

Positron Emission Tomography Plus Computed Tomography for Staging Early Lung Cancer

Summaries for Patients are a service provided by *Annals* to help patients better understand the complicated and often mystifying language of modern medicine.

The full report is titled “Positron Emission Tomography in Staging Early Lung Cancer. A Randomized Trial.” It is in the 18 August 2009 issue of *Annals of Internal Medicine* (volume 151, pages 221-228). The authors are D.E. Maziak, G.E. Darling, R.I. Inculet, K.Y. Gulenchyn, A.A. Driedger, Y.C. Ung, J.D. Miller, C.S. Gu, K.J. Cline, W.K. Evans, and M.N. Levine.

This article was published at www.annals.org on 7 July 2009.

What is the problem and what is known about it so far?

The most common type of lung cancer is non–small cell lung cancer. Surgery is the usual treatment if the cancer has not spread outside the lung. Sometimes the cancer cells invade nearby tissue, for example, lymph nodes in the area between the lungs (the mediastinum), and spread through the blood and lymph system to other parts of the body (that is, they metastasize). Doctors usually use imaging tests, such as bone scan, computed tomography (CT), or positron emission tomography (PET), to see whether lung cancer has spread to the mediastinum or to other parts of the body (extrathoracic spread). The CT scans give a series of detailed x-ray pictures of body structures. Both the bone scan and PET involve injecting a radioactive substance into a vein. They give pictures of areas of the body that “light up” because the radioactive substance goes to areas where new bone is being made (which show up on the bone scan) and the radioactive substance is rapidly trapped by cancer cells (which shows up on PET). The purpose of these imaging tests is to identify patients who have cancer that has spread and who thus are not candidates for curative surgical resection. The usual strategy to detect spread, called *conventional staging*, consists of bone scan and CT of the abdomen.

Why did the researchers do this particular study?

To see which of 2 imaging strategies better identifies patients with early-stage non–small cell lung cancer who are or are not candidates for curative surgical resection.

Who was studied?

170 patients with early-stage non–small cell lung cancer. All had chest x-rays and chest CT scans that suggested that cancer lesions were potentially resectable.

How was the study done?

The researchers randomly assigned patients to receive either whole-body PET plus CT (PET-CT) or conventional staging. Patients in both groups received cranial imaging (brain CT or magnetic resonance imaging). Then, if any of these test results were abnormal, patients in both groups underwent further testing or had biopsies of lymph nodes or suspicious lesions to see whether disease had metastasized. The researchers used the information from these tests or biopsy information to see which strategy best identified patients who were or were not candidates for curative surgery.

What did the researchers find?

The PET-CT strategy identified more patients with metastatic disease and prevented more unnecessary surgery than did the conventional strategy (14% vs. 7%). The PET-CT strategy also incorrectly identified more patients with metastatic disease than did the conventional strategy (about 5% vs. 1%). Most of these false-positive findings with PET-CT were enlarged nodes in the mediastinum. After 3 years, 30% and 34% of patients in the PET-CT and conventional strategy groups, respectively, had died.

What were the limitations of the study?

The study was small. Five PET-CT centers with strict quality control procedures that were located in academic centers were used; we do not know whether results are generalizable to other sites.

What are the implications of the study?

A PET-CT imaging strategy may help identify advanced disease and prevent futile thoracotomy in some patients with non–small cell lung cancer. However, this strategy yields false-positive results that may lead to incorrect “upstaging” of disease in some patients. Because PET-CT may be falsely positive in patients with enlarged mediastinal nodes, such findings need biopsy confirmation.

Summaries for Patients are presented for informational purposes only. These summaries are not a substitute for advice from your own medical provider. If you have questions about this material, or need medical advice about your own health or situation, please contact your physician. The summaries may be reproduced for not-for-profit educational purposes only. Any other uses must be approved by the American College of Physicians.