Strain rate imaging in ischaemic heart disease

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155 Combined assessment of segmental circumferential strain and segmental rotation by speckle tracking echocardiography in normal and ischemic myocardium

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Background: MRI-tagging has been the only non-invasive, angle independent method for assessment of regional myocardial strain. Recently, 2-D speckle tracking echocardiography (STE) has been proposed as an alternative method.

Aim of the study: To validate combined assessment of peak segmental circumferential strain (CS) and segmental rotation by STE in normal and ischemic myocardium, using MRI-tagging as reference method.

Methods: In 9 healthy controls and 7 patients with previous anterior infarctions, LV apical short-axis images were obtained by conventional echocardiography and MRI-tagging. From the echocardiographic recordings peak CS and rotation were measured in six apical segments by automatic tracking of speckle pattern displacement from frame to frame. Corresponding measurements were done by MRI-tagging analysis.

Results: In healthy controls mean peak CS for all segments was 33.8±3.5 (±SD) by STE and 30.6±3.5% by MRI, as compared to 14.2±10.1 (p<0.0001) and 14.1±10.1% (p<0.0001) as compared to 14.2±10.1 (p<0.0001) and 14.1±10.1% (p<0.0001) as compared to 14.2±10.1 (p<0.0001) and 14.1±10.1% (p<0.0001).

Conclusion: Segmental CS and rotation can be measured accurately by STE, which is a promising non-invasive tool for quantification of regional LV function.

156 Speckle tracking echocardiography (2-D strain) allows diagnosis of left ventricular regional systolic and diastolic dysfunction in patients with coronary artery disease at rest

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Background: Diagnosis of regional myocardial disturbances at rest in patients with coronary artery disease (CAD) is challenging in absence of overt left (LV) ventricular dysfunction. The new 2-D strain, a grey-scale based software, called Speckle tracking (STE), may differentiate healthy from diseased LV walls at rest. By virtue of its ability to register velocity and its derivatives from longitudinal, radial, circumferential and global level, STE may provide data to understand LV motion dynamics in CAD. The aim of the present study was to investigate whether regional myocardial dysfunctions could be diagnosed at rest.

Methods: 15 subjects (54±8 yrs) without CAD and 8 with angiographically documented CAD (63±7 yrs) underwent STE on a new version of VIVID 7 equipment. Parasternal short axis and apical LV images were post processed using a custom STE software to measure longitudinal, radial, circumferential and global level, STE may provide data to understand LV motion dynamics in CAD. The aim of the present study was to investigate whether regional myocardial dysfunctions could be diagnosed at rest.

Results: LV dimensions and ejection fraction did not differ (all p>0.05). Longitudinal S1, S2, and E' velocities, & S% differed regionally (Fig 1) in the two groups. Similarly, S1 and S2 velocities showed a strong positive association (r=0.9; p<0.001) that became worse in CAD (r=0.7; p<0.001).

Conclusion: STE obtained regional S1, S2, and E’ velocities and S% which can differentiate healthy from diseased LV segments already at rest. STE also reveals altered LV motion dynamics in patients with CAD.

157 Alteration of left ventricular mechanics in subendocardial infarction: assessment by strain rate imaging

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Previous animal studies have suggested that myocardial contractile function at rest is dependent on longitudinal fibres in the subendocardium.

Aim: We aim to investigate how short and long axis functions are affected by subendocardial infarction in humans.

Methods: Fifty-five (n=55) patients post myocardial infarct underwent tissue Doppler imaging (TDI) and gadolinium contrast enhanced cardiac magnetic resonance imaging (Ce-MRI). Transmural extent of infarct (TME) was measured by the degree of delayed gadolinium enhancement on Ce-MRI. Subendocardial infarct was defined as TME<50% and transmural infarct as TME>50%. Regional short-axis contractile function was assessed by measuring regional ejection fraction (EF), and percentage systolic radial thickening of the myocardium (%ST) on