Reappraisal of echocardiographic algorithm in predicting the pulmonary hypertension redefined by updated pulmonary artery mean pressure threshold


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Background: Although an adopted echocardiography algorithm based on tricuspid regurgitation jet peak velocity (TRVmax) and suggestive findings (SF) for pulmonary hypertension (PH) has been utilized in the non-invasive prediction of PH probability, reliability of this approach for updated hemodynamic definition of PH remains to be determined.

Aims: In this study, first time, we aimed to evaluate the TRVmax and SF in predicting the probability of PH as defined by mean pulmonary arterial pressure (mPAP) > 20 mm Hg and mPAP > 25 mm Hg, respectively.

Methods: Our study group comprised of the retrospectively evaluated 1300 patients (age 53.1 ± 18.8 years, female 62.1%) who underwent right heart catheterization (RHC) with different indications between 2006 and 2018. All echocardiographic and RHC assessments were performed in accordance with European Society of Cardiology (ESC)/European Respiratory Society (ERS) 2015 PH Guidelines.

Results: Although TRVmax showed a significant relation with mPAP in both definitions, SF offered significant contribution for only in predicting mPAP > 25 mm Hg, but not for mPAP > 20 mm Hg. In predicting the mPAP > 20 mm Hg TR Vmax and SF showed odds ratio (OR) of 2.57 (1.59–4.14, p < 0.001) and OR of 1.25 (0.86–1.82, p = 0.16), respectively (Table 1). In predicting the mPAP > 25 mm Hg, TR Vmax and SF showed OR of 2.33 (1.80–3.04, p < 0.001) and OR of 1.54 (1.15–2.08, p < 0.001), respectively (Table 1). The TRVmax > 2.8 m/sec and TRVmax > 3.4 m/sec were associated with 70% and 84% probability of mPAP > 20 mm Hg, and 60% and 76% probability of mPAP > 25 mm Hg, respectively (Figure 1).

Conclusions: In contrast to those in predicting the mPAP > 25 mm Hg, SF did not provide a significant contribution to probability of mPAP > 20 mm Hg predicted by TRVmax solely. The impact of the novel mPAP threshold on echocardiographic prediction of PH remains to be clarified by future studies.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model-1 (mPAP &gt; 20 mmHg)</th>
<th>Model-2 (mPAP &gt; 25 mmHg)</th>
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<tbody>
<tr>
<td></td>
<td>Odds ratio</td>
<td>Confidence interval</td>
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<tr>
<td>TR V max (m/sec)</td>
<td>2.57 (1.90–4.14)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>SF</td>
<td>1.25 (0.86–1.82)</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Table 1

Figure 1