Abstract: P1816

Aortic root morphology in bicuspid aortic valve is related to the type of BAV

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Topic(s):
Aortic Disease – Pathophysiology and Mechanisms

Citation:
Background: Dilatation of the ascending aorta associated with bicuspid aortic valve (BAV) is common and has been associated with an increased risk of aortic dissection. However, the causal links between BAV types, aortic valve dysfunction and aorta phenotype are still poorly understood. Our hypothesis is that aortic root dilatation in BAV is an anatomic modification related to the BAV type.

Purpose: to assess whether the morphology and orientation of the aortic root can be predicted by the type of BAV.

Methods: 86 patients with BAV without significant valvulopathy (aortic regurgitation < 2 and no more than mild stenosis with mean gradient < 10mmHg) referred for aortic aneurysm assessment and who had benefited from TTE and CT were studied.

Definitions:
-Typical BAVs have a horizontal valve opening (type I L-R and type 0 anteroposterior) while atypical BAVs have a vertical valve opening (type I N-R and type 0 lateral). (figure)
-Asymmetry of the root is evaluated in type I BAV using the normalized diameter ND=sinus to commissure diameter/mean of the 3 sinus to commissure diameters.

We compared, in the typical (n=64) and atypical (n=22) BAVs, using CT, the asymmetry of the root using the normalized diameter, the orientation of the bicuspid aortic valve opening and the orientation of the largest diameter of the aortic root using the sagittal plane as a reference. (Figure)

Results:
Patients with typical and atypical BAVs were comparable for age, sex, weight, height, aortic root surface area and maximum aortic root diameter.

•Aortic root asymmetric modifications were related to the type of BAV with:
  -a predominant non coronary sinus dilatation in type I L-R (Non coronary sinus to commissure normalized diameter=1.02 in Type I L-R vs 0.98 in type I R-N; p=0.0004).
  -a predominant left coronary sinus dilatation in type I L-N (left coronary sinus to commissure normalized diameter= 1.07 in type I R-N vs 1.01 in type I L-R; p<0.0001).
  -a significantly larger anteroposterior diameter in type 0 typical BAVs (45mm vs 40mm p=0.02) and a significantly larger lateral diameter in type 0 atypical BAVs (48mm vs 39mm p=0.0003).

•The orientation of the aortic valve opening is correlated with the type of BAV: Using the sagittal plan as a reference, this angle is 144.9° for the typical BAVs vs 56.6° for the atypical BAVs p<0.0001 (Figure)
•The orientation of the maximal aortic diameter is correlated with the type of BAV: Using the sagittal plan as a
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• The orientation of the maximal aortic diameter is correlated with the type of BAV: Using the sagittal plan as a reference, this angle is 64.3° for the typical BAVs and 143.1° for the atypical BAVs p<0.0001 (Figure)

Conclusion: The morphology and orientation of the aortic root in BAVs are strongly correlated with the type of BAV, suggesting anatomical modifications rather than aortopathy.