

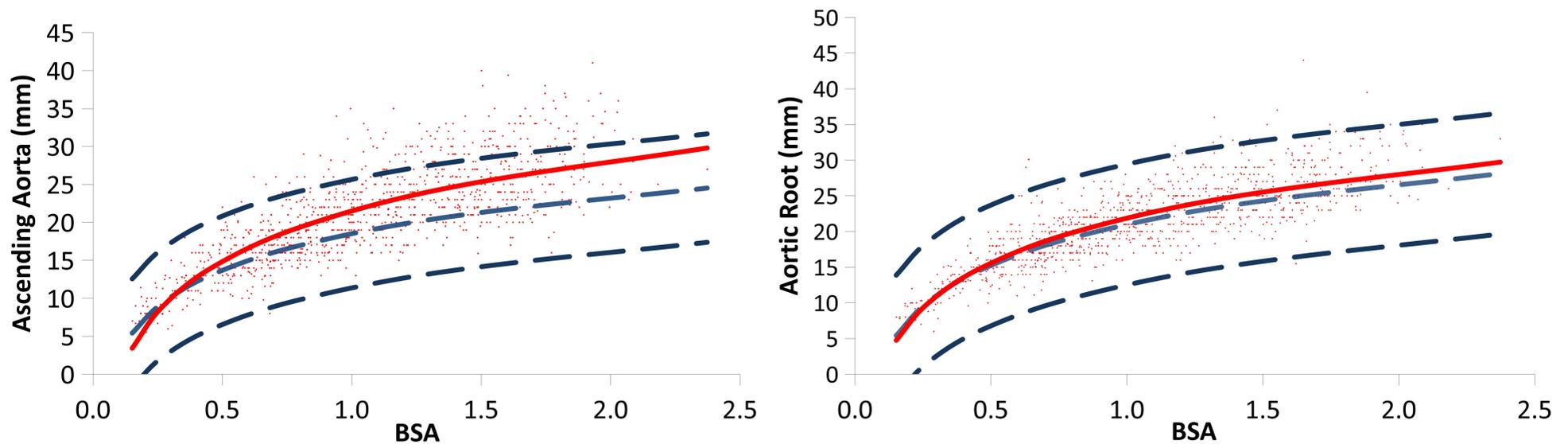
CRITERIA FOR AORTIC DILATATION DIAGNOSIS IN ADOLESCENTS WITH BICUSPID AORTIC VALVE

Siurana J.M¹, Sabaté A², Ayerza A, Jimenez L, Escriba S, Gonzalez M.A, Sorli M, Rodriguez M, Dominguez O, Rellan S, Portillo M, Albert L, Alvarez R, Figueras M, Teodoro S, Collell R, Lopez B, Manso B, Solana R, Riaño B, Rezola E, Rojo H, Cantero T, Isla R, Jimenez M, Tejero M.A, Perez A.M, Moriano A, Plata B, Salido C. ¹Fundació Hospital Nens de Barcelona. ²Hospital Universitari Vall d'Hebron. Spanish Registry children with bicuspid aortic valve (REVAB).

Introduction: In patients with a bicuspid aorta, it's common to find associated aortic dilation, which is usually the most frequent cause of surgical intervention. The main clinical guidelines point out the limit dilatation values to increase controls and to surgery. These are very well established in the adult population (absolute values) and in the child population (z-values), however, in adolescents, especially those with a body surface area (BSA) similar to adults, there is controversy about which method of measurement is the most appropriate.

Objective: Establish the threshold to define aortic root and ascending aorta dilatation in adolescents with bicuspid aortic valve. Specifically in those adolescents with adult BSA.

Methods: From the Spanish registry for children (≤ 18 years) with bicuspid aortic valve (REVAB), under the Spanish Society of Pediatric Cardiology and Congenital Heart Diseases (SECPC), patients ≥ 10 years were analyzed (N=464). The aortic root and the ascending aortic measures were compared in absolute value, value indexed by BSA and z-score, with the threshold of 40mm, 27.5mm/m² and +2/+3 respectively according to AHA guidelines. A second analysis was performed comparing patients ≥ 10 years with BSA <1.5m² and BSA ≥ 1.5 m².



Relationship between Ascending Aorta/Aortic Root diameters and BSA. Dashed lines: Mean ± 2 SD of expected size. Continuous lines: Mean of our series size.

Results: Overall, adolescents had a higher z-score of the ascending aorta than <10 years: 1.82 ± 1.8 SD vs 0.92 ± 2.1 SD, $p = 0.02$; while there was no difference for the aortic root: 0.40 ± 1.3 SD vs 0.16 ± 1.4 SD (see figures). When analyzing patients ≥ 10 years, a total of 214 patients (46.1%) had a z-score of the ascending aorta ≥ 2 and 126 patients (27.1%) had a z-score ≥ 3 while only 7 (1.5%) had an indexed value ≥ 27.5 mm/m² ($p = 0.003$ and $p = 0.002$ respectively) and 2 had an absolute value ≥ 40 mm ($p = 0.195$ and $p = 0.067$ respectively). For the aortic root, 51 patients (10.9%) had a z-score ≥ 2 and 13 (2.8%) a z-score ≥ 3 while 1 patient had an indexed value ≥ 27.5 mm/m² ($p = 1$ for both) and 1 patient had an absolute value ≥ 40 mm ($p = 0.105$ and $p = 0.027$ respectively). Almost half of the adolescents had a BSA ≥ 1.5 m² (231, 47.7%), of those, 109 (47.2%) had an ascending aorta z-score ≥ 2 , 67 (29%) had a z-score ≥ 3 , none had an indexed value ≥ 27.5 mm/m², and 2 had an absolute value ≥ 40 mm (0.9%). For the aortic root, 20 (8.7%) had a z-score ≥ 2 , 4 (1.7%) had a z-score ≥ 3 , none had an indexed value ≥ 27.5 mm/m², and 1 had an absolute value ≥ 40 mm (0.4%).

REVAB	<10 years	≥ 10 years	P value
n	606	464	
Age	4,61 \pm 2,91 SD	13,04 \pm 2,02 SD	
BSA	0,75 \pm 0,27 SD	1,50 \pm 0,25 SD	
Gender	♂ 67,8% ♀ 32,2%	♂ 70,7% ♀ 29,3%	0,300
Aortic Stenosis	15,3%	16,7%	0,689
Aortic regurgitation	Mild: 24% Moderate: 4,7% Severe: 0,3%	Mild: 37,9% Moderate: 11,2% Severe: 2,5%	0,000
AA z value	0,92 \pm 2,1	1,82 \pm 1,8	0,022
ARo z value	0,16 \pm 1,4	0,40 \pm 1,3	0,209

REVAB ≥ 10 years	Ascending Aorta			Aortic Root		
	n	%	P value	n	%	P value
z ≥ 2 vs Indexed value	214 vs 7	46,1 vs 1,5	0,003	51 vs 1	10,9 vs 0,2	1
z ≥ 3 vs Indexed value	126 vs 7	27,1 vs 1,5	0,002	13 vs 1	2,8 vs 0,2	1
z ≥ 2 vs Absolute value	214 vs 2	46,1 vs 0,4	0,195	51 vs 1	10,9 vs 0,2	0,105
z ≥ 3 vs Absolute value	126 vs 2	27,1 vs 0,4	0,067	13 vs 1	2,8 vs 0,2	0,027
z ≥ 2 BSA <1,5 vs $\geq 1,5$ m ²	111 vs 101	41,5 vs 46,8	0,245	31 vs 20	12,3 vs 8,7	0,198
z ≥ 3 BSA <1,5 vs $\geq 1,5$ m ²	65 vs 59	23,3 vs 28,6	0,187	9 vs 4	3,6 vs 1,7	0,215
Indexed value BSA <1,5 vs $\geq 1,5$ m ²	7 vs 0	2,8 vs 0	0,016	1 vs 0	0,4 vs 0	1
Absolute value BSA <1,5 vs $\geq 1,5$ m ²	0 vs 2	0 vs 0,9	0,227	0 vs 1	0 vs 0,4	0,477

Conclusions: There are a considerable number of patients who, depending on the dilatation criteria used, can be considered patients with a normal or dilated aorta, especially regarding the ascending aorta. This discrepancy is clinically significant, especially in the adolescent population when recommendations for lifestyle, follow-up and prognosis must be made. Our results denote that, especially in the ascending aorta, it would be usefully not to use the z value as a reference measure, especially in adolescents with anthropometric data similar to adults (BSA ≥ 1.5 m²), to avoid overrate to these patients and fall into unreal forecasts.

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