Abnormal aortic elasticity and aortic dilation progress with age and impact on LV mass in repaired tetralogy of Fallot.

Nakashima Y.(1), Mori Y.(1), Murakami T(1), Inoue N(1), Kaneko S.(1), Watanabe K.(2), Koide M.(2)
Division of Pediatric Cardiology
Seirei Hamamatsu General Hospital, Hamamatsu, Japan(1),Department of Cardiovascular Surgery
Seirei Hamamatsu General Hospital, Hamamatsu, Japan(2)

Background
Aortic root dilatation and impaired aortic elasticity have been reported in children and adults with repaired tetralogy of Fallot (TOF). However, no study has described the changes of aortic elasticity with age and effects of abnormal aortic elasticity on left ventricular (LV) function.

Objectives
The aim of the study was to assess the hypothesis that elastic properties of aorta were altered with age and impaired aortic elasticity affected on LV function including LV mass in repaired TOF.

Methods
The subjects consisted of 46 repaired TOF (mean age: 9.4±8.2 yrs) and 35 age-matched controls. Aortic dimension and aortic elastic properties such as the aortic strain (AoS), aortic distensibility (AoDis) and aortic stiffness index (AoSI) were obtained by cardiac catheterization. Aortic dimensions were expressed as z scores. LV mass was also obtained by LV angiogram and adjusted for height.

Results
Ascending aortic dimension was significantly increased in TOF compared with controls Z score: TOF: 2.11±1.07 vs. Control: 0.58±1.21, p<0.01, and increased with age in TOF. The AoS (%) and AoDis were significantly reduced in TOF (AoS: 12.9±5.0%, AoDis: 0.008± 0.004 cm²dynes⁻¹ 10⁻⁶ ) than controls (AoS: 20.8±5.0%, AoDis: 0.012 ± 0.004 cm² dynes⁻¹ 10⁻⁶, p<0.01). The AoSI significantly increased in TOF (4.4±2.2) than in controls (2.9±1.4). Also, AoSI and AoDis weakly but significantly decreased with age (r=0.34 in AoSi and r=0.24 in AoDiS). The LV mass index was increased in TOF (51.6±14.6g/BHx2.7) than that in control (35.7±12.4g/BHx2.7, p<0.01). No significant correlation was found between parameters of aortic elastic properties and LV endo-diastolic volume and ejection fraction in TOF.

Conclusions
In repaired TOF, increased aortic root diameters progress and abnormal aortic elasticity changes with age. Increased aortic stiffness may produce the LV hypertrophy.