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Objectives To assess the left ventricular global systolic function in patients with coronary artery heart disease by automated motion tracking of mitral annular displacement (TMAD).

Methods 30 patients (20 males and 10 females, aged from 39 to 67 years old, average age 58.33 ± 4.65 years old) with coronary artery heart disease (coronary artery stenosis $\geq 70\%$, which were confirmed by coronary angiography) and 31 age-matched normal controls (21 males and 10 females, aged from 33 to 59 years old, average age 52 ± 9.6 years old) were enrolled in this study. After routine echocardiography by Philips IE33 with S5-1 probe (the frequency is 1.7–3.4 MHz, frame rate >60 frame/s), left ventricular end-diastolic volume (LVEDV), left ventricular end-systolic volume (LVESV) and left ventricular ejection fraction (LVEF) were measured by biplane Simpson's method. Apical four-chamber, three-chamber and two-chamber two-dimensional dynamic images were stored, which lasted three to five consecutive cardiac cycles. The parameters were obtained using offline Qlab 7.0 software: maximal systolic displacement (Ds) of every annulus, systolic displacement of the middle point (D-mid), long-axis fractional shortening (FSL), then the mean of Ds, D-mid and FSL were calculated respectively. The correlation between mitral annular motion parameters and LVEF were analysed

Results

1. The mean of Ds, D-mid and FSL were significantly decreased in CHD group compared with normal controls ($p < 0.001$ for all).
2. TMAD was less time-consuming than biplane Simpson's method ($p < 0.001$), and the time for each method were (174.70 ± 29.98 s, 235.15 ± 38.35 s) respectively.
3. There was correlation between the mean of Ds, the mean of D-mid, the mean of FSL and LVEF ($r = 0.662, 0.706, 0.759, p < 0.001$) in normal group, and there was also correlation between the mean of Ds, the mean of D-mid, the mean of FSL and LVEF in CHD group ($r = 0.783, 0.733, 0.715, p < 0.001$).
4. Intraobserver and interobserver reliability for the mean of Ds, D-mid, and FSL were acceptable. Intraobserver ICC values of the mean of Ds, D-mid, and FSL were 0.87, 0.85, 0.93, and interobserver ICC values were 0.84, 0.84, 0.88, respectively.

Conclusions TMAD technology was a simple, accurate, and objective method, which can be used to evaluate the left ventricular global systolic function in patients with coronary artery heart disease.

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PRELIMINARY CLINICAL STUDY OF LEFT VENTRICULAR GLOBAL SYSTOLIC FUNCTION IN PATIENTS WITH CORONARY ARTERY HEART DISEASE BY AUTOMATED MOTION TRACKING OF MITRAL ANNULAR DISPLACEMENT

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