EARLY SYSTOLIC LENGTHENING MAY IDENTIFY MINIMAL MYOCARDIAL DAMAGE IN PATIENTS WITH NON-ST-ELEVATION ACUTE CORONARY SYNDROME

Poster Contributions
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Authors: Wasim Zahid, Christian Eek, Espen W. Remme, Helge Skulstad, Erik Fosse, Thor Edvardsen, Oslo University Hospital Rikshospitalet, Oslo, Norway

Background: There is a substantial “tug-of-war” effect between the different left ventricular (LV) segments as the intraventricular pressure rises steeply during the isovolumic contraction phase. However, during ischemia, the affected LV segments develop contractile force at a lower rate than the non-ischemic segments. As a result, non-ischemic segments with preserved contractile force cause ischemic segments to stretch in early systole. We hypothesized that the time they remain stretched, duration of early systolic lengthening (DESL), correlates to the extent of myocardial damage in patients with non-ST-elevation acute coronary syndrome (NSTE-ACS). We also assessed whether DESL could identify acute coronary occlusion in these patients.

Methods: In this study, we included 150 consecutive patients with NSTE-ACS referred for coronary angiography. Speckle tracking echocardiography was performed prior to angiography to determine DESL, which was defined as the mean time period in which the strain curves of the different segments stayed positive, from the onset of a Q-wave (or R-wave if Q was absent) on the ECG. Final infarct size was quantified with contrast enhanced magnetic resonance imaging (CE-MRI) at follow-up 9±3 months after initial admission in 61 patients.

Results: DESL showed good correlation to final infarct size (r= 0.67, p<0.001). Thirteen patients had no visible sign of infarct on CE-MRI (minimal myocardial damage), and DESL was significantly shorter in these patients, than in patients with signs of infarct (27±19 vs. 84±41 ms, p<0.001). Compared to left ventricular ejection fraction, wall motion score index, and global longitudinal strain, DESL showed the best accuracy in detecting patients with minimal myocardial damage, with an area under the receiver operating characteristic curve of 0.92 (0.82 to 0.99, p<0.001). DESL was more prolonged in patients with coronary occlusions, compared to those without occlusions (86±45 vs. 63±31 ms, p<0.01).

Conclusions: DESL correlates to infarct size, and a short DESL can accurately identify patients with minimal myocardial damage. DESL may differentiate between occlusion and non-occlusion in NSTE-ACS patients.