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## Imaging

### CONTINUOUS WAVE DOPPLER ECHOCARDIOGRAPHY MEASUREMENT OF FUNCTIONAL AORTIC VALVE AREA IN SUBJECTS WITH AORTIC VALVE STENOSIS CORRECTED BY LEFT VENTRICULAR OUTFLOW TRACT SIZE BY ECG GATED 320 SLICE CT IN BOTH DOMED AND FLATTENED TYPE VALVES

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**Background:** Aortic valve area (AVA) by continuous wave doppler (AVAcw) on transthoracic Echocardiography (TTE) represents functional AVA, and is calculated using the diameter square of the left ventricular outflow tract (LVOT) (=LVOT area). However, as the cross section of the LVOT is not a complete circle, there may be error, producing differences between functional and anatomical AVA. To correct the estimate of the LVOT, we measured cross sectional area (CSA) of the LVOT and AVA (AVAct, representing anatomical AVA) by ECG gated 320 slice CT in subjects with aortic valve stenosis and compared corrected AVAcw with AVAct in each AV morphology type.

**Methods:** 26 consecutive subjects (11 male; mean age, 72.3±9.2 years) with a diagnosis of aortic valve stenosis with AVA<2cm<sup>2</sup> on TTE underwent TTE and 320 slice CT (Aquilion one) within 3 months without incident. CT images were reconstructed every 5% from 0-95% of the R-R interval, AVAct was determined in all phases using double oblique multiplanar reconstruction, and the most opened valve phase AVA in the narrowest site was considered AVAct. Several parameters in the table were also measured.

**Results:** On TTE and CT, 7 subjects revealed a domed, bicuspid aortic valve (Domed type), and 19 subjects revealed a flattened, tricuspid aortic valve (Flattened type). In a Bland and Altman analysis, the mean difference±1.96SD of AVAct minus AVAcw was 0.25±0.48cm<sup>2</sup> in Domed type and 0.21±0.49cm<sup>2</sup> in Flattened type. There was no significant correlation of any of the factors in the table with AVAct minus AVAcw in either type. Each AVAcw was then corrected using CSA of the LVOT on CT and termed cAVAcw. In a Bland and Altman analysis, the mean difference±1.96SD of AVAct minus cAVAcw was 0.01±0.88cm<sup>2</sup> in Domed type and -0.14±0.65cm<sup>2</sup> in Flattened type, and each absolute value of the mean difference was reduced after correction in both Domed and Flattened type.

**Conclusion:** By correcting LVOT size using CSA on CT, the functional AVA was closer to the anatomical AVA in both Domed and Flattened type AV. This may be due to underestimation of LVOT area on TTE.