Left Ventricular Untwist During Isovolumic Relaxation Time in Patients with Diastolic Dysfunction

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BACKGROUND

The traditional echocardiographic parameters can evaluate the left ventricular (LV) diastolic function later to mitral valve opening (MVO), while the LV untwisting predominantly occurs during the isovolumic relaxation interval (IVRT) before MVO, so its assessment reflects the LV relaxation. The aim of this study was to employ speckle-tracking imaging (STI) to examine the LV untwisting during IVRT in patients with diastolic dysfunction.

METHODS AND RESULTS

In this study 70 patients with diastolic dysfunction and 25 healthy volunteers were recruited, all individuals were subjected to conventional echocardiography and STI. Using STI, The percentage changes between peak twisting and untwisting at MVO (%UT) was defined as (%dpTw
- UtwMVO), the untwisting rate during IVRT (UT rate) was defined as the (%dpTw - UtwMVO)/IVRT, where UtwMVO is untwisting at MVO and Tw is the peak LV twist at end-systole. The %UT was significantly reduced among patients compared to controls (0.27± 0.08 vs 0.47 ± 0.06 at P ≤0.001) as such as the UT rate (0.37 ± 0.11 vs 0.67 ± 0.10 at p ≤0.001). Both of the %UT and the UT rate were inversely correlating with and LV wall thickness, peak twist, age, and the presence of DM and/or hypertension. The UT rate was positively correlating with Doppler tissue imaging (DTI) derived mitral annular velocity (e') and IVRT.CONCLUSION

Based on STI, LV untwist during IVRT is impaired in patients with diastolic dysfunction. The UT rate and %UT may be beneficial noninvasive parameters for detection of LV diastolic dysfunction.

KEYWORDS

Untwisting, Diastolic dysfunction, Speckle tracking.