Lung Cancer Screening: Pros and Cons

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CHICAGO—Experts at RSNA 2015 debate the pros and cons of low-dose CT lung cancer screening.

“The leading cause of preventative death and illness amongst both men and women, responsible for approximately 20% of all deaths in the US, is lung cancer,” Ella Kazerooni, MD, University of Michigan, said at RSNA 2015.

With over 240,000 new cases and 162,000 deaths reported each year, lung cancer screening is covered by CMS, which was announced in February 2015, and while it does reduce mortality rates, screening is not without risk.

Lung Cancer Screening Background

“Eighty-five percent of all lung cancers are attributed to smoking, resulting in one in five deaths,” Kazerooni said. However, there are several other contributing factors including occupational exposures, radon exposure, personal cancer history, and underlying lung diseases. “These last major risk factors for lung cancer have not been studied in randomized control trials,” she said.

“There have been many single arm, prospective cohort studies using low dose helical CT which together have demonstrated improved survival,” Kazerooni said. The data from these single arm studies shows that in most cases (85%), the type of cancer detected was stage 1, the size of screen-detected cancer was, on average, smaller than symptom-presented lung cancer and according to the I-ELCAP ten-year survival data, the survival rate of “clinically detected cancer in screening is better than symptomatic clinically presented cancers.” However, all of these single arm studies were “subject to length and lead time bias as well as the possibility of over diagnosis,” Kazerooni said.

As a result, the National Lung Screen Trial (NLST) was established in 2011 as the first multicenter, randomized trial large enough to detect a significant reduction in lung cancer mortality through low dose helical CT screening, Kazerooni said. The results of this study proved over a three-year period of time that “annual low dose CT screening done in this trial versus chest X-rays reduced lung cancer specific mortality by 20% and is cost effective in most cases.”

These findings resulted in many professional societies establishing early lung cancer screening guidelines. The USPSTF used these findings to provide a Grade B recommendation, which allows eligible patients under the terms of the Patient Protection Affordable Care Act (PPACA) who meet the appropriate criteria to have a screening CT.

Criteria for Screening

The USPSTF, using the NLST enrollment criteria along with modeling studies, established the following annual recommendations for lung cancer screening, according to Kazerooni:

• Adults aged 55 to 80
• 30 pack/year smoking history
• Currently smoke or have quit within the past 15 years

Benefits of Lung Cancer Screening

There are many benefits to lung screening and typically “the higher risk of lung cancer yields higher benefit from lung cancer screening,” Kazerooni said. “In the highest quintile of risk in the NLST, there was a 60-fold greater number of prevented lung cancer deaths and fewer false positives.”

The known benefits of lung cancer screening include reduced lung cancer mortality and using it as a “teachable moment for smoking cessation, which is the single best way to prevent lung cancer,” she said. Other potential benefits include the detection of other smoking related conditions including aortic aneurysms, COPD, and abnormalities related to the lower neck and upper abdomen, Kazerooni said.

Risks of Lung Cancer Screening

Despite the defined benefits of using the USPSTF criteria for screening, there are also potential harms to doing these studies that are usually related to “detection, management of abnormalities, and treatments,” Kazerooni said. Screening patients who are low risk or who will not benefit from screening results in unnecessary diagnostic tests, potentially unnecessary invasive procedures, such
as biopsies, and any complications related to procedures. According to Doug Arenberg, MD, who is an advocate of screening when done right, “screening is not something you do on patients, it is something you do on people. It is something you do on someone who doesn’t have a disease.” This results in treating people who never would have been treated as well as possible complications with these treatments. Because all cancer screening can lead to overdiagnosis, “screening tests are only justified when the benefits outweigh this inherent harm,” he said.

One of the concerns with the USPSTF screening process is that “they may have extended the low risk criteria too low,” Arenberg said. Using NLST participants, of “1000 people within an average at-risk pool, screening would result in three fewer deaths but would also result in 365 false positives, 25 biopsies, and 3 major complications.”

So while a small percentage “accrue mortality benefits, risks are relevant to all screened individuals,” he said. This causes concern that the “balance of risk and benefit is not constant” across the screening population. Ultimately, “We improve outcomes and reduce costs by identifying the screening ‘sweet spot’ of high risk low co-morbidity.”


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