Echocardiographic Correlates of Pulmonary Artery Systolic Pressure: The Role of Left Ventricular Diastolic Function

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Background:
Left ventricular (LV) diastolic dysfunction is associated with higher pulmonary artery systolic pressure (PASP), but this association has not been examined in large, relatively unselected patient populations in routine clinical practice.

Methods:
Using the echocardiography computerized database at our institution, a tertiary care medical center, consecutive patients with sinus rhythm, without mitral stenosis or significant (> moderate) mitral regurgitation, in whom LV diastolic function was comprehensively assessed (measurements of mitral inflow E velocity, E/A ratio and E/e' ratio available for analysis) were selected (e' = early diastolic mitral annular velocity). The relationships between multiple echocardiographic parameters and PASP were examined.

Results:
During a 12 months period, 3165 patients fulfilled the inclusion criteria (age 61±15 yr; 57% men). Of these, measurements of PASP were available in 2317 patients (average PASP 35±12 mmHg; range 15-118 mmHg). By univariate linear regression: age (3.0±0.1 mmHg increase of PASP per 10 yrs of age), female gender, body mass index, heart rate, LV diastolic diameter, LV wall thickness (septum, posterior wall), LV relative wall thickness, LV mass, LV ejection fraction*, left atrial diameter, mitral E velocity, E/A ratio, E wave deceleration time*, mitral annular e'*, and E/e' ratio were significantly associated with PASP (* = negative association). By multivariate regression analysis, adjusting for age, gender and LVEF: LV mass, left atrial diameter, mitral E velocity, E/A ratio, E wave deceleration time*, and septal E/e' ratio (0.22±0.05 mmHg increase of PASP per 1 unit increase of E/e' ratio) were independent predictors of PASP (model R^2= 0.40). Once the diastolic parameters were entered into the multivariate model, LVEF (P=0.40) and body mass index were no longer predictive of PASP.

Conclusions:
In this large patient population examined in routine clinical practice, multiple LV diastolic parameters were independently associated with PASP, whereas LVEF was not.