Abstract: P5595

Non-invasive atrial work in the differential diagnosis of pre-capillary and post-capillary pulmonary hypertension

Authors:
A E Vijiiiac¹, S Iancovici¹, A Scarlatescu¹, A Deaconu¹, M Dorobantu¹, ¹Emergency Clinical Hospital Floreasca, Cardiology Department - Bucharest - Romania,

Topic(s):
Pulmonary Circulation, Pulmonary Embolism, Right Heart Failure – Diagnostic Methods

Citation:
Funding Acknowledgements:
This work was supported by CREDO Project - ID: 49182, financed through the SOP IEC-A2-0.2.2.1-2013-1 cofinanced by the ERDF

Background:
Right heart catheterization (RHC) is the gold standard for the diagnosis of pulmonary hypertension (PH) and for the discrimination of pre-capillary from post-capillary PH, but it is an invasive method with high costs and limited availability. While echocardiography is widely used in the evaluation of patients with PH, no algorithm has been validated to discriminate between the various forms of PH.

Purpose:
We aimed to assess the differences in echocardiographically-derived atrial work between patients with different forms of PH.

Methods:
We included 80 patients in our study, which were divided in two groups. The pre-capillary group consisted of 28 patients with pulmonary arterial hypertension confirmed at RHC. The post-capillary group consisted of 52 patients with PH and severe left heart disease. All patients underwent transthoracic echocardiography. Atrial work is defined as the product between atrial volume and atrial pressure; for the right atrium, we estimated atrial pressure from the inferior vena cava diameter and change with respiration; for the left atrium, we used the transmitral E-wave/septal mitral annular Doppler Tissue Imaging e’-wave ratio (E/e’) as a surrogate for atrial pressure and we defined left atrial work as E/e’ x left atrial volume.

Results:
The mean age was 54±14 years in the pre-capillary group and 71±13 years in the post-capillary group (p<0.001). Among the patients in the post-capillary group, 36 (69%) had severe left ventricular systolic dysfunction (mean ejection fraction=23±8%) and 16 (31%) had severe aortic stenosis. The right atrial work was significantly higher in the pre-capillary group: 1089±1105 vs. 382±508 in the post-capillary group (p=0.004). Using receiver operating characteristic (ROC) analysis, a cut-off value of 289.5 provided fair discrimination (area under the curve [AUC]=0.762) between the two groups (sensitivity=67%, specificity=67%). The left atrial work was significantly lower in the pre-capillary group: 392±206 vs. 1907±1072 in the post-capillary group (p<0.001). Using ROC analysis, a cut-off value of 764 provided excellent discrimination (AUC=0.980) between the two groups (sensitivity=95%, specificity=96%). There was a moderate positive correlation correlation between right atrial work and left atrial work in the post-capillary group (r=0.60, p<0.001), but no significant correlation in the pre-capillary group (p=0.84).
Conclusion:

Echocardiographically-derived atrial work, both right and left, differ significantly between pre-capillary and post-capillary PH. These two simple echocardiographic parameters might guide the differential diagnosis of PH and potentially reduce the need for RHC, should they be further validated.