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Screening for lung cancer (Review)

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[Intervention Review]

Screening for lung cancer

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ABSTRACT

Background

This is an updated version of the original review published in *The Cochrane Library* in 1999 and updated in 2004 and 2010. Population-based screening for lung cancer has not been adopted in the majority of countries. However it is not clear whether sputum examinations, chest radiography or newer methods such as computed tomography (CT) are effective in reducing mortality from lung cancer.

Objectives

To determine whether screening for lung cancer, using regular sputum examinations, chest radiography or CT scanning of the chest, reduces lung cancer mortality.

Search methods

We searched electronic databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (*The Cochrane Library* 2012, Issue 5), MEDLINE (1966 to 2012), PREMEDLINE and EMBASE (to 2012) and bibliographies. We handsearched the journal *Lung Cancer* (to 2000) and contacted experts in the field to identify published and unpublished trials.

Selection criteria

Controlled trials of screening for lung cancer using sputum examinations, chest radiography or chest CT.

Data collection and analysis

We performed an intention-to-screen analysis. Where there was significant statistical heterogeneity, we reported risk ratios (RRs) using the random-effects model. For other outcomes we used the fixed-effect model.

Main results

We included nine trials in the review (eight randomised controlled studies and one controlled trial) with a total of 453,965 subjects. In one large study that included both smokers and non-smokers comparing annual chest x-ray screening with usual care there was no reduction in lung cancer mortality (RR 0.99, 95% CI 0.91 to 1.07). In a meta-analysis of studies comparing different frequencies of chest x-ray screening, frequent screening with chest x-rays was associated with an 11% relative increase in mortality from lung cancer compared with less



frequent screening (RR 1.11, 95% CI 1.00 to 1.23); however several of the trials included in this meta-analysis had potential methodological weaknesses. We observed a non-statistically significant trend to reduced mortality from lung cancer when screening with chest x-ray and sputum cytology was compared with chest x-ray alone (RR 0.88, 95% CI 0.74 to 1.03). There was one large methodologically rigorous trial in high-risk smokers and ex-smokers (those aged 55 to 74 years with \geq 30 pack-years of smoking and who quit \leq 15 years prior to entry if ex-smokers) comparing annual low-dose CT screening with annual chest x-ray screening; in this study the relative risk of death from lung cancer was significantly reduced in the low-dose CT group (RR 0.80, 95% CI 0.70 to 0.92).

Authors' conclusions

The current evidence does not support screening for lung cancer with chest radiography or sputum cytology. Annual low-dose CT screening is associated with a reduction in lung cancer mortality in high-risk smokers but further data are required on the cost effectiveness of screening and the relative harms and benefits of screening across a range of different risk groups and settings.

PLAIN LANGUAGE SUMMARY

Screening for lung cancer

Lung cancer is the most common cause of cancer-related death in the western world. It takes about 20 years to develop and cigarette smoking is a known cause. Most lung cancers are not found early in the development of the disease. Regular screening is offered to those considered to be at high risk of contracting the disease. Trials were made of early detection methods such as the testing of sputum, x-ray and computed tomography (CT) scanning of the chest to see whether they made a difference to the number of people who were treated by surgery and the number of people who died as a result of the disease. This review examined the evidence from nine trials (with a total of 453,965 participants) and found that early screening with chest X-ray or sputum testing does not reduce the number of people who die from lung cancer. Screening with low-dose chest CT was found in one large trial to reduce the number of people who die from lung cancer but this trial only included very high-risk smokers and ex-smokers. CT screening however is associated with a high number of false positive results and there are also some people who have lung cancer detected and treated but in whom this cancer may not have progressed to cause death in their lifetime, even in the absence of treatment (referred to as overdiagnosis). More research is needed about the relative harms and benefits of CT screening in individuals at lower risk for lung cancer.