HHS Public Access

Author manuscript

Circulation. Author manuscript; available in PMC 2019 December 18.

Published in final edited form as:

Circulation. 2018 December 18; 138(25): 2867–2868. doi:10.1161/CIRCULATIONAHA.118.037841.

Lung Cancer Screening Eligible? See the preventive cardiologist on your way to the CT scanner.

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In 2015, the Centers for Medicare and Medicaid services (CMMS) published a decision memorandum to pay for annual low dose computer tomography (LDCT) of the chest for lung cancer screening (LCS) in individuals ages 55–77 years with no signs or symptoms of lung cancer, who are a) current smokers or b) former smokers but quit in the last 15 years and c) have a tobacco smoking history of at least 30 pack-years (1). This publication was followed by the U.S Preventive Services Task Force (USPSTF) recommendation of LDCT in smokers who met the CMMS criteria but aged 55–80years (2). The LCS recommendation was based largely on the results of the National Lung Screening Trial (NLST) (3) which showed a significant reduction in mortality in the LDCT arm compared with the chest radiography arm. The NLST also showed that Atherosclerotic Cardiovascular disease (ASCVD) was the most common cause of death in the trial. Thus strategies aimed at reduction of ASCVD risk in the lung cancer screening eligible population (~9 million annually in the USA), have the potential of reducing mortality even more than that which may be obtained from the early screening for lung cancer.

Identification of individuals at risk for future ASCVD in the general population is based on tools such as the Pooled Cohort Equation (PCE), the modified Framingham Risk Score (FRS) and nontraditional cardiovascular risk markers. Among the nontraditional risk markers, CT assessment of the coronary artery calcium (CAC) score has shown the most promise and has even been incorporated in current guidelines for primary prevention of ASCVD(4). A qualitative or semi-quantitative assessment of CAC can also be reported from the LDCT scan performed for lung cancer screening at no additional cost.

Limited data exist on the performance of the PCE or the FRS +/− CAC in this unique population with high observed ASCVD risk. Findings from the limited data on this important subject (Table 1) suggest that the PCE/FRS has poor discriminative ability in this population and CAC has limited role, unlike that observed in the general population (5). The actual ASCVD event rate of LCS eligible individuals appears well above the 7.5% and 10% thresholds for statin eligibility recommended by the 2013 American College of Cardiology/ American Heart Association (ACC/AHA) cholesterol guidelines and USPSTF guidelines respectively. In addition, the observed event rate of the LCS eligible individuals is also well

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Disclosure: None

above the threshold for initiation of antihypertensive medication therapy among individuals with stage 1 hypertension according to the 2017 ACC/AHA hypertension guidelines. In this paradigm, methods for upward risk reclassification that identify those with the highest risk among this already high risk group(LCS eligible) for primary prevention therapies would have minimal to no value. In contrast, downward reclassification would be of more potential value, but even downward classification using the absence of CAC is inadequate for de-risking this unique population for primary prevention of ASCVD (Table 1). Thus using the presence or absence of CAC on the LDCT scans or the qualitative reporting of CAC on LDCT scan may have limited clinical value for ASCVD risk assessment in LCS eligible individuals.

Despite the high observed ASCVD risk, the LCS eligible individual often sees a radiologist, a pulmonologist, an oncologist and or a surgeon if lung cancer is diagnosed during the process. These specialists are not well equipped to manage individuals at such a high ASCVD risk. Thus the ASCVD risk is either undertreated or ignored all together. The increased ASCVD risk is present in this cohort irrespective of the findings on the LDCT scans. The cost effectiveness of an approach that screens a sizeable number of our population for early cancer, but does not specifically address the number one cause of death in that population should be questioned.

It remains unclear whether this observed ASCVD risk in LCS eligible individuals is modifiable. However, it appears that current tools available to the general physician such as the PCE, FRS and nontraditional risk markers are suboptimal for the accurate quantification of this risk. A “treat- all aggressively approach” which includes tight blood pressure control based on current guidelines, high intensity statin and aggressive lifestyle modifications to reduce this heightened ASCVD risk may be the best approach at this time. Until ways of reducing this heightened ASCVD risk in LCS eligible individuals are better characterized and made available to the general physician, inclusion of a preventive cardiologist in the LCS process or a referral of such individuals to a preventive cardiology clinic for the optimal management of ASCVD risk should be encouraged. The referral of LCS eligible individuals to a cardiovascular prevention expert should be encouraged irrespective of whether they agree to undergo the LDCT screening, and regardless of their baseline calculated 10 year ASCVD risk or CAC status on the LDCT scan. Education is needed to make physicians aware of this heightened ASCVD risk and the apparent pitfalls of the current ASCVD risk assessment approach in this group, and to encourage the “treat-all aggressively approach” in this population. ASCVD risk reduction strategies should be an important component of the LCS program in order to adequately reduce mortality in this population.

References

1. Centers for Medicare & Medicaid Services. Decision Memo for Screening for Lung Cancer with Low Dose Computed Tomography (LDCT) 2015 https://www.cms.gov/medicare-coverage-database/details/nca-decision-memo.aspx?NCAId=274. Accessed Nov 6, 2018.
2. US Preventive Services Task Force. Final Recommendation Statement: Lung Cancer: Screening. 2013 https://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/lung-cancer-screening. Accessed Nov 6, 2018.

3. Aberle DR, Adams AM, Berg CD, Black WC, Clapp JD, Fagerstrom RM, Gareen IF, Gatsonis C, Marcus PM, Sicks JD. National Lung Screening Trial Research Team. Reduced lung-cancer mortality with low-dose computed tomographic screening. N Engl J Med. 2011; 365:395–409. [PubMed: 21714641]

4. Stone NJ, Robinson J, Lichtenstein AH, Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P, Schwartz JS, Shero ST, Smith SC Jr, Watson K, Wilson PW. 2013 ACC/AHA Guideline on the Treatment of Blood Cholesterol to Reduce Atherosclerotic Cardiovascular Risk in Adults: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. Circulation 2014 ;129(25 Suppl 2):S1–45. [PubMed: 24222016]

5. Leigh A, McEvoy JW, Garg P, Carr JJ, Sandfort V, Oelsner EC, Budoff M, Herrington D, Yeboah J. Coronary Artery Calcium Scores and Atherosclerotic Cardiovascular Disease Risk Stratification in Smokers: MESA. JACC Cardiovasc Imaging. 2018 2 9 pii: S1936–878X(18)30067–6. doi: 10.1016/j.jcmg.2017.12.017. [Epub ahead of print]

Table 1:

Risk distribution after a mean of 10 years of follow up in participants of the Multi-Ethnic Study of Atherosclerosis (MESA) who were eligible for Lung Cancer screening per the USPSTF recommendation at baseline(N=481)

Marker	C-statistics	Published Cut off	Percent below published cut- off	ASCVD event rate among those below published cut off (%)	ASCVD event rate among those with PCE<7.5%, FRS<10% and CAC = 0(%)
PCE	0.545	<7.5%	18.5	18.0	14.3
FRS	0.547	< 10%	45.1	18.9	
CAC		0	28.9	14.2	
PCE + CAC	0.600				
FRS + CAC	0.605				

Footnote: PCE: Pooled Cohort Equation, FRS: Framingham Risk Score, CAC: coronary artery calcium score, ASCVD: Atherosclerosis cardiovascular disease