Slikovne metode deformacije miokarda (strain/strain-rate)

Deformation Imaging (Strain and Strain-rate Imaging)

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The non-invasive quantification of regional myocardial function is an important goal in clinical cardiology. Myocardial thickening/thinning indices is one method of attempting to define regional myocardial function. An ultrasonic method of quantifying regional deformation has been introduced last decades based on the principles of 'strain' and 'strain rate' imaging. These imaging modes introduce concepts derived from mechanical engineering. In order to maximally exploit these techniques, an understanding of what they measure is indispensable. Doppler Myocardial Imaging (also called Tissue Doppler Imaging or Myocardial Velocity Imaging) is a quantitative approach to the assessment of regional myocardial function. Based on local velocity estimation, the technique allows the measurement of regional strain and strain rate parameters with high temporal resolution with respect to angle-dependence. Another relatively new ultrasound technique is Speckle-tracking echocardiography (STE) that can be used in conjunction with two-dimensional or three-dimensional echocardiography for resolving the multidirectional components of left ventricular (LV) deformation. The tracking system is based on grayscale B-mode images and is obtained by automatic measurement of the distance between 2 pixels of an LV segment during the cardiac cycle, independent of the angle of insonation. However, the accuracy of speckle tracking is dependent on 2D image quality and low frame rates. This topic will define each of these modalities in terms of physical principles and limitations, and will give an introduction to the principles of data acquisition and processing required to implement ultrasonic strain and strain rate imaging in clinical work.

Keywords: echocardiography, regional myocardial function, Doppler.

Ključne riječi: ehokardiografija, regionalna funkcija miokarda, Doppler.

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