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EDITORIAL

Lung Cancer Screening and Smoking Cessation: A Teachable Moment?

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Kicking the smoking habit is difficult. Although 68.8% of current adult smokers report a desire to quit and approximately 44% report attempting to stop in the last year, successful smoking cessation for more than 6 months occurs among only 4% to 7% of smokers without an intervention program (1). In a motivated population, a rigorous smoking cessation intervention with nicotine replacement therapy can have high rates (30%) of success, whereas 6-month cessation rates were halved (14%–16%) among those less motivated (2,3). Successful quitting usually requires multiple attempts, and most relapses occur within the first 90 days (4,5). The health benefits of smoking cessation are well documented and reach well beyond reducing lung cancer risk (6).

The US Preventive Services Task Force recently recommended annual screening for lung cancer using low-dose computed tomography (CT) in a population at high risk for lung cancer (7). Although questions remain as to the long-term net benefits of annual low-dose CT screening (8), finding an anomaly on a chest CT may initiate a conversation between a provider and his/her patient that reinforces the desire to quit smoking (ie, a teachable moment), leading to greater cessation success. Investigators have found some evidence of a teachable moment with increased cessation when an anomaly is discovered (9,10). Some speculate that the benefit to cessation may be short-lived (11), and recent results from the Dutch lung cancer screening trial using a carbon monoxide biomarker of smoking status found no difference in smoking cessation between screened and unscreened control subjects (12).

Tammemagi and colleagues examined the effects of screening results on the smoking behavior of 14 692 current smokers participating in the Lung Screening Study (LSS) portion of the National Lung Screening Trial (NLST) (13). Although smoking cessation was not an endpoint in the NLST and no systematic smoking cessation programs were initiated as part of the trial protocol, counseling for smoking cessation did occur as part of standard care. The finding of a positive screen by either low-dose CT or chest x-ray occurred in approximately 60% of current smokers. Authors divided the results of a screening CT into five categories of increasing clinical significance for suspicion of lung cancer or other diseases (eg, COPD). Except for one category between the sixth and seventh year of follow-up, smoking rates dropped across the five categories of scan results for each of the seven years. The lowest reduction in smoking rates occurred among participants with normal scans, with smoking rates of 87.4% 1 year after the initial screen and 61.8% after 7 years of follow-up. The greatest reduction occurred among current smokers whose baseline scan was suspicious for lung cancer, with smoking rates of 81.7% 1 year after the initial positive screen and 56.7% at 7 years of follow-up. The differential impact of screening results on likely smoking cessation was then estimated using a general estimating equation form of multivariable logistic regression model while controlling for other covariables. Tammemagi et al. (13) observed a strong dose–response in increased smoking cessation as screening results became more serious or suspicious for lung cancer. Their results remained consistent over the 5 years of postscreening follow-up.

The strength of the results observed in this study between a positive screening CT and smoking cessation likely arises from the repeated measures of smoking cessation, incorporation of multiple annual scans, a robust model that controlled for a variety of possible confounders, and stratification of screening results. Yet, these results are in direct contrast with those from the Dutch screening trial that found no differences in smoking cessation rates (12). However, the Dutch study was one-fourth the sample size of the LSS, had no stratification of screening results, and relied on a single endpoint measurement of status at 5 years after screening. The Dutch screening trial used a biological marker of smoking status, whereas the NLST relied on self-reported status, a potential weakness of the NLST-based study (14). If the increased smoking cessation results observed in the LSS remain with implementation of a national lung cancer screening program, then the net benefit of a lung cancer screening program is likely underestimated.

One question not well addressed by Tammemagi et al. (13) is whether NLST participants with normal screens continued smoking at higher rates because of a belief that negative scans indicated a clean bill of health or a health-certificate effect. The LSS was a self-selecting population and better educated than the general smoking population (14). Therefore, this population may be inherently more motivated to stop smoking, raising concerns about generalizability of the findings. Among those with a normal scan, we would expect some reduction in smoking over time. So, although the observed 26% reduction in smoking over the 5 years among those with normal scans is similar to expected smoking reduction in the general population of smokers and suggests little to no decrease in smoking cessation after a normal radiograph, it is not proof of the absence of the health-certificate effect, as the authors admit (1). The observed smoking cessation may be low for a motivated population that chose to participate in the NLST.

A population interested in screening for lung cancer has already expressed a motivation for better health. The integration of a smoking cessation intervention within the context of a screening program should increase the rates of successful smoking cessation above that observed by Tammemagi et al. (2,4) and should be rigorously implemented as suggested in published screening guidelines (15,16). As screening programs are being initiated across the country, they offer unique opportunities to conduct smoking cessation research to investigate the prevalence of the health-certificate effect and the intervention intensity required to achieve the maximum smoking cessation.

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Notes

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