

**CMR Feature Tracking shows Preserved Myocardial Deformation Long-term after Coarctation Repair.**

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Background: Arterial vasculopathy and residual aortic obstruction can lead to left ventricular (LV) dysfunction in patients with coarctation of the aorta (CoA) due to adverse ventriculo-arterial coupling. This study aimed to investigate potential differences in LV myocardial deformation indices between well-repaired CoA-patients and healthy controls.

Methods: Twenty-two well-repaired CoA patients (age  $30 \pm 10.6$  years) after surgical repair (12) or balloon angioplasty (10) (at 0.3-16 years) with >10 years of follow-up were compared to 22 healthy matched controls (age  $30 \pm 3.8$  years). Five CoA patients had been treated for re-coarctation. CMR-FT was used for LV longitudinal-, circumferential- and rotational deformation indices.

Results: Global systolic LV function was preserved in CoA patients (LV ejection fraction  $58 \pm 4.8\%$  vs.  $60 \pm 6.8\%$ ,  $p=0.56$ ) when compared to controls, with normal indexed LV end-diastolic volume ( $93 \pm 15.2 \text{ ml/m}^2$  vs.  $93 \pm 9.3 \text{ ml/m}^2$ ,  $p=0.79$ ), indexed LV end-systolic volume ( $26 \pm 7.0 \text{ ml/m}^2$  vs.  $31 \pm 7.3 \text{ ml/m}^2$ ,  $p=0.05$ ) and indexed LV mass ( $68 \pm 8.5 \text{ g/m}^2$  vs.  $63 \pm 8.6 \text{ g/m}^2$ ,  $p=0.08$ ). Twelve CoA patients (55%) were hypertensive (systolic and diastolic blood pressure of  $144 \pm 9.3 \text{ mmHg}$  and  $80 \pm 6.0 \text{ mmHg}$ , respectively) of whom 4 were on antihypertensive medication. LV global longitudinal strain was preserved in the horizontal ( $-18 \pm 4.4\%$  vs.  $-16 \pm 4.7\%$ ,  $p=0.06$ ) and vertical ( $-22 \pm 5.1\%$  vs.  $-20 \pm 6.0\%$ ,  $p=0.22$ ) long axis in CoA patients. Global circumferential strain was preserved at basal ( $-29 \pm 4.1\%$  vs.  $-28 \pm 4.8\%$ ,  $p=0.43$ ), mid-ventricular ( $-27 \pm 4.2\%$  vs.  $-25 \pm 3.0\%$ ,  $p=0.09$ ) and apical levels ( $-35 \pm 7.8\%$  vs.  $-32 \pm 34.9\%$ ,  $p=0.32$ ). Segmental increase of circumferential strain was seen in the basal-anterior ( $-28 \pm 10.1\%$  vs.  $-21 \pm 9.6\%$ ,  $p=0.03$ ) and the mid-posterior ( $-23 \pm 6.3\%$  vs.  $-27 \pm 7.3\%$ ,  $p=0.04$ ) segments. No differences were found in global torsion ( $2.4 \pm 1.3^\circ/\text{cm}$  vs.  $2.0 \pm 1.4^\circ/\text{cm}$ ,  $p=0.28$ ), twist ( $14 \pm 5.8^\circ$  vs.  $12 \pm 6.3^\circ$ ,  $p=0.34$ ) and recoil rate ( $-17 \pm 9.7^\circ/\text{cm/s}$  vs.  $-17 \pm 7.1^\circ/\text{cm/s}$ ,  $p=0.97$ ). Analysis of intra-observer variability demonstrated good reproducibility for all deformation indices.

Conclusion: Global and regional myocardial deformation indices are preserved in well-repaired CoA patients long-term after repair.