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Lung cancer screening: Is it worth it?

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When I heard the drumbeat of lung cancer screening at the most recent RSNA meeting, the words were déjà vu from the last decade of whole-body CT screening. We all recall how whole-body CT screening formed a big bubble to the extent it was marketed directly to the consumer¹ and was offered as a winning prize or gift certificate raffled by charitable organizations. Then its allure burst and faded away.

So is lung cancer screening another bubble that will inflate and burst?

Cancer remains the second-leading cause of death in the United States (U.S.). Although the third-most common cancer (after prostate and breast), lung cancer is the most common cause of cancer death. It accounts for 28% of such deaths in the U.S., and its annual burden is greater than that of any other neoplasm.²

The recent report from the National Cancer Institute's (NCI) National Lung Screening Trial (NLST) and the American Cancer Society's (ACS) lung cancer screening guidance concluded that lung cancer mortality can be reduced in specific high-risk groups by annual screening with low-dose computed tomography (LDCT) with the caveat that the potential harm-to-benefit ratio should be considered.^{2,3} The ACS does not recommend lung cancer screening for everyone.

The link between lung cancer and tobacco use, previously denied for so many years by tobacco companies, is now indisputably proven. The epidemic of lung cancer death is now receding in some countries where tobacco control has reduced smoking, but it is rapidly increasing among current and former smokers in others.⁴ Age-specific lung cancer incidence increases with age and the number of cigarettes smoked per day.⁵

Considering the high rate of tobacco use among veterans, the NLST team's report, and the ACS guidance, the U.S. Department of Veterans Affairs (VA) has decided to take an active role in the early detection and treatment of lung cancer in this population. The VA is now embarking on a "phased implementation" of CT lung screening at 6 to 8 VA hospitals. These trials will help the department plan a system-wide program in the coming years.⁶

Eligibility criteria for the NLST include being an active or former smoker, age 55 to 74, with no signs or symptoms of lung cancer, and having a 30-pack-year smoking history (a pack year is the equivalent of 1 pack of cigarettes per day per year; 1 pack per day for 30 years or 2 packs per day for 15 years would both be a 30-pack-year). Active smokers should be urged to enter a smoking cessation program, and former smokers must have quit within the past 15 years.²

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The NLST showed a statistically significant 20% reduction in mortality in a group of high-risk adults randomized to receive 3 consecutive annual LDCT lung cancer screening examinations (at baseline, year 1, and year 2), compared to an equivalent risk group of adults randomized to receive 3 consecutive annual chest radiographs.² In all 3 rounds, there was a substantially higher rate of positive screening tests in the LDCT group than in the radiography group at baseline (27.3% vs. 9.2%), at year 1 (27.9% vs. 6.2%), and at year 2 (16.8% vs. 5%).³

Screening requires a variety of health practitioners to work together. The importance of a multidisciplinary team composed of a primary care physician, radiologist, surgeon, pulmonologist, prevention physician, oncologist, and radiation therapist was emphasized by Dr. Reginald Munden, of the MD Anderson Cancer Center, at the 2012 RSNA.⁷

Some economists have a more sinister view of these issues than do most physicians. They remind us that U.S. healthcare costs represented 17.9% of the gross domestic product (GDP) in 2010 and are continuing to grow. It is projected that the U.S. will spend 20% of GDP on healthcare in 2020. Economists also warn that we already have the highest healthcare costs as a percentage of total budget compared to any other nation.

However, with tobacco control, smoking cessation, and lung screening,

we are increasing healthcare expenditures and contributing to decreasing mortality by increasing the longevity of our seniors. People are living longer, which translates to more healthcare costs for senior citizens and a higher financial burden on such resources as pensions and Social Security. We physicians are rightfully arguing that we cannot put a price on human life.

Nevertheless, the reality is that >95% of CT-detected pulmonary nodules are ultimately found to be benign.⁸ To complicate this, studies that have evaluated the outcomes of benign biopsies have found false-negative rates varying widely, from 6% to 54%.⁸ False-positive results (eg, benign noncalcified nodules or premalignant lesions that would not evolve into malignancy) invite potential burdens. Intervention (biopsy) may lead to pneumothorax and other complications. Costly investigation of incidental findings discovered outside the lungs may also lead to unnecessary studies. Yet another concern: If we embark on these trials, are we sufficiently equipped to handle the required high CT volume? Do we have enough support from facility leadership to provide the primary care, interventional radiologists, pulmonary physicians, pathologists, oncologists, cardiothoracic surgeons, radiation therapists, and clinical coordinators or case managers to care for the lung cancer patients we discover?

In light of the promising NLST report and the advent of ultrafast low-

dose CT scanners that can image the entire chest in 0.3 sec, the ACS and the VA see a silver lining in screening smokers over age 55. We at the VA medical center in Long Beach, CA, are applying to participate in this phased implementation trial. Hopefully, by collecting more data, we can set a road map to wisely guide wider implementation of CT lung cancer screening.

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