Lung Cancer Screening Criteria Should Include Occupational Exposure History

Early detection of lung cancer in a population at high risk due to occupation and smoking

Laura S. Welch, John M. Dement, Kim Cranford, Janet Shorter, Patricia S. Quinn, David K. Madtes, and Knut Ringen. Occupational and Environmental Medicine, 2018.

Overview

Low-dose CT scans can save lives by identifying lung cancers at an early stage, when treatment is most likely to be effective. Based on a growing body of evidence, the US National Comprehensive Cancer Network (NCCN) recommends including both smoking and occupational exposures to define populations eligible for CT screening. In the current study, researchers screened 1260 former construction workers from the Building Trades National Medical Screening Program (BTMed), a population that included both heavy smokers and also lighter smokers who had been exposed to harmful vapors, gases, dusts, and fumes – including known carcinogens – during their years on the job.

Key Findings

■ Using criteria that include occupational risk, researchers detected a rate of lung cancer (1.6%) equivalent to that found in the previous studies of heavy smokers - even though less than half the cohort met the heavy smoking criteria used in the other studies.

■ This study validates the lung cancer screening entry criteria recommended by the National Comprehensive Cancer Network.

■ Early Lung Cancer Detection programs should include individuals at high risk from occupational exposures even if they do not meet the general smoking criteria.

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ORIGINAL ARTICLE

Early detection of lung cancer in a population at high risk due to occupation and smoking

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► http://dx.doi.org/10.1136/oemed-2018-105464

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ABSTRACT

Objective The US National Comprehensive Cancer Network (NCCN) recommends two pathways for eligibility for Early Lung Cancer Detection (ELCD) programmes. Option 2 includes individuals with occupational exposures to lung carcinogens, in combination with a lesser requirement on smoking. Our objective was to determine if this algorithm resulted in a similar prevalence of lung cancer as has been found using smoking risk alone, and if so to present an approach for lung cancer screening in high-risk worker populations.

Methods We enrolled 1260 former workers meeting NCCN criteria, with modifications to account for occupational exposures in an ELCD programme.

Results At baseline, 1.6% had a lung cancer diagnosed, a rate similar to the National Lung Cancer Screening Trial (NLST). Among NLST participants, 59% were current smokers at the time of baseline scan or had quit smoking fewer than 15 years prior to baseline; all had a minimum of 30 pack-years of smoking. Among our population, only 24.5% were current smokers and 40.1% of our participants had smoked fewer than 30 pack-years; only 43.5% would meet entry criteria for the NLST. The most likely explanation for the high prevalence of screen-detected lung cancers in the face of a reduced risk from smoking is the addition of occupational risk factors for lung cancer.

Conclusion Occupational exposures to lung carcinogens should be incorporated into criteria used for ELCD programmes, using the algorithm developed by NCCN or with an individualised risk assessment; current risk assessment tools can be modified to incorporate occupational risk.

INTRODUCTION

Lung cancer is a leading cause of cancer death worldwide. Five-year survival is 19% for all lung cancers and 55% for localised tumours; average 5-year survival for advanced cases with metastases is only 4.5%.

In 2011, the National Lung Screening Trial (NLST) demonstrated a 20% reduction in mortality attributable to three annual screenings using low-dose CT (LDCT).[1] Subsequently, the Preventive Services Task Force of the United States Public Health Service recommended lung cancer screening, as have other professional organisations provided that it is undertaken as a structured programme in centres with considerable expertise in lung cancer care, although not all agreed with the recommendation.[2]

Key messages

What is already known about this subject?
► Early detection of lung cancer with low-dose CT has been shown to reduce mortality.
► Many individuals have been exposed to known lung carcinogens in their work, but current enrolment criteria recommended by professional organisations in the USA rarely include occupational risk.

What are the new findings?
► Using criteria that include occupational risk we detected a baseline rate of lung cancer equivalent to that found in the US National Lung Screening Trial, although less than half the cohort met smoking criteria used in that trial.
► This study validates lung cancer screening entry criteria recommended by the National Comprehensive Cancer Network.

How might this impact on policy or clinical practice in the foreseeable future?
► Risk calculators need to be modified to include occupational exposures in the algorithms.
► Early Lung Cancer Detection programs should specifically include individuals at high risk from occupational exposures.

Discussion continues about defining appropriate risk for screening, frequency of screening, overdiagnosis of lung cancer and evaluation of non-nodule incidental findings. In Europe, recommendations on screening are awaiting the results of the NELSON trial and pooled analyses across screening trials[3–5]; ongoing trials are providing information on screening frequency, nodule management and potential for overdiagnosis.

Most guidelines for lung cancer screening do not include assessment of occupational risk, although this risk is incorporated in the National Comprehensive Cancer Network (NCCN) lung cancer screening guidelines[6] and risk models from Cronin and the Liverpool Lung Project (LLP).[7 8] Here, we present results of a lung cancer screening programme in workers at high risk for lung cancer due to a combination of occupational exposures and smoking.

METHODS AND MATERIALS
Medical programme
The study population is a subset of participants in the Building Trades National Medical Screening

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