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Prognostic value of tissue-tracking mitral annular displacement by speckle-tracking echocardiography in asymptomatic patients with aortic stenosis with preserved left ventricular ejection fraction

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Background. Management of asymptomatic severe aortic stenosis (AS) patients with preserved left ventricular (LV) ejection fraction (EF) remains controversial. Recent studies using have shown that decreased LV longitudinal deformation assessed by global longitudinal strain analysis can predict adverse cardiac events in AS patients with preserved EF. Tissue-tracking mitral annular displacement (TMAD) by speckle-tracking echocardiography provides rapid and simple assessment of LV longitudinal deformation even when the acoustic window is poor (Fig.1).

Purpose. The purpose of this study was to examine the value of TMAD to predict occurrence of the cardiac events in asymptomatic severe AS patients with preserved EF.

Methods. We studied 103 patients with severe AS and preserved EF [aortic velocity >4m/s or aortic valve area (AVA) <1.0 cm², EF >50%] in whom TMAD was measured, and a total of 44 patients were included in the final data set according to the exclusion criteria. Using TMAD analysis software, the base-to-apex displacement of automatically defined mid-point of mitral annular line in four-chamber view was quickly assessed, and the percentage of its displacement to LV length at end-diastole (%TMAD) was calculated (Fig.1). We investigated the association between %TMAD and the cardiac events including implementation of hospitalization due to heart failure, decreased EF (<50%), aortic valve replacement or transcatheter aortic valve implantation due to appearance of symptoms and cardiac death,

Results. In all the final study patients, %TMAD was successfully and quickly (within 10 seconds) evaluated. During a follow-up, the cardiac events developed in 16 (36%) of 44 patients. Table shows echocardiographic parameters in patients with and without the cardiac events. %TMAD was significantly impaired in patients with the cardiac events compared with those without the cardiac events (9.6 ± 0.6 vs 12.1 ± 0.4%, p= 0.002). The other parameters were not involved in the event occurrence; age, LV mass index, EF, aortic velocity, AVA, tricuspid regurgitation pressure gradient (TR-PG), early diastolic /atrial filling velocity (E/A), early diastolic velocity of the mitral valve annulus (e’) and E/e’. In multiple variable analysis, %TMAD was an independent predictor of the cardiac events (HR; 12.1, p= 0.001). ROC analysis revealed that the area under the curve of %TMAD was 0.81 for the cardiac events. Kaplan-Meier analysis showed %TMAD (cut-off: 11.9) provides a significant difference in the cardiac event (Fig. 2). Conclusions. The present results suggest that TMAD easily and rapidly estimated by speckle-tracking echocardiography can be used as a simple method to predict occurrence of the cardiac events in asymptomatic severe AS patients with preserved EF.
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