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Operating Characteristics of Pulmonary Capillary Wedge Pressure for Pulmonary Arterial Hypertension

To the Editor:

We reworked the statistics presented by Halpern and Taichman in a recent issue of CHEST (July 2009) in a manner that might be of interest. In Figure 4, they note that the sensitivity and specificity of pulmonary capillary wedge pressure (PCWP) > 15 for the outcome of left ventricular end-diastolic pressure (LVEDP) > 15 mm Hg are 94.2% and 60.2%. However, the diagnosis of interest in their study is pulmonary arterial hypertension (PAH) type 1, using an LVEDP ≤ 15 mm Hg as the gold standard. It is useful to calculate the operating characteristics of the PCWP for this diagnosis. Using their Table 1 (all patients with pulmonary hypertension), we constructed Table 1.

Table 1—Analysis of Pulmonary Capillary Wedge Pressure as a Test for Pulmonary Arterial Hypertension

<table>
<thead>
<tr>
<th>Pulmonary Arterial Hypertension</th>
<th>Positive (LVEDP ≤ 15 mm Hg)</th>
<th>Negative (LVEDP &gt; 15 mm Hg)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive test</td>
<td>270</td>
<td>310</td>
<td>580</td>
</tr>
<tr>
<td>(PCWP ≤ 15 mm Hg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative test</td>
<td>152</td>
<td>3,194</td>
<td>3,346</td>
</tr>
<tr>
<td>(PCWP &gt; 15 mm Hg)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>422</td>
<td>3,504</td>
<td>3,926</td>
</tr>
</tbody>
</table>

LVEDP = left ventricular end-diastolic pressure; PCWP = pulmonary capillary wedge pressure.

The operating characteristics for PCWP generated by this table are: sensitivity 64%, specificity 91.2%, positive predictive value 46.6%, and negative predictive value 95.5%. The positive predictive value indicates that among the study population, the majority of positive tests (PCWP ≤ 15 mm Hg) are false positives; in other words, the PCWP is not reliable to rule in PAH. The negative predictive value indicates that 95% of negative tests (PCWP > 15 mm Hg) are true negatives; the PCWP can be used to rule out PAH in this population. It should be noted that positive and negative predictive values are dependent on prevalence, and should be generalized with caution. If applied in a population with a higher prevalence of PAH, the usefulness of the PCWP to rule out disease would diminish. But the conclusion of this analysis seems to be generalizable: care should be exercised before starting a patient on therapy for PAH if the diagnosis was ruled in by PCWP. In some patients, particularly those with risk factors or clinical evidence of heart disease, further cardiac workup, including left heart catheterization, may be indicated.

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