

**Implications of Early Aortic Stiffening in Patients with Transposition of the Great Arteries after Arterial Switch Operation.**

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**Objectives:** In patients with transposition of the great arteries (TGA) the elastic function of the transposed aorta after arterial switch operation (ASO) is suspected to be important for long-term prognosis. Therefore, the goal of this study was a comprehensive assessment of the aortic bioelastic properties in children and adults with TGA after ASO.

**Methods:** 51 patients and 34 age-matched controls were studied at 3.0 Tesla with magnetic resonance imaging. 43 patients (12.8±6.9 years) underwent one-stage ASO, 8 patients (23.8±6.9 years) had prior pulmonary artery banding (two-stage ASO). Aortic dimensions, distensibility, pulse wave velocity (PWV), aortic arch angle, left ventricular (LV) mass, LV function and left atrial (LA) volumes as a surrogate marker of diastolic dysfunction were assessed.

**Results:** Compared to controls, patients had increased aortic root areas (602.6±240.5 vs. 356.8±113.4 mm<sup>2</sup>/m, p<0.01) and reduced distensibility of the thoracic aorta most pronounced at the aortic root (3.2±2.0 vs. 9.1±4.7 10<sup>-3</sup> mmHg<sup>-1</sup>, p<0.01). Ascending and descending aortic distensibility correlated negatively with the aortic areas at the same level (p<0.01). PWV was significantly higher in two-stage ASO (5.3±1.0 vs. 3.5±0.6 m/s, p<0.01). In patients PWV and aortic distensibility correlated with age (p=0.04-<0.01). LV mass was higher in patients than in controls (p=0.02). LA volumes correlated negatively with aortic root and ascending aortic distensibility and positively with PWV (p<0.05).

**Conclusions:** Reduced aortic bioelastic properties and aortic root dilatation are present in TGA patients post ASO and are likely to contribute to LV diastolic dysfunction. Impaired aortic bioelasticity was strongly associated with age suggesting the need for routine monitoring for early onset of degenerative cardiovascular disease.