NOVEL THREE DIMENSIONAL STRAIN ANALYSIS IN THE MEASUREMENT OF LV VENTRICULAR FUNCTION: HEAD TO HEAD COMPARISON BETWEEN 2D AND 3D SPECKLE TRACKING ECHOCARDIOGRAPHY

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Background: Complex cardiac deformation caused by simultaneous contraction and twist cannot be exactly evaluated with 2D technique. The aim of study was to evaluate the 3D-STE by comparing the regional and global longitudinal function measurement against the 2D-STE values in a wide range of subjects

Methods: Simultaneous 2D and 3D (frame rate of 25 ± 8 Hz by ECG gating over 4 cardiac cycles) data sets were acquired using GE Vivid E9 system in 26 normal subjects and 13 patients with RWMAs

Results: In overall subjects, global longitudinal strain (LS) determined by 2D and 3D were well correlated (R=0.84, p<0.001). However, only weak correlation was found in each segment of apical walls, but the correlation coefficients of mid wall segments were modest. Moreover, each segment of basal walls showed poor correlation between 2D and 3D STE values, and LS of averaged basal 6 segments were not statistically correlated between 2D and 3D STE. However, correlation between 2D and 3D STE in terms of averaged mid wall 6 segments (R=0.83, p<0.001) and averaged apical 4 segments (R=0.69, p<0.001) were excellent

Conclusions: Although 3D strain agreed well with 2D strain in the measurement of global longitudinal function, agreement between 2D and 3D in term of LS value of each segment was not good. Especially in basal segments, the correlation between 2D and 3D strain was poor. Therefore, our findings indicate that care must be taken when interpreting or comparing each regional strain value obtained using different (2D or 3D) methods.