Comparison of cardiac MR feature tracking and myocardial MR tagging for assessment of regional ventricular function

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Background: Quantification of regional myocardial function allows risk stratification in heart disease. CMR tagging (TAG) enables the evaluation of segmental cardiac deformation, but it has not reached clinical routine due to the long acquisition and post-processing times. Conversely, CMR feature-tracking (FT) is a post-processing method based on standard cine-MR imaging.

Purpose: To compare myocardial strain and torsion obtained with CMR-TAG and CMR-FT in healthy volunteers and myocardial infarction (MI).

Methods: 42 subjects (18 healthy; 24 MI) underwent CMR (1.5T, cine/TAG sequences). Global and segmental (16-segment) circumferential strain (CS), and torsion were measured using FT (CVI42, Canada) and tagging (InTag, France). Inter-method agreement was assessed using 2-way-mixed intraclass correlation coefficient (ICC).

Results: The agreement for segmental and global CS measurements was good to excellent in both groups (Table). Torsion angle showed excellent (0.763) and good (0.697) agreement for healthy and MI.

Conclusion: CMR-FT strain and torsion measurements showed high agreement with CMR-tagging. Thus, CMR-FT provides a potential clinical alternative in the assessment of regional ventricular function.

Segmental and global CS: agreement (ICC)

CS (%)	Healthy CMR-FT	Healthy CMR-TAG	ICC (p-value)	MI CMR-FT	MI CMR-TAG	ICC (p-value)
1	–18.1±4.3	–17.2±4.2	0.809 (0.001)	–15.5±5.0	–13.7±4.8	0.659 (0.004)
2	–16.9±1.8	–15.0±3.2	0.704 (0.004)	–10.5±4.0	–9.5±3.6	0.654 (0.006)
3	–15.3±2.9	–16.1±3.6	0.827 (0.001)	–8.8±3.7	–8.8±3.5	0.819 (0.000)
4	–16.3±2.9	–17.6±3.8	0.735 (0.852	–11.3±5.2	–11.8±5.9	0.733 (0.001)
5	–21.4±3.1	–20.6±3.4	0.673 (0.188)	–14.4±4.5	–14.5±3.6	0.612 (0.022)
6	–21.4±4.4	–22.5±3.9	0.832 (0.000)	–17.5±4.8	–16.5±5.5	0.617 (0.013)
7	–19.5±4.1	–21.9±4.7	0.759 (0.000)	–13.5±4.7	–13.8±5.8	0.781 (0.000)
8	–20.3±3.9	–18.5±4.3	0.687 (0.007)	–13.6±5.2	–11.9±4.6	0.786 (0.000)
9	–19.3±3.5	–17.1±3.9	0.621 (0.010)	–13.9±4.6	–11.4±5.0	0.765 (0.000)
10	–17.4±2.7	–18.4±2.5	0.689 (0.857)	–11.8±4.2	–12.6±4.1	0.654 (0.007)
11	–21.7±2.6	–23.7±3.7	0.605 (0.025)	–15.1±4.1	–16.1±3.0	0.601 (0.021)
12	–20.7±3.1	–21.7±4.8	0.730 (0.005)	–15.6±5.1	–14.6±5.2	0.791 (0.000)
13	–22.0±4.5	–21.4±3.9	0.641 (0.045)	–14.0±5.4	–11.2±5.6	0.621 (0.008)
14	–20.6±4.4	–17.3±3.1	0.645 (0.005)	–14.4±6.3	–11.1±4.9	0.768 (0.000)
15	–22.6±4.0	–19.0±3.3	0.648 (0.010)	–15.8±6.1	–11.3±4.4	0.649 (0.001)
16	–24.7±4.2	–22.6±4.9	0.680 (0.021)	–18.6±5.6	–15.2±5.4	0.713 (0.001)
Global	–19.6±2.3	–19.2±2.1	0.821 (0.000)	–13.0±3.8	–12.9±3.1	0.873 (0.000)