



Mini Review

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Screening for Lung Cancer: An Overview

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Introduction

Lung Cancer is the leading cause of cancer-related deaths worldwide; the vast majority of cases (far to 80%) are diagnosed at an advanced stage, when treatment options are limited. Aiming to change that scenario, a lot of interest has arisen from the scientific community in the last decades in order to track a pathway to allow earlier diagnoses.

The National Lung Screening Trial (NLST), published in 2011, was one of the first important studies about effective Lung Cancer screening. It consisted on a clinical trial conducted in the United States with the aim of evaluating the effectiveness of low-dose computed tomography (LDCT) in the early detection of lung cancer in high-risk patients. The NLST included more than 53,000 participants aged 55 to 74 years, who had a history of smoking for at least 30 years or had quit smoking within the past 15 year. The participants were randomly assigned to one of two screening groups: one group underwent LDCT annually for three years, and the other group underwent chest X-ray annually for the same period. The results of the study showed that LDCT reduced lung cancer mortality by 20% compared to chest X-ray. In addition, LDCT allowed for the detection of more cases of early-stage lung cancer than chest X-ray.

In 2013, a systematic review from Cochrane evaluated seven controlled randomized trials regarding the efficacy of screening for Lung Cancer with LDCT. The analysis included a total of 90,475 participants and compared the screening with LDCT versus chest X-ray or no screening. The results showed a reduction of 20% in mortality when LDCT where used. The review pointed, however, some important negative effects of the screening, including detection of benign pulmonary lesions, which could lead to unnecessary invasive procedures e patient-family anxiety; and also,

the screening could lead to the detection of lesions that may never became cancer, leading to overdiagnosis and overtreatment.

Taking into account all of the trials published in that matter, still in 2013, the US Prevention Taskforce (USPSTF) published its official recommendations regarding screening for lung cancer: individuals between the ages of 55 and 80 years-old with a history of smoking (over than 30 packs-year) should undergo annual screening with LDCT. The recommendation included, yet, that the screening should be done in specialized centers with highly defined protocols, to minimize the rate of false positives or overdiagnoses. In 2021, the USPSTF updated their recommendations, stating a screening in individuals between 50-80 years-old, with a history of smoking at least 20 packs-year.

A lot of other papers reaffirmed the data already known, but a major trial about the subject was published in 2020, The NELSON (Dutch-Belgian Randomized Lung Cancer Screening Trial), that enrolled over 15,000 participants aged from 50 to 74 years, who were current of former smokers with a smoking history of at least 10 cigarettes per day for at least 30 years or 15 cigarettes per day for at least 25 years. The participant were randomly assigned to either the LDCT group or the control group. The LDCT group received screening with low-dose computed tomography scans at baseline and after 1, 2 and 4 years [1]. The primary endpoint of the study was lung cancer mortality. The results of the study showed that LDCT screening group had a significantly lower cancer mortality rate compared to the control group [2-4].

The European Society of Radiology developed, also, recommendations for lung cancer screening with LDCT. According to ESR guidelines, individuals aged 50-75 with a smoking history of at least 20 pack-year and a quit time of less than 10 years should be

offered LDCT screening yearly for at least 3 years [5]. The guidelines also suggest that individuals with a history of other lung diseases, such as COPD, may also benefit from LDCT screening. In addition, the ESR recommends that the results should be interpreted by radiologists with expertise in thoracic imaging, in order to diminish the overdiagnoses.

Much has been speculated about the cost-effectiveness of screening for Lung Cancer with LDCT, considering the cost of that screening for a large population [6]. A systematic review from Lung Cancer Journal, published in 2022, evaluates that matter. The review looked at 45 studies, including trials and modeling studies. 86.7% of the studies found screening with LDCT to be cost-effective, being optimal between the ages of 55-75 with a smoking history of at least 20 packs-year. Even though it's not trial validated, biennial screening was found to be more cost-effective than annual. The review highlights the importance of smoking cessation intervention, considering an improve of cost-effectiveness when done alongside with the screening. With the development of risk prediction models and smoking cessation interventions, another economic evaluations may be required in the future.

Conclusion

In conclusion, in order to take away from the Lung Cancer the first position in cancer-related deaths worldwide, it's fundamental

to implement comprehensive protocols for Lung Cancer screening, using LDCT, and create specialized centers to treat that matter, with programs of smoking cessation alongside, and a qualified medical group to access properly those high-risk individuals.

References

1. The National Lung Screening Trial Research Team (2011) Reduced Lung-Cancer Mortality with Low-Dose Computed Tomographic Screening. *N Engl J Med* 365(5): 395-409.
2. Manser R, Lethaby A, Irving LB, Stone C, Byrnes G, et al. (2013) Screening for lung cancer. *Cochrane Database of Systematic Reviews* 2013(6): CD001991.
3. Krist AH, Davidson KW, Mangione CM, Barry MJ, Cabana M, et al. (2021) Screening for Lung Cancer. *US Preventive Services Task Force Recommendation Statement*. *JAMA* 325(10): 962-970.
4. De Koning HJ, van der Aalst CM, de Jong PA, Scholten ET, Nackaerts K, et al. (2020) Reduced Lung-Cancer Mortality with Volume CT Screening in a Randomized Trial. *N Engl J Med* 382(6): 503-513.
5. Kauczor H-U, Baird A-M, Blum TG, Bonomo L, Bostantzoglou C, et al. (2020) ESR/ERS statement paper on lung cancer screening. *Eur Respir J* 55(2): 1900506.
6. Grover H, King W, Bhattarai N, Moloney E, Sharp L, et al. (2022) Systematic review of the cost-effectiveness of screening for lung cancer with low dose computed tomography. *Lung Cancer* 170: 20-33.