Study finds that annual screening with chest x-ray does not reduce rate of lung cancer deaths

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In a trial that included more than 150,000 participants, those who underwent annual chest radiographic screening for up to 4 years did not have a significantly lower rate of death from lung cancer compared to participants who were not screened, according to a study in the November 2 issue of *JAMA*. The study is being published early online to coincide with its presentation at the annual meeting of the American College of Chest Physicians (CHEST 2011).

"Lung cancer is the leading cause of cancer death in the United States and worldwide. Screening for lung cancer has long been studied as an approach to reducing the burden of lung cancer," according to background information in the article. "The effect on mortality of screening for lung cancer with modern chest radiographs is unknown."

Martin M. Oken, M.D., of the University of Minnesota, and colleagues examined the effect on mortality of screening for lung cancer using radiographs in the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial. This randomized controlled trial involved 154,901 participants, ages 55 through 74 years, of whom 77,445 were assigned to annual screenings and 77,456 to usual care, at 1 of 10 screening centers across the United States, between November 1993 and July 2001. The groups were similar: approximately half were women (50.5 percent); about 45 percent were never smokers, 42 percent former smokers, and 10 percent current smokers.

Participants in the intervention group were offered an annual chest radiograph for 4 years. Diagnostic follow-up of positive screening results was determined by participants and their health care practitioners. Participants in the usual care group were not offered chest radiograph screening and received their usual medical care. All diagnosed cancers, deaths, and causes of death were ascertained through the earlier of 13 years of follow-up or until December 31, 2009.

Adherence to screening was 86.6 percent at the beginning of the trial, decreasing to 79 percent by year 3. The overall adherence rate was 83.5 percent, and 91.2 percent of participants had undergone at least 1 radiographic screening. In the usual care group, the contamination rate (i.e., rate of chest radiograph screening) during the screening phase of the trial was estimated at 11 percent.

During the entire 13 year study period, there were 1,696 lung cancers detected in the intervention group and 1,620 lung cancers in the usual care group. Of participants diagnosed with lung cancer during the follow-up, stage and histology was similar by group, with about 41 percent being adenocarcinoma, 20 percent squamous cell carcinoma, 14 percent small cell carcinoma, 5 percent large cell carcinoma, and 20 percent other non-small cell lung cancer.

Regarding the effect on mortality, the researchers found that annual chest radiographic screening for up to 4 years did not significantly decrease lung cancer mortality compared with usual care: for the total 13-year follow-up period, 1,213 lung cancer deaths were observed in the intervention group vs. 1,230 in the usual care group.

"The randomized groups in PLCO were comparable at baseline, there was relatively high screening adherence in the intervention group and low contamination in the usual care group, and the treatment distributions across the groups were similar. Therefore, these findings

provide good evidence that there is not a substantial lung cancer mortality benefit from lung cancer screening with 4 annual chest radiographs," the authors write.

In an accompanying editorial, Harold C. Sox, M.D., of Dartmouth Medical School, West Lebanon, N.H., comments on the findings of this study.

"The PLCO lung cancer study result provides convincing evidence that lung cancer screening with chest radiography is not effective. The study is important for putting this question to rest and providing strong empirical grounds for comparing low-dose computed tomography to a real-world alternative: usual care. The National Lung Screening Trial showed convincingly that early detection can lower the risk of death from lung cancer, a big step forward. How that evidence will translate into policy and practice will depend on analyses still to be completed. The PLCO trial is another important step, confirming expectations rather than setting new ones."

More information: *JAMA*. 2011;306[17]:1865-1873

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