

DIAGNOSTIC VALUE OF 2D STRAIN IMAGING IN PATIENTS WITH SUSPECTED CORONARY ARTERY DISEASE

**Daniela TEFERIÇI¹, Spiro QIRKO¹,
Elizama PETRELA², Alban DIBRA¹,
Elvis PAVLI¹, Petrit BARA¹**

¹ Department of Cardiology, UHC "Mother Theresa", Tirana

² Department of Statistics, UHC "Mother Theresa", Tirana

Abstract

Background and Objectives: Strain imaging (SI) has been shown to quantify regional myocardial function in both acute ischemic myocardium and infarcted myocardium. The aim of this study is to determine the diagnostic value of SI for the detection and localization of coronary lesions in patients with chest pain, but without apparent wall motion abnormalities.

Methods: SI for advanced wall motion analysis was performed in 59 patients with suspicious stable angina (SA) and in 57 patients with suspicious unstable angina (UA), prior to coronary angiography. All the patients had normal conventional wall motion scoring. Longitudinal strain was measured in 3 apical views, and assessments of the strain value for individual segments with using an 18-segment division of the left ventricle were performed to determine the average strain value. For the identification of ischemia a magnitude parameter, being defined as a reduction of the peak systolic strain, was used. A homogenous pattern or constant strain was defined as relatively uniform distribution of the peak systolic strain. Heterogeneity of strain was considered abnormal; these segments were called the strain-positive segments and the rest of the segments were called strain negative. Significant coronary artery disease (CAD) was considered present if stenosis above 70% was noted on the quantitative angiography.

Results: Of the 59 SA patients, 28 had >70% stenosis (ischemic-SA) and 31 had normal coronary anatomy or 50% stenosis (normal-SA). Of the 28 patients in the ischemic-SA group, 9 patients (32%) showed a homogeneous pattern of peak systolic strain throughout the wall (strain negative) and 19 patients (67%) showed heterogeneity of strain (strain positive). Of 31 patients with normal coronary anatomy or <50% stenosis (normal-SA), 6 patients (19%) showed heterogeneity of strain (strain positive) and 25 patients (80%) showed a

homogeneous pattern of peak systolic strain throughout the wall (strain negative). The positive predictive value of strain was 76% in the SA group.

Of the 57 UA patients, 32 had >70% stenosis (ischemic-UA) and 25 had normal coronary anatomy or 50% stenosis (normal-UA). Of the 32 patients in the ischemic-UA group, 7 patients (22%) were determined to be strain negative, and 25 patients (78%) were determined to be strain positive. Of 25 patients with normal coronary anatomy or 50% stenosis (normal-UA), 25 patients (80%) showed a homogeneous pattern of peak systolic strain throughout the wall (strain negative) and 6 patients (19%) showed heterogeneity of strain (strain positive). The positive predictive value of strain was 78,1% in the UA group.

Sensitivity and specificity of 2D strain was evaluated using diagnostic test. The results were: 76% and 80,6% respectively in the stable angina group and 78,1% and 73% respectively in the unstable angina group.

Conclusion: Ultrasound-based SI demonstrates a strong correlation with coronary angiography and it has potential as a noninvasive diagnostic tool for detecting CAD in patients with chest pain, but who are without apparent wall motion abnormalities on conventional echocardiography.

Key words: Coronary artery disease (CAD); Echocardiography; Strains.

Introduction

Evaluation of left ventricular (LV) regional ischemia was traditional based on the visual assessment of wall motion and wall thickening, which were derived from two-dimensional (2D) grayscale imaging.

This echo technique has its limitations, with relatively high for both intra-observer and inter-observer variability (1), and the limited ability of the human eye to resolve rapid and short-lived myocardial motion (2). Acute myocardial ischemia induces a delay in the