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Pattern of Ascending Aortic Dimensions Predicts the Growth Rate of the Aorta in Patients With Bicuspid Aortic Valve

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Objectives

This study sought to identify risk factors for rapid growth of the ascending aorta in patients with bicuspid aortic valve (BAV) disease, taking into account its phenotypic variability.

Background

Phenotypic heterogeneity of BAV-related aortopathy has recently been widely recognized. However, few studies have addressed the determinants of aortic growth so far, not distinguishing among morphological phenotypes.

Methods

Serial retrospective data on 133 adult outpatients with BAV undergoing echocardiographic follow-up were analyzed to search for factors associated with aortic diameter growth over time and with rapid aortic growth (fifth quintile of growth rate distribution), focusing on the impact of different valve morphotypes (i.e., cusp fusion pattern: right-left coronary [RL] and right-noncoronary [RN]) and previously defined aortic phenotypes (nondilated aorta, ascending dilation, root dilation).

Results

The RL pattern was present in 69% of patients with BAV and RN in 31%. At baseline, an ascending dilation phenotype was observed in 57% of patients and a root phenotype in 13.5%. No patient with RN-BAV had a root dilation phenotype at either baseline or last examination. Follow-up time averaged 4.0 ± 2.7 years (535 patient-years). The mean growth rate was 0.3 mm/year at the sinuses and 0.6 mm/year at the ascending level. Aortic regurgitation predicted an increase in ascending diameter over time (odds ratio [OR]: 2.3; p = 0.03). Root phenotype at presentation, not absolute baseline diameter, was an independent predictor of fast progression (>0.9 mm/year) for the ascending tract (OR: 14; p = 0.001). Fast growth was rarely seen in patients with the RL morphotype and ascending phenotype (6% at the root and 10% at the ascending level).

Conclusions

In patients with BAV, the root phenotype (aortic dilation predominantly at the sinuses, with normal or less dilated ascending tract) may be a marker of more severe aortopathy, warranting closer surveillance and earlier treatment. The more common ascending phenotype proved to be a more stable disease entity, generally with slower progression.

Key Words: aortic dilation, ascending aorta, bicuspid aortic valve, echocardiography, follow-up

Abbreviations and Acronyms: AR, aortic regurgitation, BAV, bicuspid aortic valve, MVP, mitral valve prolapse, RL, right-left coronary, RN, right-noncoronary, STJ, sinotubular junction

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