

Evaluation of diastolic left ventricular function using ECG-gated MDCT

Myong Hun Ham, Jongmin Lee

Kyungpook National University Hospital, Korea.

jonglee@knu.ac.kr

PURPOSE: The E/A and E/E' ratio has been used as an indirect factor to evaluate left ventricular diastolic function during echocardiography. In this study, we evaluated the feasibility of E/A and E/E' ratio measured during ECG-gated MDCT.

MATERIALS AND METHODS: Ninety-seven patients examined by both ECG-gated MDCT and echocardiography within one-month interval were recruited as subjects. From the ECG-gated MDCT data with retrospective ECG-gating, left ventricular volume change was measured during one cardiac cycle. The area of mitral valvular orifice was measured in en face view at each cardiac cycle. Trans-mitral-valvular velocities were calculated by dividing LV volume changes with MV orifice areas at 10-phase images for whole cardiac cycle. The ratio between velocities at early-diastolic (E) and late atrial contraction (A) phases was calculated as E/A ratio. Early diastolic mitral annular velocities (E' velocities) were calculated from moved longitudinal distances of mitral valvular annulus during E phase. Moved longitudinal distances of mitral valvular annulus were measured by multiplying changed slice number by slice thickness in en face view. The ratio between trans-mitral-valvular velocities at E phase and E' velocities was calculated as E/E' ratio. The E/A ratio and E/E' ratio were validated based on echocardiographic results.

RESULTS: The E/A ratios and E/E' ratios measured by ECG-gated MDCT and echocardiography showed significant correlation, respectively { $R = 0.68$ ($p < 0.0001$), $R = 0.77$ ($p < 0.0001$), respectively}

CONCLUSION: The E/A ratio and E/E' ratio measured by ECG-gated MDCT revealed a significant correlation with echocardiographic results. The E/A ratio and E/E' ratio could be used as an index for left ventricular diastolic function during ECG-gated MDCT