Chapter 2

LUNG CANCER SCREENING

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Cancer is a major public health problem and is the second leading cause of death in the world. Lung cancer is the second most common cancer site following breast and prostate cancer in women and men respectively. 1.6 million deaths are estimated annually due to lung cancer (Steward B &Wild CP,2014). And over 234.000 new lung cancer cases are going to be diagnosed and 154.000 cancer associated deaths will be seen annually in USA (Siegel RL&Miller KD,& Jemal A. ,2017) .

Smoking is deemed to be the cause in 85-90 % of all lung cancer cases (Alberg AJ&Samet JM. ,2003) . Prevention rather than screening is the preferred strategy so smoking cessation should be the cornerstone in this issue. As smoking cessation strategies progresses, a decline in lung cancer cases and mortality is detected in USA (Jamal A& King BA&Neff LJ, et al., 2016)).

The 5-year survival of lung cancer mianly depends on stage at the diagnosis. In non-small cell lung carcinoma 5-year survival is up to 92% in stage IA1 whereas it is nearly 0% in stage IVB (Mountain CF. ,1997).

Small cell lung cancer has fewer data than non-small cell lung cancer but it is well known that survival is negatively correlated with the stage of the disease at diagnosis. The overall 5-year survival is approximately 18% for all lung cancer cases (Siegel RL&, Miller KD, Jemal A. ,2018).

Screening is a legitimate strategy in such a lethal, highly morbid and prevalent cancer. What about the possible benefits and harms of lung cancer screening? The most attractive benefit is to diagnose the cancer at an earlier stage to let surgical cure or to achieve an improvement in overall cure rates and reduce mortality and, additionally to enhance the cessation of smoking as a secondary gain. Radiation exposure, patient anxiety and distress enhanced by false positive results, over diagnosis and the cost and consequences of diagnostic procedures spent for abnormal screening findings and resulting complications (Woolf SH, Harris RP, Campos-Outcalt D. ,2014).

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Some other screening modalities including positron emission tomography, immunostain or molecular analysis of sputum for tumor markers, automated image cytometry of sputum, fluorescence bronchoscopy, exhaled breath analysis of volatile organic compounds, genomic and proteomic analysis of bronchoscopic samples and serum protein microarrays. The Continuous Observation of Smoking (COSMOS) study focused on the estimation of volume doubling time of tumors by low-dose computed tomography to prevent overdiagnosis of some tumors with low volume doubling time (Veronesi G& Maisonneuve P, &Bellomi M, et al. ,2012).

In conclusion, smoking cessation certainly has a superior effect on lung cancer mortality than any screening modality. Screening with chest radiography has no positive effect on lung cancer incidence or mortality. Screening with low-dose computed tomography is recommended by many Professional organizations in high risk patients. Each subject who currently smoke or have a smoking history should have counseling about lung cancer screening.

REFERENCES

Alberg AJ, Samet JM. (2003) Epidemiology of lung cancer. Chest, 123:21S.

Brain K, Lifford KJ, Carter B, et al.(2016) Long-term psychosocial outcomes of low-dose CT screening: results of the UK Lung Cancer Screening randomised controlled trial. Thorax, 71:996.

Brenner DJ.(2004) Radiation risks potentially associated with low-dose CT screening of adult smokers for lung cancer. Radiology , 231:440.

Canadian Task Force on Preventive Health Care, Lewin G, Morissette K, et al.(2016) Recommendations on screening for lung cancer. CMAJ, 188:425.

Croswell JM, Baker SG, Marcus PM, et al.(2010) Cumulative incidence of false-positive test results in lung cancer screening: a randomized trial. Ann Intern Med, 152:505.

Detterbeck FC, Mazzone PJ, Naidich DP, Bach PB. (2013) Screening for lung cancer: Diagnosis and management of lung cancer, 3rd ed: American College of Chest Physicians evidence-based clinical practice guidelines. Chest ,143:e78S.

Field JK, Duffy SW, Baldwin DR, et al.(2016) UK Lung Cancer RCT Pilot Screening Trial: baseline findings from the screening arm provide evidence for the potential implementation of lung cancer screening. Thorax,; 71:161.

Gareen IF, Duan F, Greco EM, et al.(2014) Impact of lung cancer screening results on participant health-related quality of life and state anxiety in the National Lung Screening Trial. Cancer,120:3401.

Infante M, Brambilla G, Lutman F, et al. (2003) DANTE: a randomized trial on lung cancer screening with low-dose sprial CT (LDCT): initial announcement. Chest ,124:118S.

Jaklitsch MT, Jacobson FL, Austin JH, et al.(2012) The American Association for Thoracic Surgery guidelines for lung cancer screening using low-dose computed tomography scans for lung cancer survivors and other high-risk groups. J Thorac Cardiovasc Surg ,144:33.

Jamal A, King BA, Neff LJ, et al.(2016) Current Cigarette Smoking Among Adults - United States, 2005-2015. MMWR Morb Mortal Wkly Rep, 65:1205.

Larke FJ, Kruger RL, Cagnon CH, et al. (2011) Estimated radiation dose associated with low-dose chest CT of average-size participants in the National Lung Screening Trial. AJR Am J Roentgenol , 197:1165.

Lindell RM, Hartman TE, Swensen SJ, et al.(2007) Five-year lung cancer screening experience: CT appearance, growth rate, location, and histologic features of 61 lung cancers. Radiology , 242:555.

Mountain CF. Revisions in the International System for Staging Lung Cancer. Chest 1997; 111:1710.

National Lung Screening Trial Research Team, Aberle DR, Adams AM, et al. (2011) Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med , 365:395.

Prorok PC, Andriole GL, Bresalier RS, et al.(2000) Design of the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial. Control Clin Trials , 21:273S.

Rampinelli C, De Marco P, Origgi D, et al. (2017) Exposure to low dose computed tomography for lung cancer screening and risk of cancer: secondary analysis of trial data and risk-benefit analysis. BMJ,356:j347.

Siegel RL, Miller KD, Jemal A. (2017) Cancer Statistics, CA Cancer J Clin ; 67:7. doi: 10.3322/caac.21387.

Siegel RL, Miller KD, Jemal A. Cancer statistics, (2018). CA Cancer J Clin 2018; 68:7.

Silvestri GA. (2011) Screening for lung cancer: it works, but does it really work? Ann Intern Med , 155:537.

Sone S, Nakayama T, Honda T, et al.(2007) Long-term follow-up study of a population-based 1996-1998 mass screening programme for lung cancer using mobile low-dose spiral computed tomography. Lung Cancer , 58:329.

Steward B, Wild CP. (2014) World Cancer Report.

Veronesi G, Maisonneuve P, Bellomi M, et al. (2012) Estimating overdiagnosis in low-dose computed tomography screening for lung cancer: a cohort study. Ann Intern Med ,157:776.

Wender R, Fontham ET, Barrera E Jr, et al. (2013) American Cancer Society lung cancer screening guidelines. CA Cancer J Clin , 63:107.

Wille MM, Dirksen A, Ashraf H, et al.(2016) Results of the Randomized Danish Lung Cancer Screening Trial with Focus on High-Risk Profiling. Am J Respir Crit Care Med , 193:542.

Woolf SH, Harris RP, Campos-Outcalt D. (2014) Low-dose computed tomography screening for lung cancer: how strong is the evidence? JAMA Intern Med, 174(12):2019-2022.

Yousaf-Khan U, van der Aalst C, de Jong PA, et al.(2017)Final screening round of the NELSON lung cancer screening trial: the effect of a 2.5-year screening interval. Thorax, 72:48.