18.5% ± 7%, and twist at -9.6° ± 4.3°(p = 0.05). Time to peak systolic twist was less heterogeneous, twist direction uniformly ccw. Time to peak diastolic untwisting was significantly longer (320 ms ± 120 ms) than in the ToF group Figure 1.

Conclusion

Not only the degree and length of systolic twist are affected in CHD post-op pts but also time to peak and length of diastolic untwisting. These findings could help evaluate the LV for early alterations in this pt group independent of LV systolic function.

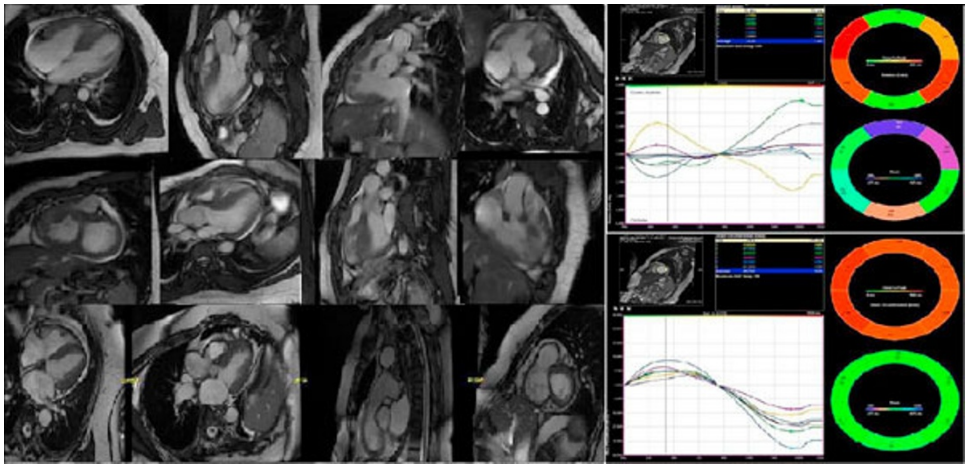

Figure 1