Correlation between Tei index and E/Ea ratio in patients with first acute myocardial infarction

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Purpose: Tei index has been proposed as a non invasive and simple index that enables the evaluation of global left ventricular (LV) function. We hypothesized that left ventricular function, expressed by the Tei index, allow non invasive estimation of impaired hemodynamic during acute myocardial infarction (AMI).

Methods: We studied 72 patients with a first AMI. Measurements of Doppler echocardiographic parameters from mitral inflow were performed during the first 48 hours after admission. Mitral annulus Doppler tissue velocities were measured from septal and lateral wall. E/Ea ratio was calculated. Tei index was obtained as: (a – b)/b, where (a) is the interval between the cessation and onset of mitral flow and (b) is the ejection time by aortic flow by pulsed Doppler echocardiography. Aortic Pre-ejection period (PEP) was measured and Aortic PEP/ET (ejection time) ratio were also calculated. The left ventricular diastolic pressure was measured during the coronary angiography.

Results: Tei index had a negative correlation with the peak systolic myocardial velocities (r=–0.36, p=0.002). Tei index and Aortic PEP/ET ratio showed also significant correlation both with E/Ea ratio (r=0.33, p=0.005 and r=0.28, p=0.01 respectively).

Patients with high left ventricular diastolic pressure have a Tei index significantly higher than patients with normal left ventricular diastolic pressure (0.52±0.21 vs 0.41±0.23, p=0.05).

Conclusions: Tei index allows not only the estimation of left ventricular systolic function but also show an approximate estimation of left ventricular diastolic pressure in patients with AMI.

Left atrial area index over late diastolic mitral annulus velocity is a useful echo index to identify diastolic dysfunction in patients with acute myocardial infarction

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Background: Combined interpretation of late diastolic mitral annulus velocity (Aa) with left atrial area may have additional benefits in the assessment of diastolic dysfunction. The purpose of the study was to demonstrate a correlation between the LA area/Aa ratio and classical echocardiographic parameters analyzing the diastolic function in patients with a first acute myocardial infarction and may be useful in the identifying diastolic dysfunction and predicting clinical outcomes.

Methods: We enrolled 72 consecutive patients hospitalized for a first acute myocardial infarction and performed transthoracic Doppler echocardiography during the first 48 hours after chest pain onset.

LA area/Aa ratio was evaluated in terms of diagnosing diastolic dysfunction and predicting clinical outcomes.

Results: There is a correlation between LA area/Aa ratio and many classical echocardiographic parameters analyzing the diastolic function (Table 1). During follow-up, the group with LA area/Aa ≥2.4 had a higher incidence of primary composite outcomes (cardiac death and/or rehospitalization for heart failure) than the group with LA area/Aa <2.4 (33% vs 1.6%, P<0.001).

Conclusions: As a new echo index, LA area/Aa is a useful parameter to identify advanced diastolic dysfunction and predict clinical outcomes in patients with a first acute myocardial infarction.
tral Doppler (E, A) and lateral and septal mitral annular systolic (Sa) and dias-
tolic (Ea) velocity measurements and their mean (Sae and Eae). Age and LVEF were 56±11y and 28±8%: 39% had ischemic cardiopathy; 75% were NYHA 4; 48% had increased PCWP>15 mmHg. Correlations between PCWP and the three tested E/Ea ratios ranged from 0.33 to 0.47 and E/Elat showed the best correlation (all p<0.001). Fifty-five patients (44%) had an ele-
vated E/Elat >15. Specificity and sensitivity of E/Elat for increased PCWP were globally poor (76%: C95[65-86] and 58%; C95[45-71%]). The cohort was sub-divided into quintiles accordingly to Salat velocity. In patients with higher lateral Salat>4.5 cm/s (three upper quintiles, N=78), specificity of E/ 
Elat for increased PCWP was 91% C95[78-97], significantly higher (p<0.01) than in the two lower quintiles with Sa<4.5 cm/s (39%; CI95[17- 
64]). In contrast, sensitivity of E/Elat was not significantly different among 
groups of Salat. When considering E/Elat as a continuous variable, area 
under the ROC curve (AUC) was 0.72 (0.63-0.79) in the entire population. 
AUC was better in the group with Salat>4.5 cm/s (0.82 [0.71-0.92]) than the group with Sa<4.5 cm/s (0.54 [0.38-0.71]), with significant difference between the two AUCs (p=0.005). Specificities, sensitivities and AUCs of, E/Elat, and E/Ea/et after stratifying for Salat values were lower than those observed with E/Elat.

Conclusion: Our data suggest that E/Elat may be a reliable tool to iden-
tify patients with normal LV filling pressure in severe systolic HF if longitudi-
dinal contractility is preserved (Salat>4.5cm/s).

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New parameters for the quantification of the right ventricle systolic function: a prospective MRI study

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Purpose: Cardiac MRI is the gold standard for studying the right ventricle 
(RV) systolic function, a well-established prognosis determinant of cardiomy-
opathies. We sought to identify new reliable and less time consuming param-
eters than endocardial delineation, for assessing right ventricular systolic 
function.

Methods: Forty three unselected patients (31 males, 12 females) aged 19-
81 years who were referred for cardiac MRI in a University Hospital center were included consecutively.

MRI Right and Left Ventricle Ejection Fraction (RVEF, LVEF) were mea-
sured by defining the contour of the endocardium. In a subsequent post-treat-
ment investigation, we blindly measured MRI TAPSE (mTAPSE), and the RV 
diastolic and systolic diameters (dD, sD) at basal and medial levels in a short 
axis view. We then calculated new parameters we called Fractionnal Basal 
Diameter Change FBDC=(basal dD – basal sD)/ basal dD, and Fractionnal 
Medial Diameter Change (FMDC) calculated by the same method at a medial 
level.

Results: Thirty five patients had a RVEF>40% (group A), 8 patients 
(19%) had a RVEF<40% (group B).

MRI stroke RV and LV volumes showed very strong correlations (r=0.87 
p<0.0001), thus MRI RVEF was a reliable measurement.

In group A, FBDC was 0.23±0.08, FMDC was 0.22±0.11 and mTAPSE was 24 +/-9 mm. In group B, FBDC and mTAPSE were significantly lower than in group A (FBDC=0.14 +/-0.11 r=0.01, 
FMDC=0.13+/−0.11 p=0.04, mTAPSE=16+/-5 mm p=0.02).

Conclusions: New regional right ventricle parameters correlated well with MRI RVEF especially at a basal level. These parameters appeared more sig-
nificant than TAPSE, a well-established parameter of systolic right ventricle 
function in echocardiography.

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Comparison between echocardiographic (TTE) and cardiac magnetic resonance (CMR) parameters of left ventricular afterload and remo-
deling

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Objective: To investigate the value of TTE and CMR in the assessment of left ventricular (LV) adaptation to an increased afterload and to analyze the effect of the on LV systolic function.

Background: To maintain an effective LV-arterial coupling, the LV adapts to the increased afterload by changing its geometry with subsequent hyper-
trophic-remodeling resulting in a reduction of the effective systolic myocardial wall stress.

Methods: We studied a group of 49 subjects: 35 healthy subjects (group I, 38±13 years) and 14 patients with aortic valve stenosis (group II, 77±9 year, valve area=0.75±0.18 cm²). We calculated: 1) TTE parameters of wall stress (SMWS, 10³N/m²), remodeling (h/r), and systolic function (LVEF ejection fraction (2DF-E, %), 2D longitudinal global strain (global-ε, %); 2CMR 
end-diastolic mass to volume ratio (LVM/EDV, g/ml) as well as the 3D systolic myocardial wall stress (3D SMWS, 10³N/m³) combining LV geom-
etry(3DLVgf) and arterial load. The Statistical analysis was performed by Pearson correlation coefficient and t-test.

Results: LVEF was homogeneous in 2 groups (I=64%, II=62%, p=0.69).
Significant difference was found between the 2 groups in terms of SMWS, global-ε and h/r (p<0.05). Furthermore, while no correlation was found between TTE and CMR parameters in the group I, significant correlations were found in group II for the comparisons: 1-TTE and CMR parameters of LV remodeling (LVM/EDV and h/r), (r=0.87, p=0.0005); 2-CMR LV geom-
etry factor (3DLVgf) and TTE 2D global-ε(r=0.79, p=0.005); 3-CMR SMWS and TTE 2D global-ε(r=0.8, p=0.003); 4 – CMR SMWS and TEE SMWS (r=0.78, p=0.005).

Conclusion: Increased afterload results in LV remodeling with good cor-
relation between CMR and TEE parameters. Its effect on LV function was 
revealed by the good negative correlation between CMR SMWS and TTE 
global-ε, which was found despite the preserved LVEF. Parameters of longi-
tudinal systolic dysfunction may have a clinical interest in management of patients with preserved LVEF as a predictor of heart failure.

Keywords: LV remodeling, systolic myocardial wall stress, global longi-
tudinal strain, echocardiography, cardiac magnetic resonance

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Importance of left ventricular remodelling and regional wall motion abnormalities in the occurrence of functional ischemic mitral regur-
gitation

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Introduction: Functional ischemic mitral regurgitation (IMR) is common in patients with ischemic left ventricular dysfunction after myocardial infar-
cion, and significantly worsens prognosis. The aim of this study is to deter-
mine the relative importance of the global and regional left ventricular (LV) remodelling in the occurrence of IMR.

Methods: 81 patients (mean age=61±11 years) admitted with acute myo-
cardial infarction (AMI) were screened. Patients with atrial fibrillation and 
organic valvular diseases were excluded from the study. Echocardiography 
two-dimensional and Doppler echocardiograms) was performed in the first 
week after admission. The 81 patients were divided in 2 groups: with IMR 
group 1=39 patients) and without IMR (group 2=42 patients). LV volumes 
were calculated by apical biplane Simpson’s rule. The LV wall-motion score (WMS) index was obtained in a 17 segment model according to established