Assessment of Aortic Root Dilatation in Pediatric Patients Status Post Heart Transplant

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Background: Prevalence, clinical implication and risk factors of aortic root dilation (ARD) in patients post heart transplant are currently unknown.

Methods: From 1999 to 2014, 173 patients underwent heart transplant at our institution. Patients were excluded if age at transplant was > 21 years old or if echo studies did not provide adequate imaging. Recorded information included diagnosis type (congenital heart disease (CHD) or acquired heart disease (AHD) including cardiomyopathies) and whether aortic arch reconstruction was performed. Echoes at 3 months, 6 months, 12 months post heart transplant and then annually were reviewed. The aortic annulus, aortic sinus, aortic sino-tubular (ST) junction, and ascending aorta diameters were noted. Height and weight data was deemed unreliable, so ARD was defined by the presence of any of the following: (1) sinus/annulus ratio > 1.56, (2) ST junction/annulus ratio > 1.28, or (3) ascending aorta/annulus ratio > 1.35.

Results: 150 subjects (53% male) met study criteria; 74 had CHD, 73 had AHD and 3 with unknown pre transplant diagnosis. Of the 74 with CHD, 38 had prior aortic arch reconstruction. The median age at transplant was 3 years (7 days – 20.3 years) with a median duration of follow up of 3.88 years (3 months – 15 years). There was a significant increase in the number of subjects who developed ARD on a later follow up echo compared to the number who had ARD on their initial post-transplant echo irrespective of the pre transplant diagnosis **(Table 1).** An increased ST junction/annulus ratio was the most common abnormality identified. The median duration to maximum ST junction/annulus ratio was 7.6 months. There were no significant differences in prevalence of ARD or days to maximum ratio between the diagnosis groups (CHD vs AHD, aortic arch reconstruction vs no aortic arch reconstruction). Aortic regurgitation was very rare (7 with mild; none with >mild), did not correlate with ARD and did not require any interventions.

Conclusion: During intermediate F/U, ARD commonly develops in children post heart transplant, and the prevalence increases with time after transplant. Within 1 year after transplant, almost 50% had developed abnormalities in aortic root size that were not apparent at the initial post-transplant echo. This finding appears uniform across all pre-transplant diagnoses and irrespective of prior arch reconstruction.

Patient groups	ARD only on initial study	ARD after the initial study	p-value
CHD	2/58 (3.4%)	27/58 (46.5%)	**< 0.0001**
With aortic reconstruction	2/25 (8%)	11/25 (44%)	**0.008**
Without aortic reconstruction	0/33 (0%)	16/33 (48.48%)	**<0.0001**
AHD	2/62 (3.23%)	27/62 (43.55%),	**<0.0001**

Table 1: Comparison of patients who had ARD on their initial post transplant echocardiogram to those who developed ARD at any point in time after their initial echocardiogram.