CT scanning before fiberoptic bronchoscopy improved the accuracy of bronchoscopy in suspected endobronchial carcinoma


**Question**
In patients with suspected endobronchial carcinoma, does computed tomographic (CT) scanning done before fiberoptic bronchoscopy improve the diagnostic yield of bronchoscopy and reduce the number of further diagnostic tests?

**Design**
Randomized (allocation concealed*), blinded (test readers),* controlled trial comparing CT scanning of the chest and upper abdomen before fiberoptic bronchoscopy with fiberoptic bronchoscopy alone using diagnostic results that included biopsy as the diagnostic standard.

**Setting**
A lung cancer investigation unit in Cambridgeshire, England, United Kingdom.

**Patients**
171 of 172 consecutive patients (mean age 67 y, 62% men) with suspected lung cancer and in whom bronchoscopy was considered the most likely route to obtain diagnostic samples. Exclusion criterion was presence of clearly defined peripheral mass on chest radiography and no proximal component.

**Intervention**
All patients received CT scanning. 90 patients were allocated to have their CT scan discussed with a bronchoscopist before further procedures were done. 81 patients were allocated to go directly to fiberoptic bronchoscopy (CT scan results were not available to the bronchoscopist). ≥ 5 bronchial biopsy specimens of visual tumors were taken; bronchial washing was done; and if no visible tumor was seen, bronchial brushing was done. Additional follow-up tests were done as needed using information from the CT scans. Follow-up was 100%.

**Primary outcome measures**
Number of tests used and proportion of true positive and negative results using biopsy as the diagnostic standard.

**Main results**
78% of the patients had confirmed lung cancer. In the CT-scanning group, 6 patients (2 with cancer) did not have further invasive testing, and 16 had alternative invasive testing (12 needle biopsies). 68 patients in this group had bronchoscopy after CT scanning. A comparison of the 2 groups showed that initial CT scanning led to more accurate testing (Table). The groups did not differ for total adverse effects (pneumothorax requiring conservative treatment, P = 0.2, and minor hemorrhage, P = 0.3) or costs (£525/patient for initial CT scanning vs £534/patient in the bronchoscopy group).

**Conclusion**
Computed tomographic scanning before fiberoptic bronchoscopy influenced the choice of initial diagnostic tests and improved the diagnostic accuracy of bronchoscopy in patients with suspected endobronchial carcinoma.

*See Glossary.

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**Commentary**
Since its introduction in 1972, fiberoptic bronchoscopy has been the main technique used to obtain histologic evidence of suspected bronchial carcinoma. Although several retrospective studies have suggested that CT scanning before bronchoscopy might aid precision and therefore diagnostic yield, the study by Laroche and colleagues is the first to provide prospective evidence.

The study is well designed and shows that CT scanning before bronchoscopy for all patients had 3 benefits. First, 7% of all patients were allocated to go directly to fiberoptic bronchoscopy (CT scan results were not available to the bronchoscopist). ≥ 5 bronchial biopsy specimens of visual tumors were taken; bronchial washing was done; and if no visible tumor was seen, bronchial brushing was done. Additional follow-up tests were done as needed using information from the CT scans. Follow-up was 100%.

**Computed tomographic (CT) scanning before bronchoscopy vs bronchoscopy alone for patients with suspected endobronchial carcinoma**

<table>
<thead>
<tr>
<th>Patients</th>
<th>Outcomes</th>
<th>Initial CT</th>
<th>Bronchoscopy first</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>All</td>
<td>Bronchoscopy is diagnostic</td>
<td>73%</td>
<td>54%</td>
<td>0.015</td>
</tr>
<tr>
<td>All</td>
<td>First invasive procedure is diagnostic</td>
<td>76%</td>
<td>55%</td>
<td>0.005</td>
</tr>
<tr>
<td>With cancer</td>
<td>Sensitivity of bronchoscopy</td>
<td>89%</td>
<td>71%</td>
<td>0.012</td>
</tr>
<tr>
<td>With cancer</td>
<td>Histologic diagnosis on first invasive procedure</td>
<td>90%</td>
<td>71%</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Increased costs if routine CT scanning before bronchoscopy is introduced.

The study took place in a large, free-standing specialist unit: It should be replicated in different settings, including general hospitals, before initial CT scanning can be generally adopted. Any advantage from CT scanning depends strongly on individual radiologists’ expertise, especially in assessing the detailed anatomy of the bronchial tree. This expertise may be less well developed in the average general hospital. Furthermore, CT scanners in general hospitals are often extremely busy: Adding CT scanning for every patient with suspected lung cancer may cause problems with accessibility.

Nonetheless, if the study results prove applicable, CT scanning before bronchoscopy in all patients may well refine our use of bronchoscopy and improve our investigation of suspected lung cancer.

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