胸腔影像學概論
Chest imaging
【胸部X光片Ⅶ】

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學習目標：

- 各種疾病的X光特徵及其臨床issues
- 有關免疫風濕疾病的認識
- 有關職業暴露所產生的疾病
- 有關呼吸道的特殊疾病

Reference

- **Jud W. Gurney ... et al. (2006). *Diagnostic imaging*. Salt Lake City, Utah: Amirsys.**
- **Jannette Collins, Eric J. Stern. (1999). *Chest radiology : the essentials* . Philadelphia : Lippincott Williams & Wilkins.**
- **Alfred P. Fishman; section editors, Jack A. Elias ... et al. (1998). *Fishman's pulmonary diseases and disorders*. New York：McGraw-Hill, Health Professions Division.**
- 江自得（**2003**）。實用胸腔**X**光診斷學。臺北：力大。
- 葉育文（譯）**(2005)**。胸部**X**光臨床判讀（原作者：**Paul F. Jenkins**）。台北：合記。

Diagnostic Imaging (2)

- **Immunologic**
- **Occupation**
- **Airway structure change**

Sarcoidosis, Pulmonary (1)

Key Facts

Terminology
- Common systemic granulomatous disease of unknown etiology

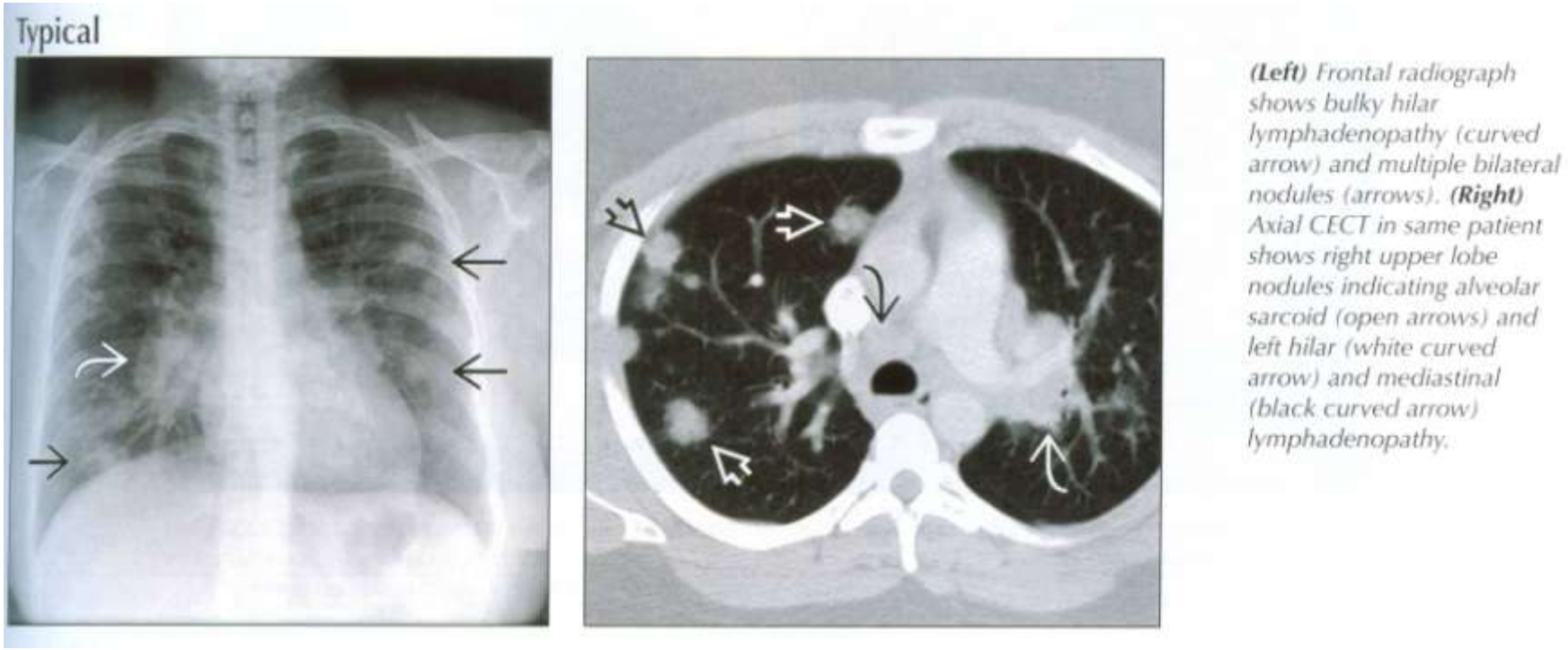
Imaging Findings
- Best diagnostic clue: Symmetric hilar and mediastinal lymphadenopathy; without or with pulmonary opacities
- Micronodules (1-5 mm)
- Centrilobular, perivascular, perilymphatic, bronchovascular bundles, subpleural, septal
- Often extends in a swath from the hilum to lung periphery
- Predilection for posterior (sub)segment upper lobes and superior segments lower lobes
- Alveolar sarcoid: Airspace nodules and consolidation with air bronchograms
- Progressive massive fibrosis, architectural distortion, honeycombing, cysts, bullae

Top Differential Diagnoses
- Berylliosis
- Silicosis
- Tuberculosis (TB)
- Histoplasmosis, coccidioidomycosis, cryptococcus

Clinical Issues
- Major complications include respiratory failure from fibrosis, mycetomas, hemorrhage, cor pulmonale
- Cardiac disease: Myocardial infarction in 5%, arrhythmias, heart block, sudden death
- Variable, worse in African-Americans (more extrapulmonary involvement); better in children

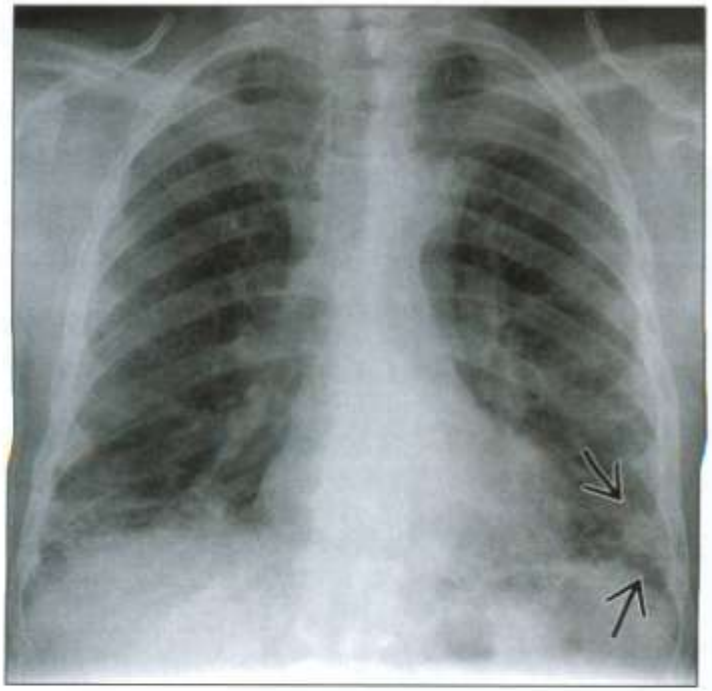
Sarcoidosis, Pulmonary (2)

Image Gallery

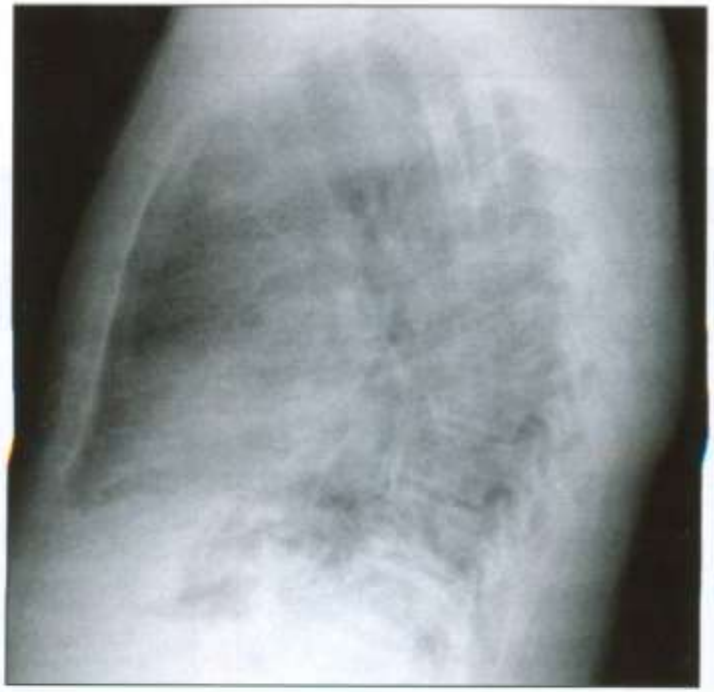


(Left) *Frontal radiograph shows bulky hilar lymphadenopathy (curved arrow) and multiple bilateral nodules (arrows).* ***(Right)*** *Axial CECT in same patient shows right upper lobe nodules indicating alveolar sarcoid (open arrows) and left hilar (white curved arrow) and mediastinal (black curved arrow) lymphadenopathy.*

Rheumatoid Arhritis(1)



Frontal radiograph shows basilar reticular interstitial lung disease with a nodular opacity at the left lung base (arrows) in this patient with a history of long standing rheumatoid arthritis.



Lateral radiograph again shows the basilar predominance of the interstitial changes typical for RA. In the absence of other findings of RA, the interstitial changes alone are nonspecific.

Rheumatoid Arhritis (2)

Key Facts

Terminology

- Subacute or chronic inflammatory polyarthropathy of unknown cause
- Associated lung findings: Pleural disease, interstitial fibrosis with honeycombing, micronodules, small and large nodules, and airway disease

Imaging Findings

- Best diagnostic clue: Diffuse interstitial thickening with erosion of distal clavicles
- Rheumatoid nodules (seen in < 5%)
- Caplan syndrome: Rare
- Hyperinflation (bronchiolitis obliterans) or cryptogenic organizing pneumonia (COP) pattern
- Bronchiectasis (20%)
- Pulmonary fibrosis often indistinguishable from usual interstitial pneumonia (UIP)
- Pleural abnormalities and pulmonary nodules, if present, help distinguish RA related interstitial lung disease (ILD) from UIP

Top Differential Diagnoses

- Hand films or findings of distal clavicle erosions useful to differentiate RA from other interstitial lung disease

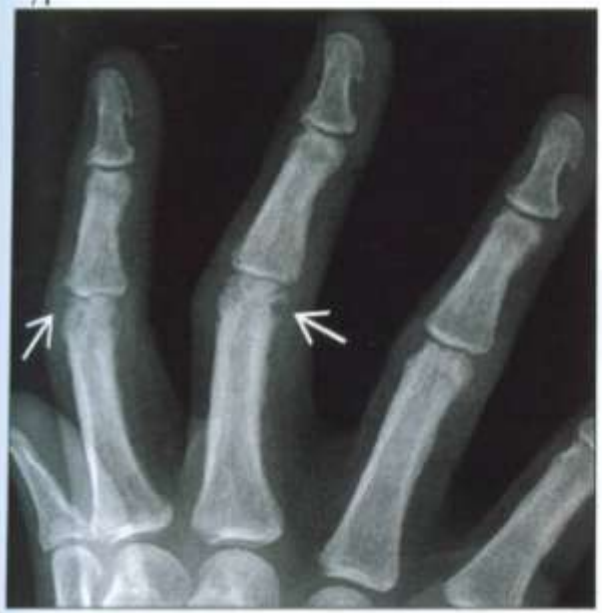
Clinical Issues

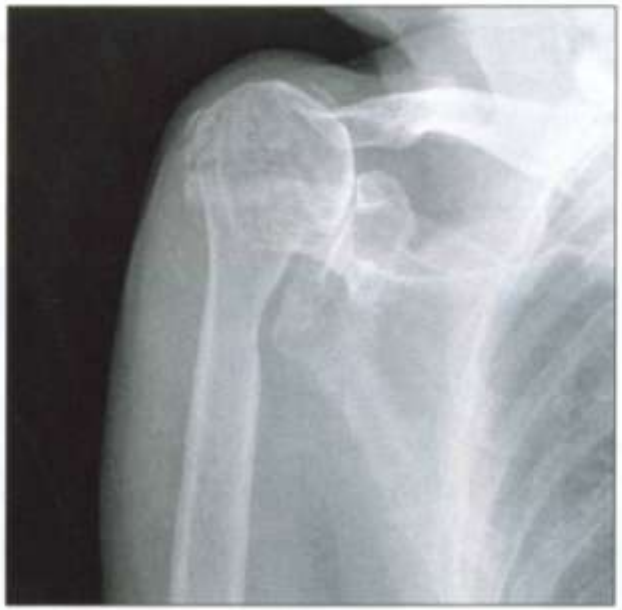
- Most have arthritis; positive rheumatoid factor (RF) (80%), and cutaneous nodules
- Pleural fluid: High protein, low glucose, low pH, high LDH, high RF, low complement
- Death from infection, respiratory failure, cor pulmonale, amyloidosis
- Drugs used to treat RA may cause ILD

Rheumatoid Arhritis (3)

Image Gallery

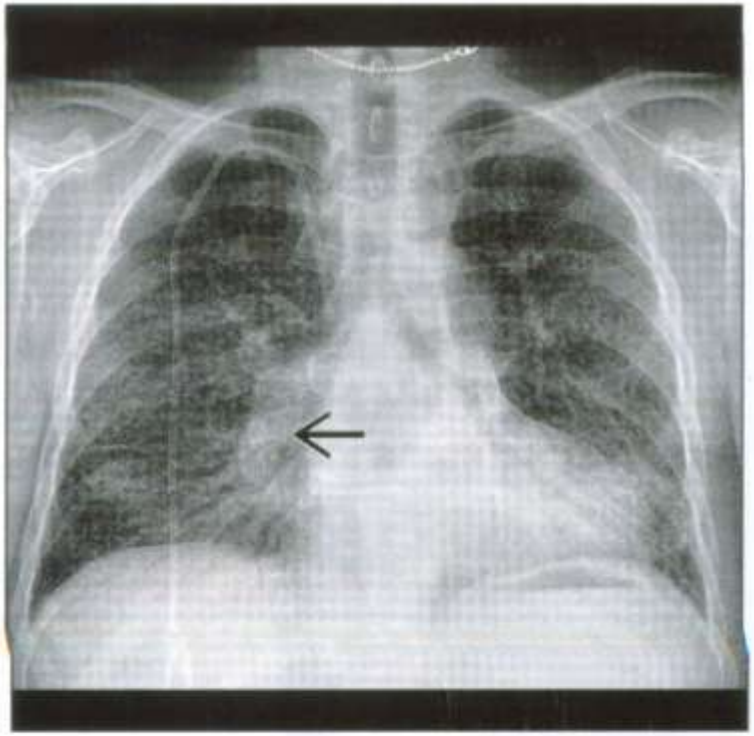
Typical



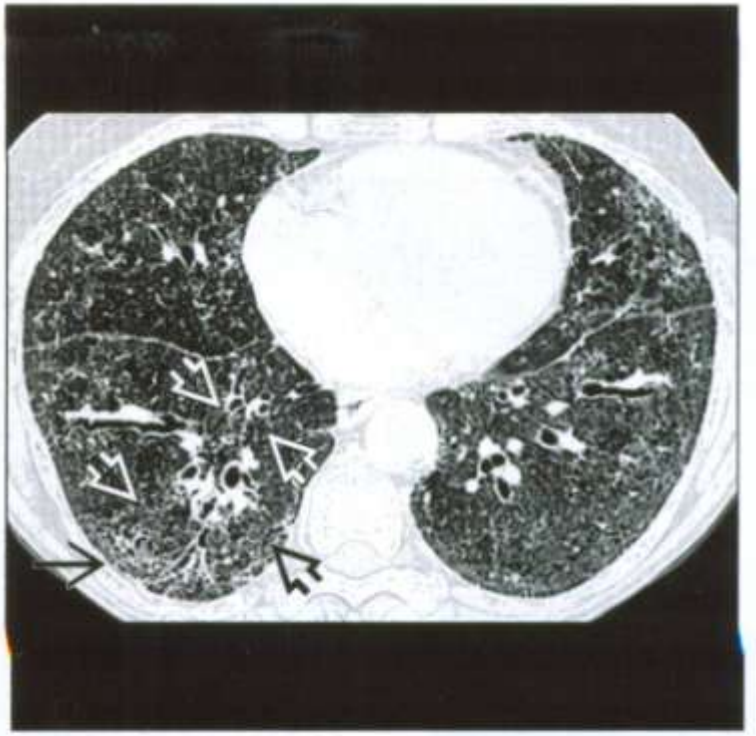


(Left) *Anteroposterior radiograph of the hand shows early marginal erosive changes of the proximal interphalangeal (PIP) joints (arrows), with joint space narrowing. (Courtesy of C. Bush, MD).* ***(Right)*** *Anteroposterior radiograph of the shoulder shows chondrolysis, osteopenia, and erosions of the humeral head and clavicle. Rotator cuff degeneration results in a high-riding humeral head.*

Scleroderma, Pulmonary (1)



Frontal radiograph shows fine "lace-like" diffuse interstitial thickening from scleroderma. Heart is mildly enlarged and central pulmonary arteries (arrow) are enlarged from pulmonary arterial hypertension.



Axial HRCT shows fine intralobular interstitial thickening (arrow), ground-glass opacification, extending along bronchovascular pathways (open arrows) in NSIP pattern.

Scleroderma, Pulmonary(2)

Key Facts

Terminology
- Systemic sclerosis
- Generalized connective tissue disorder affecting multiple organ systems including the skin, lungs, heart and kidneys

Imaging Findings
- Best diagnostic clue: Basilar interstitial thickening with dilated esophagus
- Esophageal dilatation (80%) air-filled
- Pulmonary artery enlargement from pulmonary artery hypertension, (< 50%) may be separate from interstitial lung disease (ILD) (10%)
- 1/3rd have pattern similar to idiopathic pulmonary fibrosis (IPF)

Top Differential Diagnoses
- Idiopathic Pulmonary Fibrosis
- Aspiration Pneumonia
- Nonspecific Interstitial Pneumonitis
- Asbestosis
- Rheumatoid Arthritis
- Drug Reaction

Clinical Issues
- Most common presentation is Raynaud phenomenon (up to 90%), tendonitis, arthralgia, arthritis
- Poor; 70% 5 year survival; cause of death usually aspiration pneumonia

Diagnostic Checklist
- Lung carcinoma in patient with dominant nodule or focal ground-glass opacity

Polymyositis - Dermatomyositis Pulmonary (1)

Key Facts

Terminology
- Idiopathic, inflammatory, immune mediated myopathic disorder with multiple systemic manifestations

Imaging Findings
- Best diagnostic clue: Patchy subpleural consolidation in the setting of reduced lung volumes
- Elevated hemidiaphragms due to respiratory muscle weakness, atelectasis
- Interstitial thickening, predominantly lower lungs
- Soft tissue calcifications
- Whole body turbo STIR to demonstrate soft tissue inflammatory burden

Top Differential Diagnoses
- Drug Toxicity
- Hypersensitivity Pneumonitis
- Asbestosis
- Inhalational Injury
- Rheumatoid Arthritis
- Sjögren Syndrome
- Idiopathic Pulmonary Fibrosis

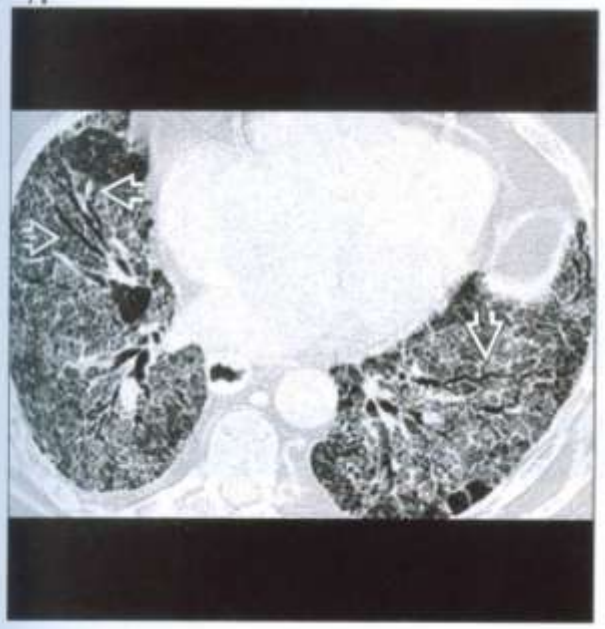
Pathology
- Most likely precipitant appears to be a viral cause in a genetically susceptible individual

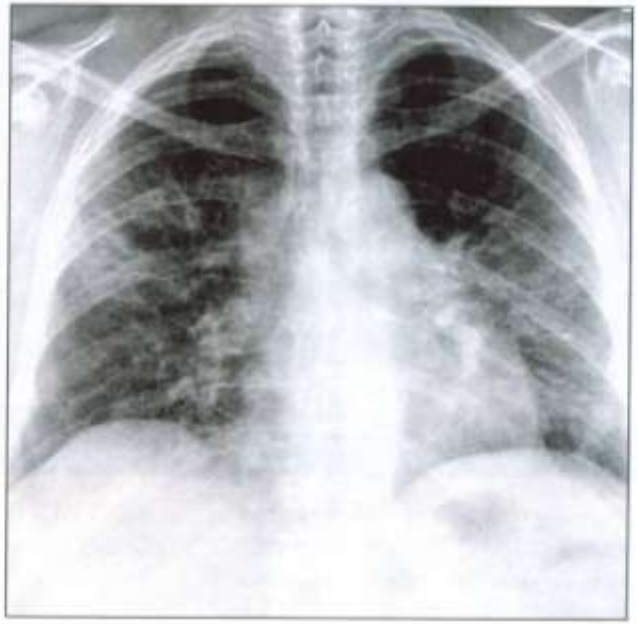
Clinical Issues
- No established association between interstitial lung disease and extent of muscle or skin findings
- Aspiration pneumonia secondary to pharyngeal and esophageal myopathy in 15-20%

Polymyositis - Dermatomyositis Pulmonary (2)

Image Gallery

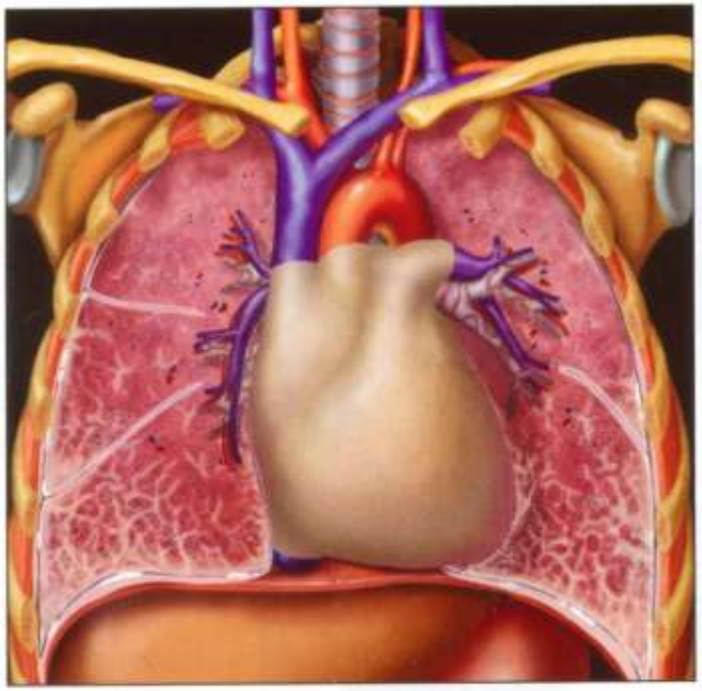
Typical



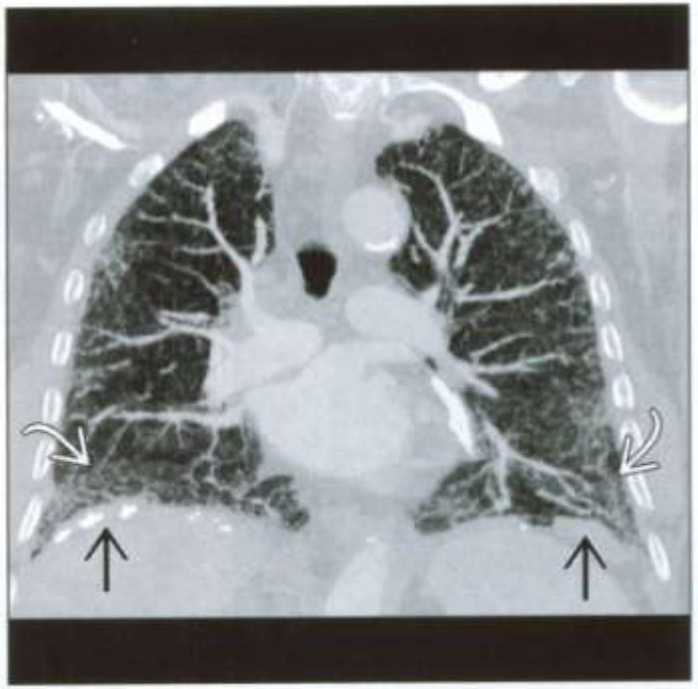


(Left) *Axial HRCT shows extensive bibasilar traction bronchiectasis (arrows) and fibrosis in a patient with polymyositis. NSIP pattern at histology.* ***(Right)*** *Frontal radiograph shows scattered interstitial changes in a patient diagnosed with polymyositis.*

Asbestosis (1)



Axial graphic shows abnormal interstitial thickening predominantly involving the periphery of the lower lobes. Pleural plaques may be absent in up to 20% of patients with asbestosis.



Coronal HRCT shows fine peripheral interstitial fibrosis (curved arrows) most marked in the basilar peripheral lung. Multiple calcified and noncalcified diaphragmatic plaques (arrows).

Asbestosis (2)

Key Facts

Terminology
- Interstitial lung disease due to the inhalation of asbestos fibers

Imaging Findings
- Morphology: Fibrosis centered on respiratory bronchioles
- Lung cancer: Lower zone predominance in contrast to the upper zone predominance in the general population of smokers
- Subpleural curvilinear lines early sign
- Protocol advice: Prone scans helps to differentiate true interstitial lung disease from gravity-related physiology

Top Differential Diagnoses
- Idiopathic Pulmonary Fibrosis
- Scleroderma
- Rheumatoid Arthritis
- Hypersensitivity Pneumonitis
- Lymphangitic Tumor
- Cytotoxic Drug Reaction

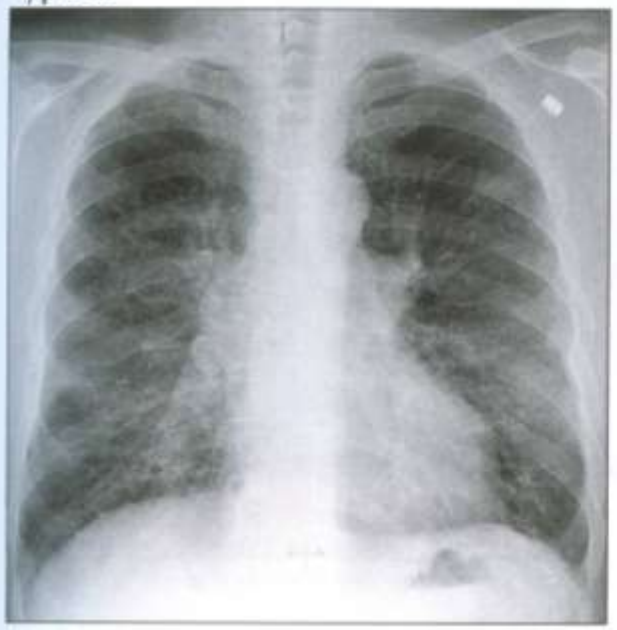
Pathology
- Fibrosis + asbestos bodies = asbestosis
- Retention: Long thin fibers > short, thick fibers
- Fibrosis associated with > 1 million fibers/gm lung tissue

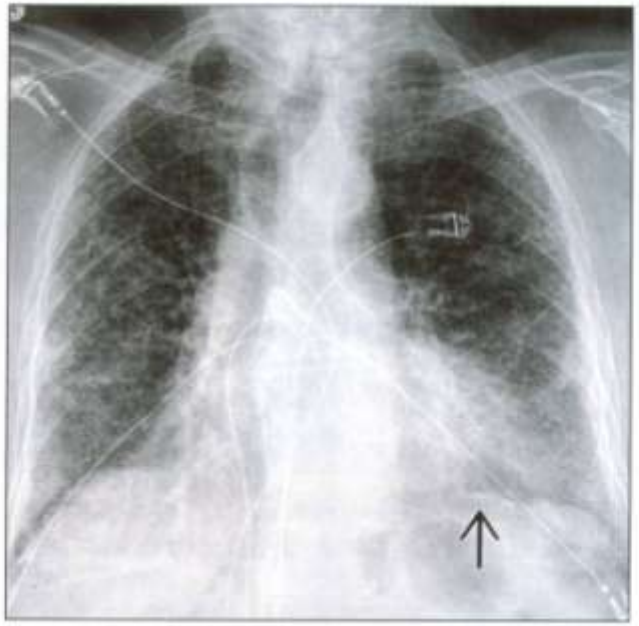
Clinical Issues
- Latent period 20-30 years
- Does not regress, slowly progresses
- High proportion die of lung cancer (1 in 4)

Asbestosis(3)

Image Gallery

Typical





(Left) *Frontal radiograph shows mild basilar interstitial thickening in the typical railroad worker with asbestosis. No pleural plaques.* ***(Right)*** *Frontal radiograph shows more severe interstitial thickening in asbestosis. "Shaggy" heart borders. Calcified diaphragmatic plaque (arrow).*

Silicosis - Coal Worker Pneumoconiosis (1)

Key Facts

Terminology

- Simple or chronic pneumoconiosis: Micronodules < 1 cm, more profuse in upper lung zones, often have hilar and mediastinal lymphadenopathy, develops more than 10 years after long term occupational exposure
- Complicated pneumoconiosis known as progressive massive fibrosis (PMF): Aggregation of nodules into large masses larger than 1 cm in diameter, evolves from simple or chronic pneumoconiosis
- Acute silicoproteinosis: Resembles alveolar proteinosis, develops within weeks after heavy dust exposure
- Caplan syndrome: Coal worker pneumoconiosis (CWP) + rheumatoid arthritis + necrobiotic nodules

Top Differential Diagnoses

- Sarcoidosis
- Tuberculosis (TB)
- Langerhans Cell Histiocytosis
- Hypersensitivity Pneumonitis
- Talcosis

Pathology

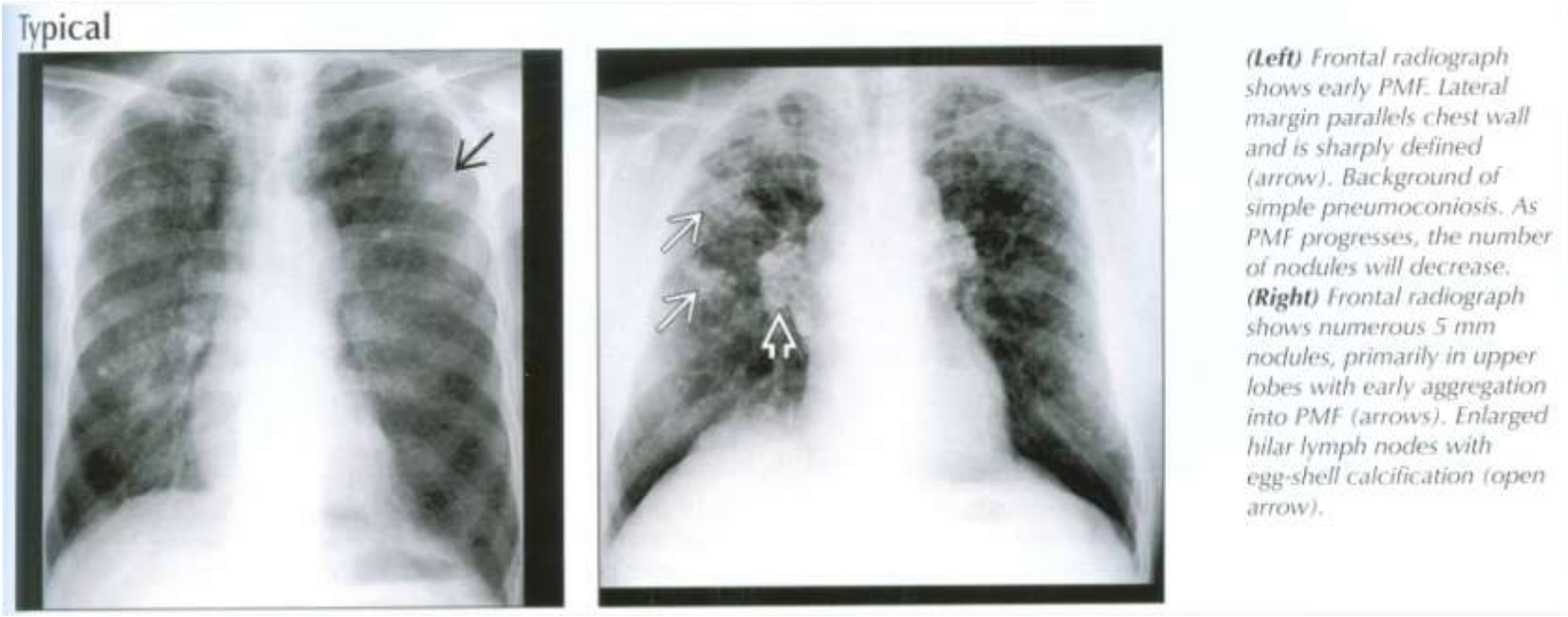
- Silica more fibrogenic than coal
- Primarily involves upper lung zones, PMF results in end-stage lung

Clinical Issues

- Typical occupations: Sandblasting, quarries, mining, glassblowing, pottery

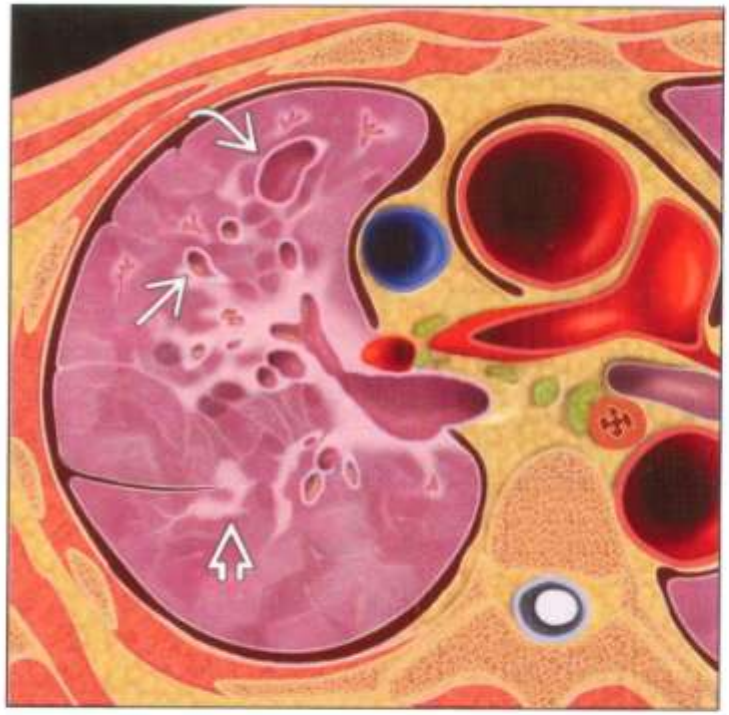
Silicosis - Coal Worker Pneumoconiosis (1)

Image Gallery

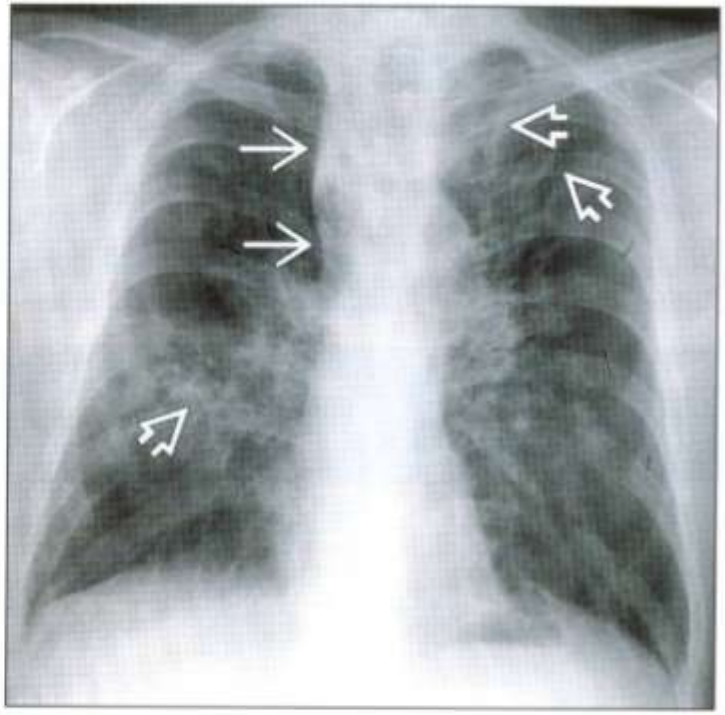


(Left) *Frontal radiograph shows early PMF. Lateral margin parallels chest wall and is sharply defined (arrow). Background of simple pneumoconiosis. As PMF progresses, the number of nodules will decrease.* ***(Right)*** *Frontal radiograph shows numerous 5 mm nodules, primarily in upper lobes with early aggregation into PMF (arrows). Enlarged hilar lymph nodes with egg-shell calcification (open arrow).*

Cystic Fibrosis, Pulmonary (1)



Graphic shows bronchial abnormalities in cystic fibrosis. Abnormal thick secretions result in bronchiectasis (arrow), mucus plugging (open arrow) and parenchymal destruction of the lung (curved arrow).

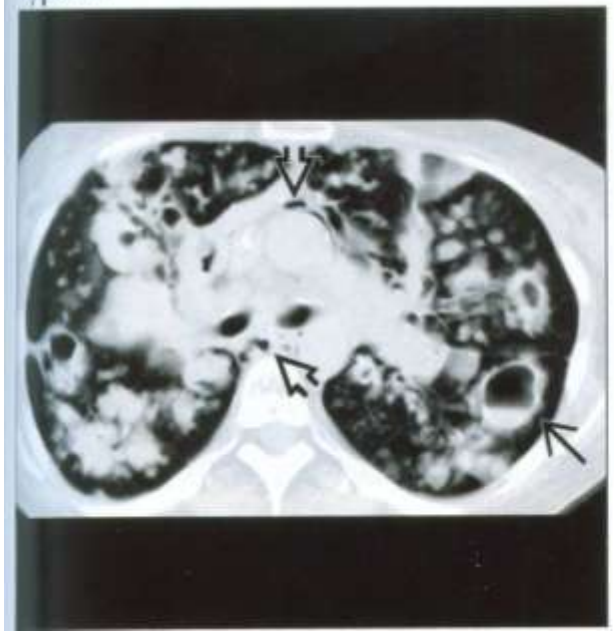


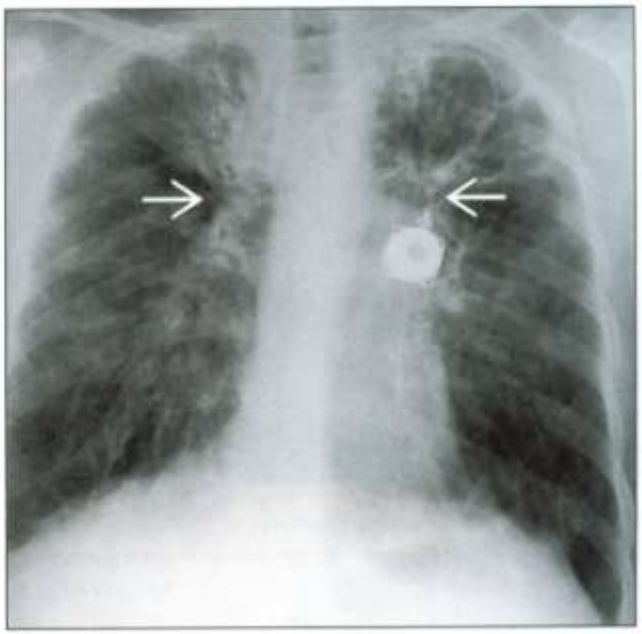
Frontal radiograph shows typical features of cystic fibrosis with right upper lobe collapse (arrows) and scattered bronchiectasis bilaterally (open arrows) with upper lobe predominance.

Cystic Fibrosis, Pulmonary(2)

Image Gallery

Typical





(Left) *Axial NECT shows severe cystic and cylindrical bronchiectasis bilaterally in the upper lobes with an air fluid level (arrow) suggesting acute infection. Spontaneous pneumomediastinum (open arrows).* ***(Right)*** *Frontal radiograph shows severe upper lobe volume loss with upward retraction of hila (arrows) and large cystic spaces, as well as an implanted reservoir catheter. Note the radiographic opacities are more marked in the right upper lobe.*

Tracheobronchomegaly (1)

Key Facts

Terminology
- Rare disorder characterized by dilation of the trachea and central bronchi that impairs the ability to clear mucus from the lungs

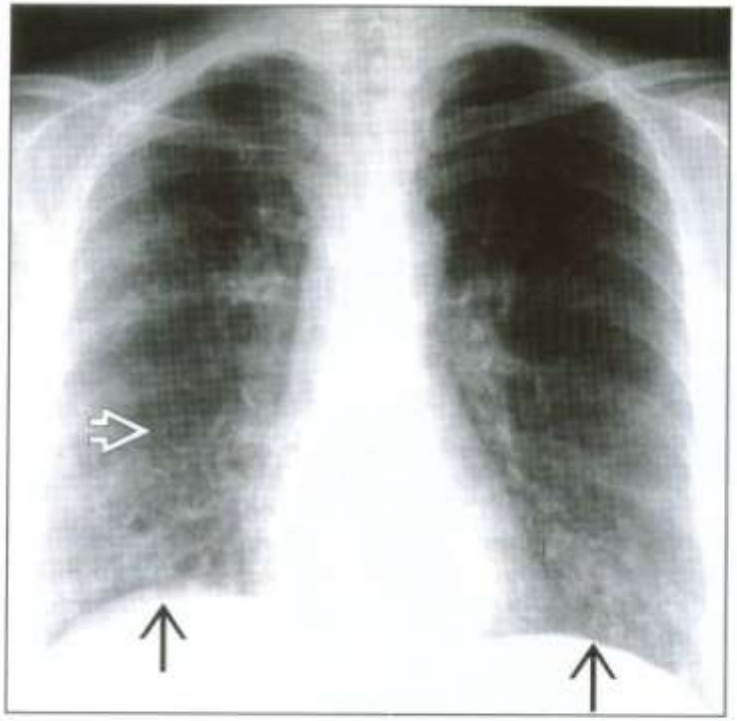
Imaging Findings
- Tracheal diameter > 27 mm in men and > 23 mm in women
- Recurrent pulmonary infections; bronchiectasis
- Morphology: Corrugated trachea, best seen on lateral radiograph
- Airways dilated on inspiration, collapse on expiration
- Hyperinflation and emphysema
- Thinning of the tracheal wall

Top Differential Diagnoses
- Ehlers-Danlos syndrome
- Cutis laxa (generalized elastolysis)
- Immune deficiency states and recurrent childhood infections
- Ataxia telangiectasia

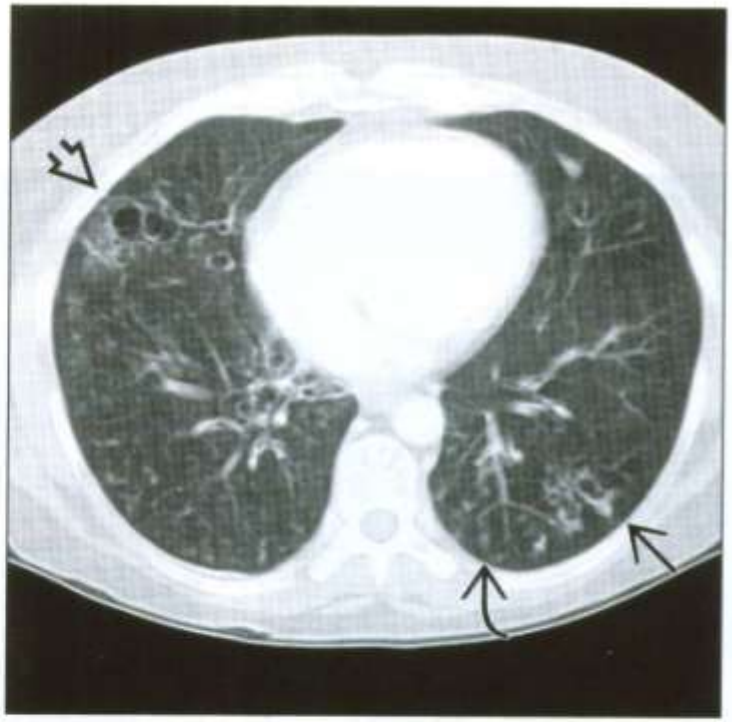
Pathology
- Mounier-Kuhn: Idiopathic

Clinical Issues
- Recurrent infections may lead to bronchiectasis and pulmonary fibrosis
- Obstructive airway disease from collapse of trachea and major bronchi (tracheomalacia)
- Usually diagnosed, age 30-50 years
- Gender: Male to female ratio, 19:1

Immotile Cilia Syndrome(1)



Frontal radiograph shows situs solitus, bibasilar bronchial wall thickening (arrows) and right lower lobe bronchiectasis (open arrow). Electron microscopy showed ciliary ultrastructure defects.



Axial CECT shows right middle lobe cystic bronchiectasis (open arrow), left lower lobe cylindrical bronchiectasis (arrow) and centrilobular nodules (curved arrow). Primary ciliary dyskinesia syndrome.

Immotile Cilia Syndrome(2)

Key Facts

Imaging Findings

- Situs inversus or dextrocardia (50%), paranasal sinusitis, bronchiectasis
- Situs solitus, 50%
- Recurrent pneumonias
- Variable severity of bronchiectasis: Cylindrical, varicose, cystic bronchiectasis
- Bronchiolectasis: Tree in bud, V and Y shaped peripheral centrilobular opacities
- Peribronchial or confluent airspace opacities representing pneumonia
- Areas of decreased attenuation suggest small airways disease
- Diffuse centrilobular small nodules up to 2 mm in diameter

Top Differential Diagnoses

- Young Syndrome
- Sinobronchial Allergic Mycosis
- Cystic Fibrosis

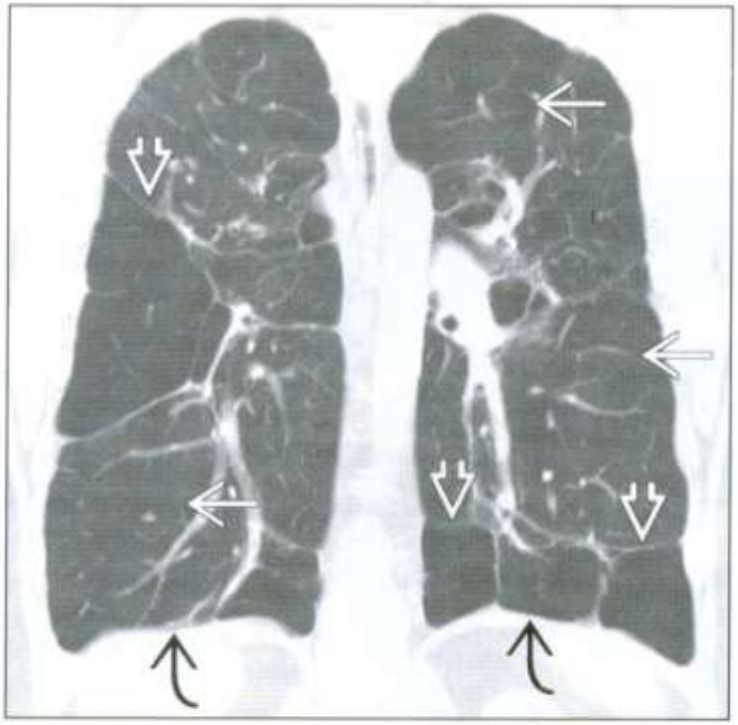
Pathology

- Abnormal ciliary function eventually results in stasis of secretions in airways, recurrent infections and bronchiectasis
- Cilia with missing dynein arms, central microtubule pairs, inner sheath, radial spokes, or nexin links

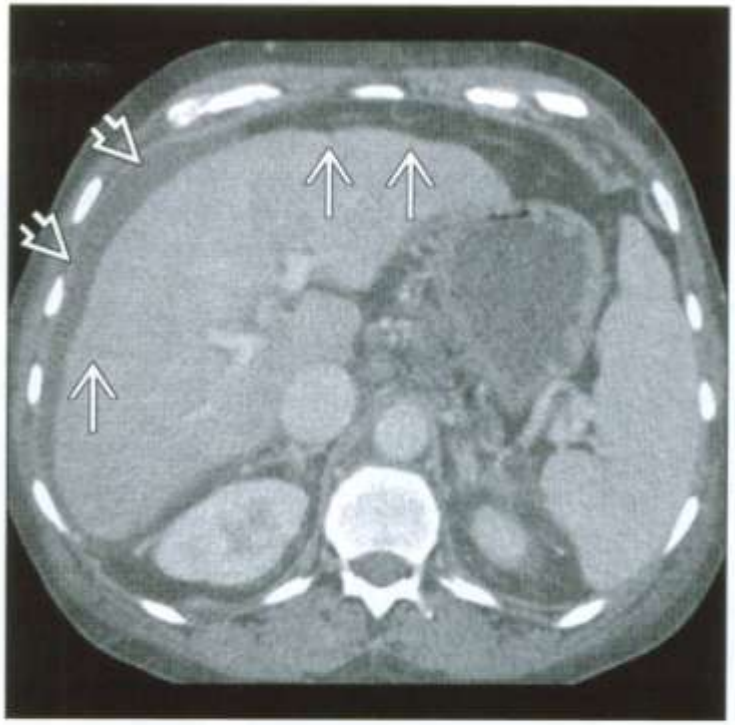
Clinical Issues

- Infertile males due to immotile spermatozoa
- Gender: Male:Female = 1:1
- Good prognosis, compatible with normal lifespan

Alpha-1 Antiprotease Deficiency (1)



Coronal CECT in alpha-1-antitrypsin deficiency shows flattened hemi-diaphragms (curved arrows), areas of panlobular lung destruction (arrows), and subpleural bullae (open arrows).



Axial CECT in alpha-1-antitrypsin deficiency induced liver cirrhosis shows a small liver with an nodular contour (arrows), combined with perihepatic ascites (open arrows).

Alpha-1 Antiprotease Deficiency (2)

Key Facts

Terminology
- Inherited deficiency of alpha-1-antitrypsin
- Common Pi ZZ phenotype: 1 in 2000
- Liver disease in infancy
- Panlobular emphysema

Imaging Findings
- Basal emphysema
- Combination with bullous disease
- Combination with liver cirrhosis

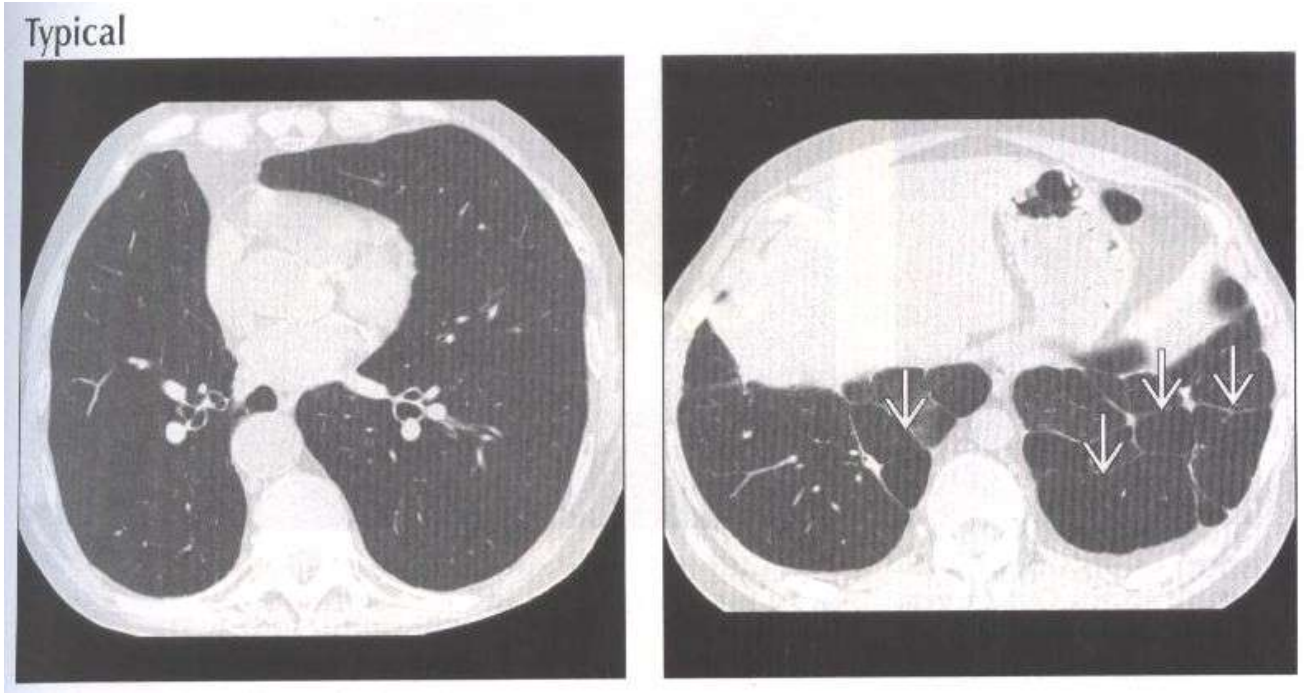
Top Differential Diagnoses
- Centrilobular Emphysema
- Bullae
- Langerhans Cell Histiocytosis
- Lymphangiomyomatosis
- Neurofibromatosis

Pathology
- Pi ZZ have 15% normal levels, need 35% to protect from emphysema
- Epidemiology: As common as cystic fibrosis, Pi ZZ 1 in 2000

Clinical Issues
- Most suffer from wheezing and exertional dyspnea
- Nearly 80% of patients have a positive family history of lung disease
- Nearly 25% of patients have a positive family history of liver disease
- Smoking an extremely important cofactor for the development of disease in alpha-1-deficient individuals
- Many cases are discovered as a consequence of family screening of emphysema patients

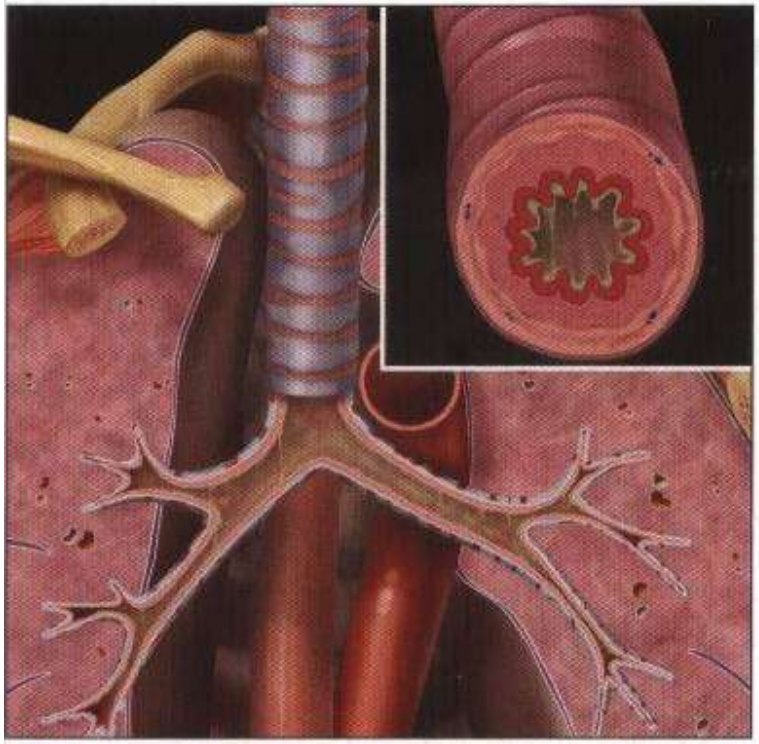
Alpha-1 Antiprotease Deficiency (3)

Image Gallery

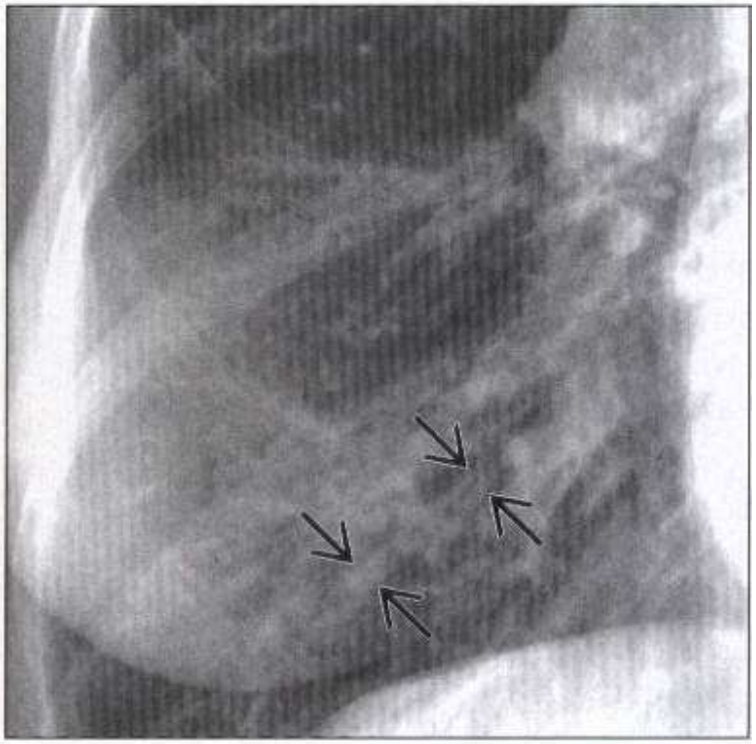


(Left) *Axial CECT in alpha-1-antitrypsin deficiency shows diffuse bilateral destruction of lung parenchyma resulting in diffuse hypoattenuation.* ***(Right)*** *Axial CECT in alpha-1-antitrypsin deficiency shows extensive bullae (arrows) in the lower lobes.*

Chronic Bronchitis (1)



Coronal graphic shows generalized thickening of trachea & central bronchi. Bronchial walls are coated with a thick layer of mucus. Inset depicts a thickened bronchus in cross-section.

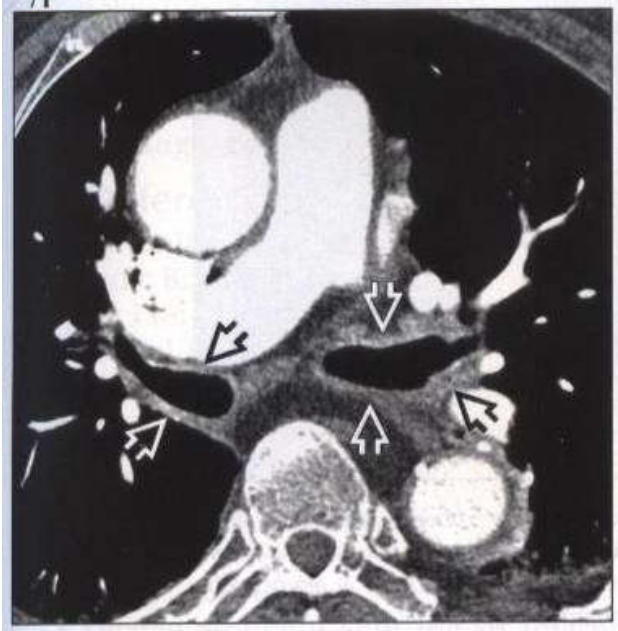


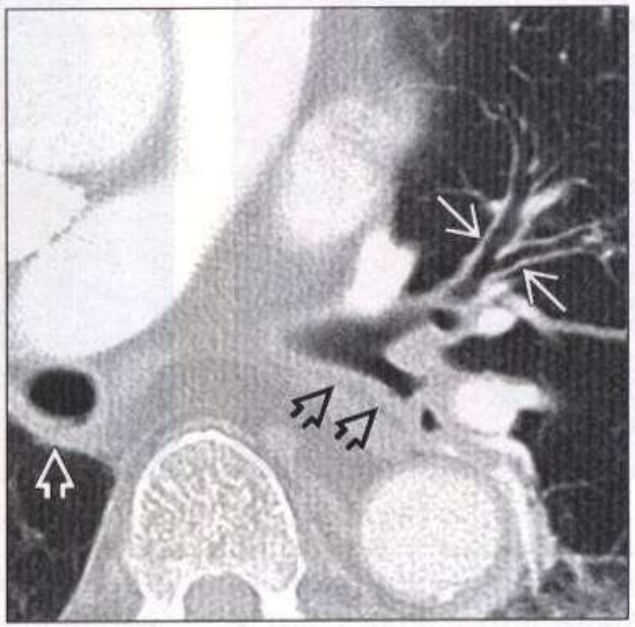
Frontal radiograph magnification view from a patient with chronic bronchitis shows generalized thickening of central interstitium. Arrows outline one thickened bronchus (tramline).

Chronic Bronchitis (2)

Image Gallery

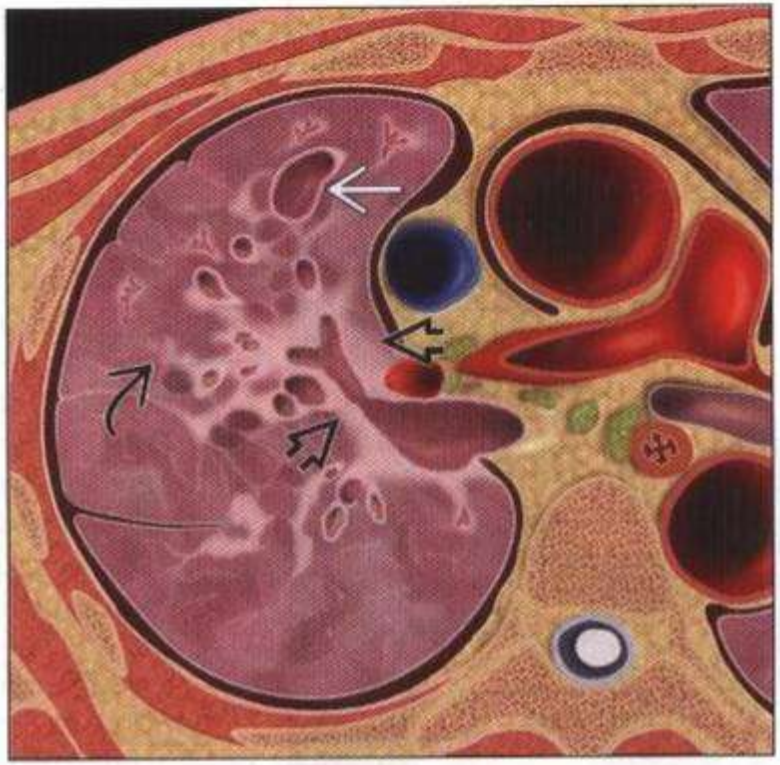
Typical



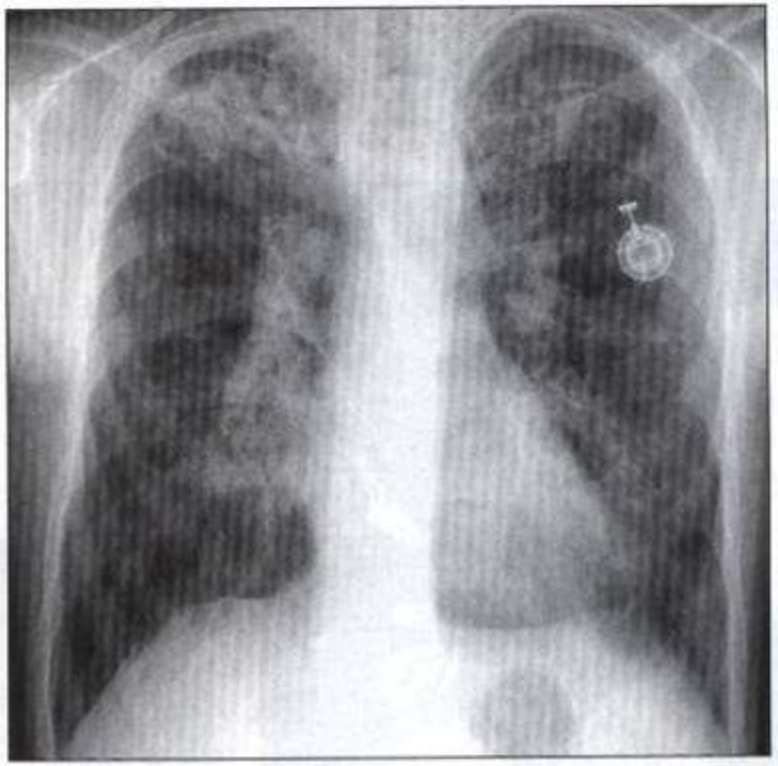


(Left) *Axial CECT with mediastinal window settings shows marked central bronchial thickening in a patient with chronic bronchitis (open arrows).* ***(Right)*** *Axial CECT in same patient with lung window settings again shows thickening of central bronchi (open arrows). Bronchial wall thickening also extends to segmental bronchi (arrows).*

Bronchiectasis (1)



Axial graphic shows cystic bronchial dilatation in right upper lobe (arrow). Bronchial wall is thickened by fibrosis (open arrows). A focus of organizing pneumonia (curved arrow) is seen.



Frontal radiograph in cystic fibrosis shows bilateral bronchiectasis, worst in right upper lobe, where atelectasis is also visible. Cor pulmonale & adenopathy cause hilar enlargement.

Bronchiectasis (2)

BRONCHIECTASIS

Imaging Findings
- Best diagnostic clue: Thickened, cystic bronchi containing fluid levels
- Tramlines or tram tracks
- Ring shadows
- Signet ring sign

Top Differential Diagnoses
- Pneumonia
- Chronic Bronchitis
- Cystic Lung Disease
- Bronchial Atresia
- Atelectasis
- Asthma

Pathology
- Defect of mucous clearance

Key Facts
- Prevalence lower with antibiotics & immunization
- Bronchial wall dilatation, thickening & chronic inflammation with granulation tissue & fibrosis
- Bronchial wall weakness, recurrent infections, parenchymal volume loss & distortion
- Bronchial artery hypertrophy

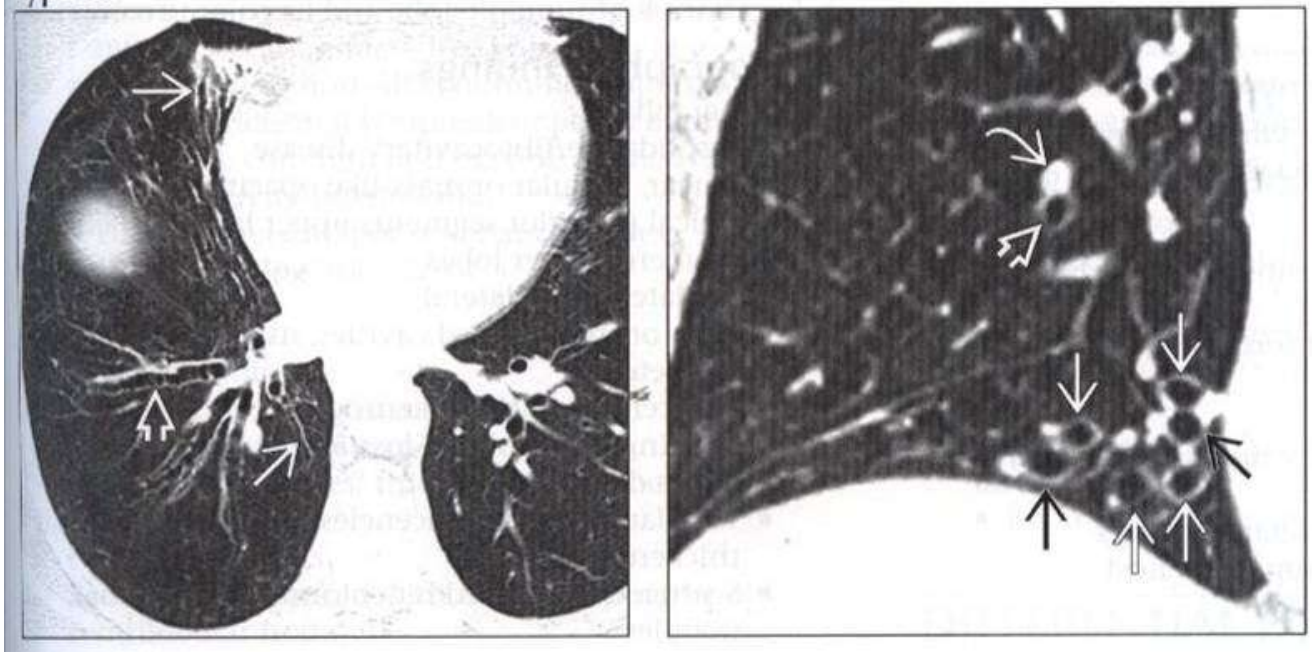
Clinical Issues
- Most common signs/symptoms: Cough, sputum production & hemoptysis
- Other signs/symptoms: Digital clubbing, dyspnea, crackles & wheezing

Diagnostic Checklist
- In young patient with diffuse bronchiectasis, confirm cystic fibrosis by identifying pancreatic atrophy

Bronchiectasis (3)

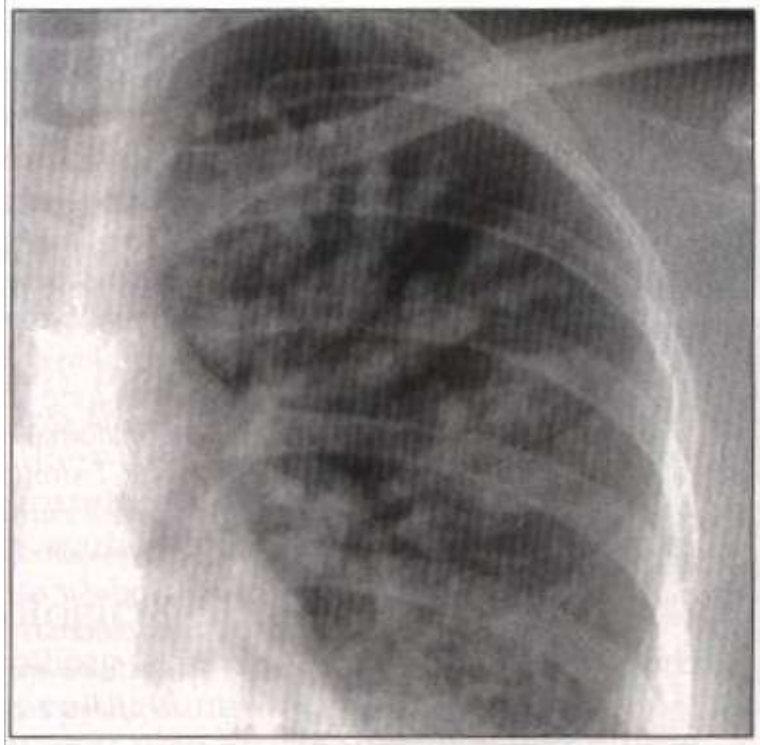
Image Gallery

Typical

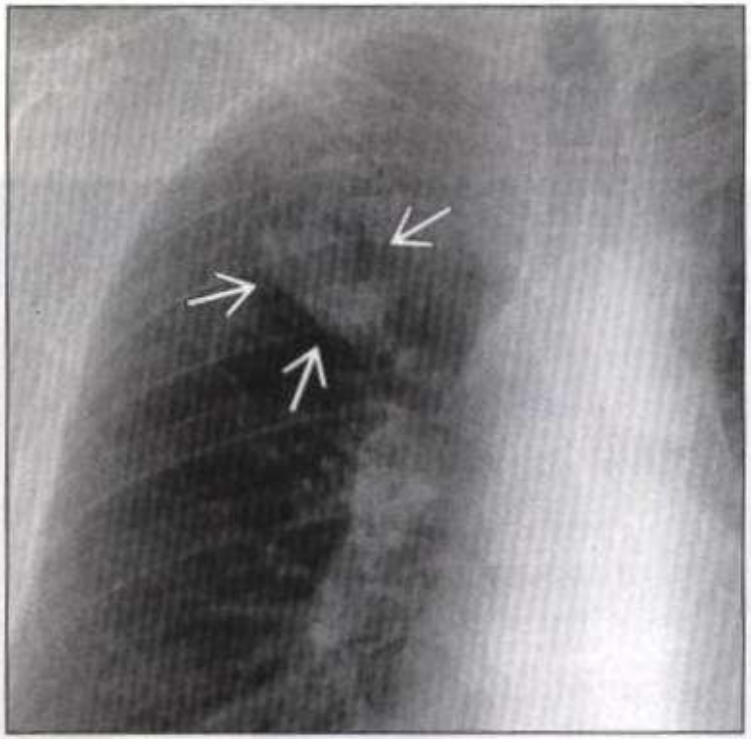


(Left) *Axial CECT shows cylindrical bronchiectasis in right middle & lower lobes (arrows). Varicose bronchiectasis is visible in right lower lobe (open arrow).* ***(Right)*** *Coronal CECT magnification view shows multiple signet ring signs, dilated bronchi in cross-section (arrows). Compare to normal bronchus (open arrow) & paired pulmonary artery (curved arrow).*

Allergic Bronchopulmonary Aspergillosis(1)



Frontal radiograph shows diffuse bronchial dilatation with a "glove-like" or "Y-shaped" configuration typical for allergic bronchopulmonary aspergillosis. (Courtesy J. Speckman, MD).



Frontal radiograph shows focal bronchial dilatation in the RUL (arrows) from mucoid impaction in this patient with allergic bronchopulmonary aspergillosis. ABPA often involves the upper lobes.

Allergic Bronchopulmonary Aspergillosis(2)

Key Facts

Terminology
- Hypersensitivity reaction to aspergillus fumigatus
- Occurs in conjunction with asthma and cystic fibrosis
- Allergic fungal sinusitis may occur alone or with ABPA
- May be associated with chronic eosinophilic pneumonia or cryptogenic organizing pneumonia (COP)

Imaging Findings
- Mucoid impaction
- Tubular, finger-in-glove increased opacity in bronchial distribution
- Central bronchiectasis; predominantly cystic
- Fleeting areas of consolidation

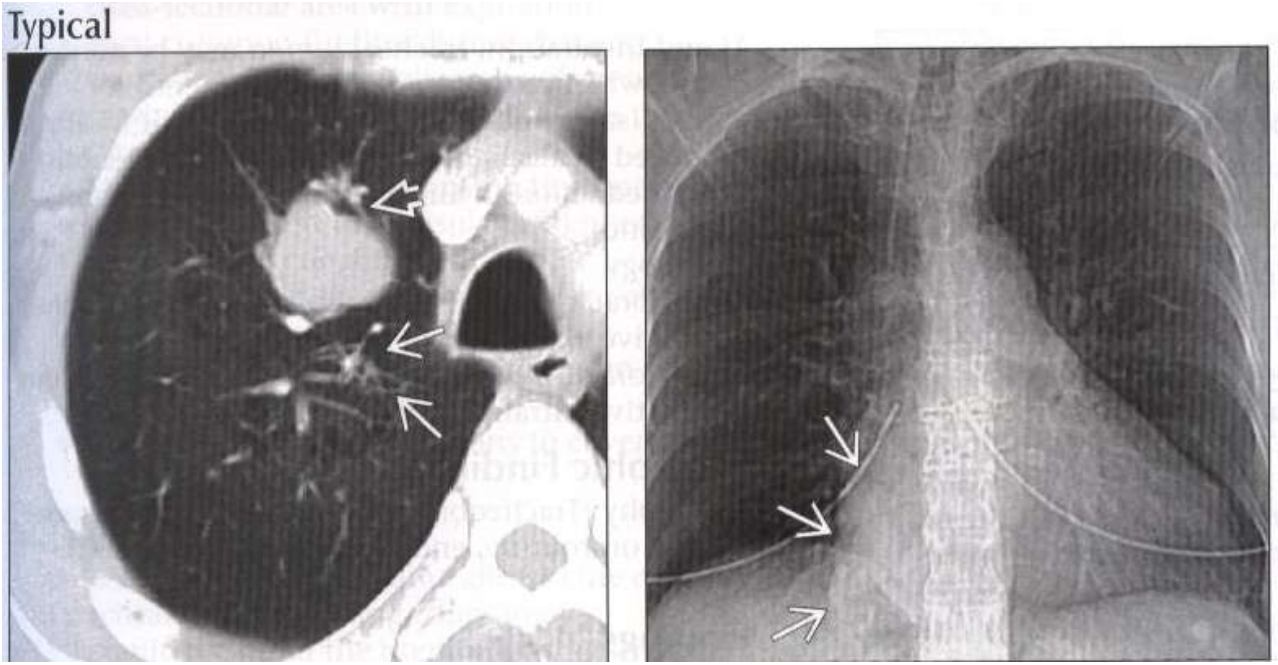
Top Differential Diagnoses
- Bronchogenic Carcinoma with Obstruction
- Bronchial Atresia
- Airway Obstruction from Foreign Body
- Bronchocentric Granulomatosis

Pathology
- Type I hypersensitivity reaction with IgE and IgG release
- Septate hyphae branching at 45 degree angle
- May be progressive

Clinical Issues
- Cough, wheezing, low grade fever, malaise
- Oral corticosteroids treatment of choice

Allergic Bronchopulmonary Aspergillosis(3)

Image Gallery

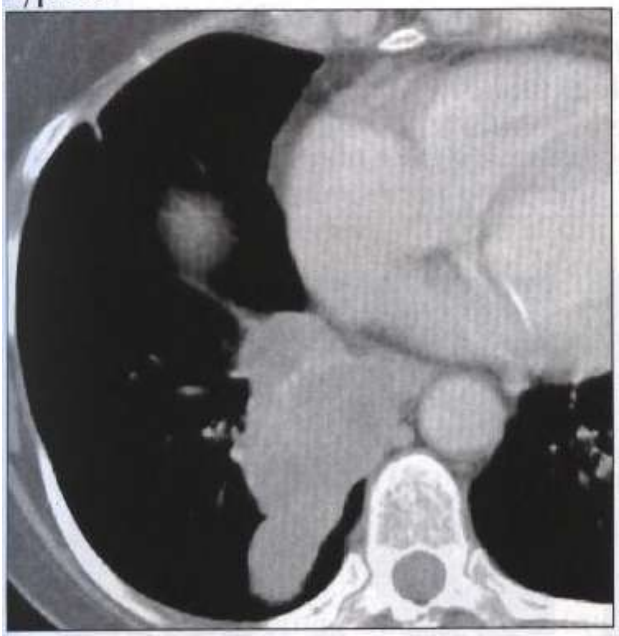


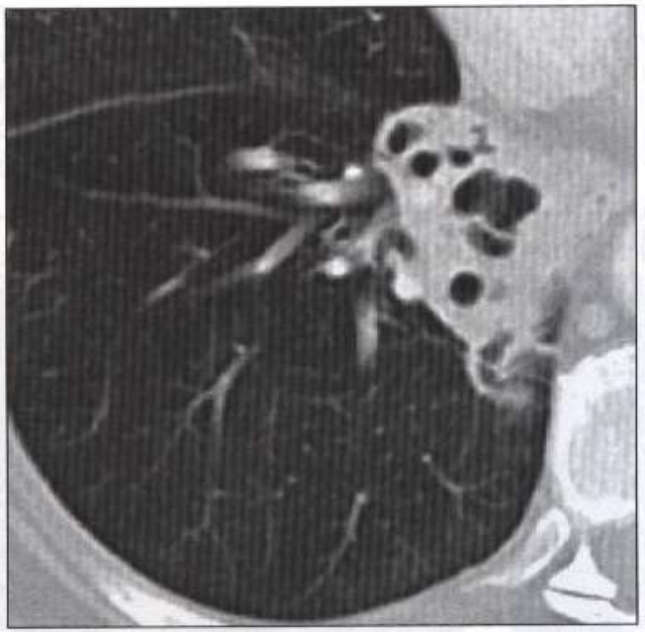
(Left) *Axial CECT in the same patient with ABPA shows multifocal bronchiectasis (arrows) with a more saccular area of dilatation containing an air-fluid level (open arrow).* ***(Right)*** *Coronal scout topogram shows a tubular opacity in the right lower lobe (arrows) corresponding to an area of focal involvement with ABPA. (Courtesy J. Speckman, MD).*

Allergic Bronchopulmonary Aspergillosis(4)

Image Gallery

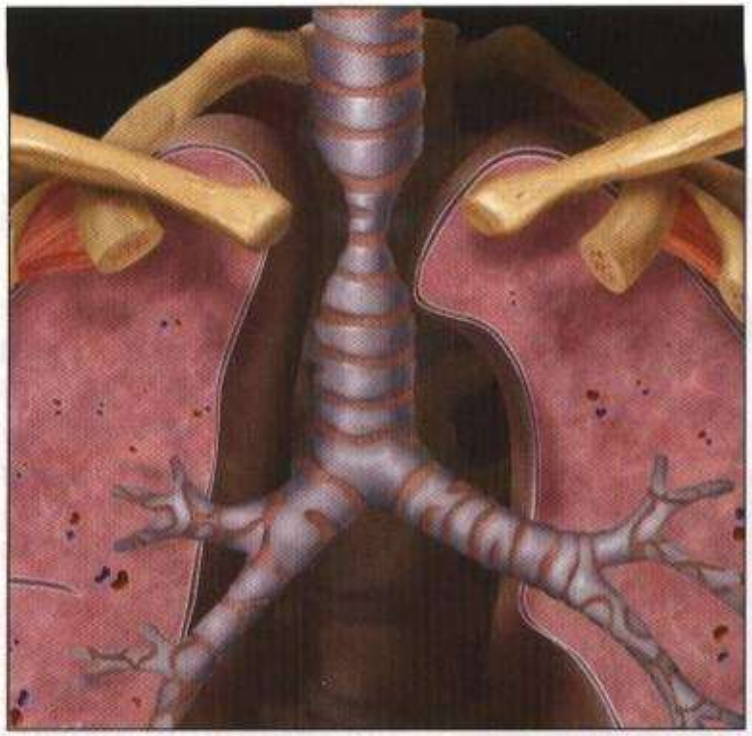
Typical



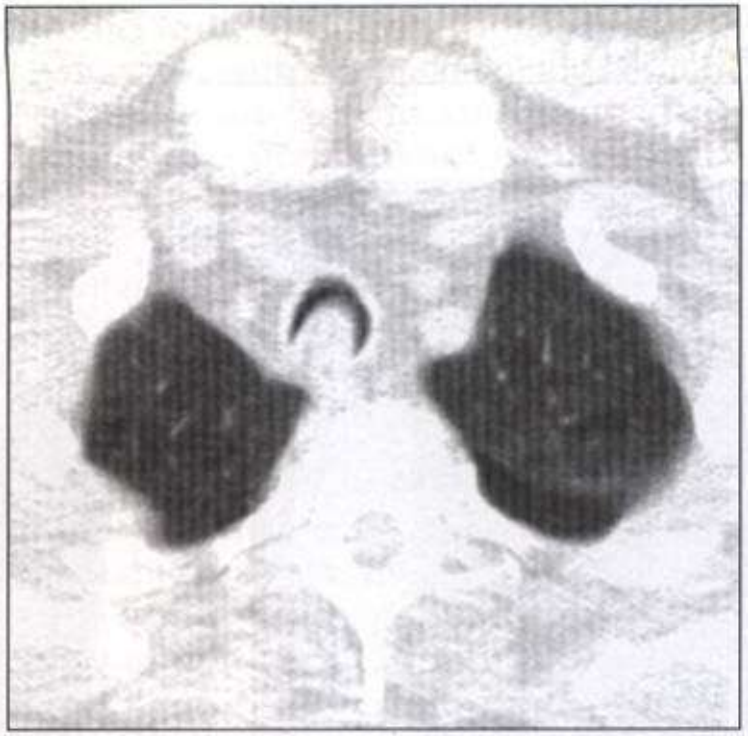


(Left) *Axial CECT shows extensive RLL mucoid impaction in this same patient with ABPA. The location here in the lower lobe is not as commonly seen, as the upper lobes are most commonly affected.* ***(Right)*** *Axial CECT in the same patient with ABPA shows central bronchiectasis with bronchial wall thickening. Histologic evaluation typically reveals mucous with branching hyphae and eosinophils.*

Tracheobronchomalacia (1)



Graphic shows circumferential tracheal stenosis at the thoracic inlet following prolonged intubation. Stenosis may be isolated or may be accompanied by tracheomalacia.



Axial NECT at dynamic expiration shows frown-like configuration of tracheal lumen consistent with tracheomalacia.

Tracheobronchomalacia (2)

Key Facts

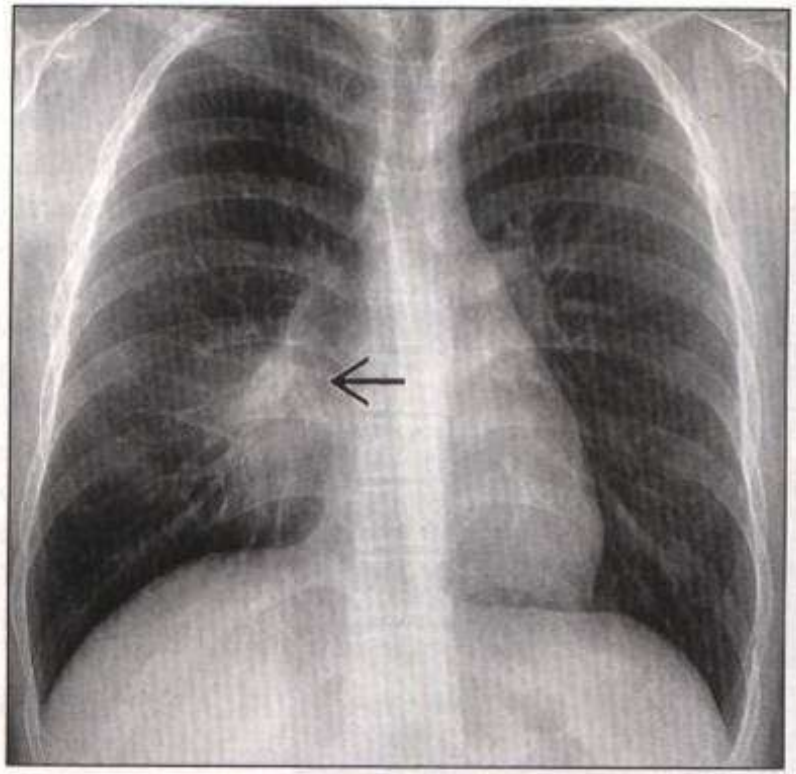
Terminology
- Increased compliance and excessive collapsibility of trachea or bronchi

Imaging Findings
- Best diagnostic clue: "Frown sign" (crescentic narrowing of tracheal lumen that resembles a frown) during expiration
- > 50% reduction in airway lumen at expiration diagnostic
- Radiography: Tracheobronchomalacia usually escapes detection on routine, end-inspiratory CXR and CT scans
- Best imaging tool: Paired inspiratory-dynamic expiratory helical CT imaging

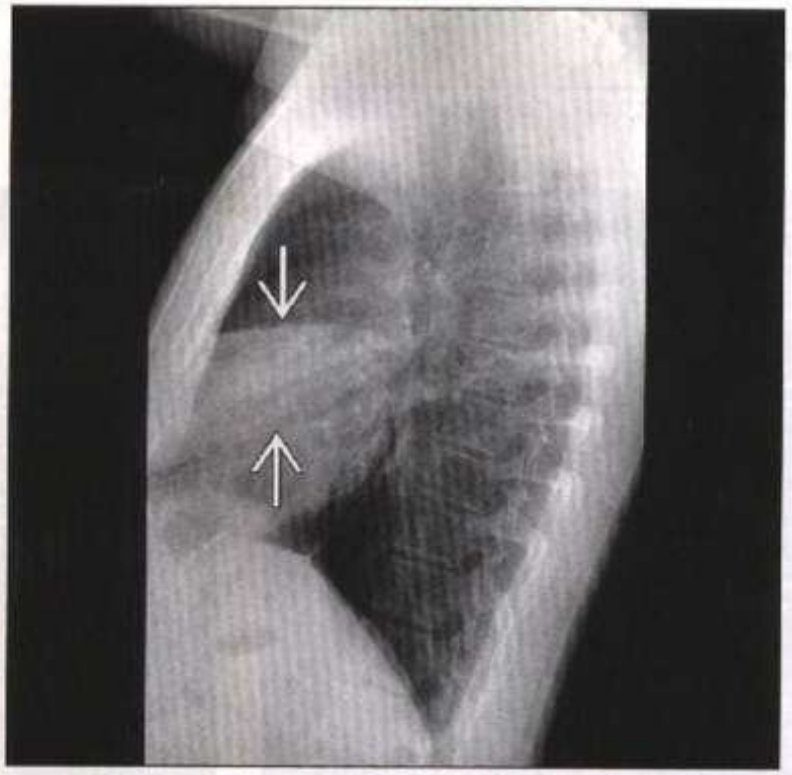
Pathology
- General path comments: Weakening of the cartilage and/or hypotonia of the posterior membranous trachea, with degeneration and atrophy of the longitudinal elastic fibers
- Acquired form relatively common in adults, incidence increases with advancing age

Clinical Issues
- Intractable cough, dyspnea, wheezing, recurrent respiratory infections
- Patients often misdiagnosed as having asthma
- Acquired form usually progressive over time in the absence of therapy
- Surgical repair with tracheoplasty procedure for severely symptomatic patients with diffuse malacia

Middle Lobe Syndrome (1)



Frontal radiograph shows focal opacification of the right middle lobe and silhouetting of the superior right heart border (arrow).



Lateral radiograph shows an anterior wedge-shaped opacity from the collapsed right middle lobe (arrows). Patient initially refused treatment.

Middle Lobe Syndrome (2)

Key Facts

Terminology
- Recurrent or fixed atelectasis or consolidation of the right middle lobe or lingula

Imaging Findings
- Location: Right middle lobe most common followed by lingula
- Best imaging tool: CT to exclude central obstructing lesion and to evaluate for bronchiectasis

Top Differential Diagnoses
- Pneumonia
- Mycobacteria Avium Complex
- Allergic Bronchopulmonary Aspergillosis (ABPA) or Cystic Fibrosis

Pathology
- Central obstruction (30%)
- Peripheral obstruction (70%)

Bronchiolitis Obliterans (1)

Key Facts

Terminology
- Concentric luminal narrowing of the membranous and respiratory bronchioles secondary to submucosal and peribronchiolar inflammation and fibrosis without intraluminal granulation tissue and polyps

Imaging Findings
- Bronchiectasis common with post-infectious BO
- Air trapping at expiratory HRCT
- Inspiratory scans may be completely normal
- Caveat: In patients with widespread disease, end-expiratory CT sections may appear virtually identical to inspiratory CT sections because air trapping extensive

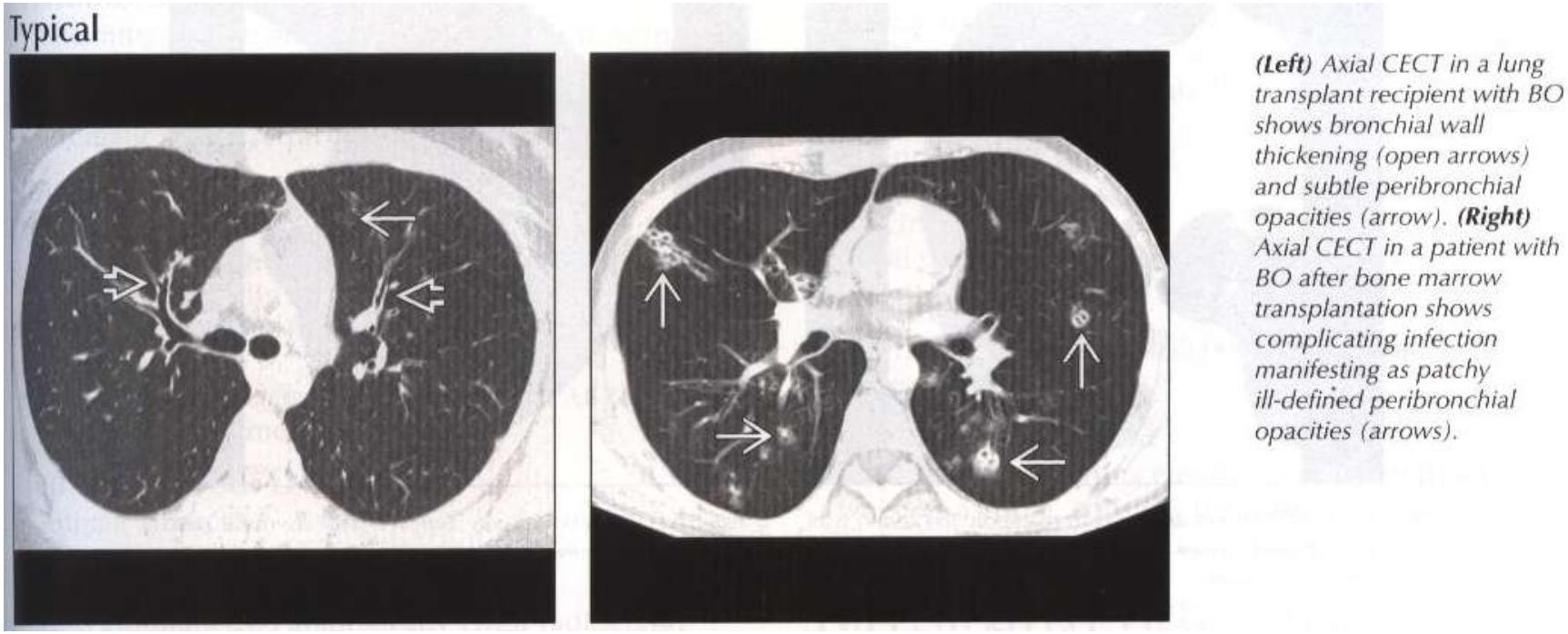
Top Differential Diagnoses
- Asthma
- Langerhans Cell Granulomatosis
- Hypersensitivity Pneumonitis

Pathology
- Idiopathic
- Postinfectious
- Inhalational injury
- Connective tissue disorders
- Drugs
- Transplant recipients (occurs in 50% of long term lung transplant survivors)

Clinical Issues
- Clinical course may resemble chronic obstructive pulmonary disease, with the notable exception that the course of BO substantially more rapid

Bronchiolitis Obliterans (2)

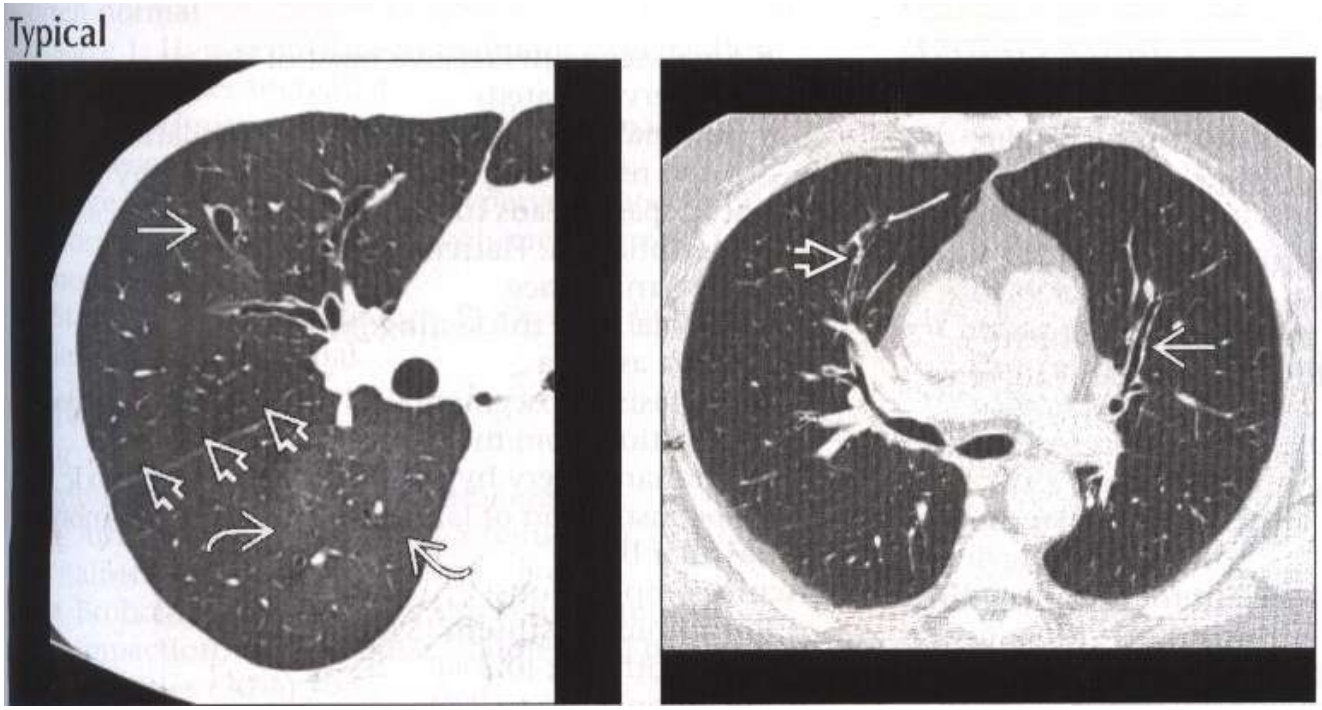
Image Gallery



(Left) *Axial CECT in a lung transplant recipient with BO shows bronchial wall thickening (open arrows) and subtle peribronchial opacities (arrow).* ***(Right)*** *Axial CECT in a patient with BO after bone marrow transplantation shows complicating infection manifesting as patchy ill-defined peribronchial opacities (arrows).*

Bronchiolitis Obliterans (3)

Image Gallery



(Left) *Axial NECT at end expiration in a patient with BO shows bronchiectasis (arrow) and diffuse air trapping (open arrows). Higher attenuation lung (curved arrows) is normal.* ***(Right)*** *Axial CECT in a patient with postinfectious BO shows bronchial wall thickening (arrow) and intrabronchial mucous plug (open arrow).*

Summary

- 肺部免疫及職業暴露產生結構異常