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Meeting abstract

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215 Reduced aortic elasticity and dilatation are associated with aortic regurgitation and left ventricular dysfunction after the arterial switch operation

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Introduction

Intrinsic pathology of the aortic wall is a possible explanation for aortic dilatation in transposition of the great arteries patients corrected with the arterial switch operation (ASO). The relationship between aortic dimensions, aortic wall elasticity, aortic valve competence and left ventricular (LV) function in patients after the ASO has not previously been studied.

Purpose

To assess dimensions and elasticity of the aorta and their relationship with aortic valve competence and left ventricular (LV) function in patients after the ASO.

Methods

MRI was performed in 15 ASO patients (mean ± SD age (yrs.): 16 ± 4) and 15 age and gender matched controls. Aortic root diameters at 3 predefined levels, aortic valve competence and systolic LV function were measured using standard MRI sequences. Pulse wave velocity (PWV) in the aortic arch and descending aorta, and aortic root distensibility were used as markers of aortic wall elasticity.

Results

ASO patients frequently showed aortic root dilatation as compared to controls (mean difference 5.7–9.4 mm, P < 0.007 at 3 predefined levels). ASO patients showed reduced aortic elasticity, as indicated by increased pulse wave velocity (PWV) in the aortic arch (5.1 m/s ± 1.2 vs. 3.9 m/s ± 0.7, $P = 0.004$) and reduced root distensibility ($2.2*10^{-3}$ $mmHg^{-1}$ ± 1.8 vs. $4.9*10^{-3}$ $mmHg^{-1}$ ± 2.9, $P < 0.01$). Minor degrees of aortic regurgitation (AR) were present in 6 patients (AR fraction 5% ± 3 vs. 1% ± 1, $P < 0.001$). In addition, LV ejection fraction (LV EF) was decreased in ASO patients (51% ± 6 vs. 58% ± 5, $P = 0.003$) and LV dimensions were enlarged with LV end-diastolic volume 112 mL/m^2 ± 13 vs. 95 mL/m^2 ± 16 ($P = 0.007$) and LV end-systolic volume 54 mL/m^2 ± 11 vs. 39 mL/m^2 ± 7 ($P < 0.001$). AR fraction was correlated with increased PWV in the aortic arch (r = 0.39, $P = 0.03$), reduced root distensibility (r = 0.45, $P = 0.01$) and aortic root dilatation (r 0.32–0.66, $P < 0.01$ for all levels). Degree of AR predicted decreased LV EF (r = 0.41, P = 0.026) and was correlated with increased LV dimensions (r = 0.48, $P = 0.008$; r = 0.67, $P < 0.001$; respectively).

Conclusion

Aortic root dilatation and reduced elasticity of the proximal aorta were frequently present in ASO patients. Dilatation of the aortic root and reduced proximal aortic wall elasticity were associated with degree of AR, while AR was correlated with LV systolic dysfunction and increased LV dimensions after ASO.