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COMPARISON OF MDCT MEASUREMENTS OF AORTIC ANNULUS SIZE IN SYSTOLE AND DIASTOLE: A MULTICENTER EVALUATION

ACC Moderated Poster Contributions

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Background: Measurement of aortic annular size is critical for prosthesis sizing in transcatheter aortic valve implantation (TAVI). Multi-Detector CT (MDCT) can be used to derive aortic annulus dimensions. Changes of MDCT-derived annulus dimensions between systole and diastole are unknown. We analyzed changes of the aortic annulus diameters, area and circumference during the cardiac cycle in patients scheduled for TAVI.

Methods: 75 patients planned for TAVI were analyzed. To measure aortic annular dimensions, multiplanar reconstructions were rendered in a double-oblique plane aligned with the aortic annulus both in systole and diastole. Aortic annular dimensions (short, long and mean diameter, area and circumference) were independently measured by 3 expert readers from 3 institutions. Changes of aortic annulus geometry between systole and diastole were evaluated. Furthermore, interobserver agreement was determined for systolic and diastolic measurements.

Results: Aortic annulus area was significantly larger in systole compared to diastole ($476 \pm 91 \text{ mm}^2$ vs. $456 \pm 96 \text{ mm}^2$, $p < 0.001$). Similarly, there were small, but significant differences in circumference ($80 \pm 9 \text{ mm}$ vs. $78 \pm 9 \text{ mm}$), short diameter ($21 \pm 2 \text{ mm}$ vs. $20 \pm 2 \text{ mm}$; $p < 0.001$) and long diameter ($27 \pm 3 \text{ mm}$ vs. $26 \pm 3 \text{ mm}$, $p = 0.05$). The most reproducible measurement were the mean annular diameter (inter-observer intraclass correlation coefficient in systole: 0.84 [95% confidence interval (CI): 0.78 to 0.90] and diastole 0.853 [0.79 to 0.91] and annular area systole 0.81 [95% confidence interval: 0.60 to 0.90] and diastole 0.80 [0.60-0.88], with lower reproducibility of the 2-dimensional measurements long diameter systole 0.78 [0.68-0.85] diastole 0.79 [0.70-0.86] and short diameter systole 0.70 [0.49-0.82] and diastole 0.67 [0.47-0.80].

Conclusions: The aortic annulus is marginally smaller in diastole than systole across all MDCT methods of measurement. The interobserver reproducibility of these measurements appears unaffected by the phase of the cardiac cycle. Further study is needed to define the implications of these differences on sizing.