# Prediction of regional coronary perfusion abnormalities using regional two-dimensional strain in non-ST elevation acute coronary syndrome

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**Background**: Visual assessment of regional wall motion abnormalities (RWMA) on echocardiography represents the current standard in assessing the coronary artery disease (CAD) induced changes in myocardial contractility. Although it has been proven to predict long-term outcomes it's hard to rely on in acute situations due to the patient dependent variance in image acquisition quality and interoperator variability. It has been shown that 2D strain (2DS) is a sensitive indicator for sub-clinical myocardial injury.[1,2] The purpose of this study was to assess the value of regional 2DS performed early in patients with non-ST elevation acute coronary syndrome (NSTE-ACS) for predicting localization of ischemia-inducing stenosis and compare it with RWMA.

**Patients and Methods**: We performed a retrospective analysis of patients admitted from January 2013 till December 2015 with the diagnosis of NSTE-ACS. Exclusion criteria were no coronary angiography, known prior CAD, no echo in 24 hours prior to angiography and image quality not adequate for 2DS analysis. Total of 123 patients were included. 4 clinicians blinded to laboratory and ECG results performed 2DS analysis of regional longitudinal peak systolic strain (LPSS) according to the 18-segment model, and RWMA were categorized according to the wall motion score guidelines, as interpreted by the clinician performing the original echo.

**Results**: We found significant correlation of flow limiting stenosis, defined as a narrowing of >70% on angiography, with LPSS decrease for all three coronary vessels (**Table 1**). RWMA shows good predictive power of stenosis in LAD and LCx, but not in RCA (**Figure 1**). However, LPSS was more precise overall (mean sensitivity 75.6% vs 39.5%,

**TABLE 1. Regional visual wall motion assessment 2D longitudinal peak systolic strain values according to segments and location of coronary stenosis.**

| Segment | Lession location | *P* |
|---|---|---|
| APLAX Basal anteroseptum | LAD | 0.098 |
| APLAX Mid anteroseptum | LAD | <0.0001 |
| APLAX Apical anteroseptum | LAD | <0.0001 |
| APLAX Apical inferolateral | LCx | <0.0001 |
| APLAX Mid inferolateral | LCx | 0.04 |
| APLAX Basal inferolateral | LCx | 0.01 |
| A4C Basal inferoseptal | RCA | 0.087 |
| A4C Mid inferoseptal | LAD | 0.1 |
| A4C Apical inferoseptal | LAD | <0.0001 |
| A4C Apical anterolateral | LAD | 0.003 |
| A4C Mid anterolateral | LCx | 0.366 |
| A4C Basal anterolateral | LCx | 0.015 |
| A2C Basal inferior | RCA | 0.133 |
| A2C Mid inferior | RCA | 0.722 |
| A2C Apical inferior | LAD | 0.15 |
| A2C Apical anterior | LAD | <0.0001 |
| A2C Mid anterior | LAD | 0.027 |
| A2C Basal anterior | LAD | 0.032 |

LAD = left anterior descending coronary artery; LCx = left circumflex coronary artery; RCA = right coronary artery; APLAX – Apical long axis view; A4C – Apical four chamber view; A2C – Apical two chamber view.

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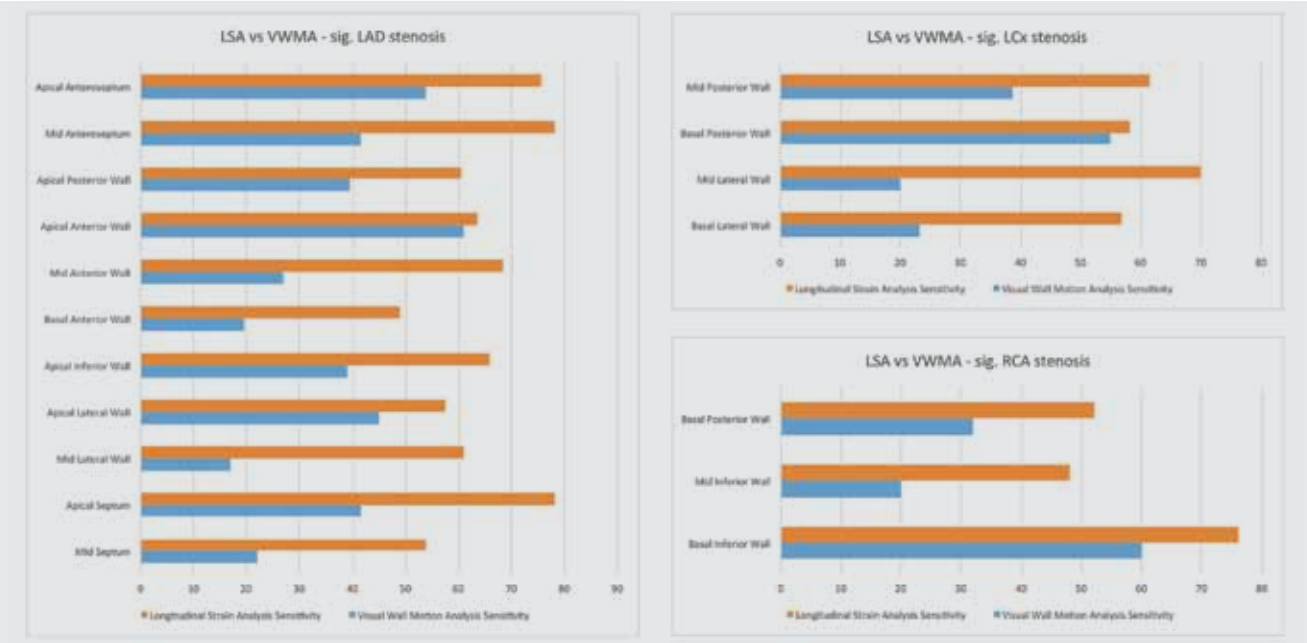


**FIGURE 1. Comparison of sensitivity for detection of significant coronary artery stenosis of regional visual wall motion assessment (VWMA) vs 2D longitudinal peak systolic strain analysis (LSA).**

P<0.001), and significant difference was present even after accounting for potentially confounding factors like arterial hypertension, smoking, alcohol, atrial fibrillation, valvular disease, age or prior medical therapy.

**Conclusion**: We have shown that there is significant correlation between a decrease in LPSS and localization of significant stenosis in patients with NSTE-ACS, and that it is significantly more accurate in detecting ischemia induced loss of myocardial contractility than the visual assessment of RWMA.

## LITERATURE

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