Association between left atrial coupling index by echocardiography and left ventricular end diastolic pressure by left ventricular catheterization

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Background: Left atrial volumetric/mechanical coupling index (LACi) is a novel echocardiographic parameter combining important information regarding left atrial size and function in one variable. The association between LACi and invasive pressure measurements of diastolic function has not yet been investigated.

Purpose: We sought to investigate the association between LACi by echocardiography and left ventricular end-diastolic pressure (LVEDP) by left ventricular catheterization.

Methods: Patients suspected of coronary artery disease referred for angiography had simultaneous left heart catheterization performed for invasive pressure measurements and had an echocardiogram performed. LVEDP >12 mmHg was considered elevated. LACi was calculated as the index of LAVI (left atrial maximal volume index) and mean peak tissue velocity at late diastole measured using tissue Doppler at the base of the left ventricle.

Results: Forty patients were prospectively included of whom 73% were male and the mean age was 65 years. Median LACi was 2.9 (2.0, 4.1), and a total of 25 (63%) patients had elevated LVEDP. In unadjusted regression analyses, LVEDP increased with 2.3 (0.5-4.0) mmHg per 1.0 increase in LACi (p=0.013) (Figure 1, top panel). This association remained unchanged after adjusting for age and vessel disease (VD). In univariable logistic regression model, a 0.1 increase in LACi was associated with an 8% higher probability of having elevated LVEDP (OR 1.08, 95%CI (1.01-1.20), p=0.027, per 0.1 increase in LACi), which also remained unchanged after adjustment for age and VD.

Conclusion: LACi obtained by echocardiography is associated with LVEDP and with elevated LVEDP obtained by left ventricular catheterization. Even in those with normal LA size, higher LACi can indicate elevated filling pressure.