Correlation of Pulmonary Artery Dimensions Between Endobronchial Ultrasound and CT Scan

To the Editor:

The dimensions of the pulmonary artery (PA) on CT scan and the ratio of the main PA to ascending aorta (AA) have been shown to correlate with the diagnosis and severity of pulmonary hypertension. The mediastinal vessels are easily visualized with convex probe endobronchial ultrasound (EBUS) as the depth of penetration with EBUS is approximately 5 cm; also, the vessels run adjacent to the airway, and there is no interposition of aerated lung between airways and vessels. Whether the measurements of PA dimensions performed by EBUS correlate with CT scan measurements of the PA remains unknown.

A prospective observational study was undertaken over a period of 2 months at our center. Written informed consent was obtained from all patients, and the study protocol was approved by the ethics review committee. All patients aged 18 years or older and undergoing EBUS were eligible for inclusion in the study. Patients with visible extrinsic compression of mediastinal vasculature on chest CT scan and those who failed to provide informed consent were excluded. The dimensions of the left PA (LPA) and the AA were documented in all cases. The diameter of the LPA, just distal to bifurcation of the main PA, was measured by contrast-enhanced CT scan with the help of calipers. In the same section, the diameter of the AA was also measured. While performing EBUS (BF-UC 180F with compatible endoscopic ultrasound unit EU-ME1; Olympus Medical Systems), the bronchoscope was turned to the 10 o'clock position facing the main carina with the tip flexed and apposed to the tracheal wall just proximal to the carina. The dimensions of the LPA and the AA were measured at this level, and an average of long-axis and short-axis diameters was used for calculation. Microsoft Excel 2010 was used for the data analysis.

A total of 30 cases (mean age, 49.8 years; 20 men) were included for the final analysis. The clinical indications included sarcoidosis (n = 12), malignancy (n = 8), TB (n = 6), and others (n = 4). The dimensions recorded by both the modalities are shown in Table 1. There was a statistically significant correlation between the values measured on CT scan and EBUS (Table 1). However, the limits of agreement were wide, indicating that the two measurements cannot be used interchangeably (Fig 1).

The diagnostic spectrum of EBUS has rapidly evolved since its inception in 2001 including its utility in diagnosis of pulmonary thromboembolism and tumor embolism. A correlation between dimensions of airway, measured on EBUS and CT scan, has been described. We found a significant correlation between the parameters measured by CT scan and EBUS. However, the limits of agreement were wide (approximately 30% of the vascular diameters). Hence, measuring the dimensions of great vessels through EBUS is unlikely to contribute significantly in the management of pulmonary hypertension. Importantly, it was difficult to assess the diameter of the main PA as it would not fit into the scanning range of EBUS. Due to the small sample size, larger studies are required to confirm our observations.

<table>
<thead>
<tr>
<th>Variables</th>
<th>LPA</th>
<th>AA</th>
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<tbody>
<tr>
<td>CT scan diameter in mm, mean ± SE</td>
<td>17.98 ± 0.86</td>
<td>25.93 ± 1.03</td>
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<tr>
<td>EBUS diameter in mm, mean ± SE</td>
<td>17.39 ± 0.77</td>
<td>23.95 ± 0.93</td>
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<tr>
<td>Pearson coefficient of correlation, r</td>
<td>0.78</td>
<td>0.85</td>
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<tr>
<td>P value</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
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<tr>
<td>Mean bias in mm (limits of agreement)</td>
<td>−0.59 (3.53, 2.34)</td>
<td>−1.98 (−4.92, 0.96)</td>
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</tbody>
</table>

AA = ascending aorta; EBUS = endobronchial ultrasound; LPA = left pulmonary artery.
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References