
dipyridamole on cardiac perception of pain and on electrophysiological character-
ization of interindividual differences in the extension of ischemia, in the sensitivity
results in a very variable sequence of events, which doesn't seem to reproduce the
Global myocardial jeopardy score was the only mutivariate predictor of
Conclusion:
(38%).
left ventricular wall motion abnormalities or ST segment depression) in 8 patients
malities in 7 patients (17%), ST segment depression in 16 patients (39%) and
ities, 31 patients (75%) had ST segment depression and 32 patients (78%) had
number of diseased coronary vessels.
Methods:
I.P. Nedeljkovic1, M. Ostojic2, B. Beleslin2, A. Djordjevic-Dikic2, N. Milic2,
A. Sestito1, F. Pennestrì2, G. Sgueglia2, F. Infusino2, F. Crea2, G.A. Lanza2.

"Ischemic cascade" during dipyridamole stress echocardiography in
Objective: To determine, if other characteristics including not just severity and local-
ization of coronary stenosis but also the amount of myocardium at jeopardy, would
better correlate with the potential of provoking ischemia by exercise than classical
numerical indexes of coronary vessels.
Background: Althought simply and easy, coronary artery disease severity de-
scribed by the number of diseased vessels, may underestimate the potential im-
portance of coronary anatomy, as well as the importance of myocardium at risk to
develop myocardial ischemia during exercise stress echocardiography test.
Methods: We evaluated 211 consecutive pts (171 male, 40 female; mean age
51±10 years; 103 with previous myocardial infarction, 108 with angina pectoris) by
exercise stress echocardiography according to Bruce treadmill protocol and coro-
nary arteriography (one-vessel CAD, 114 pts; multi-vessel CAD, 45 pts). Myocardial
ischemic score is calculated for each vessel as a sum of all significant lesions rep-
resented as a product of: (1) myocardial kinetic status (O for akinetic, 0.5 for hypo-
kinetic, and 1 for normal kinetic) and (2) percent stenosis of coronary vessel (scored from 3-5), (3) and (3) weighting flow factor for particular localisation.
Results: Univariate logistic regression analysis showed significant correlation be-
tween number of diseased vessels, % diameter stenosis, weighting flow fac-
tor, myocardial jeopardy score, with the results exercise stress echocardiography
(p<0.0001 for all). However, in multivariable analysis significant predictor of stress
test results was only myocardial jeopardy score (p<0.0001). Cut-off value of my-
ocardial jeopardy score best predictive for stress test outcome was 9.5.
Conclusion: Global myocardial jeopardy score was the only mutivariate predictor of
stress echocardiography test results containing the information of functional sten-
sis significance (severity and localization) and amount of myocardium at risk. Thus,
this is the best digital description of coronary artery disease potential for provoking
ischemia by exercise.

Cultural evolution of digital description of coronary artery disease severity poten-
tially inducing myocardial ischemia during exercise stress echocardio-

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Automated classification of wall motion abnormalities by analysis of left
ventricular endocardial contour motion patterns.
J.G. Bosch1, F. Nijland2, S.C. Mitchell2, B.P.F. Leievelt2, O. Kamp2, M. Soroka2,
H.C. Reiber1, L. Devereaux2, I. Reiber1, 1Leiden University Medical Center, Leiden,
Netherlands; 2Vrije Universiteit Medical Center, Amsterdam, Netherlands;
3University of Iowa, Electrical Engineering, Iowa City, United States of
America.

Objective: fully automated border detection (ABD) and classification of wall motion
abnormalities (WMA) is highly desired for objective analysis of stress echo.
Methods: We developed a fully automated ABD technique based on Active Ap-
pearance Motion Models (AAM), which learns typical shape-motion patterns from
a set of example image sequences. AAMM uses Principal Component Analysis to
find eigenvarianes of shape/motion, including typical normal and pathological en-
docardial contraction patterns, and expresses each shape as a linear combination of
these. We hypothesized these AAM modal shape coefficients (MSCs) would al-
low WMA classification.

Experiments: Low-dose dobutamine (LDD) stress echo was performed on 129 in-
fant patients split randomly into training (TRN, n=45) and test set (TST, n=44).

Expert-verified endocardial contours (MAN) were available in 4-chamber (4c) and
2-chamber sequences for baseline and LDD. AAMMs were generated from TRN
and ABD was tested on TST sets. Resulting borders (AUTO) were compared to MAN borders, in average point distance (APD, mm) and LV endocardial area (LVA,
cm²). MSCs for all sequences were extracted and statistically related to segmental
and global Visual Wall Motion Scoring (VWMS).

Results: on 4c baseline TST, AAMM ABD exceeded (APD >8mmn) in 97% of cases
(APD Mean±SD: 3.3±1.2mmn, LVA regression: AUTO=0.91*MAN+1.7cm², r=0.87).

Multivariate linear regression showed clear correlations between MSCs and global
Dobutamine ischemic stress echocardiography.

Conclusion: AAMM allows fully automated endocardial border detection and its
MSCs show promising accuracy for automated classification of WMA.

Positive pre-ejection velocity changes during dobutamine stress test in
identifying hibernating myocardium and predicting functional recovery.
C.J. Aggeli1, M.S. Bonou2, G. Roussakis1, S.B. Brili1, C.S. Theocharis1, M.
Vavouranakis1, C. Pitsavos1, C. Stefanadis1. 1Hippikration Hospital, Athens,
Greece; 2POLYCLINIK, Cardiology, Athens, Greece.

Introduction: The value of pre-ejection velocity changes recorded by tissue
Doppler imaging (TDI) during dobutamine stress echocardiography to predict func-
tional recovery has not been studied.

Purpose: The aim of this study was to evaluate the accuracy of TDI velocity
changes during low-dose dobutamine stress echocardiography, to identify hiber-
nating myocardium and its prognostic value to predict recovery after revascu-
larization.

Methods: Dobutamine stress echocardiography using TDI was performed in 41 pa-
ients with coronary artery disease and left ventricular dysfunction, 2-5 days before
revascularization. TDI ejection (E) and PE as well as early (EA) and late (AA) dia-
tolic velocities were recorded during rest and dobutamine stress echocardiography.

Rest echocardiography was repeated 3 months after revascularization.

Results: Left ventricular ejection fraction increased from 24±4 to 35±4.5% at follow-
up (p<0.001). Of the 408 revascularized segments with severe dysfunction, 188
(45%) improved at follow-up. E, PE and Ea velocities (cm/sec) changed signifi-
cantly dobutamine stress echocardiography vs. rest (4.8±1.2 vs. 5.9±1.6, 4.9±1.1 vs.
5.6±1.9, 4.8±0.9 vs. 5.6±1.4, respectively, p<0.001), whereas Aa velocities (cm/sec)
did not change (6.3±1.4 vs. 6.4±1.3). The use of receiver operating curves
identified a stress-induced increase of 0.5 cm/s in E velocity as the optimal cut-off
value for viability, which predicted recovery of myocardial function with a sensitiv-
ity of 80% and a specificity of 86%. Interestingly, a stress-induced increase of PE ve-
locity by 0.6 cm/sec was identified as having superior sensitivity of 91% and spec-
ificity 90% in predicting functional recovery. A cut-off point of 0.44 cm/sec change in
Ea velocity during Dobutamine stress echocardiography had a high also sensitivity
(80%) and specificity (81%) to predict myocardial recovery function.

In conclusion, pre-ejection velocity increase is the most accurate index, for the iden-
tification of hibernating myocardium during dobutamine stress echocardiography,
concerning prediction of functional recovery. This is maybe due to lower tethering
effect during pre-ejection period.