Echocardiography for coronary artery disease – strain or not to strain

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Wall motion abnormalities on echocardiography play important role in diagnosing and treating ischemic heart disease. However, assessment of typical wall motion abnormalities represented as myocardial thickening is a little bit subjective and operator dependent. Wall motion abnormalities of patients with focal ischemic myocardium also used to be missed because of tethering motion of ischemic myocardium. Therefore, a necessity of more objective and inclusive non-invasive method arises clinically in estimating ischemic heart disease.

Doppler- and two dimensional- derived myocardial deformation analyses may be additional methods for objective and accurate estimation of ischemic heart disease. Recent several studies demonstrated that decreased strain and strain rate and increased postsystolic shortening were associated with ischemic heart disease and had an incremental benefit compared with the assessment of wall motion abnormalities in detection of coronary artery disease. In addition, these myocardial deformation parameters to measure before and after index revascularization or during dobutamine infusion were useful predictors of adverse outcomes, irreversible myocardial dysfunction and assessed infarct scar size in patients with revascularization after acute myocardial infarction.

Despite clinical utility of myocardial deformation analysis, however, strain rate analysis has been rarely used as daily practice in patients with known or suspected coronary artery disease. In fact, Doppler strain imaging analysis needs highly training and is time-consuming work because it is one dimensional and angle dependent and needs high frame rate. On the other hand, two dimensional strain rate imaging analysis can relatively measure easily and shows similar clinical useful data compared with Doppler strain imaging. Variable vendor dependent cut-off values and measuring algorithms also remain as barrier to use strain analysis as standard practice. Nevertheless, myocardial deformation analysis will be a useful method to estimate ischemic heart disease through the rapid technical development in early future.

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