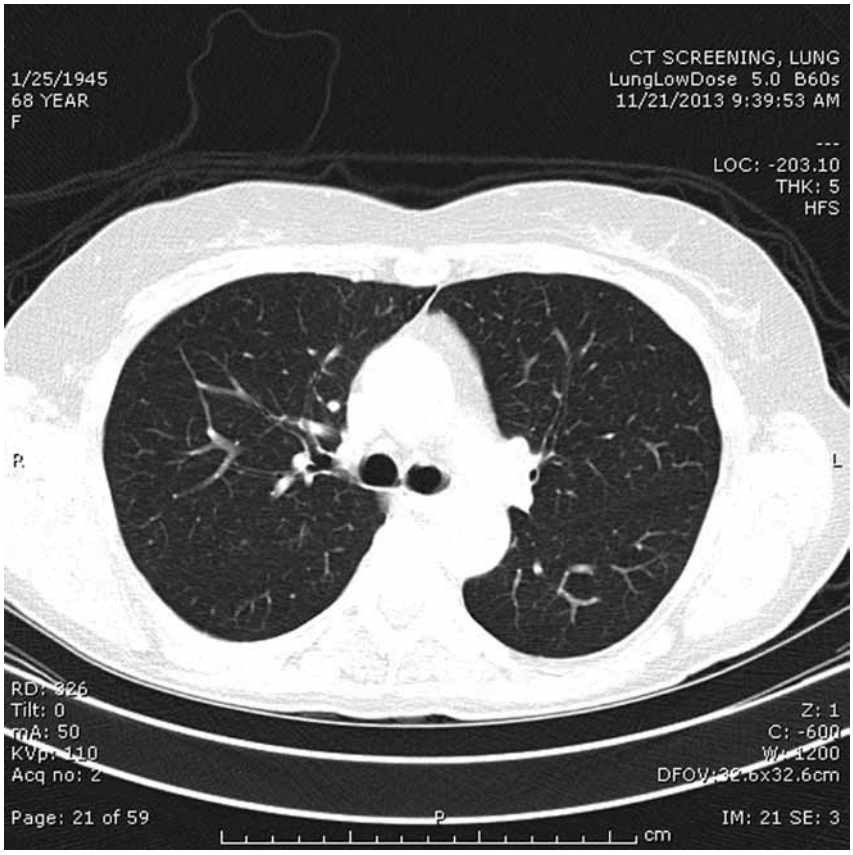
CASE STUDY: Low-Dose CT Scan of the Lung

From the teaching files of Radiology Associates of Hartford, P.C.

Low-dose CT (LDCT) lung scans present a new screening and diagnostic tool at the disposal of physicians.



Normal LDCT lung scan

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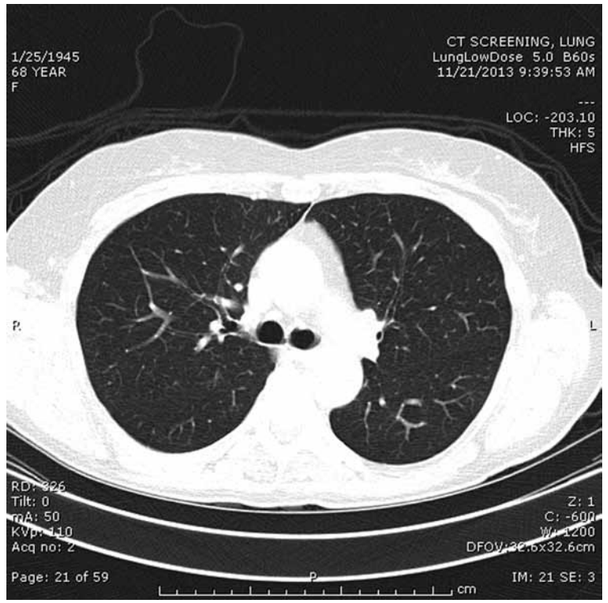
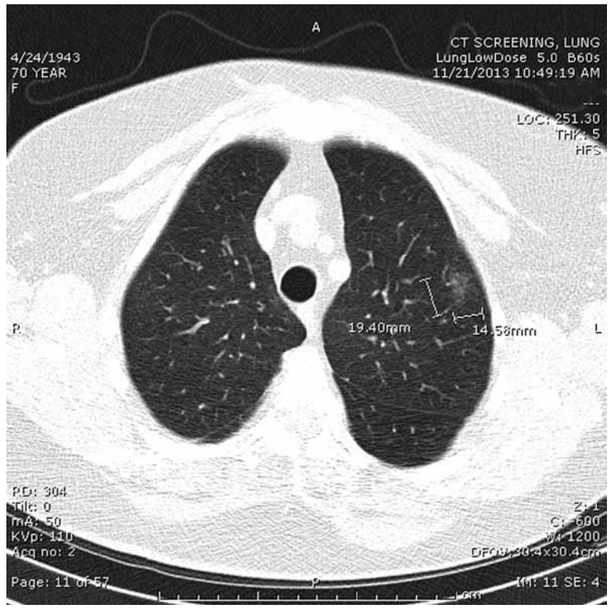
Clinicians frequently encounter patients with a current or past history of smoking, or exposure to such environments, and research points to a rising incidence of lung cancer in younger and non-smoking individuals.[1] New screening guidelines combined with increased findings of subsolid lesions – also known as ground glass nodules – promise to increase both the number of patients referred for LDCT lung screening and the challenges associated with diagnosing incidentally detected complex lesions.

The patient population for annual CT screening has been expanded to include asymptomatic people at high risk for lung cancer. Based on final USPSTF recommendations,[2] this group now includes current and former smokers aged 55 to 80 years who have a smoking history of 30-pack-years or greater.

The new guidelines are based primarily on results from the National Lung Screening Trial (NLST), which concluded that current and former heavy smokers evaluated with low-dose CT had a 20 percent lower mortality rate than those screened with X-ray.[3] As with other screening tests, the possibility of overdiagnosis, further testing and increased anxiety must be discussed and balanced with the patient's clinical history and personal situation.



Normal LDCT lung scan



LDCT left upper lobe subsolid (ground glass) pulmonary nodule measuring 1.9 X 1.5 cm.

Background and Pt Hx

A 70-year-old female patient received a low-dose CT lung scan at Radiology Associates of Hartford, P.C., during the Great American Smokeout. The patient had a 40-plus-year history of tobacco use and presented with no symptoms.

Differential Diagnosis

When compared to a 2006 CT angiogram of the chest, the patient had developed a left upper lobe ground glass (subsolid) pulmonary nodule, indeterminate in nature, measuring 1.9 X 1.5 cm. This could be a small area of transient infection or inflammation, early low-grade malignancy, interstitial pneumonia, autoimmune process, hypersensitivity reaction or otherwise benign finding.

Natural History and Prognosis

Subsolid nodules present a complex set of challenges in interpretation. Unlike most cancerous masses in the body, subsolid nodules are less dense, less clearly defined and more infiltrative. About 18 percent of these subsolid nodules are malignant.[4]

Conclusion

The patient's primary care physician was immediately contacted to discuss these results. The patient was recommended for follow-up low-dose CT scan within 3 months.

[1] Recommendations for the Management of Subsolid Pulmonary Nodules Detected at CT: a statement from the Fleischner Society. Radiology. 2013 Jan;266(1):304-17. doi: 10.1148/radiol.12120628. Epub 2012 Oct 15.

[2] Screening for Lung Cancer. U.S. Preventive Services Task Force Final Recommendation Statement. http://www.uspreventiveservicestaskforce.org/uspstf13/lungcan/lungcanfinalrs.htm. Accessed November 11, 2014.

[3] ClinicalTrails.gov, National Lung Screening Trial (NLST) Screening http://clinicaltrials.gov/show/NCT00047385. Accessed November 11, 2014.

[4] Henschke CI, Yankelevitz DF, Mirtcheva R, et al. CT screening for lung cancer: frequency and significance of part-solid and nonsolid nodules. AJR Am J Roentgenol 2002;178(5):1053–1057.

Considerations for Low-Dose CT Lung Screening

- Healthy current and former smokers ages 55–80 who have significant cumulative tobacco smoke exposure
- Includes individuals with a 30-pack-year or more history of smoking
  - — One pack year equals an average of one pack of cigarettes per day for a year
- Caution is recommended in screening patients with significant comorbidity, particularly those who are toward the upper end of the screening age range
- For current smokers, counsel the patient on smoking cessation. Take the opportunity to visually demonstrate the impact of smoking on the lungs

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