

**Does arterial switch for d-transposition of the great arteries alter myocardial deformation of the ventricles?**

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**Introduction:** The arterial switch operation (ASO) is currently the surgical technique of choice for repair of d-transposition of the great arteries. The main pulmonary artery is moved forward (Lecompte maneuver) and its branches are stretched on either side of the ascending aorta. The coronary arteries are removed from and reinserted into the aorta. We sought to assess myocardial deformation changes in the right (RV) and left ventricles (LV) as signs of subclinical myocardial functional impairment after ASO and re-positioning of the coronary arteries.

**Methods:** Patients after ASO and normal controls underwent cardiac magnetic resonance (CMR) imaging including 2D SSFP for ventricular function. 2D SSFP cine images were post-processed with a feature tracking software (TomTec 2D CPA). Global circumferential strain was measured on short axis mid-ventricular slices and global longitudinal strain on horizontal long-axis images, separately for each ventricle. Patients with pulmonary arteries stenoses or history, symptoms, or CMR findings suspicious for coronary compromise were excluded.

**Results:** Eighteen patients after ASO (age  $16.8 \pm 6.7$ y) were compared to 18 normal controls (age  $22.2 \pm 11.4$ y;  $p=0.098$ ). RVs of ASO patients showed lower longitudinal strains ( $-14.1 \pm 6.4\%$  vs.  $-18.3 \pm 3.8\%$ ;  $p<0.05$ ) but higher circumferential strains ( $-16.6 \pm 3.2\%$  vs.  $-13.1 \pm 4.3\%$ ;  $p<0.01$ ) compared to normal RVs. LV longitudinal strain ( $-15.4 \pm 5.1\%$  vs.  $-17.5 \pm 4.6\%$ ; n.s.) and LV circumferential strain ( $26 \pm 5.6\%$  vs.  $-23 \pm 13.1\%$ ; n.s.) were not significantly different in patients vs. controls. There were no differences between ASO patients and controls regarding ejection fractions of the RV ( $54 \pm 6\%$  vs.  $52 \pm 5\%$ ; n.s.) and LV ( $58 \pm 8\%$  vs.  $60 \pm 5\%$ ; n.s.) or regarding end-diastolic volumes of the RV ( $91 \pm 21$ ml/m<sup>2</sup> vs.  $94 \pm 12$ ml/m<sup>2</sup>; n.s.) and LV ( $87 \pm 26$ ml/m<sup>2</sup> vs.  $80 \pm 11$ ml/m<sup>2</sup>; n.s.) indexed to body surface area, respectively.

**Conclusions:** LV deformation is preserved after the ASO operation, despite coronary artery surgery. In contrast, even in the absence of significant pulmonary artery stenosis, RV deformation is altered with decreased global longitudinal strain and increased circumferential strain, while preserving RV volume and ejection fraction. This may be the result of abnormal ventriculo-arterial coupling after the Lecompte maneuver and its changes in the outflow tract geometry.