

Letters to the Editor

Impaired Aortic Valve Growth in Type 1 Diabetes Mellitus



To the Editor:

The onset of type 1 diabetes during childhood may cause growth retardation.¹ Growth velocity in prepubertal age and growth spurt in pubertal stage are reduced in patients with type 1 diabetes when compared with controls.² Glycemic control seems to be a determinant of impaired growth. Aortic valve root apparatus reaches adult dimension during puberty. No data report the diameters of aortic apparatus in patients affected by type 1 diabetes compared with controls. Therefore, we performed a complete 2-dimensional echocardiogram, and the aortic valve apparatus was measured from the parasternal long axes view in 93 young subjects with type 1 diabetes without cardiovascular and severe diabetic complications and 56 controls. As reported in Table 1, females affected by type 1 diabetes showed an aortic annulus diameter of 9.9 ± 0.9 mm/m² compared with 11.7 ± 1.1 mm/m² in female controls ($P < 0.01$), whereas diabetic males presented a diameter of 10.1 ± 1.1 mm/m² compared with 11.9 ± 1.4 mm/m² ($P < 0.01$) in male controls. Interestingly, men with type 1 diabetes showed a significantly lower aortic annulus diameter than female controls. Moreover, when we compared subjects with the onset of diabetes earlier than 10 years of age ($n = 31$) and then compared them with those with the onset of the disease later than 22 years of age ($n = 19$), a tendency towards a lower annulus diameter in patients with an early onset of diabetes (9.8 ± 0.9 vs 10.6 ± 1.1 mm/m², respectively; $P = 0.07$) was observed.

To the best of our knowledge, this is the first finding of a reduced growth of the aortic valve apparatus in patients with type 1 diabetes. Heart valvular homeostasis is a complex process involving a heterogeneous population of interstitial cells that are fibroblast-like in phenotype.³ After embryonic maturation, these cells convert into a quiescent phenotype and in the absence of diseases maintain physiological turnover of the extracellular matrix to provide efficient function throughout life.⁴ However, the mechanisms that regulate postnatal valve growth and remodelling as well as adult homeostasis are poorly understood. We believe that these

findings, if confirmed, are relevant because they may indicate that the altered metabolic and endocrine milieu of type 1 diabetes may interfere with those mechanisms that maintain growth and remodelling of the aortic valve during childhood.

Thus, we found a significantly lower aortic annulus diameter in young patients with type 1 diabetes compared with healthy controls. We speculate that this finding may be related to impaired growth of the aortic annulus in type 1 diabetes, especially when the onset of the disease is during childhood.

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Disclosures

The authors have no conflicts of interest to disclose.

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Table 1. Aortic measures of patients with type 1 diabetes and controls according to sex

	Female		<i>P</i> value	Male		<i>P</i> value
	Type 1 (n = 41)	Controls (n = 28)		Type 1 (n = 52)	Controls (n = 28)	
Age, y	33.2 ± 11.0	29.2 ± 7.2	0.07	32.5 ± 8.8	27.1 ± 4.4	< 0.01
Diabetes duration, y	18.9 ± 10.4			18.0 ± 10.2		
Height, cm	162.6 ± 5.4	165.0 ± 4.6	0.06	177.7 ± 6.8	179.9 ± 7.7	0.19
BSA, m ²	1.7 ± 0.1	1.6 ± 0.1	0.04	1.9 ± 0.2	1.9 ± 0.1	0.24
Annulus diameter/BSA, mm/m ²	9.9 ± 0.9	11.7 ± 1.1	< 0.01	10.1 ± 1.1	11.9 ± 1.4	< 0.01
Sinus of valsalva/BSA, mm/m ²	15.8 ± 2.0	17.2 ± 3.5	0.05	15.7 ± 2.0	16.1 ± 1.5	0.40
Sinotubular junction/BSA, mm/m ²	14.6 ± 2.9	13.7 ± 1.6	0.08	14.1 ± 2.1	13.3 ± 1.7	0.10
Ascending aorta/BSA, mm/m ²	15.1 ± 1.6	15.4 ± 1.4	0.40	14.4 ± 1.4	14.6 ± 1.4	0.49
Aortic arch/BSA, mm/m ²	13.1 ± 1.8	14.0 ± 1.6	0.05	12.5 ± 1.5	12.6 ± 1.3	0.75

All aortic measures were normalized to BSA.

Values are represented as mean ± SD. For comparisons 2-sided unpaired *t* tests were used.

BSA, body surface area.