

Day-to-day Variation of Left Ventricular Segmental Longitudinal Strain in Patients with Ischemic Heart Disease

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Background: Little is known about the magnitude of spontaneous changes in segmental LV function for lack of sensitive tools to determine small variations. Automatic analysis of longitudinal strain (LS) has a small variability and a greater sensitivity to wall motion abnormalities than highly experienced readers.

Methods: Five IHD patients had a total of 18 repeated echo studies performed at a fixed hour in the morning, before any medication was ingested. Segmental LS based on speckle tracking was measured by Vivid 7 software. Segments with high quality recordings obtained from the 3 standard apical views were analyzed. Mitral medial- and lateral-annular and LV apical points were manually located. Endocardial tracking, LV division into 6 segments per-view and collection of data on peak-LS, peak-systolic-LS and time-to-peaks (TTP) was performed automatically. The analysis was performed by a layman, blindly.

Results: Repeated studies of 375 segments were available for analysis. Mean standard deviation (SD) and coefficient of variation (COV=SD/mean) of the parameters studied are presented in table. For comparison: intra-observer variation of the method for LS is 1.4±0.2.

	Peak LS	Peak Syst. LS	TTP LS	TTP Syst. LS
Mean SD	2.5±0.8	2.4±0.7	24.8±22.0	1.7±0.9
COV	0.32	0.29	0.89	0.53

No significant differences in daily variations between basal, mid and apical segments or between normal, hypokinetic and akinetic segments were found.

Conclusions: Ranges for day-to-day variation in LS measurements were determined. Spontaneous changes in LS are measurable and must be taken into account when evaluating changes in segmental strain in a given patient.