Assessment of Valsalva maneuver as a method for evaluation of patients with pseudonormalized left ventricular filling pattern.

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Background: Valsalva maneuver was used to differentiate normal from pseudonormalized mitral flow pattern. Doppler tissue imaging (DTI), differentiates normal from abnormal diastolic function.

Aim of the Work: Assessment of Valsalva maneuver as a mean to differentiate pseudonormal from normal mitral flow pattern (MFP), using pulsed-wave DTI.

Patients and Methods: sixty patients with dilated cardiomyopathy (EF<40%), sinus rhythm and pseudonormalized MFP were selected. Transmural flow velocity curve was performed before and during Valsalva maneuver was recorded. Peak early mitral filling (Em), peak atrial filling (Am) and Em/Am were measured before and during Valsalva. After Valsalva patients were classified into two groups. Group I included 24 patients with Em/Am<1 and group II, 36 patients with Em/Am>1.
Pulsed-wave DTI was recorded at septal, lateral, inferior and anterior aspect of the mitral annulus from apical 4 and 2 chamber views. The mean peak early velocity (Ea), Peak atrial (Aa), and Ea/Aa of the 4 sites were measured from DTI derived velocity curve for each patient. The results were compared with the MFP.

Results: Valsalva maneuver was able to detect a hidden relaxation abnormality in 40% of patients where Em/Am became <1 with significantly prolonged deceleration time (DT), and isovolumetric relaxation time (IVRT). However, 60% of patients the Em/Am remained >1 with slightly prolonged DT and IVRT. Pulsed-wave DTI detected relaxation abnormality in all patients. They had Ea/Am 0.79±0.11, prolonged DT and IVRT. Group 1 had higher EF (36.71% vs. 32.87%), higher Ea (6.1±0.68 vs 5.3±0.3 cm/s), lower Aa (7.9±2.012 vs 8.1±1.91 cm/s) and higher Ea/Aa (0.77 vs 0.65) than group II patients. These data may denote that it was a progression of diastolic dysfunction with or without a hemodynamic factor that was responsible for the persistence of pseudonormalized pattern during Valsalva.

Conclusion: Patient uncooperation, less sensitivity, and specificity are the major limitations Valsalva maneuver in assessment of patients with pseudonormalized MFP. DTI tissue imaging is a simple noninvasive technique with less load dependence. It can be used in combination with MFP for better understanding and assessment of diastolic dysfunction in those patients.

Echocardiographic diastolic dysfunction parameters and mitral regurgitation are predictors of pulmonary hypertension in left ventricular dysfunction.

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Introduction: Pulmonary hypertension (PHT) in patients with left ventricular systolic dysfunction (LVSD) is associated to a worse prognosis.

Objectives: We sought to study the prevalence of PHT in a group of patients with LVSD and its relation to echocardiographic parameters of diastolic function (DF).

Methods: We have studied a series of 71 patients, 58 men, medium age 53±14 years with LVSD, mean ejection fraction (EF) 25±7%. 34 of them had coronary disease and 37 had dilated cardiomyopathy. A transthoracic echocardiography was performed measuring: the systolic pulmonary arterial pressure (SPAP), DF parameters in the mitral flow, E and A velocity, Ea velocity (Ea), E deceleration time (EDT) and isovolumetric relaxation time (IVRT), and in the right superior pulmonary vein: systolic wave velocity (S), diastolic (D) their areas (ARS and ADF) and their ratio (S/D) and the velocity of the atrial retrograde wave (A). Mitral regurgitation and its severity was also assessed. SPAP could be measured in 55 patients (77%).

Conclusions: 1) The severity of PHT is correlated with DF parameters and mitral regurgitation in patients with cardiac failure due to LVSD. 2) Those patients with a more restrictive inflow pattern and more severe mitral regurgitation have a higher SPAP.

Prognosis of systolic and diastolic heart failure in the elderly.

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The results of comparison of prognosis of systolic (S) and diastolic (D) heart failure (HF) has been controversial. The objective of this study was to compare outcomes of SHF and DHF in elderly hospitalized patients.

Methods: Left ventricular ejection fraction (EF), mitral E/A velocity ratio and deceleration time (DT) were measured and calculated by echocardiography. In NYHA class II-IV pts SHF was defined as EF<40% and DHF as EF>40% plus either impaired relaxation (E/A<1.0 and DT>140 ms) or restrictive function (E/A>2.0 or DT>40 ms) or atrial fibrillation. Actuarial survival was assessed by Kaplan-Meier analysis. 77 patients >65 years (28 males and 49 females) were followed for 11.4±6.4 months. 34 pts had SHF and 43 pts had DHF. 37 pts died (48%) in G1 and 22 in GII (NS), HF mortality was 3 in GI and 11 in GII (p=0.033). 2 years actuarial survival in the whole group was 30%. There was no difference between survivors and nonsurvivors in age (77±1.6 vs 79±3.7), EF (46.2±18.2 vs 42.5±21.8%), pulmonary artery systolic pressure (43.1±12.9 vs 47.6±15.0 mmHg), but NYHA class was significantly lower (2.9±0.7 vs 3.4±0.85, p<0.05) and pleural effusion by echo was significantly less frequent (27.5% vs 51%, p<0.05) in survivors than in nonsurvivors. Actuarial 2 year survival of pts in class IV was significantly worse (10%) compared to NYHA III-IV (41%), p=0.003. There was no difference in the 2 year survival between GI (32%) and GII (27%).

Conclusion: Overall survival rate was 14 months. 37 patients in the elderly, similar survivorship was independent of age and EF but it was inversely related to functional class.

Assessment of isolated diastolic dysfunction occurs in 36% of patients with the clinical diagnosis of congestive heart failure.

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Introduction: The prevalence of diastolic left ventricular (LV) dysfunction in a population presenting with the diagnosis of congestive heart failure (CHF) is controversial. The prevalence of systolic and diastolic LV dysfunction in patients with CHF varies considerably in current literature. We evaluated the prevalence of systolic and suspected diastolic LV dysfunction in a large population presenting with a clinical diagnosis of CHF using echocardiography.

Methods: We retrospectively reviewed the medical records of 24,380 echocardiograms performed at our institution from 1984 to 1998. We evaluated the prevalence of abnormal LV systolic and diastolic dysfunction in patients with the clinical diagnosis of CHF. Suspected diastolic dysfunction was defined as presence of left atrial enlargement, left ventricular hypertrophy or presence of diastolic mitral flow pattern (A over E reversal).

Results: In this cohort, 636 echocardiograms with CHF as the primary diagnosis were reviewed. LV function data were available in 461 patients. Normal LV size and function was found in 238 patients (48%). Isolated suspected diastolic dysfunction was confirmed in 166 patients (36%). Normal systolic and diastolic function was observed in 12% of patients.

Conclusion: Nearly one-half of the echocardiograms with the primary diagnosis of CHF exhibited normal LV size and systolic function. In this cohort, 36% of the patients had suspected echocardiographic evidence of abnormal diastolic dysfunction along with the clinical diagnosis of CHF.

Left ventricular longitudinal relaxation velocity: a sensitive index of diastolic function.

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Objective: The aim of the present study was to evaluate maximal longitudinal relaxation velocity of the left ventricle as an index of diastolic function.

Methods: Sixty-four consecutive patients with known or suspected heart failure, diagnosed by Doppler echocardiography were recruited. The patients were between 20-80 years of age, mean age 59. Twenty-five had a history of hypertension, 13 a history of angina pectoris and 11 a history of myocardial infarction. The long axis movements of the mid annulus were obtained at four sites, and M-mode and pulsed tissue Doppler recordings of the maximal early diastolic velocity were analysed by using the mean value from four sites. The maximal relaxation velocity by M-mode (M-RVm) was measured as the steepest part of the curve in early diastole and the velocities recorded by pulsed tissue Doppler (TD-RVm) were measured from the outer border of the dense part of the spectral curve. The diastolic mitral inflow velocity and pulmonary vein flow were recorded by pulsed Doppler from the apical four-chamber view.

Conclusions: Every case was classified as belonging to the group with normal or to the group with impaired diastolic function with all three methods, M-RVm, TD-RVm and the combination E/A ratio of the mitral inflow and recording of the pulmonary vein flow. Cases with diastolic dysfunction according to the latter method were regarded as true cases when the sensitivity and specificity for M-RVm and TD-RVm were calculated. Previously reported reference values were used for M-RVm and TD-RVm. Results: According to age-related reference values for the E/A ratio of the mitral inflow, and for pulmonary vein flow, 27 of 64 had diastolic dysfunction, of whom 12 had also systolic dysfunction (EF<50% by Simpson's rule). When diastolic dysfunction was identified by measures of the E/A ratio and pulmonary vein flow, M-RVm had a sensitivity of 89% and specificity of 81%. TD-RVm had a sensitivity of 81% and a specificity of 78%. Fisher's exact test showed that information recorded by either modality can be used to identify diastolic dysfunction (p<0.0001). TD-RVm (mean 86.8 mm/sec) was 29.7% (p<0.001) higher than M-RVm (mean 66.9 mm/sec).

Maximum relaxation velocity in the long axis of the left ventricle, recorded by either M-mode or Doppler can be used for assessment of diastolic function. Considerably higher velocities are recorded by tissue Doppler than by M-mode. Different age-related reference values must therefore be used.