Can strain imaging predict viability in ST segment elevation myocardial infarction patient

Authors:
F Mghaieth Zghal1, S Habboubi1, S Boudiche1, M Ben Halima1, B Rekik1, A Farhati1, S Ouali1, MS Mourali1,
1Rabta Hospital - Tunis - Tunisia,

Topic(s):
Tissue Doppler, Speckle Tracking and Strain Imaging

Citation:
ABSTRACT

Background: In the acute phase of ST elevation myocardial infarction (STEMI), the main objective is to recanalize the guilty artery, but it is important to know whether myocardium with severely compromised function is permanently injured or reversibly dysfunctional indicating myocardial viability. On the other hand, viability tests such as scintigraphy, magnetic resonance imaging with delayed enhanced (DE-MRI) or dobutamine stress echocography are either not validated or unavailable in the acute phase of STEMI. The assessment of myocardial deformation by bidimensional strain (2D) is a technique that has emerged in recent years with good correlation with MRI for viability assessment. An important question remains: Is myocardial viability can be determined by 2D strain parameters at the acute phase of STEMI?

Aim: To assess myocardial viability in the acute phase of STEMI by 2D strain echocardiographic parameters in comparison with 3 month DE-MRI as a reference method.

Methods: A total of 31 first STEMI patients treated with successful primary or elective percutaneous coronary intervention (PCI) were included with an akinetic area on echocardiography corresponding to the infarct segments. Doppler strain values from left ventricular basal, mid and apical segments (n = 527) were obtained at the acute phase of STEMI and checked up after 3 months. The scar was assessed for viability by DE-MRI as reference method, 3 months after the acute phase. Viability was defined by a DE < 50% of wall thickness in the scar zone.

Results: Mean age of the study population was 59.29 ± 9.96 years, 27 (87%) being males. Nine patients (29%) showed post-PCI improvement of left ventricle (LV) function. Regional peak systolic strain of the infarct segments and global longitudinal strain (GLS) after 3 months. At the acute phase, wall motion score index (WMSI), regional and global strain values were significantly better in the viable than in the non-viable segments. GLS was -10.92 ± 2.48 in patients with MRI non viable myocardium and -14.45 ± 2.91 in patients with MRI viable myocardium. A pre-PCI strain value of -2.9% as a cut-off predicted segmental function recovery after PCI and myocardial viability with a sensitivity 82% of and a specificity 84%.

Conclusion: This monocenter study confirms that 2D strain imaging can be a useful and accurate method to predict myocardial viability and recovery of segmental and global LV function after PCI in STEMI patients.