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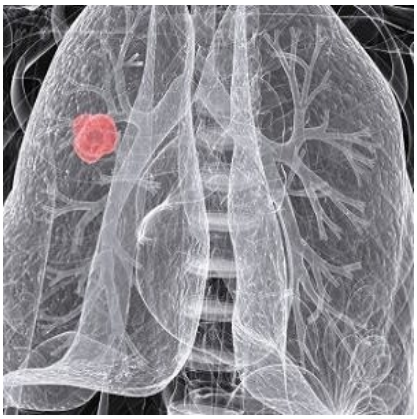
Improving performance of lung cancer screening in places with high number of nonsmokers



Due to marked differences in lung cancer demographics in Asia and the predominance of subsolid nodules and adenocarcinoma spectrum lesions, the criteria for lung cancer screening and the associated nodule classification and reporting systems require adjustments. New research shows applying modified Lung-RADS to an Asian population may substantially improve sensitivity while maintaining specificity for detection of adenocarcinoma.

In an effort to reduce false-positive rate and standardise reporting of lung cancer screening examinations, the American College of Radiology (ACR) in 2014 released the Lung Imaging Reporting and Data System (Lung-RADS). Recent studies have demonstrated that Lung-RADS, compared to the U.S. National Lung Screening Trial (NLST) criteria, substantially reduces the false-positive result rate with a small corresponding decrease in sensitivity.

However, Lung-RADS was designed to be used in the United States where screening programmes target high-risk smokers. The diagnostic performance of Lung-RADS in populations with high prevalence of non-smoking associated lung cancer, such as in China, Taiwan, Korea, and Japan, is unclear.

In the current study, researchers in Taiwan analysed a retrospective cohort of 1,978 consecutive healthy subjects (72.8% nonsmokers) who underwent low-dose computed tomography (LDCT) from August 2013 to October 2014 (1,084 men, 894 women). Lung-RADS categories 2 and 3 were modified to include subcategories of 2A/2B/2C and 3A/3B/3C, respectively. Clinical information and nodule characteristics were recorded. Receiver operating characteristic curves were used to compare diagnostic accuracy to the ACR Lung-RADS and NLST criteria, at different cutoffs.

The researchers found:

- 32 subjects (30 nonsmokers) had pathology-proven adenocarcinoma spectrum lesions in the follow-up period (1.6 ± 0.5 years).
- Modified Lung-RADS, using modified Lung-RADS category 2C as cutoff, had an area under the curve (AUC) of 0.973 in predicting adenocarcinoma spectrum lesions (sensitivity of 100%, specificity of 89.3%), which was significantly higher than that of Lung-RADS (AUC = 0.815, P < .001) and NLST (AUC = 0.906, P < .001).
- Modified Lung-RADS showed an AUC of 0.992 in predicting invasive adenocarcinoma (sensitivity of 95%, specificity of 97.8%) when category 3B was used as cutoff.

"As expected, when the ACR Lung-RADS positive threshold was retrospectively applied to our study cohort, the false-positive rate is lower compared to the NLST criteria (2.72% vs. 15.67%, respectively). However, the sensitivity also decreased from 96.87% to 65.62%," the authors say. "These results are consistent with previous studies that demonstrated Lung-RADS may substantially reduce the false-positive result rate with a corresponding decrease in sensitivity compared to the NLST criteria."

However, as the authors note, the decrease in sensitivity by using Lung-RADS is "more drastic in our screening population with a high percentage of nonsmokers compared to the screening population in the United States."

The effect of using modified Lung-RADS in clinical practice must be carefully studied in prospective large cohort studies, the authors add.

LDCT screening allows early detection and intervention of lung cancer in both smoker and nonsmokers. In fact, a previous study demonstrated wide implantation of LDCT screening may decrease lung cancer mortality in a Japanese community composed of smoker and >50% nonsmokers. However, given the differences in population risk factors and clinical presentations of lung cancer, the reduction in the sensitivity of Lung-RADS, which was designed to be used in the USA where screening programmes target high-risk smokers, may negate the benefits of screening when applied to an Asian population.

Source: Academic Radiology
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