

POSTER PRESENTATION

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Feature tracking strain is similar to harmonic phase cardiac magnetic resonance in Fontan patients: a validation study

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Background

Feature tracking strain (FTS) is a new technique to evaluate myocardial deformation from routinely acquired cardiac magnetic resonance (CMR) cine images, however, it has not been validated in single ventricle patients. The purpose of this study is to validate FTS against myocardial tagged harmonic phase (HARP) images, considered the reference standard in non-invasive deformation analysis.

Methods

We retrospectively analyzed CMRs of 15 consecutive single ventricle Fontan patients (Table 1) with myocardial tagging and balanced steady state free precession (SSFP) cine images in the same study. Off-line analysis was performed on basal, mid and apical short axis levels using Diagnasoft Virtue (v4.5.1) and TomTec 2D Cardiac Performance Analysis (v 1.0) for HARP and FTS, respectively. Lagrangian endocardial strain was compared between techniques.

Results

There was good correlation in global circumferential strain (GCS) between HARP and FTS, Pearson $r = 0.67$, $p = 0.006$. Average GCS was -19 (95% CI -4.3 to -33.8) from HARP and -16.7 (95% CI -6.4 to -26.9) from FTS. FTS yielded lower values (bias -2.3) than HARP (Figure 1), equivalent to a bias of 12.3% (average bias of FTS/average HARP $\times 100$). This difference was not significant via Student's T-test ($t = 3$, DF 13, $p = 0.1$). Analysis of variance (ANOVA) showed considerable overlap in

Table 1 Demographics.

Subjects, n	15
Age in years, media (range)	18 (5-38)
Single ventricle morphology (LV:RV)	7:8
Double outlet right ventricle, n	5
Hypoplastic left heart syndrome, n	4
Tricuspid atresia	3
Pulmonary atresia, intact ventricular septum, n	1
Unbalanced AV canal, n	1 unbalanced to left 1 unbalanced to right

measurements, $F = 2.64$, $p = 0.04$. Intraclass correlation was 0.58, indicating moderate agreement.

Conclusions

Feature tracking analysis has moderate agreement with grid-tagged HARP measurements of circumferential strain in Fontan patients, with a trend towards lower strain values via FTS. Further validation of FTS in a large sample is warranted.

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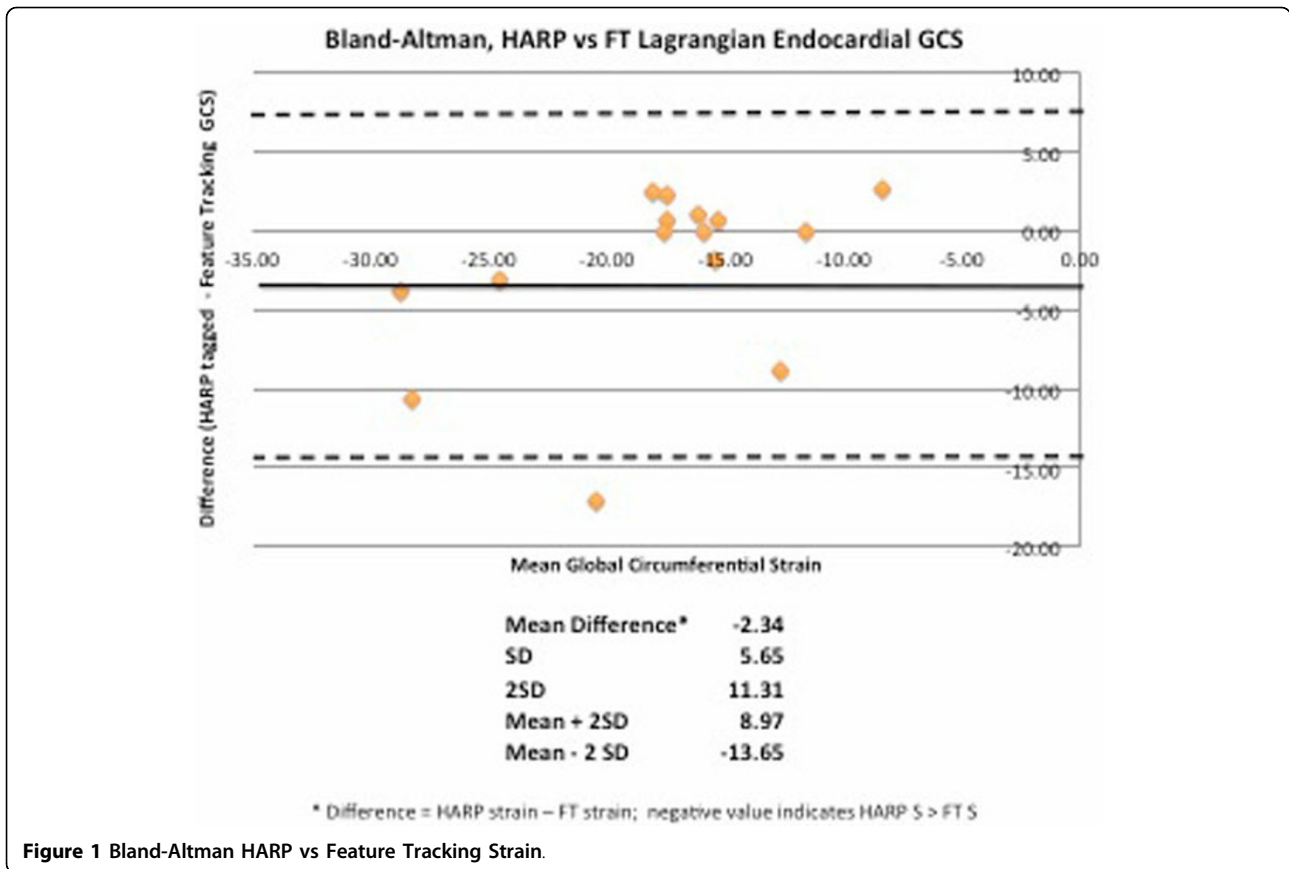
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