

## RADIOLOGY ROUNDS

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Department Editor

# What was this woman's pulmonary nodule?

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A 20-year-old woman came in complaining of severe headaches. Remarkable physical examination and laboratory findings included blood pressure of 250/150 mm Hg and serum creatinine concentration of 3.5 mg/dL. Contracted kidneys were discovered on intravenous pyelography. After further evaluation, a diagnosis of glomerulonephritis was made.

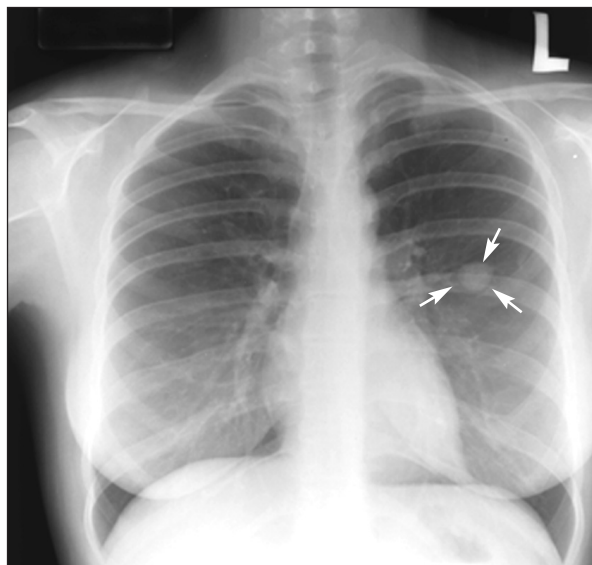
A coin lesion detected on a plain chest radiograph was an incidental finding during her workup, although she had no respiratory symptoms or any history that suggested previous pulmonary disease. Posteroanterior (PA) and lateral chest radiographs were obtained.

### Radiographic findings

The PA chest radiograph (Figure 1) displays a sharply demarcated nodule in the region of the anterior segment of the left upper lung although the lateral view (Figure 2, page 20) suggests that the nodule could be within the superior segment of the left lower lobe, which would be significant for a surgical approach. Faint calcifications were suggested within the nodule. Linear tomograms were done, and an enlarged tomogram identified distinct calcifications in a “popcorn” configuration (Figure 3, page 20), which is pathognomonic of hamartoma.

### Diagnosis

The differential diagnosis includes any benign or malignant lung tumor, metastatic tumor, and amyloidoma. Ewing's sarcoma is unlikely since there is no bone involvement.<sup>1</sup> In addition, a malignant lesion typically has a lobulated contour and an irregular or spiculated margin with distortion of adjacent vessels.<sup>2</sup> The so-called popcorn configuration differs from the target calcification of conditions such as histoplasmosis, the



**Figure 1** This posteroanterior radiograph displays a sharply demarcated nodule (arrows) in the region of the anterior segment of the left upper lung.

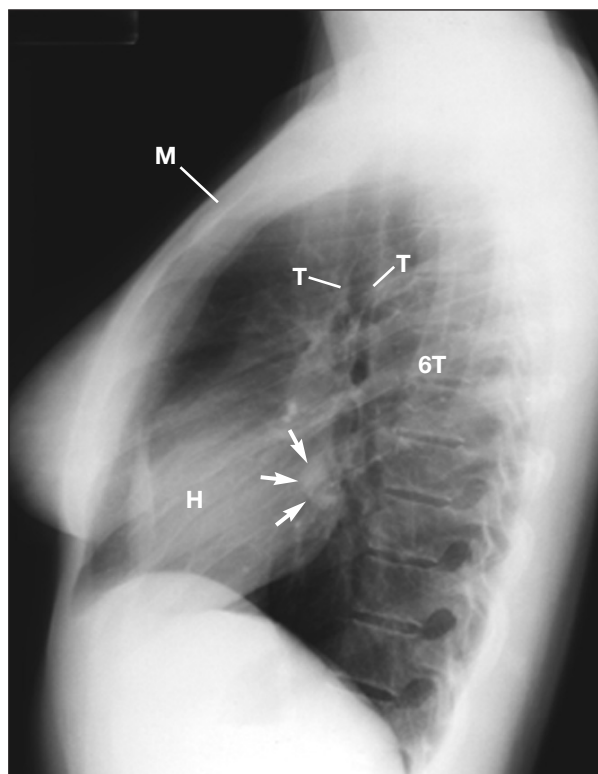
peripheral calcification of other granulomatous diseases, metastatic calcifications, pneumoconioses, pleural calcifications, and parasitic calcifications.

### Discussion

A hamartoma is an overdevelopment of some tissue element—such as cartilage, fibrous tissue, smooth muscle tissue, or blood vessels—that normally belongs at the site where it is found. Pulmonary hamartomas are benign lesions made up of an abnormal mixture of epithelial and mesenchymal components. These lesions are generally more common in men than in women and usually occur in the sixth or seventh decade of life in people who smoke.<sup>3</sup> Most tumors are peripheral lesions in the parenchyma of the lungs; endobronchial lesions are less common.<sup>4</sup> Peripheral nodules typically cause no symptoms, and the lesions are discovered as an incidental finding on a chest radiograph.

*continued*

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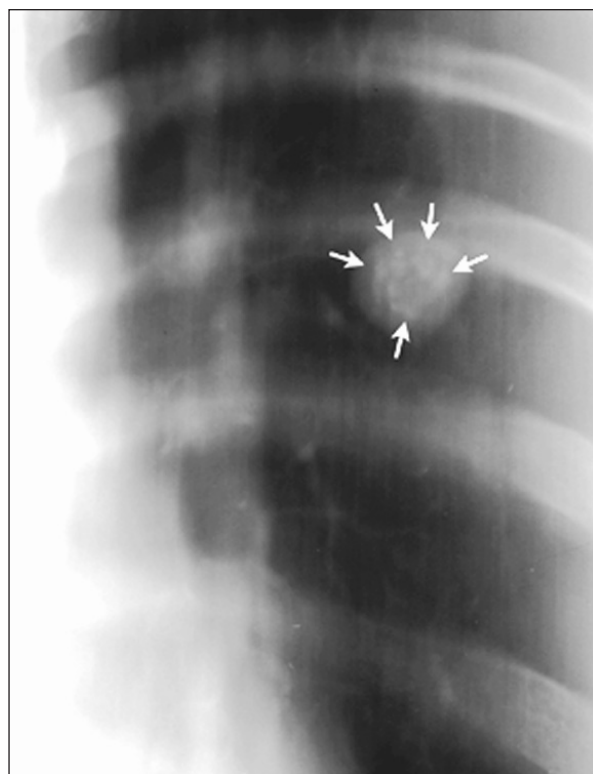
**Figure 2** This lateral view suggests that the nodule (arrows) could be within the superior segment of the left lower lobe. H = heart; M = manubrium; T = trachea; 6T = sixth thoracic vertebra.

Radiographically, a hamartoma appears as a sharply defined, rounded lesion of intermediate soft tissue density. Punctate areas of calcium deposit are contained within the sharply demarcated nodule. Size varies from 2.5-9.0 cm when detected. Hamartomas are rarely malignant.<sup>3</sup> Up to half of all solitary pulmonary nodules detected on conventional radiographs are shown to be multiple nodules on computed tomography (CT), which suggests metastatic or granulomatous disease.<sup>5</sup> Thin-section CT can also demonstrate patterns of calcification associated with different lesions, as well as fat density, which is a reliable sign of hamartoma.<sup>2,5</sup>

This patient should be seen at monthly intervals for 3-6 months until radiographs ascertain that the nodule is stable.

#### Take-home messages from this case

In evaluating a solitary pulmonary nodule, the goal is to differentiate benign from malignant le-



**Figure 3** Because radiographs suggested calcifications within the nodule, this linear tomogram was done and enlarged, clearly showing calcifications in a popcorn configuration. This strongly suggests that the nodule was a hamartoma.

sions in the most cost-effective manner. A clearly demarcated lesion with distinct popcorn calcifications strongly suggests hamartoma, the most common benign pulmonary lesion. Hamartomas are often asymptomatic and found incidentally on a chest radiograph. ■

#### REFERENCES

1. Gladish GW, Sabloff BM, Munden RF, et al. Primary thoracic sarcomas. *Radiographics* 2002;22:621-637.
2. Erasmus JJ, Connolly JE, McAdams HP, et al. Solitary pulmonary nodules: Part I. Morphologic evaluation for differentiation of benign and malignant lesions. *Radiographics* 2000;20:43-58.
3. Gjevre JA, Myers JL, Prakash UB. Pulmonary hamartomas. *Mayo Clin Proc* 1996;71:14-20.
4. Choh JH, Steimle CM, Ahmad Z, et al. Endobronchial hamartoma: A benign, obstructive pulmonary hamartoma. *Contemp Surg* 2001;57:297-299.
5. Leef JL III, Klein JS. The solitary pulmonary nodule. *Radiol Clin North Am* 2002;40:123-143.