
RSNA Press Release

Annual CT Detects Early-Stage Lung Cancers, Saves Lives

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At A Glance

- Regular CT screening is an effective tool for diagnosing early-stage lung cancer, a study of 6,318 smokers shows.
- Annual CT screening is frequent enough to diagnose early-stage lung cancer.
- Early-stage lung cancer is the most curable form of lung cancer.

CHICAGO — Annual computed tomography (CT) screening is an effective diagnostic tool for detecting early-stage lung cancer in smokers and for reducing mortality rates, according to two ongoing studies from the 10-year Early Lung Cancer Action Project (ELCAP) in New York.

"More than 80 percent of the diagnosed lung cancers we found in initial and annual repeat CT screenings were Stage I — the most curable form of lung cancer," said Claudia I. Henschke, M.D., Ph.D., principal investigator of the studies and professor of radiology and division chief of chest imaging at New York Hospital/Cornell Medical Center in New York City.

Lung cancer is the leading cause of cancer death among men and women, and more people will die of lung cancer than of breast, colon and prostate cancers combined, according to the American Cancer Society. Lung cancer has no early warning signs and a tumor may be the size of an apple by the time it is detected, often because of symptoms like shortness of breath, hoarseness, coughing up blood and unexplained weight loss.

Dr. Henschke presented the findings today at the 89th Scientific Assembly and Annual Meeting of the Radiological Society of North America (RSNA).

ELCAP: Original Cohort Study (1993-2003)

Multiple annual CT screenings were performed on 2,968 high-risk subjects to determine the proportion of lung cancers diagnosed on repeat CT screenings compared to those diagnosed from symptoms in between the screenings. The study also looked at the number of deaths due to lung cancer after long-term follow-up.

Cancers were classified as annual repeat screening diagnosis (findings on a low-dose CT scan 11 to 13 months after the last screening) or as an interim diagnosis (symptoms

appearing within 12 months after the last screening). Among the 29 cases diagnosed, 28 were screen-diagnosed and one was interim-diagnosed, indicating that annual screening was frequent enough to diagnose early-stage lung cancer.

Long-term follow-up of patients with screen-diagnosed lung cancer who underwent surgery also showed a high cure rate.

"Through these screenings we will determine how many patients are cured," Dr. Henschke said. "Depending on the resulting long-term follow-up, we hope that CT screening will be made widely available to high-risk smokers and former smokers."

Co-authors are David F. Yankelevitz, M.D., Ali O. Farooqi, William J. Kostis, Ph.D., and Dorothy I. McCauley, M.D.

NY-ELCAP: A Multi-Institutional Study (1999-2003)

NY-ELCAP was designed to evaluate the effectiveness of annual CT screening in high-risk subjects at 12 medical institutions throughout the state of New York. Participants — 6,318 men and women, age 60 or older, who had no history of cancer and smoked at least one pack of cigarettes a day for 10 years — underwent low-dose CT of the lungs and chest and were added to the ELCAP annual report cases. As of November 2003, annual CT screenings have been performed on 4,658 people based on a positive finding in an earlier screening. Again, more than 80 percent of the lung cancers detected were Stage I.

"CT screening can help save lives," Dr. Henschke said. "Without it, about 85 percent of lung cancers that physicians diagnose are more advanced."

Stage I cancer is typically small (no larger than 10 millimeters in diameter) and localized in the lungs without spreading to the lymph nodes. The average cure rate for patients when Stage I lung cancer is removed is 60 percent to 70 percent, while the cure rate for more advanced types of lung cancer — Stage II and later — is less than 5 percent, according to Dr. Henschke.

Co-authors of the studies are Matthew D. Rifkin, M.D., Samuel Kopel, M.D., Donald L. Klippenstein, M.D., Arfa Khan, M.D., and Leslie J. Kohman, M.D.; and John H.M. Austin, M.D., David D. Mendelson, M.D., Robert Heelan, M.D., Terence A.S. Matalon, M.D., Peter W. Wiernik, M.D., and David H. Gordon, M.D.

RSNA is an association of more than 35,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill.

Figure 1. High-resolution CT scan images displayed with advanced 3D image processing techniques show a small (approximately 4 mm) pulmonary nodule. The two scans were obtained 189 days apart and the growth rates are automatically determined.

Figure 2. A scout view from a CT scan (A) shows where nodule candidates are automatically selected for review. They are outlined with the squares. The CT image (B) shows one of the selected candidates presented to the radiologist for review.

Figure 3. Advanced image processing shows the extent of emphysema. Normal lung tissue appears as pink and emphysema appears black. Patient (A) has no emphysema, while patient (B) has advanced emphysema prominent in the upper lobes.

Play video clip:

[CT Scan](#) (.mov file; 4min, 13 sec.)

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