and MVP was analyzed off-line.

Results: 1) Wall motion score index (WMSI) assessed by 2DE decreased significantly in 9 of 12 patients (75%) reflecting improvement of regional wall motion abnormality. 2) In contrast, in 11 of 12 patients (92%) the peak systolic myocardial velocity (1.17 vs 0.87 cm/s, p < 0.001) and transmyocardial velocity gradient (0.06 vs 3.28 cm/s, p < 0.001) obtained by MVP at the region suspected to be viable increased significantly.

Conclusion: hlyocardial velocity profile (MVP) obtained from color TDI during low dose DSE quantitatively assessed myocardial viability in patients with myocardial infarction. MVP was better sensitive than evaluation using conventional WMSI.

Tissue Doppler Imaging Pattern of Left Bundle Branch Block is a Strong Predictor for Mortality in Patients With Heart Failure

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Background: Recent studies have established that left bundle branch block (LBBB) is a strong predictor for mortality in patients with heart failure (HF). Aim of the study was to assess if different electromechanical pattern due to LBBB, established by Tissue Doppler Imaging, had an influence on mortality in patients with HF. Methods: We studied 21 patients with LBBB and dilated cardiomyopathy with 2D echocardiography and Tissue Doppler imaging (TDI). We analyzed quantitatively color coded M-mode of interventricular septum (IVS) and the following electromechanical patterns were identified: mildly unsynchronized (IIA), severely unsynchronized (IIIB), reversed late in systole (IIIA) and reversed throughout the systole (IIIB). All patients were divided into three groups, according to left ventricular function (LVEF): Group I <30%; Group II: 30-40%; Group III: >40%. We considered also age, NYHA functional class, QRS narrowing and mitral regurgitation for multivariate analysis. Results: The highest mortality rate (100%) was observed in IIIB electrical-mechanical pattern and TDI at the base of left ventricle (LVEF) 30-40%, while the lowest mortality rate (25%) was related to IIA TDI pattern with LVEF <40% (100% vs 25%, p< 0.01). The multivariate analysis shows that the electromechanical pattern is a strong predictor for mortality independently from age, NYHA functional class. QRS narrowing, mitral regurgitation (r² = 0.61). Conclusions: TDI is an useful method to assess the severity of LV asynchrony. The electromechanical pattern is a strong predictor for mortality independently from LVEF, in HF patients.

Longitudinal Myocardial Displacement and Strain Rate in the Hypertrophied Heart Evaluated by Tissue Strain Imaging With Doppler Angle Correction and Tissue Tracking Technique

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Background: The left ventricular (LV) systolic function in the long-axis direction has been evaluated by pulsed tissue Doppler mitral anular motion However, it could not avoid the effect of cardiac translation. A prototype software (AploQ, Toshiba Corp.) was recently developed to obtain tissue strain imaging (TSI). In this program, the center of contraction was set in the LV cavity and velocity was automatically angle-corrected. The velocity imaging were region of myocardium were automatically defined and interrogated over time to yield displacement by 2D tissue Doppler tracking technique. TSI was finally obtained as a spatial derivative of the tissue displacement. Purpose To evaluate longitudinal LV myocardial contractile characteristics in hypertrophied heart using TSI. Methods: Subjects consisted of 20 normal (N), 20 hypertensive hypertrophy (HHD) and 12 asymmetric septal hypertrophy (ASH). Color tissue Doppler image was recorded from apical four chamber view and the TSI at the base of ventricular septum was analyzed off-line. Results: Peak systolic displacement (Dp) and peak systolic strain rate (SRp) decreased and time to Dp prolonged in hypertrophied heart (table). Conclusions: Longitudinal myocardial fiber contraction was depressed in hypertrophied ventricular septum especially in asymmetric hypertrophy. Ischemia or doppler angle correction and tissue tracking can qualitatively evaluate longituval LV contractility regardless of cardiac translation.

<table>
<thead>
<tr>
<th>Group</th>
<th>Dp (cm)</th>
<th>SRp (1/s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>10.4 ± 3.2</td>
<td>20.7 ± 6.0</td>
</tr>
<tr>
<td>HHD</td>
<td>8.7 ± 2.8</td>
<td>303 ± 54*</td>
</tr>
<tr>
<td>ASH</td>
<td>5.7 ± -0.2*</td>
<td>336 ± -0.4*</td>
</tr>
</tbody>
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True 2-D Velocity Display by Multiscale Motion Mapping (Triple-M Imaging) Allows New Insights Into Complex Cardiac Motion Patterns

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Background: Quantitative motion assessment in echo usually relies on tissue Doppler border detection algorithms despite known limitations. Methods: Multiscale motion mapping is a novel image processing technique combining optical flow & spline imaging in space & time. Using all available grayscale info, it yields quantitative...
after TAB can be used to estimate the pressure drop across the aortic band and to predict the amount of cardiac hypertrophy in mice. After TAB, mice utilize peripheral arterial adaptations to keep normal mean carotid flow, and maintain cerebral perfusion.

**Quantitative Estimation of Subendocardial Ischemia With Dobutamine Stress Echocardiography Assessed by a Newly Developed Strain: M-Mode Echocardiography**

Takashi Manou, Satoshi Nakatani, Hiroki Kakuuchi, Masaharu Yamaguchi, Masafumi Kitakaze, Kunio Miyatake, National Cardiovascular Center, Osaka, Japan

**Background:** Myocardial ischemia has been well demonstrated by inducible asynergy with dobutamine stress echocardiography (DSE), but subendocardial ischemia has not been quantified and fully elucidated. To address this issue, we evaluated the transmural myocardial strain distribution by using the recently developed myocardial strain m-mode imaging system (Aprior, Tsuchiya lapan). **Methods:** Wall motion abnormalities were assessed in 8 patients with a standard DSE protocol. Placing M-mode cursors on the parasternal long axis parasternal short axis views, we obtained end-systolic myocardial strain profile in each segment (antero and posterior walls at levels of base and mid). **Results:** Regional wall motion changes were assessed in 24 segments; 13 showed normal responses and 11 showed new wall motion abnormalities. Strain in the subendocardial-half layer (EnSt) in normal segments increased during DSE (62.8±12.8 vs. 93.1±44.5%, p<0.001), but that in abnormal segments decreased (32.5±14.2 vs. 37.3±16.5%, p>0.01) and abnormal segments (24.9±7 vs. 20±1.7%, p<0.01). Thus, EnSt/EpSt was attenuated in abnormal segments (2.15±0.66 vs. 0.24±1.38, p<0.001). **Conclusions:** Subendocardial ischemia could be quantified by the transmural myocardial strain profile obtained by the newly developed strain imaging system combined with DSE.

**1190MP-163 Progression of Coronary Calcification Poses a High Risk of Myocardial Infarction**

Paolo Raggi, Leslie J. Shaw, Tracy Callister, Matthew J. Budoff, Tulane University, New Orleans, LA. American Cardiovascular Research Institute, Atlanta, GA

**Background.** Progression of coronary artery calcification (CAC) can be accurately assessed by means of sequential electron beam tomography (EBT) imaging. However, the prognostic significance of a measured change in CAC is still unknown.

**Methods.** We conducted an observational study for the occurrence of myocardial infarction (MI) in asymptomatic individuals submitted to sequential EBT screening at a minimum interval of one-year between scans. Plaque quantification was performed with a volumetric method (calcium volume score: CVS) and annual progression of CVS was assessed as absolute and percentage change when the initial CVS was 0.**

**Results.** 833 subjects met the inclusion criteria (average time between EBT scans: 2.1±1.4 years). 45 subjects suffered an MI (2.2% per year). Only 3 MI patients (7%) showed stabilization of CVS (yearly change<15%) compared to 42% of the remaining 786 subjects (p<0.001). The yearly average CVS change in MI patients was 47.5±17.5% while it was 26±12% in patients without events (p<0.001). The relative risk of suffering an MI in the presence of CVS progression was 17 (CI: 3.5-34) compared to the progression. In a stepwise Cox model initial CVS, diabetes mellitus, hypertension, and % CVS change were independent predictors of MI.

**Conclusions:** The risk of suffering an MI increases significantly in asymptomatic indivi-