ASSESSMENT OF CYCLIC CHANGES IN THE SIZE OF THE AORTIC ANNULUS USING SPECKLE-TRACKING TRANSESOPHAGEAL ECHOCARDIOGRAPHY

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It is uncertain whether dynamic variation in the size of the aortic annulus occurs in the cardiac cycle in humans. The purpose of this study was to analyze cyclic changes of the aortic annulus using speckle-tracking transesophageal echocardiography (TEE). The subjects were 40 patients with aortic stenosis (AS) and 40 normal controls. Absolute and relative changes in the size of the aortic annulus and the times at which the maximum and minimum sizes occurred during the cardiac cycle were determined using speckle-tracking TEE. The maximum and minimum sizes were 22.9±2.6 and 20.1±2.7 mm, respectively, in controls. The change in size of the aortic annulus was 2.9±0.6 mm and the relative change was 13.1±3.5%. The maximum aortic annulus size was reached at the onset of aortic valve opening and the minimum size occurred in the rapid filling phase. In the AS group, the change in size of the aortic annulus was significantly smaller than that in the control group (2.2 ± 0.6 vs. 2.9 ± 0.6 mm, p <0.0001) and the time to reach the maximum size was significantly longer (99.2±18.2 vs. 84.1±18.3 msec, p =0.0003). The study showed that dynamics changes of the aortic annulus occur in the cardiac cycle and can be measured using speckle-tracking TEE. We also found that AS has an effect on the extent and timing of these changes. This suggests that accurate assessment of aortic annulus size requires consideration of timing in the cardiac cycle.