e24 Atlas of Chest Imaging

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This atlas of chest imaging is a collection of interesting chest radiographs and computed tomograms of the chest. The readings of the films are meant to be illustrative of specific, major findings. The associated text is not intended as a comprehensive assessment of the images.

EXAMPLES OF NORMAL IMAGING

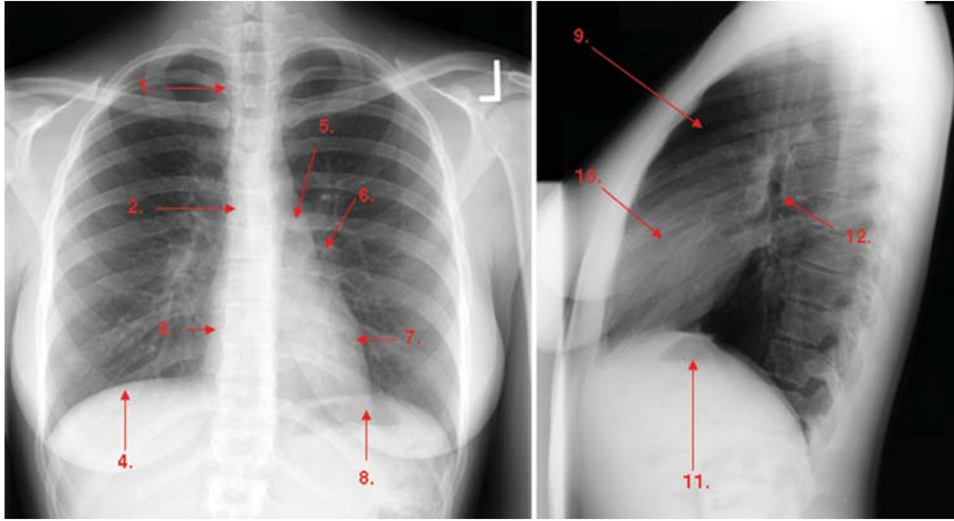

FIGURE e24-1 Normal chest radiograph—review of anatomy. 1. Trachea. 2. Carina. 3. Right atrium. 4. Right hemi-diaphragm. 5. Aortic knob. 6. Left hilum. 7. Left ventricle. 8. Left hemi-diaphragm (with stomach bubble). 9. Retrosternal clear space. 10. Right ventricle. 11. Left hemi-diaphragm (with stomach bubble). 12. Left upper lobe bronchus.

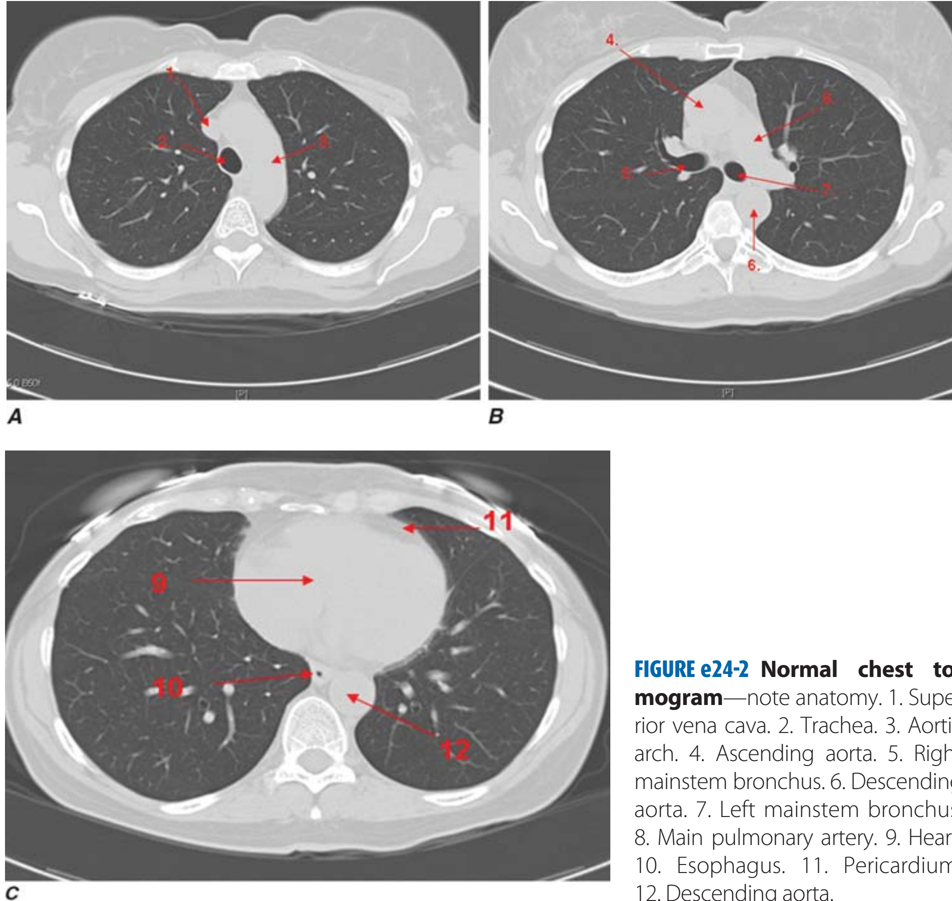

FIGURE e24-2 Normal chest tomogram—note anatomy. 1. Superior vena cava. 2. Trachea. 3. Aortic arch. 4. Ascending aorta. 5. Right mainstem bronchus. 6. Descending aorta. 7. Left mainstem bronchus. 8. Main pulmonary artery. 9. Heart. 10. Esophagus. 11. Pericardium. 12. Descending aorta.

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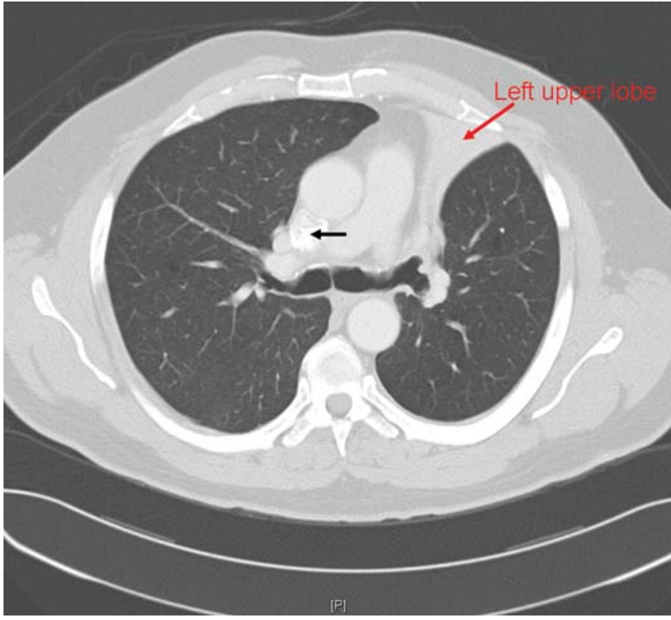

FIGURE e24-3 CT scan demonstrating left upper lobe collapse. The patient was found to have an endobronchial lesion (not visible on the CT scan) resulting in this finding. The superior vena cava (*black arrow*) is partially opacified by intravenous contrast.

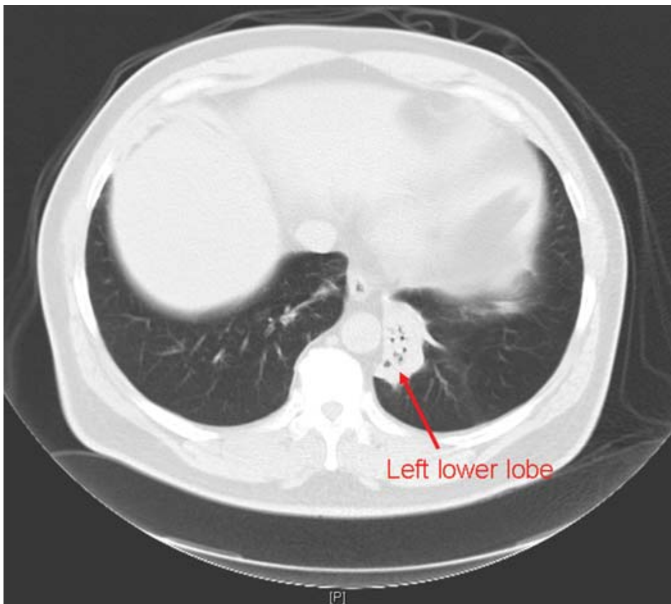

FIGURE e24-4 CT scan revealing chronic left lower lobe collapse. Note dramatic volume loss with minimal aeration. There is subtle mediastinal shift to the left.

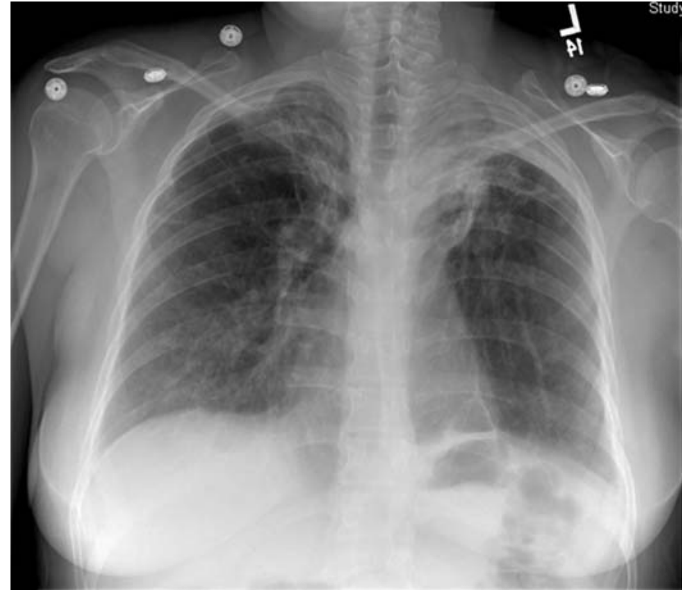

FIGURE e24-5 Left upper lobe scarring with hilar retraction with less prominent scarring in right upper lobe as well. Findings consistent with previous tuberculosis infection in an immigrant from Ecuador.

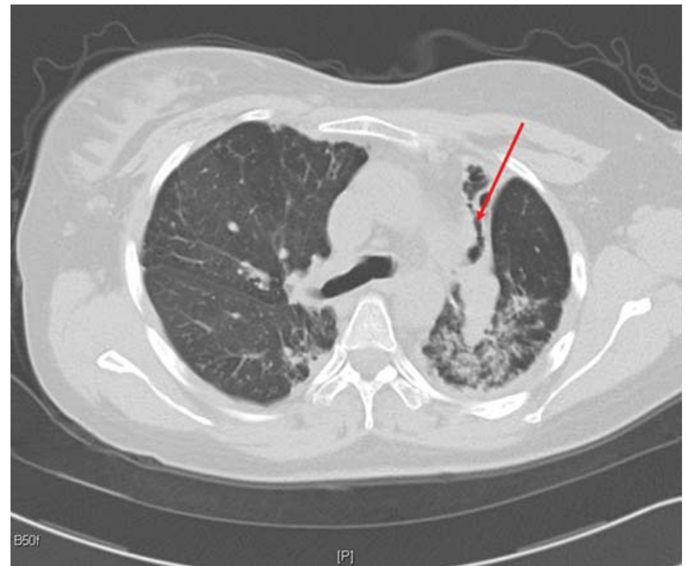

FIGURE e24-6 Apical scarring, traction bronchiectasis (*red arrow*), and decreased lung volume consistent with previous tuberculosis infection. Findings most significant in left lung.

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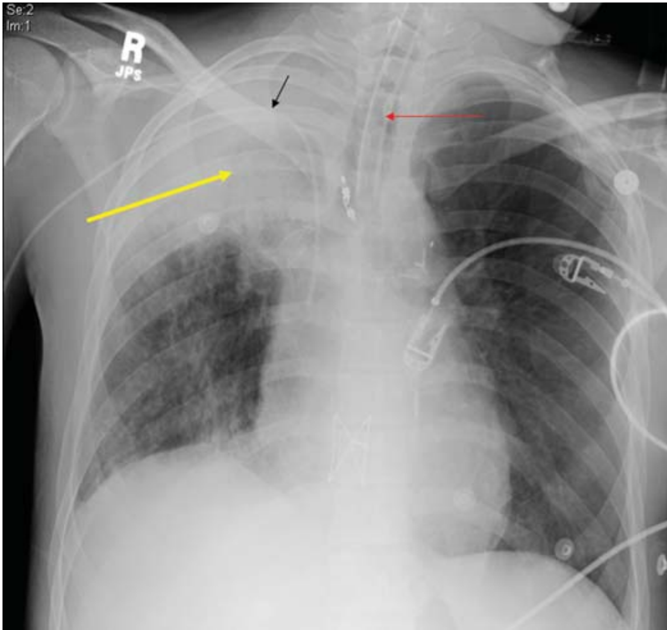

FIGURE e24-7 Chest x-ray (CXR) demonstrating right upper lobe collapse (*yellow arrow*). Note the volume loss as demonstrated by the elevated right hemi-diaphragm as well as mediastinal shift to the right. Also apparent on the film are an endotracheal tube (*red arrow*) and a central venous catheter (*black arrow*).

LOSS OF PARENCHYMA

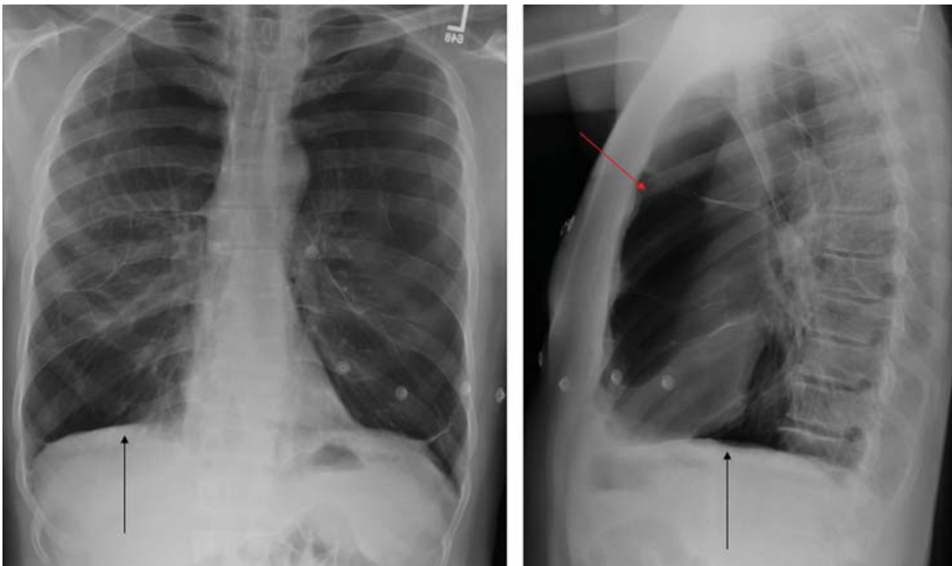

FIGURE e24-8 Emphysema with increased lucency, flattened diaphragms (*black arrows*), increased AP diameter, and increased retrosternal clear space (*red arrow*).

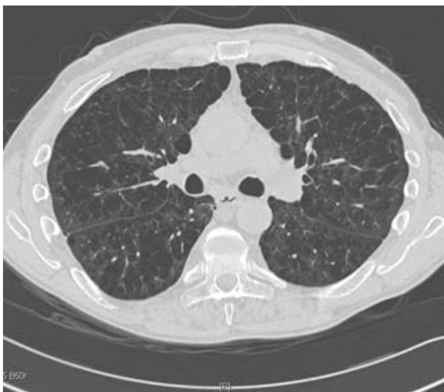

FIGURE e24-9 CT scan of diffuse, bilateral emphysema.

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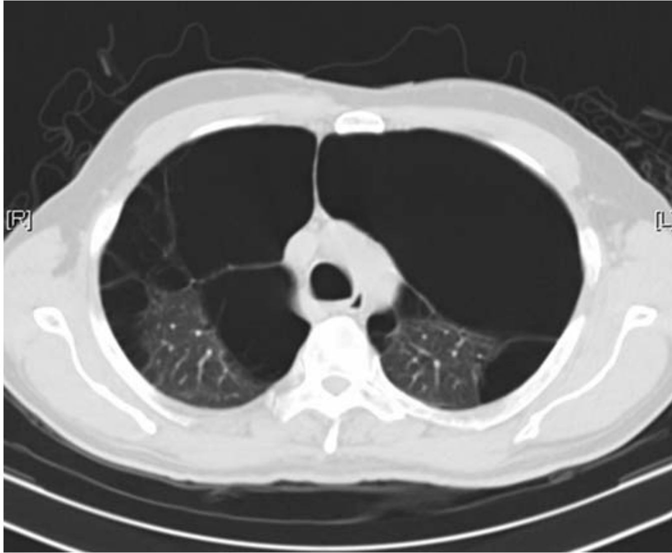

FIGURE e24-10 CT scan of bullous emphysema.

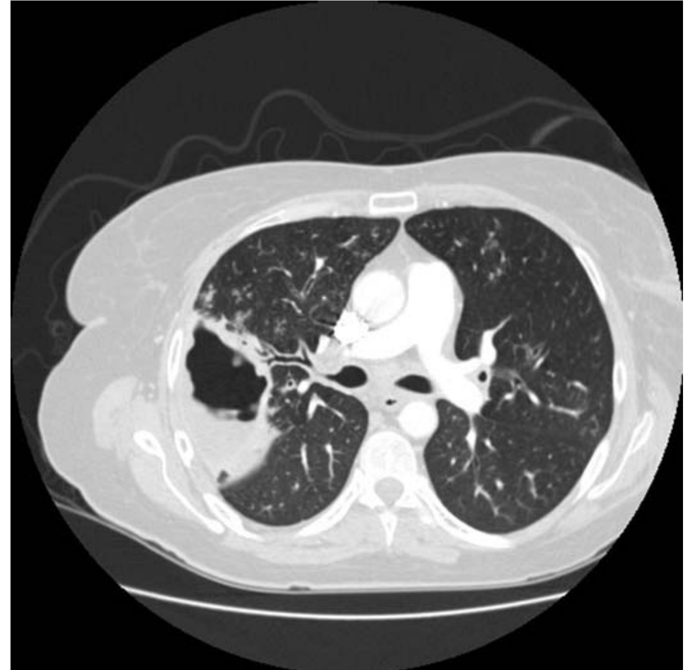

FIGURE e24-13 CT scan of parenchymal cavity.

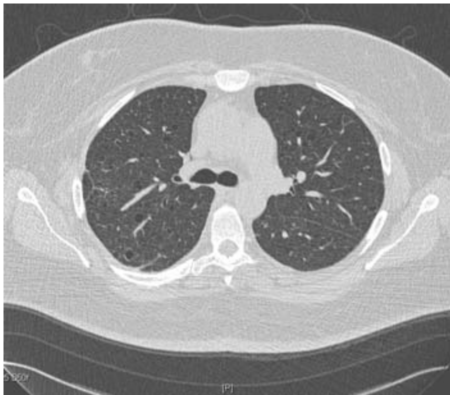

FIGURE e24-11 Multiple, thin-walled cysts consistent with lymphangioleiomyomatosis.

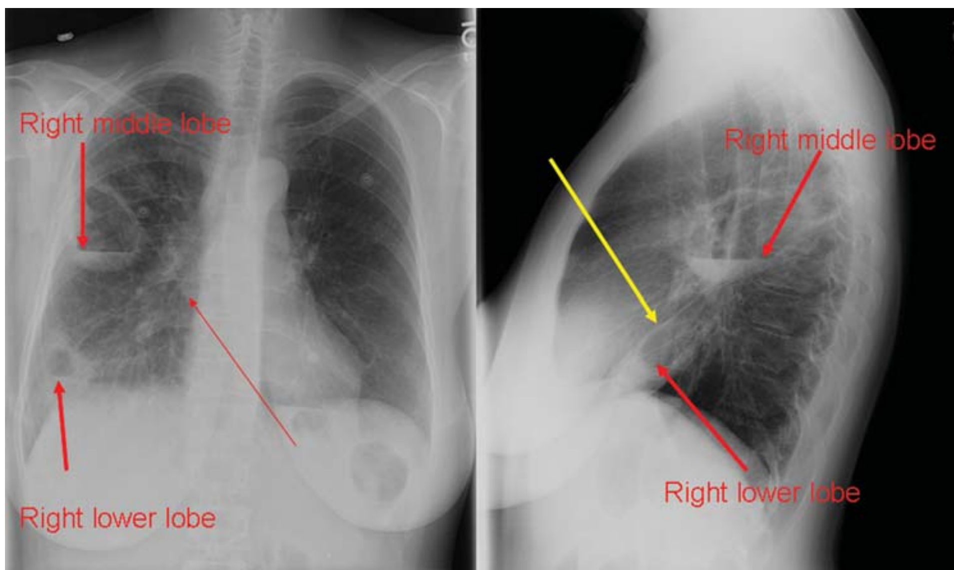

FIGURE e24-12 Two cavities on posteroanterior (PA) and lateral CXR. Cavities and air-fluid levels identified by *red arrows*. The smaller cavity is in the right lower lobe (located below the major fissure, identified with the *yellow arrow*) and the larger cavity is located in the right middle lobe which is located between the minor (*red arrow*) and major fissures. There is an area of consolidation associated with the cavity in the right lower lobe.

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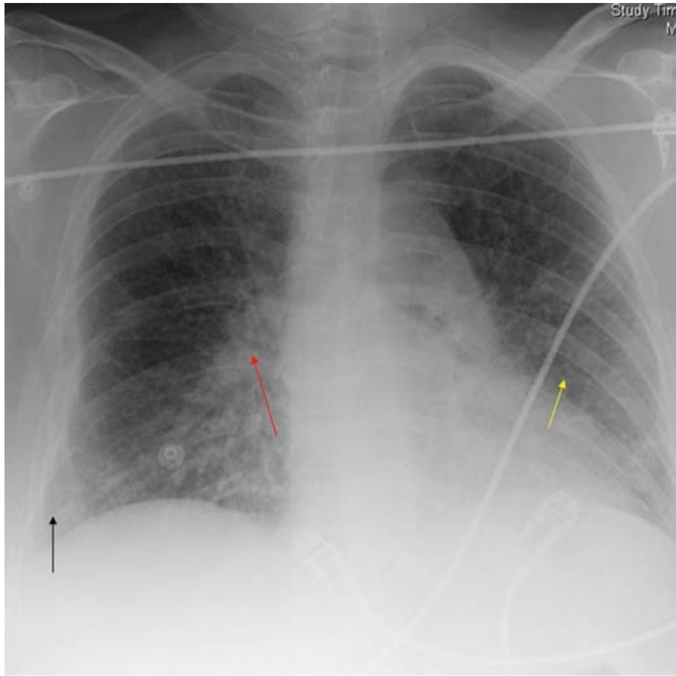

FIGURE e24-14 Mild congestive heart failure. Note the Kerley B lines (*black arrow*) and perivascular cuffing (*yellow arrow*) as well as the pulmonary vascular congestion (*red arrow*).

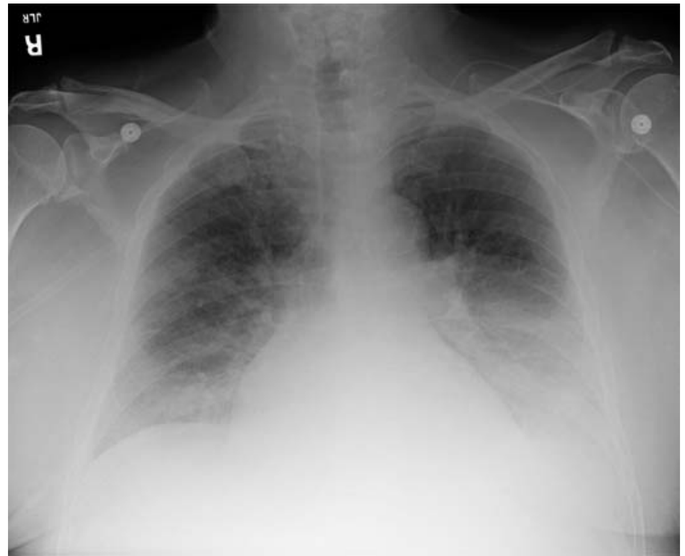

FIGURE e24-15 Pulmonary edema. Note indistinct vasculature, perihilar opacities, and peripheral interstitial reticular opacities. While this is an anteroposterior film making cardiac size more difficult to assess, the cardiac silhouette still appears enlarged.

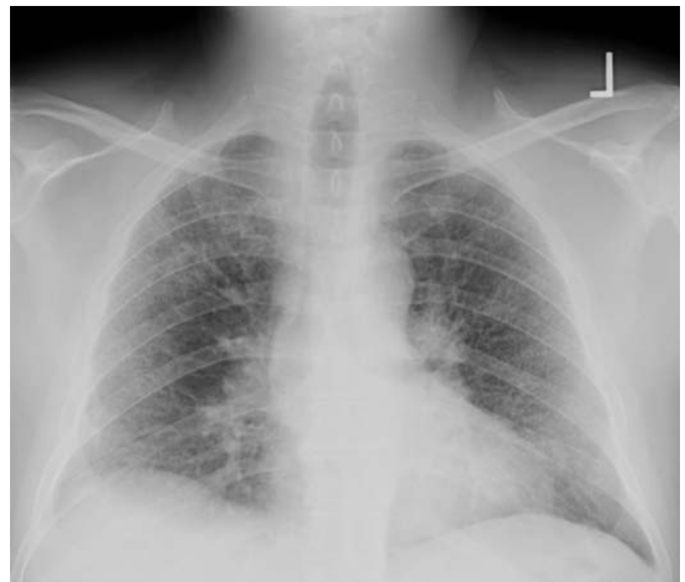

FIGURE e24-16 CXR demonstrates reticular nodular opacities bilaterally with small lung volumes consistent with usual interstitial pneumonitis (UIP) on pathology. Clinically, UIP is used interchangeably with idiopathic pulmonary fibrosis (IPF).

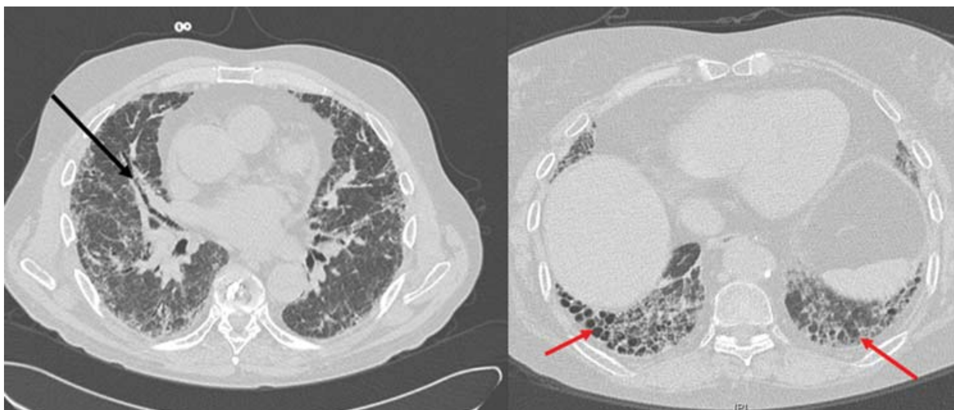

FIGURE e24-17 CT scan of usual interstitial pneumonitis (UIP), also known as idiopathic pulmonary fibrosis (IPF). Classic findings include traction bronchiectasis (*black arrow*) and honeycombing (*red arrows*). Note subpleural, basilar predominance of the honeycombing.

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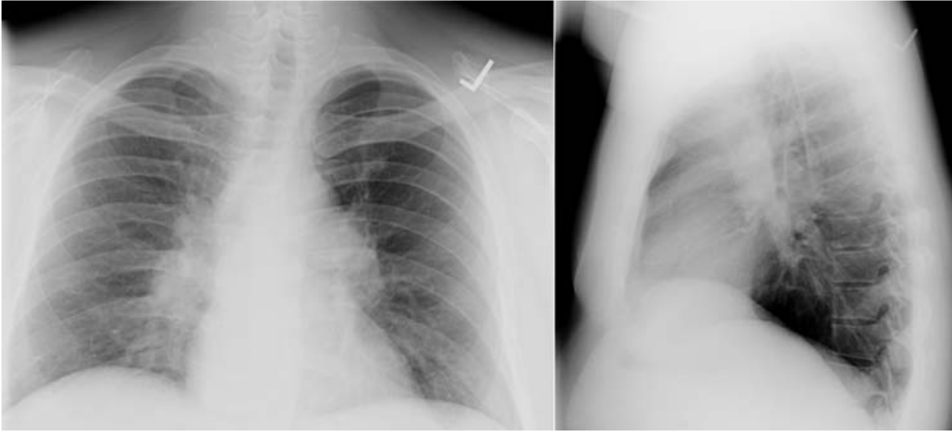

FIGURE e24-18 **Sarcoid—CXR of stage I** (hilar lymphadenopathy without parenchymal infiltrates).

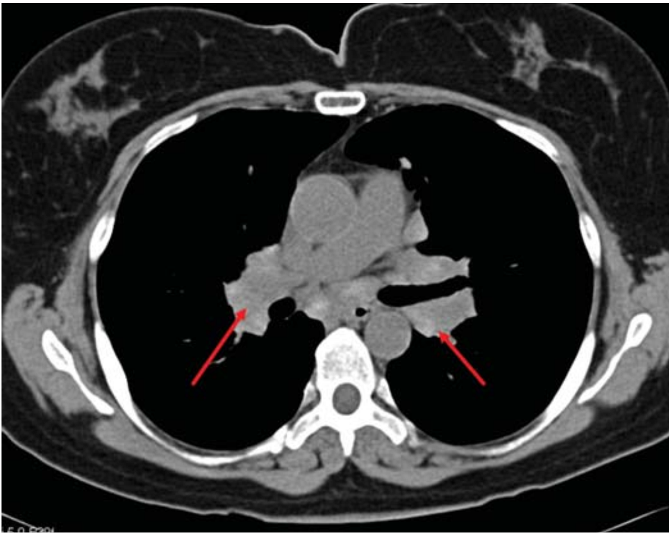

FIGURE e24-19 **Sarcoid—CT scan of stage I** demonstrating bulky hilar and mediastinal lymphadenopathy (*red arrows*) without parenchymal infiltrates.

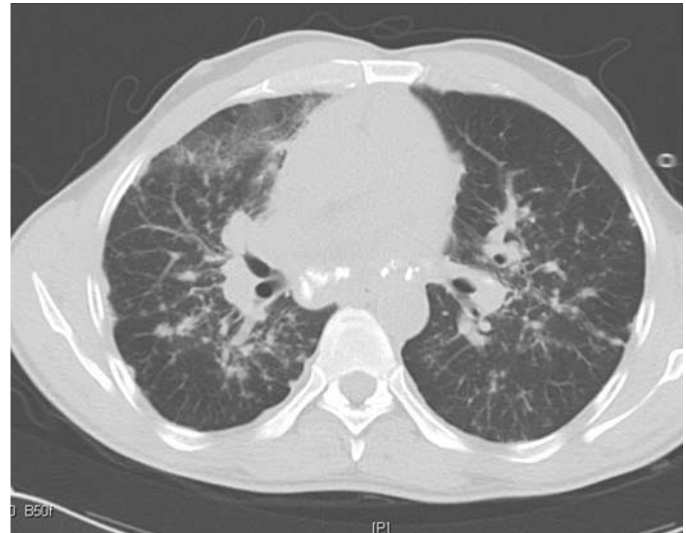

FIGURE e24-21 **Sarcoid—CT scan of stage II** (calcified lymphadenopathy, parenchymal infiltrates).

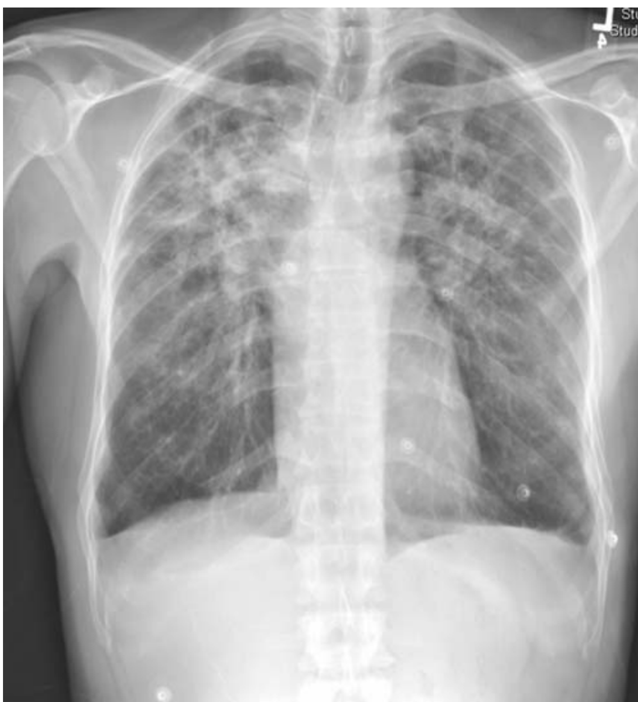

FIGURE e24-20 **Sarcoid—CXR of stage II** (lymphadenopathy with parenchymal changes). Note apical predominance of disease. The diaphragms are also flattened, suggesting hyperinflation.

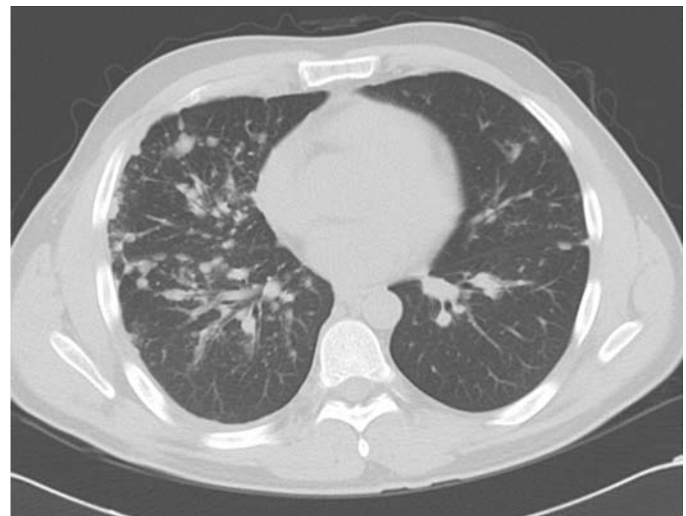

FIGURE e24-22 **Sarcoid—CT scan of stage II** (nodular opacities tracking along bronchovascular bundles).

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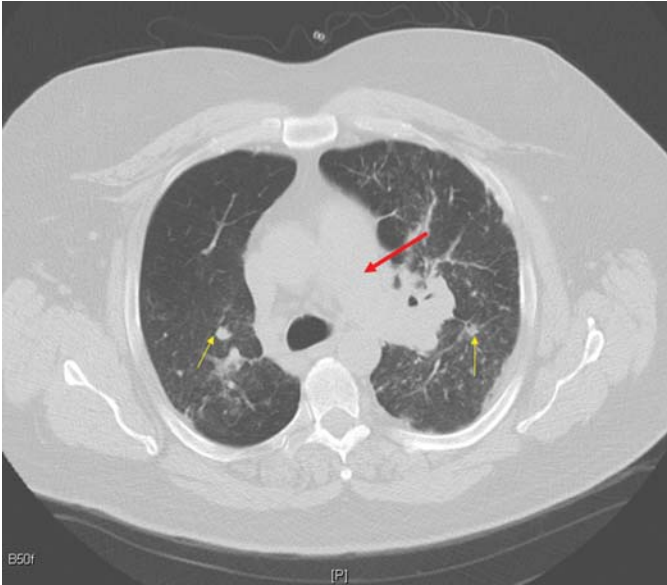

FIGURE e24-23 **Sarcoid—stage III** with nodular parenchymal infiltrates (*yellow arrows*), no lymphadenopathy. Also note large pulmonary artery (*red arrow*).

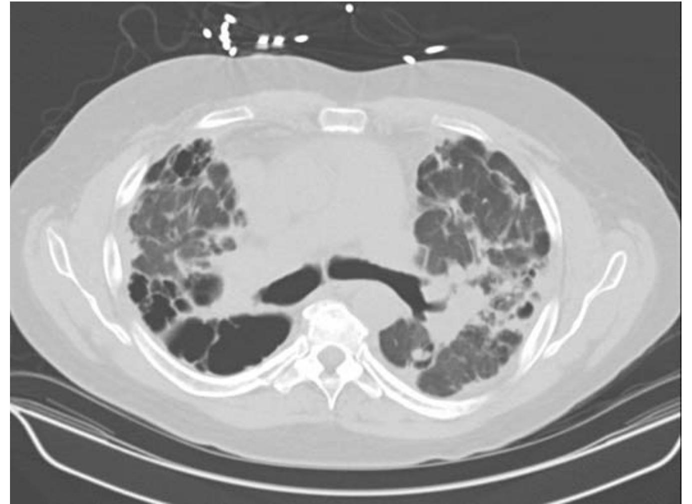

FIGURE e24-24 **Sarcoid—stage IV** (fibrotic lung disease).

ALVEOLAR PROCESSES

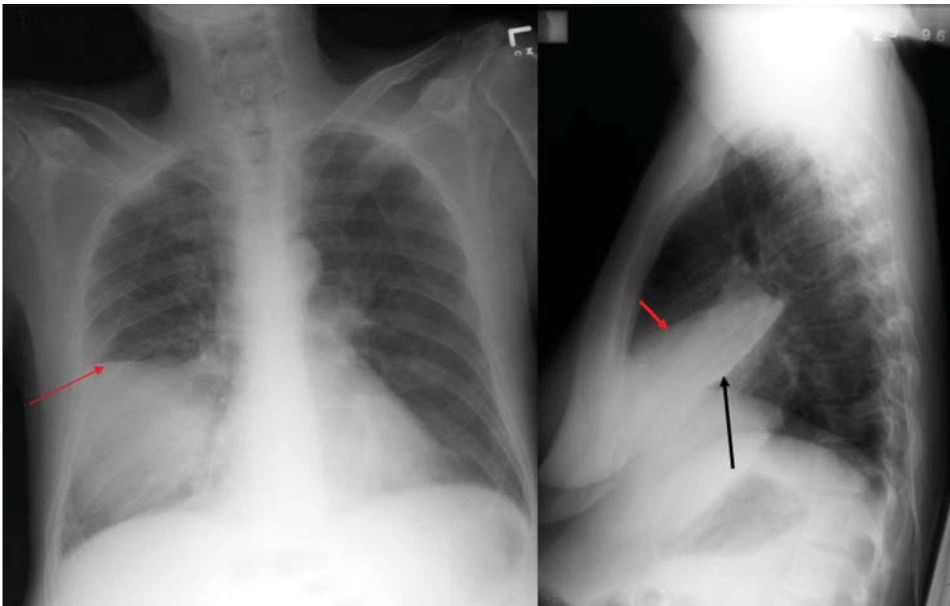

FIGURE e24-25 **Right middle lobe opacity** illustrates major (*black arrow*) and minor fissures (*red arrows*) as well as the "silhouette sign" on the right heart border.

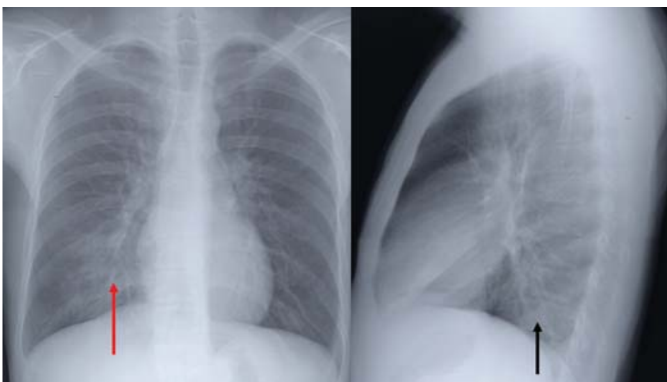

FIGURE e24-26 **Right lower lobe pneumonia**—subtle opacity on PA film (*red arrow*), while the lateral film illustrates the "spine sign" (*black arrow*) where the lower spine does not become more lucent.

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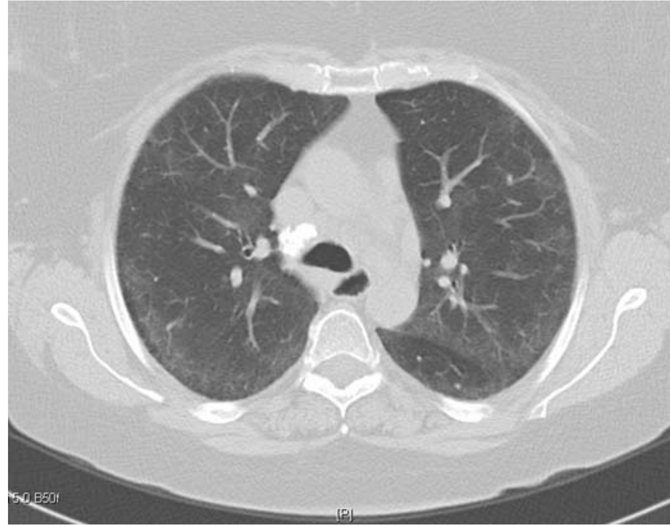

FIGURE e24-27 CT scan of diffuse, bilateral "ground-glass" infiltrates. This finding is consistent with fluid density in the alveolar space.

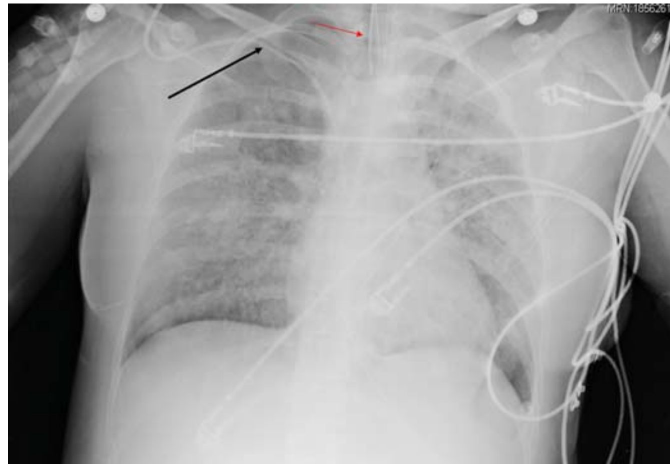

FIGURE e24-28 CXR reveals diffuse, bilateral alveolar infiltrates without pleural effusions, consistent with acute respiratory distress syndrome (ARDS). Note that the patient has an endotracheal tube (*red arrow*) and has a central venous catheter (*black arrow*).

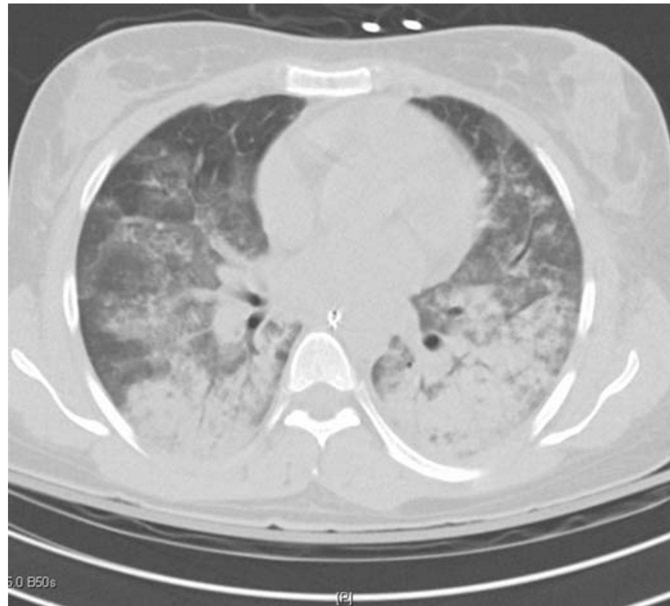

FIGURE e24-29 CT scan of ARDS demonstrates ground-glass infiltrates with more consolidated areas in the dependent lung zones.

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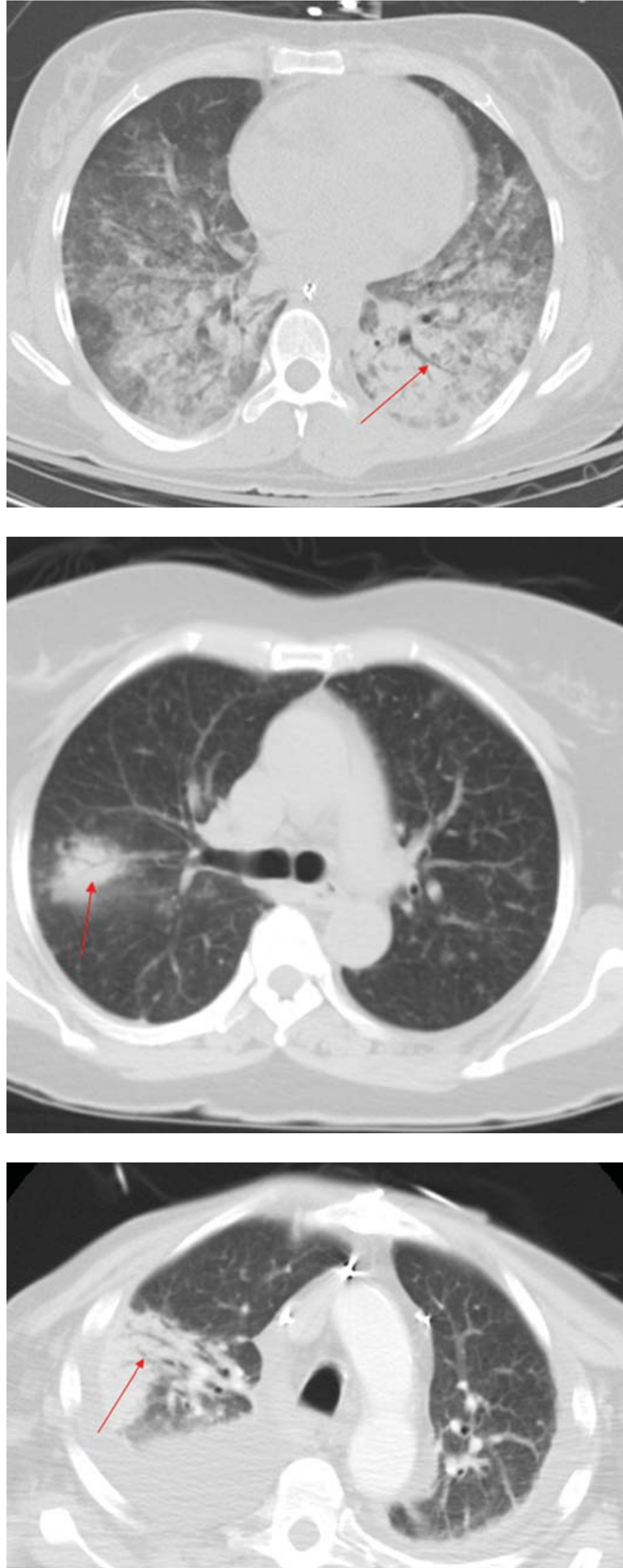

FIGURE e24-30 **Three examples of air bronchograms** (*red arrows*) on chest CT.

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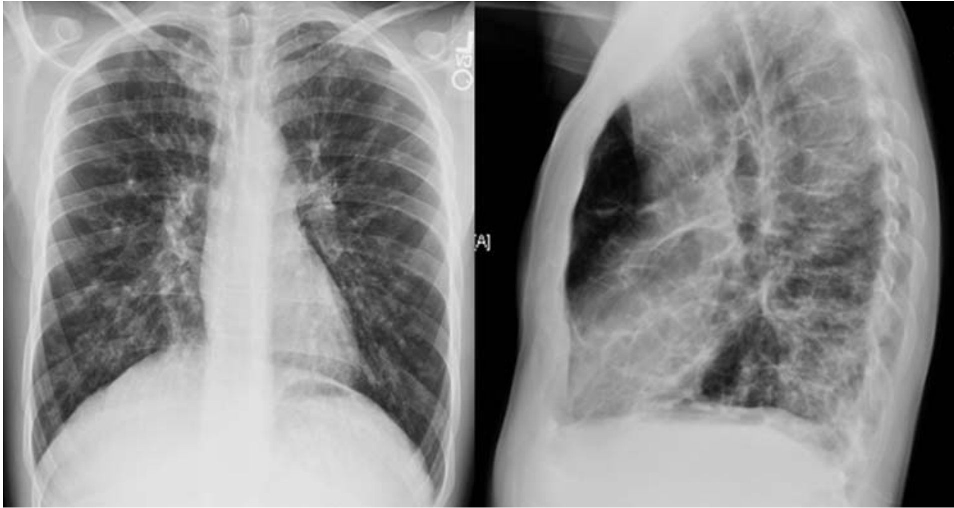

FIGURE e24-31 Cystic fibrosis with bronchiectasis, apical disease.

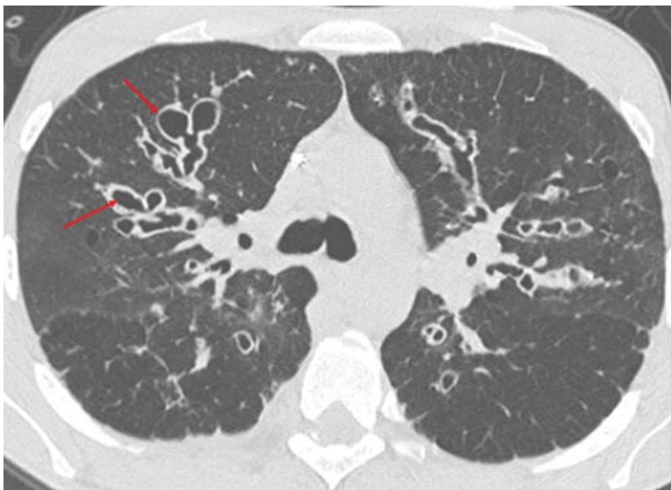

FIGURE e24-32 CT scan of diffuse, cystic bronchiectasis (*red arrows*) in a patient with cystic fibrosis.

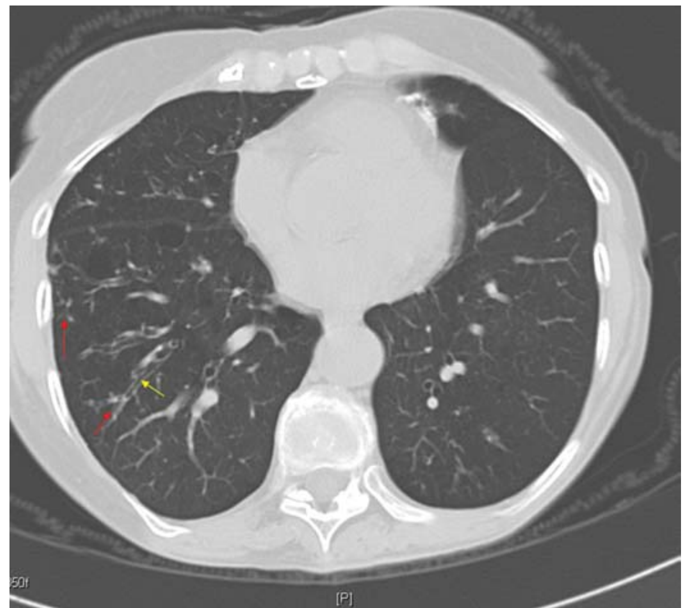

FIGURE e24-34 "Tree in bud" opacities (*red arrows*) and bronchiectasis (*yellow arrow*) consistent with atypical mycobacterial infection. "Tree in bud" refers to small nodules clustered around the centrilobular arteries as well as increased prominence of the centrilobular branching. These findings are consistent with bronchiolitis.

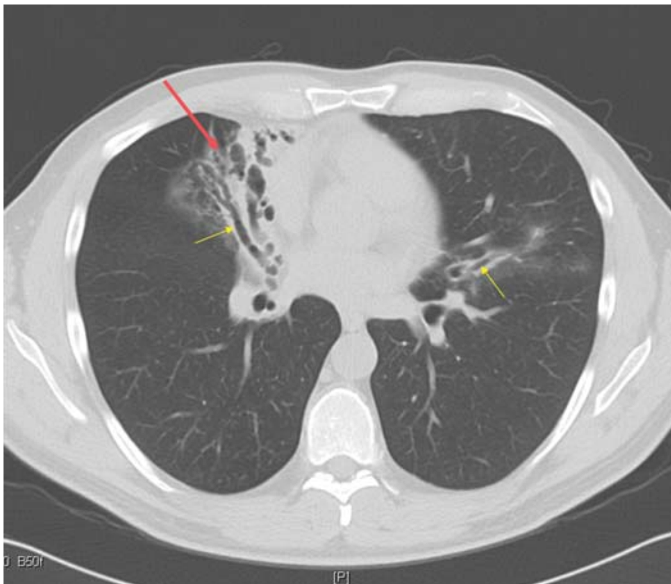

FIGURE e24-33 CT scan of focal right middle lobe and lingular bronchiectasis (*yellow arrows*). Note that there is near total collapse of the right middle lobe (*red arrow*).

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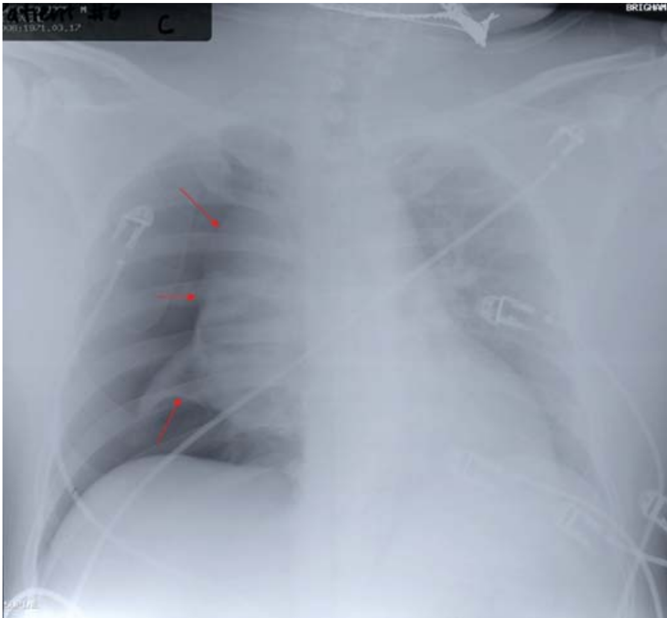

FIGURE e24-35 Large right pneumothorax with near complete collapse of right lung. Pleural reflection highlighted with *red arrows*.

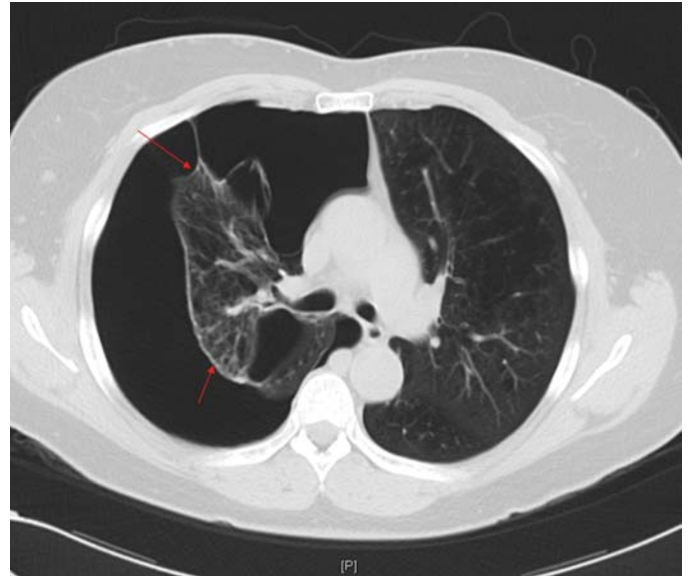

FIGURE e24-37 CT scan of large right-sided pneumothorax. Note significant collapse of right lung with adhesion to anterior chest wall. Pleural reflection highlighted with *red arrows*. The patient has severe underlying emphysema.

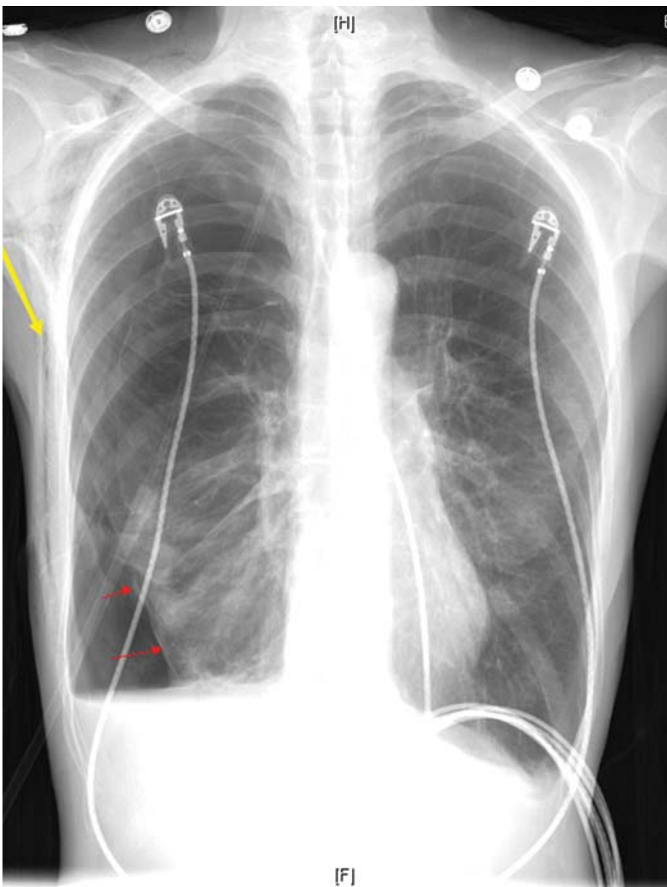

FIGURE e24-36 Basilar pneumothorax with visible pleural reflection (*red arrows*). Also note, patient has subcutaneous emphysema (*yellow arrow*).

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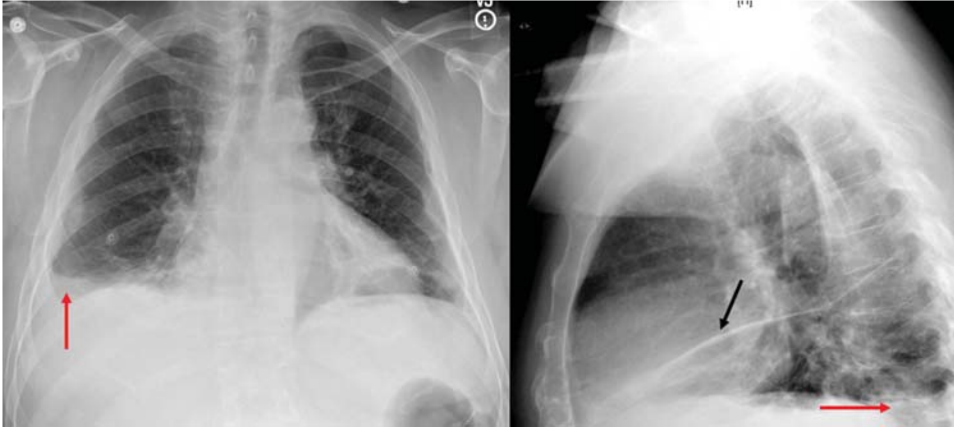

FIGURE e24-38 Small right pleural effusion (*red arrows* highlight blunted right costophrenic angles) with associated pleural thickening. Note fluid in the major fissure (*black arrow*) visible on the lateral film as well as the meniscus of the right pleural effusion.

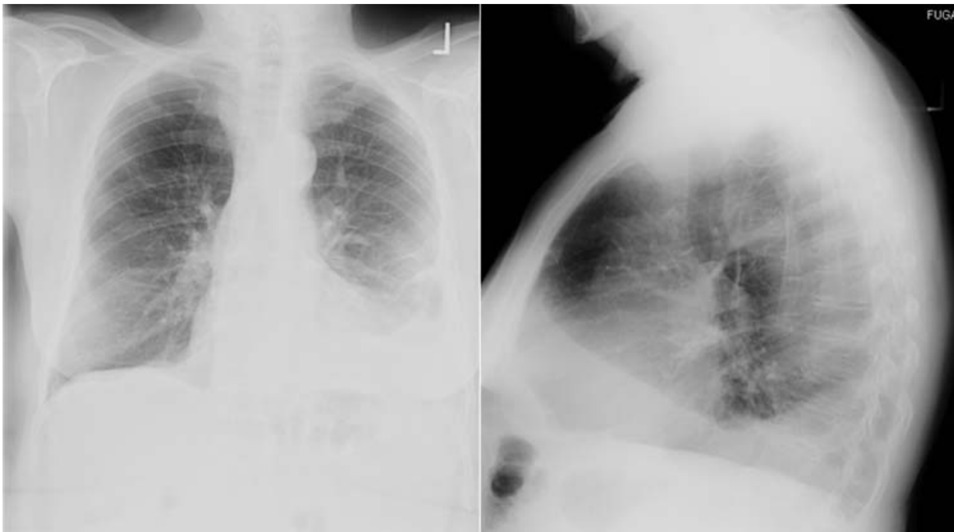

FIGURE e24-39 Left pleural effusion with clear meniscus seen on both PA and lateral chest radiographs.

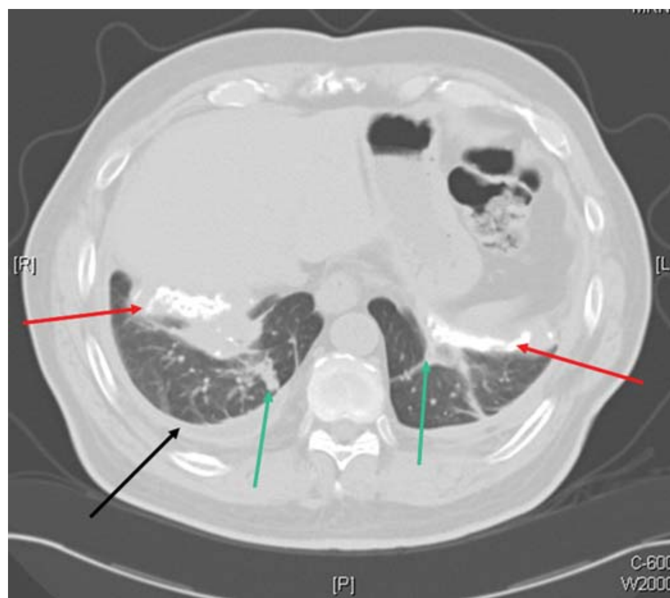

FIGURE e24-40 Asbestosis. Note calcified pleural plaques (*red arrows*); pleural thickening (*black arrow*) and subpleural atelectasis (*green arrows*).

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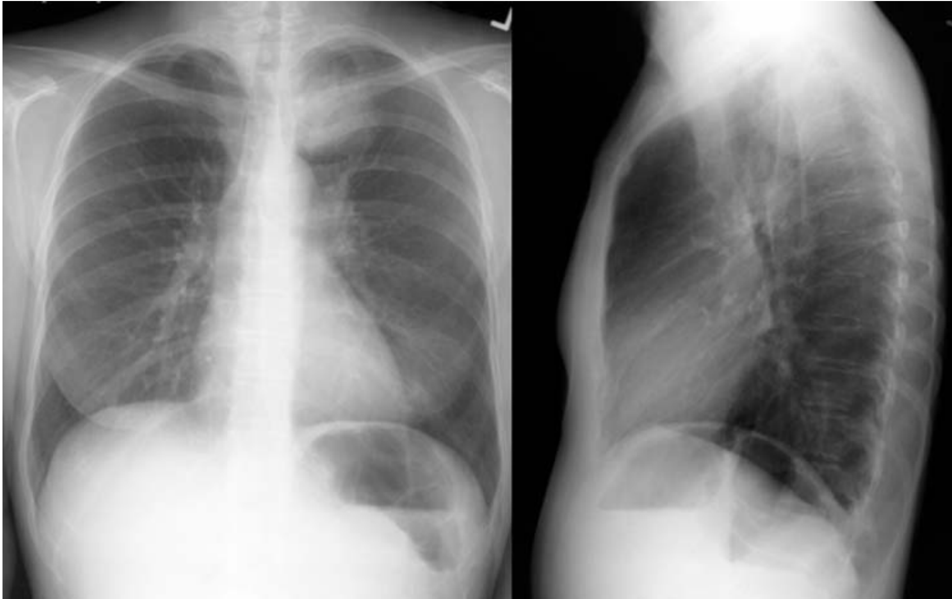

FIGURE e24-41 **Left upper lobe mass,** which biopsy revealed to be squamous cell carcinoma.

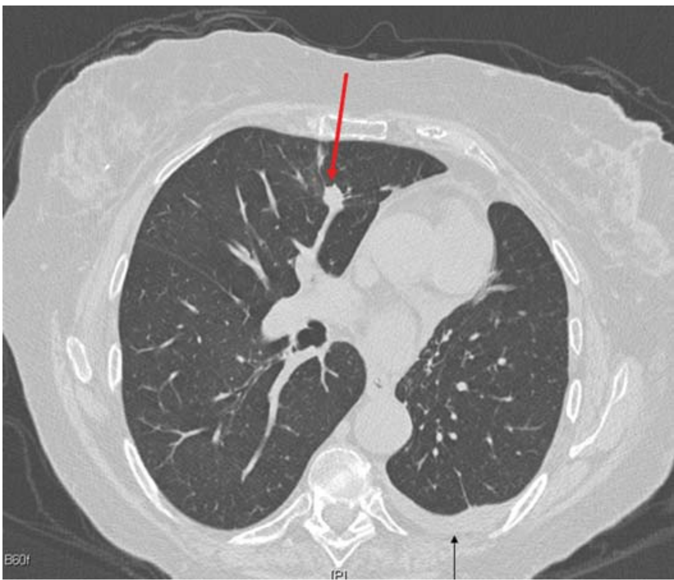

FIGURE e24-42 **Solitary pulmonary nodule on the right** (*red arrow*) with a spiculated pattern concerning for lung cancer. Note also that the patient is status-post left upper lobectomy with resultant volume loss and associated effusion (*black arrow*).

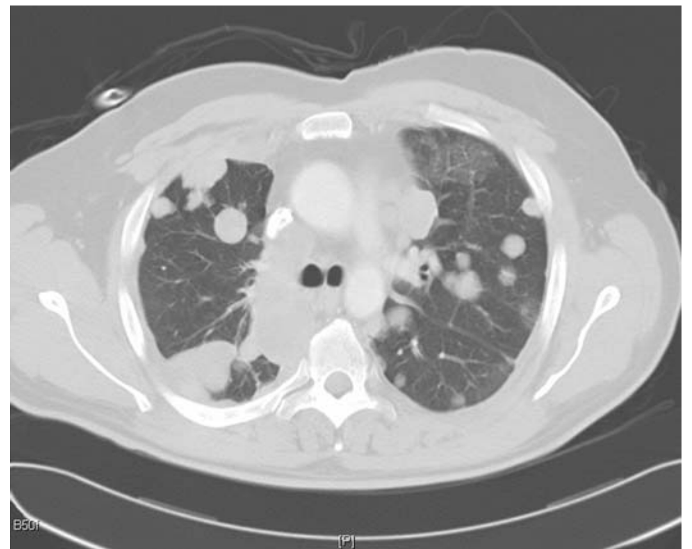

FIGURE e24-43 **Metastatic sarcoma.** Note the multiple, well-circumscribed nodules of different size.

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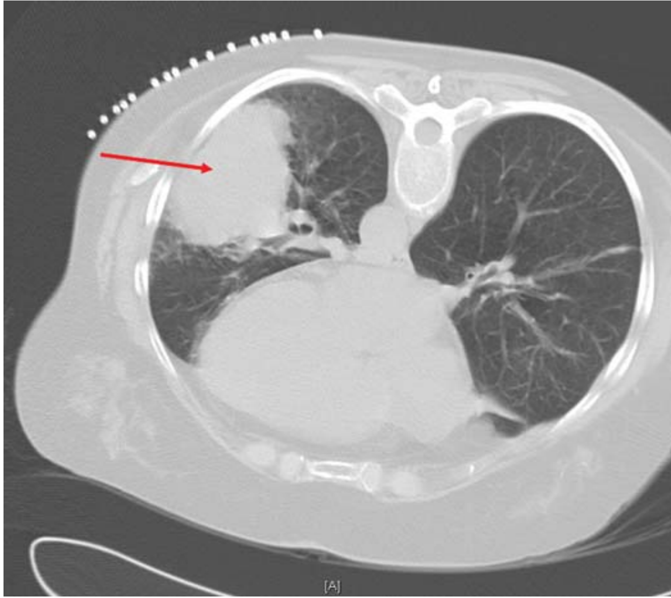

FIGURE e24-44 Left lower lobe lung mass (*red arrow*) abutting pleura. Biopsy demonstrated small cell lung cancer.

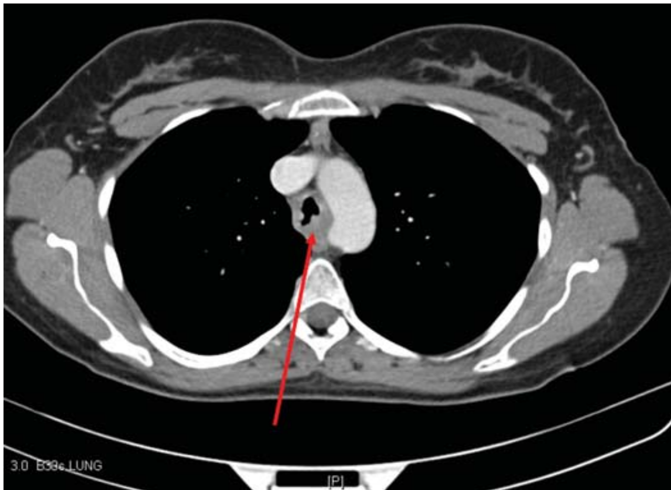

FIGURE e24-45 CT scan of soft tissue mass encircling the trachea (*red arrow*) and invading tracheal lumen. Biopsy demonstrated adenoid cystic carcinoma (cylindroma).

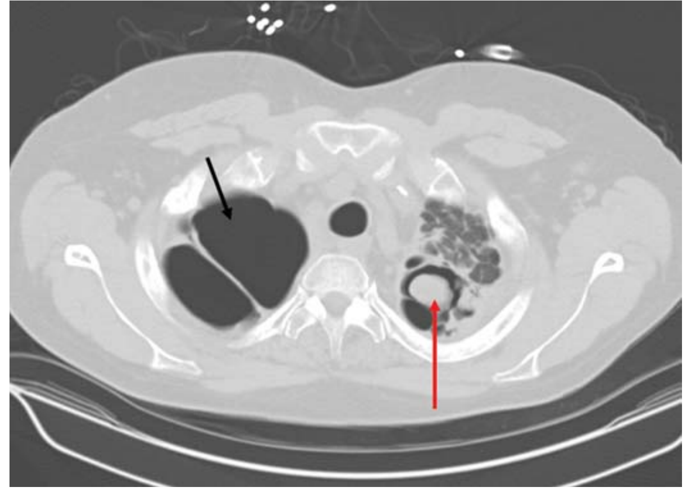

FIGURE e24-46 Mycetoma. Fungal ball (*red arrow*) growing in preexisting cavity on the left. Right upper lobe has a large bulla (*black arrow*).

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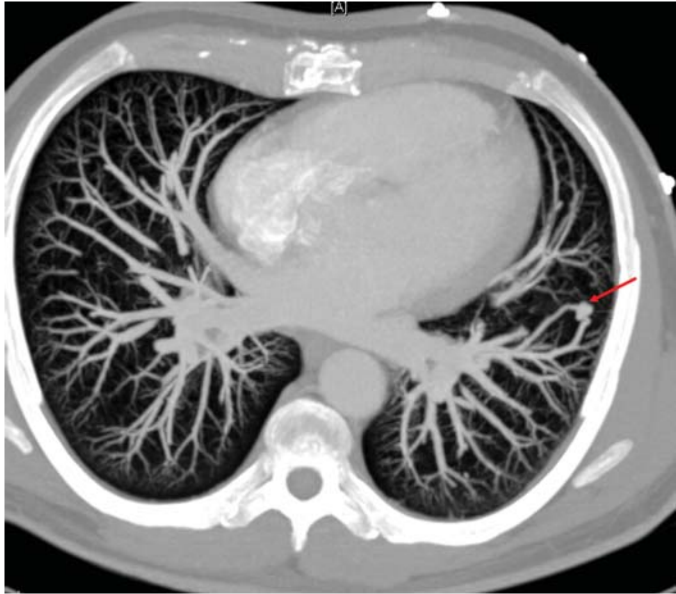

FIGURE e24-47 **Pulmonary arteriovenous malformation (AVM)** demonstrated on reformatted CT angiogram (*red arrow*).

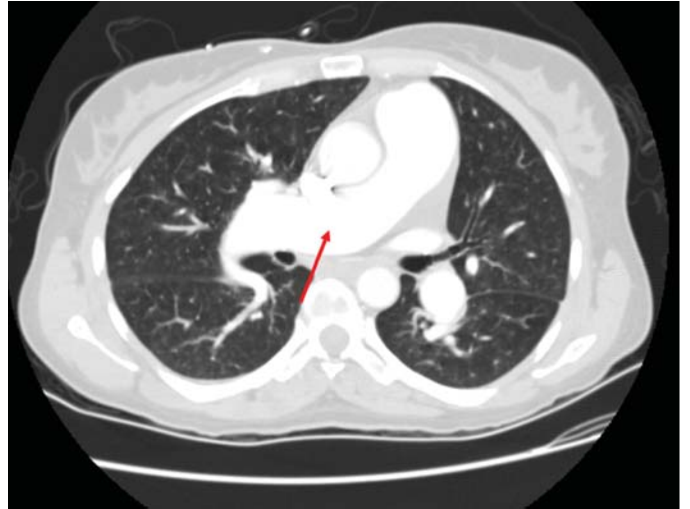

FIGURE e24-50 **CT scan of the same patient** as in Fig. e24-49. Note the markedly enlarged pulmonary arteries (*red arrow*).

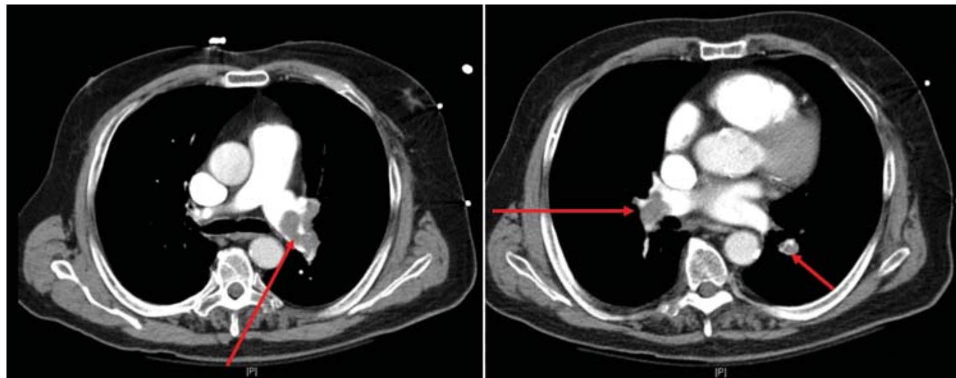

FIGURE e24-48 **Large bilateral pulmonary emboli** (intravascular filling defects in contrast scan identified by *red arrows*).

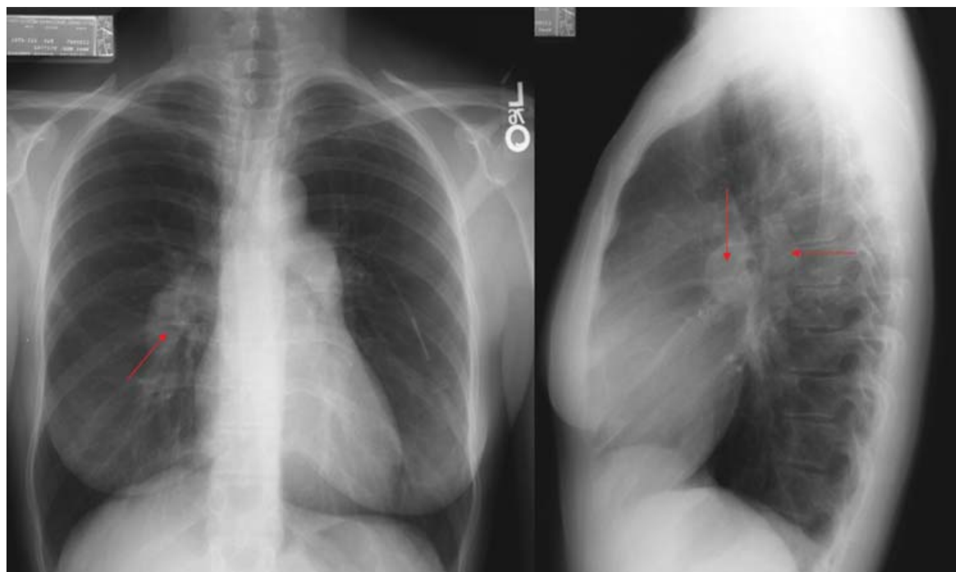

FIGURE e24-49 **CXR of a patient with severe pulmonary hypertension.** Note the enlarged pulmonary arteries (*red arrows*) visible on both PA and lateral films.

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