

difference between coronal and sagittal view indicated an asymmetric shape of aorta annulus in BAV. Diameter of aortic annulus of BAVs was significantly larger than controls ( $p<0.05$ ). Group A had larger aortic annulus than group B and controls ( $p<0.05$ ), while there was no difference between group B and controls ( $p>0.05$ ). In subgroup AS and AR, diameter of AS was similar to that of controls ( $p>0.05$ ), which was smaller than that of AR ( $p<0.05$ ). Diameter of aortic sinus had a descending order of group A, group B and controls and there was significant difference between any two groups ( $p<0.05$ ). Diameter of ascending aorta was obviously larger in BAVs than in controls, while there was no statistical difference between group A and B ( $p>0.05$ ).

ARV of BAVs at end-diastolic phase and end-systolic phase was larger than controls ( $p<0.05$ ). End-diastolic ARV of BAVs was smaller than that at end-systolic phase ( $p<0.05$ ), while there was no statistically difference between different phase in controls ( $p>0.05$ ). There was no difference between ARV in group A and group B at same phase ( $p>0.05$ ). No matter in group A or B, even in subgroup AS and AR, end-systolic ARV was larger than end-diastolic one ( $p>0.05$ ). The changes between smallest and largest ARV in group A, group B and controls were 14.5%, 13.3% and 9.03%. While in subgroup AS and AR, ARV changes were 8.87% and 17.6%.

**Conclusions** It was an asymmetric shape of bicuspid aortic annulus and aorta dilated even without severe stenosis or regurgitation. Three-dimensional echocardiography can provide more accurate assessment on aortic root. Aortic root volume used as an integrate indicator for evaluation the geometrical changes had its own potential value in the future therapy for aortic disease.

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#### REAL-TIME THREE-DIMENSIONAL ECHOCARDIOGRAPHY FOR ASSESSMENT OF BICUSPID AORTIC ROOT: PARTIAL AND UNITARY EVALUATING INDICATOR

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**Objectives** To validated the accuracy of three-dimensional echocardiography (3DE) for quantifying bicuspid aortic root geometry with partial and unitary indicators comparison with measurement by cylindrical sizers during operation

**Methods** Twenty-seven patients diagnosed as BAV scheduled for operation were enrolled as group A and 18 BAVs with relative normal haemodynamic were enrolled as group B. group A was also divided into subgroup AS and subgroup AR. All these groups received two dimensional transthoracic echocardiography (2D-TTE) and real-time three-dimensional transthoracic echocardiography (RT-3D-TTE). Real-time three-dimensional transesophageal echocardiography (RT-3D-TEE) was performed on patients during operation. Forty-two adults matching with age and gender enrolled as controls received 2D-TTE, RT-3D-TTE. Diameters of aortic annulus, aortic sinus and ascending aorta were all measured. Aortic root volume (ARV) was unitary indicators to evaluate the geometrical changes of aortic root.

**Results** Diameter of aortic annulus by 2DE was smaller than that from other methods ( $p<0.05$ ). Aortic annulus diameter on sagittal view was smaller than that on coronal view by 3DE ( $p<0.05$ ). The