Abstract: P111

Evaluation of diastolic function in patients with pulmonary hypertension due to left heart disease assessed by TDI and compared with MDCT

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Background: In the evaluation of diastolic function of left ventricle, as one of the main parameters of several cardiac pathologies, we use mostly 2D echocardiography by means of tissue Doppler (TDI). Cardiac CT is used extensively for the coronary disease, but few studies have shown its value for the evaluation of diastolic function in the left ventricle with elevated pressures.

Purpose: To demonstrate the assessment of diastolic function by means of multidetector row computed tomography (MDCT) and in comparison with tissue Doppler imaging (TDI) in patients with elevated LV filling pressures due to left heart disease.

Methods: Sixty-four patients (33 males, 31 females, mean age 74 years) consecutive patients with pulmonary hypertension due to left heart disease (PH-LHD) who underwent 2D echocardiography with TDI and 64-MDCT were enrolled and assessed in our department. Left heart diseases (coronary artery disease, cardiomyopathy, valvulopathy), right ventricle function, pulmonary circulation were evaluated by 2D and Doppler (CW, PW, TDI) and the following parameters were recorded: LV , MV E, MV E/A, peak mitral septal velocity (e’), MV E/e’. In CT: peak transmitral velocity (cm/s) was calculated by dividing peak diastolic transmitral flow (ml/s) by the corresponding mitral valve area (cm2). Mitral septal tissue velocity was calculated from changes in LV length per cardiac phase. In both examinations (TDI and CT), E/e’ estimated the LV filling pressures. The mean follow-up period was 17.8 months.

Results: Aforementioned indices showed a good correlation between 2D echocardiography TDI and MDCT and for assessment of E (p<0.01), E/A (p<0.01), e’ (p<0.01) and E/e’ (p<0.01). Diastolic dysfunction using MDCT in comparison of echocardiography evaluation was noticed to have an accuracy by 70%. Mortality rate was 37.5%. However only LVEF and NYHA class differed significantly between survivors and nonsurvivors. Advanced NYHA class IV significantly predicted mortality (95% CI: 6.5-316.9, OR: 46.7, p<0.001).

Conclusions: Multiple echocardiographic parameters are influenced in PH-LHD. Estimation of LV filling pressures or diastolic function in PH-LHD by MDCT showed a good correlation when compared to 2D echocardiography TDI. Only NYHA class was able to predict mortality in this group of patients.