

Aortic Distensibility and Vascular Physiology in Adult Patients with Coarctation of Aorta late after repair

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Purpose: Patients with coarctation of aorta (CoA) present cardiovascular complications late after repair such as hypertension, aneurisms and coronary artery disease which imply a process of chronic vasculopathy. Our prospective study investigated the elastic properties of the aorta and peripheral vessels in adult patients with CoA, late after repair.

Methods: We enrolled 19 adult patients (9 male) with repaired CoA (mean age 25.3± 9.3y, 18.3±8.1 years after repair) and 29 matched healthy controls (14 male, mean age 26.1±9.1y). From transthoracic echocardiography (Vivid7, GE, USA) we measured the systolic (ASd) and diastolic diameter (ADd) of the ascending aorta and we calculated aortic distensibility as $[2 \times (ASd - ADd) / ADd \times (SBP - DBP)]$ and stiffness index as $\log [SBP \times (ASd - ADd) / (DBP \times ADd)]$. We used arterial applanation tonometry (SphygmoCor 2000, AtCor Medical, Australia) to measure the augmentation index (AI%) and the augmented pressure (AP) of the central aortic pressure and strain gauge plethysmography to measure forearm blood flow (FBF) as an index of endothelial function of peripheral arteries.

Results: Presented in Table 1 & figures 1-5.

Table 1. Aortic distensibility and vascular function indices.

	CoA	Controls	p value
Aortic distensibility ($\text{dyn}^{-1} \text{cm}^2 10^{-6}$)	3.09 ± 1.61	4.75 ± 2.64	p = 0.02
Stiffness index (mmHg)	7.67 ± 12.42	2.61 ± 1.96	p = 0.005
AP (mmHg)	8.53 ± 5.50	2.33 ± 4.89	p = 0.001
AIx (%)	26.17 ± 14.98	7.10 ± 13.68	p = 0.0007
FBF (ml/min/100ml tissue)	13.31 ± 5.10	24.27 ± 13.50	p = 0.009

Values are mean±SD.

Conclusions: Adult CoA patients show impaired elastic properties of aorta and peripheral arteries, late after repair, regardless the initial lesion. These results may be due to endothelial dysfunction and may suggest a procedure of peripheral vasculopathy which may explain, at least in part, the late complications of repaired CoA.

