Abstract: P2452

Application of left atrial strain for differentiation between pre- and post-capillary pulmonary hypertension

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Topic(s):
Tissue Doppler, Speckle Tracking and Strain Imaging

Citation:
Background: Pulmonary hypertension (PH) is classified as pre- or post-capillary PH, and pulmonary capillary wedge pressure (PCWP) > 15 mmHg is used as criterion for post-capillary PH. Elevated left atrial (LA) pressure is associated with reduced LA reservoir strain. Thus, LA strain may potentially serve to differentiate between these diagnoses.

Objectives: This study tested the hypothesis that LA strain can be used as a noninvasive parameter to differentiate between pre- and post-capillary PH.

Methods: We analyzed 103 patients (mean age: 58 years, 51 female) referred to right heart catheterization due to unexplained dyspnea or suspected heart failure. Echocardiography was performed within 24 hours of the invasive procedure. Mean pulmonary artery pressure (PAP) was noninvasively estimated from tricuspid regurgitation (TR) velocity and inferior vena cava (IVC) diameter and collapsibility. LA reservoir strain was calculated from apical four-chamber view by speckle tracking echocardiography, and was feasible in 101 patients.

Results: Twenty-eight patients were invasively confirmed with pre-capillary PH and 43 patients with post-capillary PH. The remaining 32 patients had no PH. LA reservoir strain was significantly lower in patients with post-capillary PH than patients with pre-capillary PH (9.9 ± 5.5% vs. 24.6 ± 8.2%, p< 0.01). At a cut-off value of 15.4%, LA reservoir strain could predict elevated PCWP > 15 mmHg with AUC=0.88, sensitivity=84.8% and specificity=81.8%. As shown in the figure, echocardiography with LA reservoir strain correctly differentiated 82% of patients into pre- and post-capillary PH.

Conclusions: These results suggest that LA reservoir strain can be used to predict elevated PCWP, thus allowing discrimination between pre- and post-capillary PH.
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<table>
<thead>
<tr>
<th>Invasive study</th>
<th>66 pts PH *</th>
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<tbody>
<tr>
<td>26 pts</td>
<td>pre-capillary PH</td>
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<td>40 pts</td>
<td>post-capillary PH</td>
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<tr>
<th>Non-invasive study</th>
<th>20 pts correctly classified as pre-capillary PH</th>
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<tbody>
<tr>
<td>12 pts incorrectly classified</td>
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<tr>
<td>34 pts correctly classified as post-capillary PH</td>
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* Five pts were excluded due to poor quality of TR velocity or IVC.