Correlation between Global left ventricular Longitudinal Peak Systolic Strain and SYNTAX Score in evaluation of coronary artery disease

Thesis

Submitted in partial fulfillment of the requirements for the M.Sc. degree in cardiology

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Summary

Detection of significant coronary artery disease (CAD) in patients with stable angina is a major challenge. Echocardiography is a well validated non-invasive test for assessment of myocardial ischemia, however the judgment of wall motion abnormalities (WMA) is subjective and needs high experience, also it relies only on assessing the radial mechanics, neglecting the most vulnerable longitudinal one. 2D speckle tracking echocardiography (STE) is a relatively new, largely angle-independent technique, that allows evaluation of the three components of myocardial deformation. The speckles seen in grayscale B-mode images are the result of constructive and destructive interference of ultrasound backscattered from structures smaller than the ultrasound wavelength. The early affection of longitudinal function, renders the longitudinal strain a potential sensitive marker of myocardial ischemia.

The aim of the present work was to study the diagnostic accuracy of global longitudinal strain at rest in detecting significant CAD as compared to conventional wall motion abnormality (WMA) assessment.

We prospectively studied 70 symptomatic patients (excluding those with significant structural heart disease). For all patients 2D STE analysis was done. Coronary angiography was done within one month. SS was calculated for each group of patients based on the presence and/or the severity of coronary artery disease (CAD): no CAD on angiogram (n=10, control group), low SS (n=25, SS<22) and high SS (n=35, SS≥22).

Results: The mean age was 55±9.6 years, 54% were males, two third of patients were hypertensive, 52% were diabetic, high percentage of high syntax score were noticed among males, diabetic patients and smoker, also low mean of GLS were noticed among diabetic patients and smoker, otherwise, there were no significant differences between the groups regarding the other baseline characteristics.

There is statistically significant positive correlation with p-value < 0.05 between syntax score and each of (LVEDD, and LVESD) , on the other hand statistically significant negative correlation with p-value < 0.05 between syntax score and each of (E/A, GLS, AP2LS, AP3LS, and AP4LS) is noted.

On using Receiver Operating Characteristic Curve (ROC) analysis, a cut off value of 17.8 &16.5 showed 84% &93% sensitivity and 70% &91% specificity to detect high and low syntax score respectively.

Conclusion: 2D longitudinal strain analysis has incremental diagnostic value over visual assessment during echocardiography in predicting significant coronary artery disease; GLS may offer a potential sensitive tool to detect significant CAD.