

# 胸腔影像學概論

## Chest imaging

### 【胸部X光片 IV】

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# 學習目標

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- 胸部X光的基本判讀
- 瞭解肺部正常的結構及血管氣管的分佈
- 瞭解肺部在產生病變時各種不同的pattern
- 瞭解氣體在病變所生不一樣的pattern

# Reference

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- **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。**

# Pulmonary Trunk prominence

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- 右下肺動脈口徑在肺門處:16mm
- >19mm:懷疑是否有肺動脈高血壓
- >22mm:確定有肺動脈高血壓。

# Pulmonary Trunk prominence

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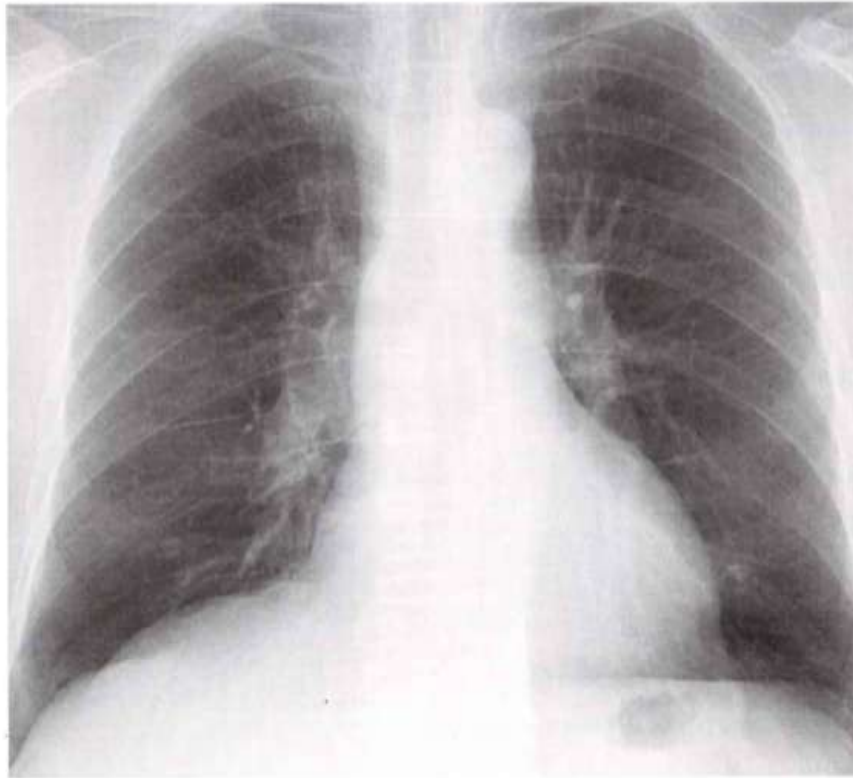
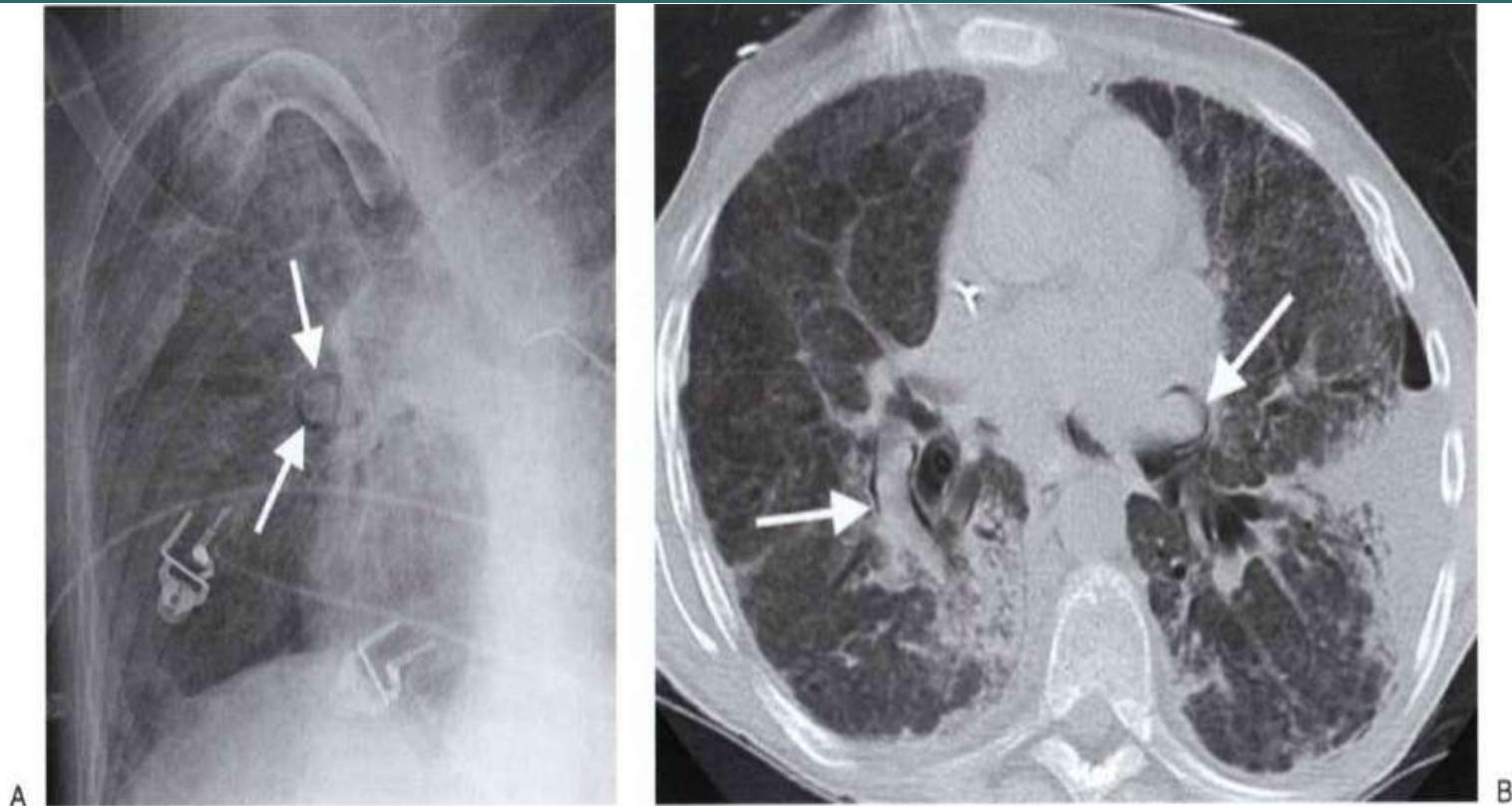


Fig 13-8 COPD，兩側肺門變大(pul. artery dilatation)

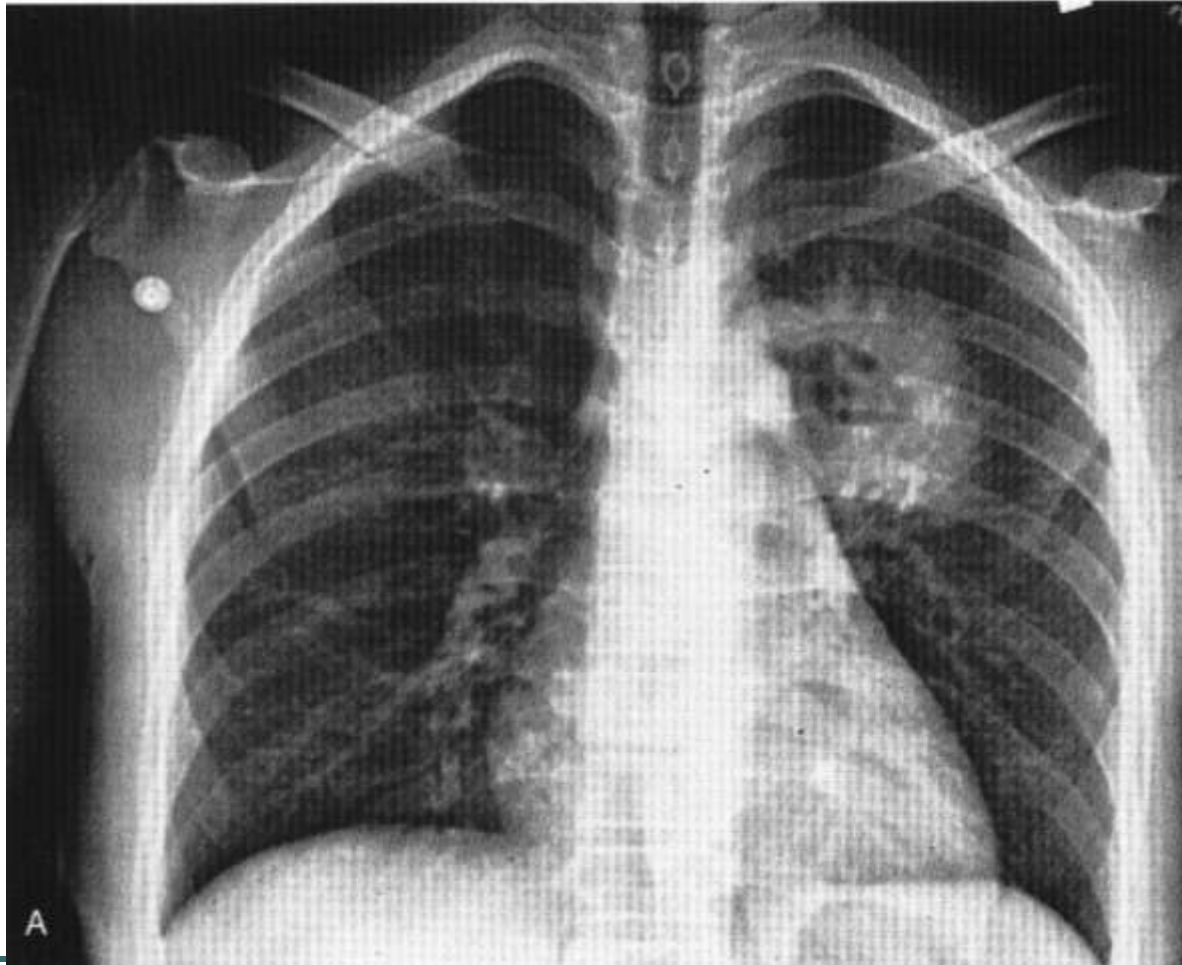
# Pulmonary Trunk prominence



**FIGURE 2-17. Ring around the artery sign.** A: PA chest radiograph of a patient with acute respiratory distress syndrome shows a ring of lucency around the right pulmonary artery (*arrows*), signifying pneumomediastinum. B: CT confirms air surrounding both pulmonary arteries (*arrows*).

# Cavitary Pneumonia

肺中遭受破壞的組織所形成



**TABLE 7-5**

**CAUSES OF CAVITARY PULMONARY NODULES**

**“CAVITY”**

Carcinoma (bronchogenic, metastases—especially squamous cell)

Autoimmune (Wegener granulomatosis, rheumatoid nodules)

Vascular (bland and septic emboli)

Infection (especially mycobacterial and fungal)

Trauma (pneumatocele)

Young—i.e., congenital (sequestration, diaphragmatic hernia, bronchogenic cyst)

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Reproduced with permission from Dähnert W. *Radiology Review Manual*. Baltimore: Williams & Wilkins; 1991.



# Squamous cell carcinoma (Central Necrosis)



FIGURE 15-12. Squamous cell carcinoma. A: PA chest radiograph of a 62-year-old woman with left chest pain shows an ill-defined mass with central lucency in the left middle lung. B: Lateral view confirms that this mass is in the superior segment of the left lower lobe (arrows). (Continued)

# Septic Emboli

## Multiple cavity & noncavity nodules

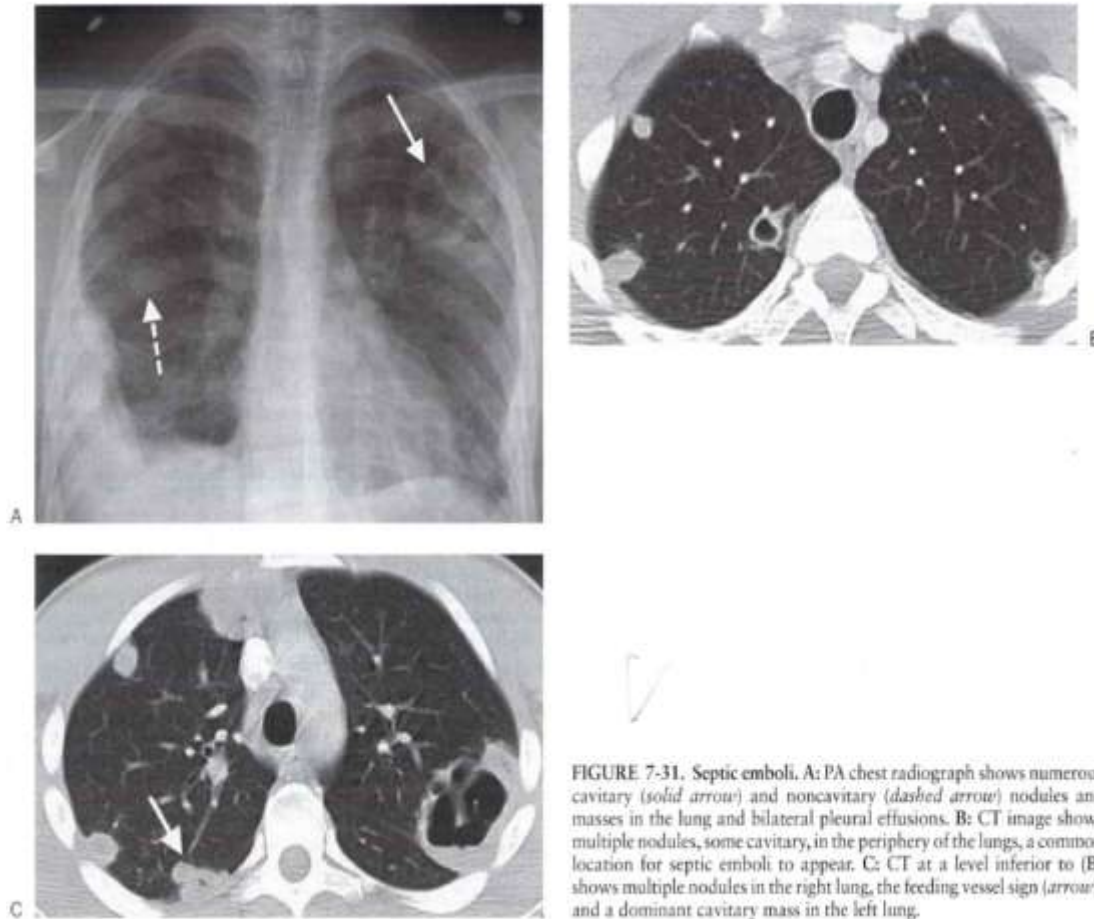
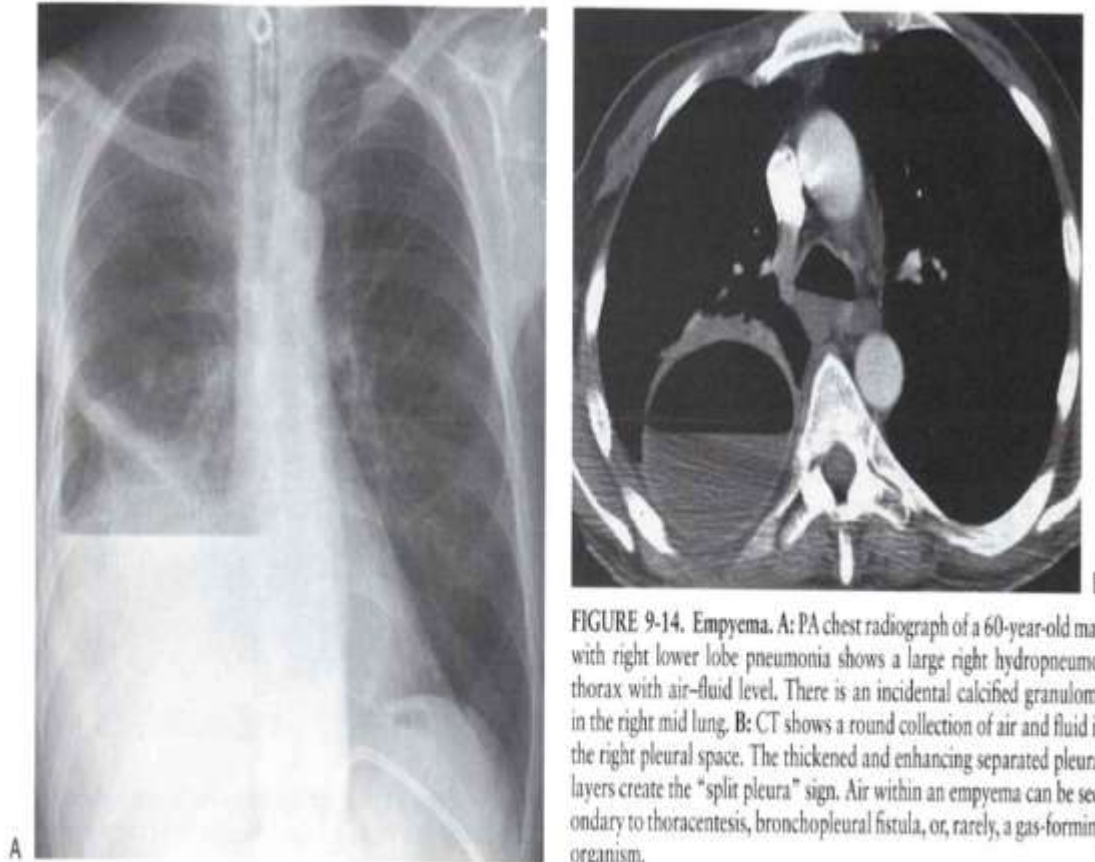


FIGURE 7-31. Septic emboli. A: PA chest radiograph shows numerous cavitory (*solid arrow*) and noncavitory (*dashed arrow*) nodules and masses in the lung and bilateral pleural effusions. B: CT image shows multiple nodules, some cavitory, in the periphery of the lungs, a common location for septic emboli to appear. C: CT at a level inferior to (B) shows multiple nodules in the right lung, the feeding vessel sign (*arrow*), and a dominant cavitory mass in the left lung.

# Empyema

## Hydropneumothorax



**FIGURE 9-14.** Empyema. **A:** PA chest radiograph of a 60-year-old man with right lower lobe pneumonia shows a large right hydropneumothorax with air-fluid level. There is an incidental calcified granuloma in the right mid lung. **B:** CT shows a round collection of air and fluid in the right pleural space. The thickened and enhancing separated pleural layers create the "split pleura" sign. Air within an empyema can be secondary to thoracentesis, bronchopleural fistula, or, rarely, a gas-forming organism.

# Pulmonary Ring Shadow

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- **Airway diseases**

**Blebs & bullae**

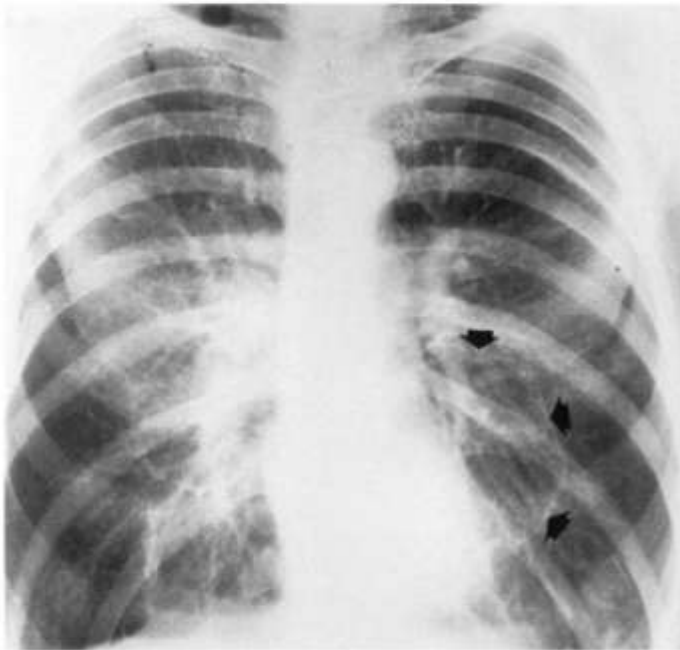
**Bronchoectasis( dilated bronchus)**

- **Pneumatocele**

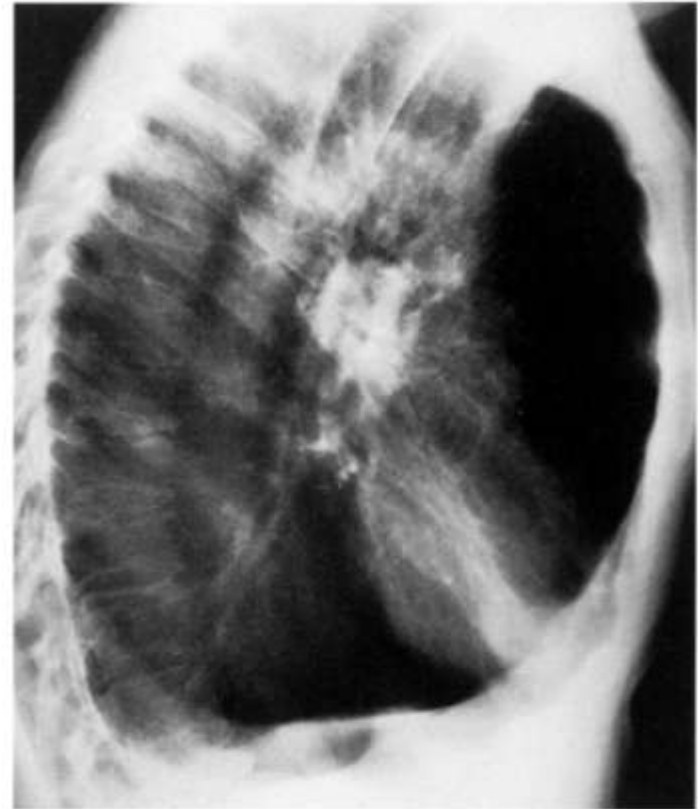
**Pulmonary laceration**

**Pulmonary infection (staphylococcal)**

# COPD & Bleb Formation



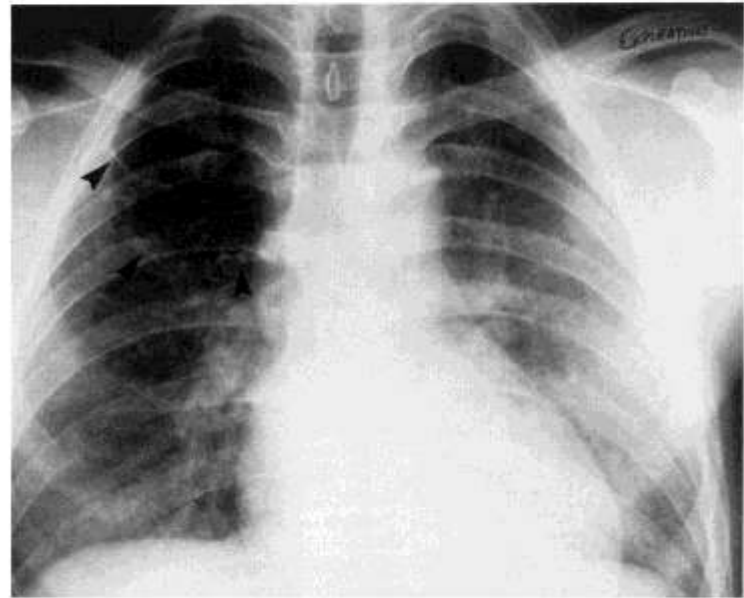
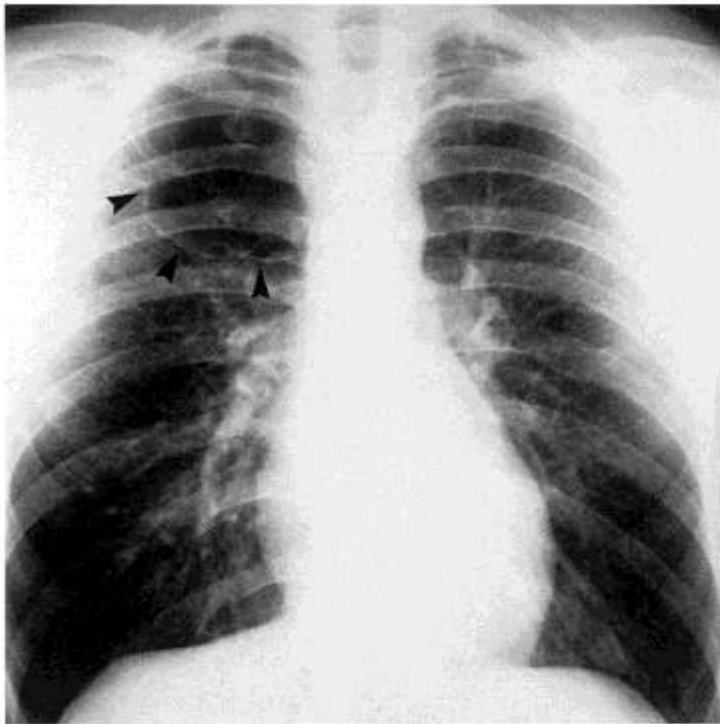
A



B

# Bullous Formation (Insp. & Expir.)

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# Pneumatocele

## Staphylococcal Pneumonia

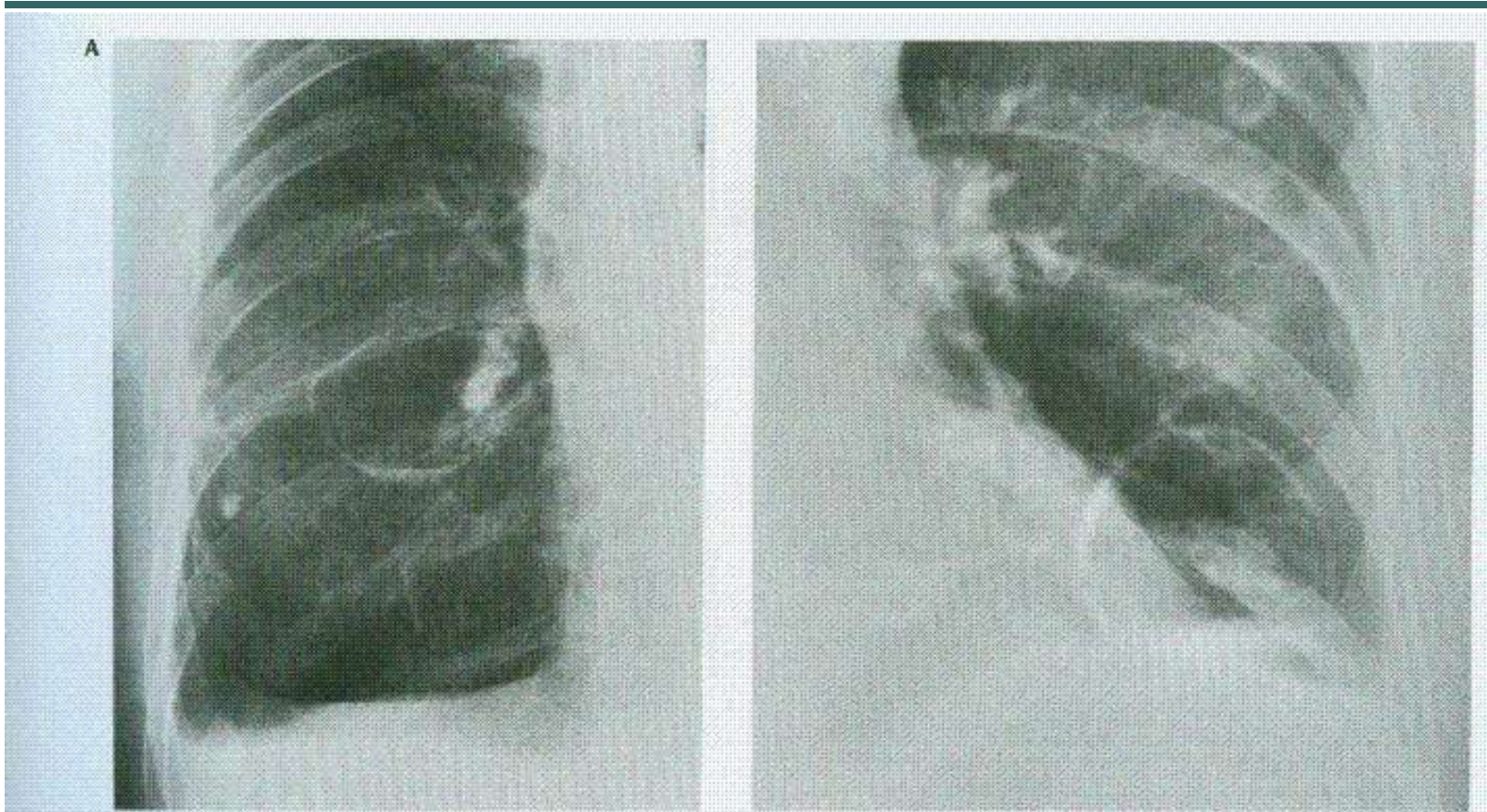
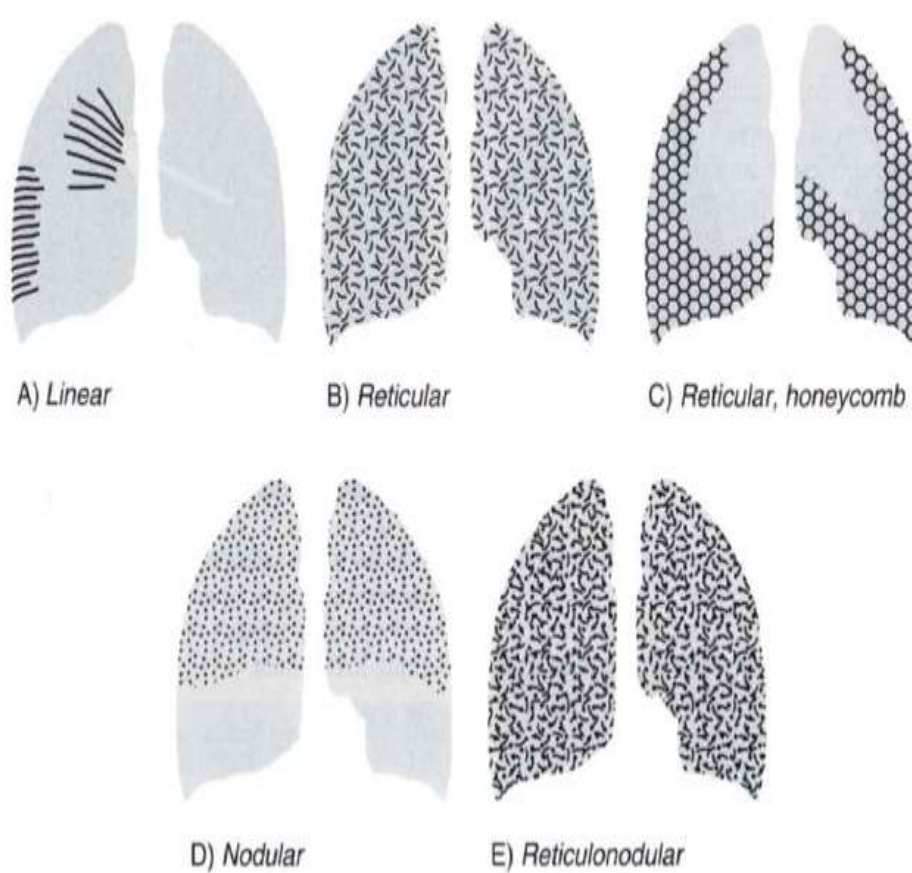


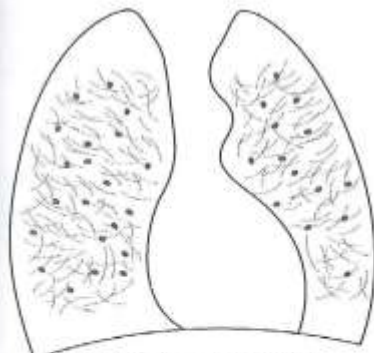
Fig. 3.97 A, A pneumatocele due to previous trauma. A small amount of fluid is present in the pneumatocele. B, A pneumatocele due to staphylococcal pneumonia. A second, smaller pneumatocele is seen in the left mid zone.

# Interstitial Change Pattern

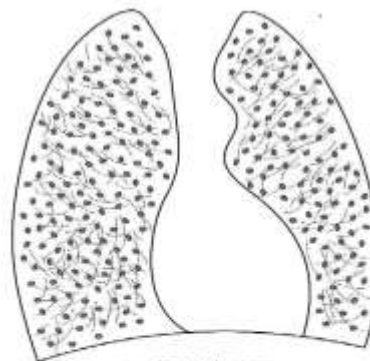
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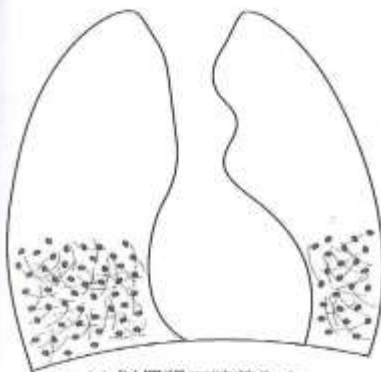




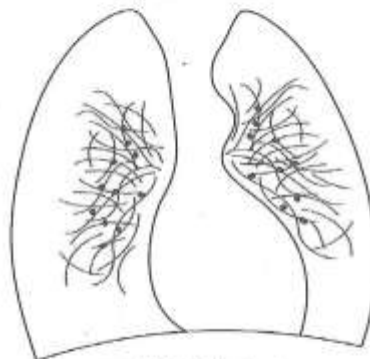
(a) 較少侵犯肺尖與肺底部



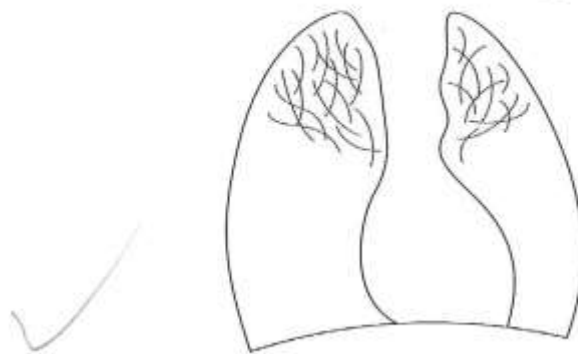
(b) 廣泛性侵犯



(c) 以侵犯下肺葉為主



(d) 以侵犯肺門為主

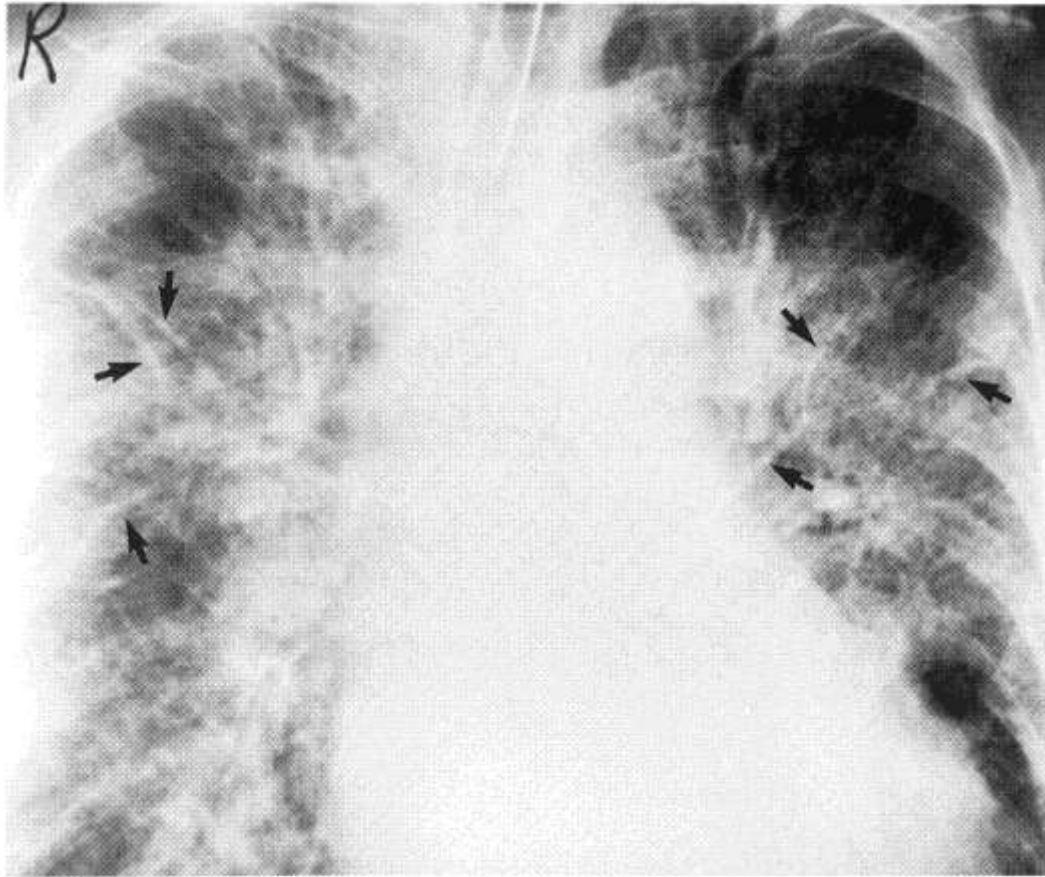


(e) 以侵犯上肺葉為主，通常合併模糊線狀陰影與上肺葉縮小

圖 4.2 (a-e) 間質性肺疾病的分布型態。

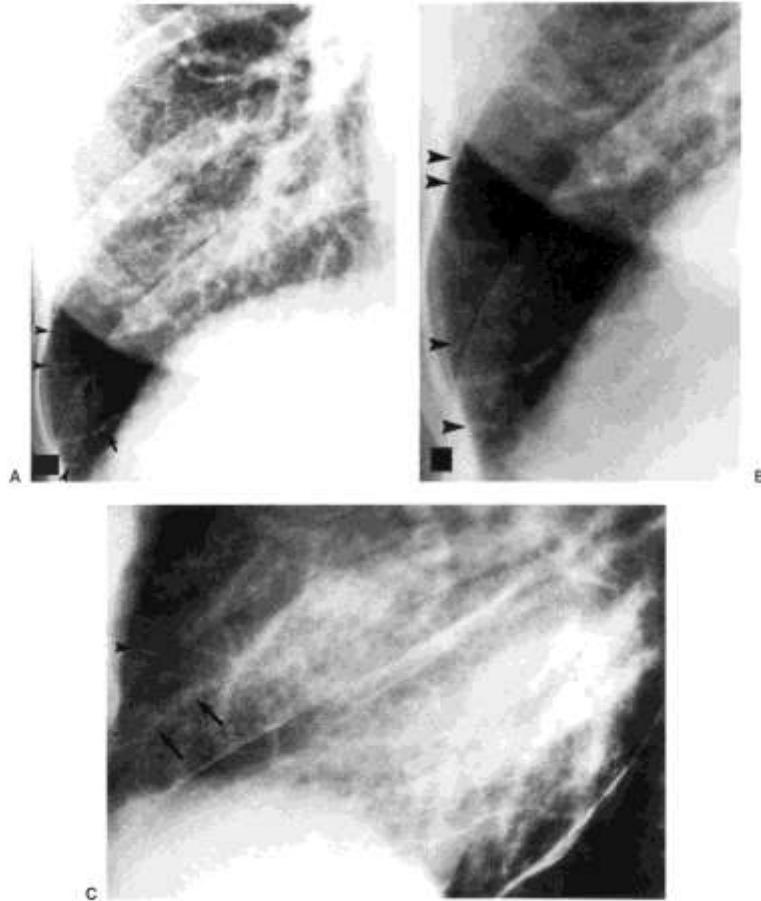
# Pulmonary Edema

## 線狀陰影(Kerley A Line)



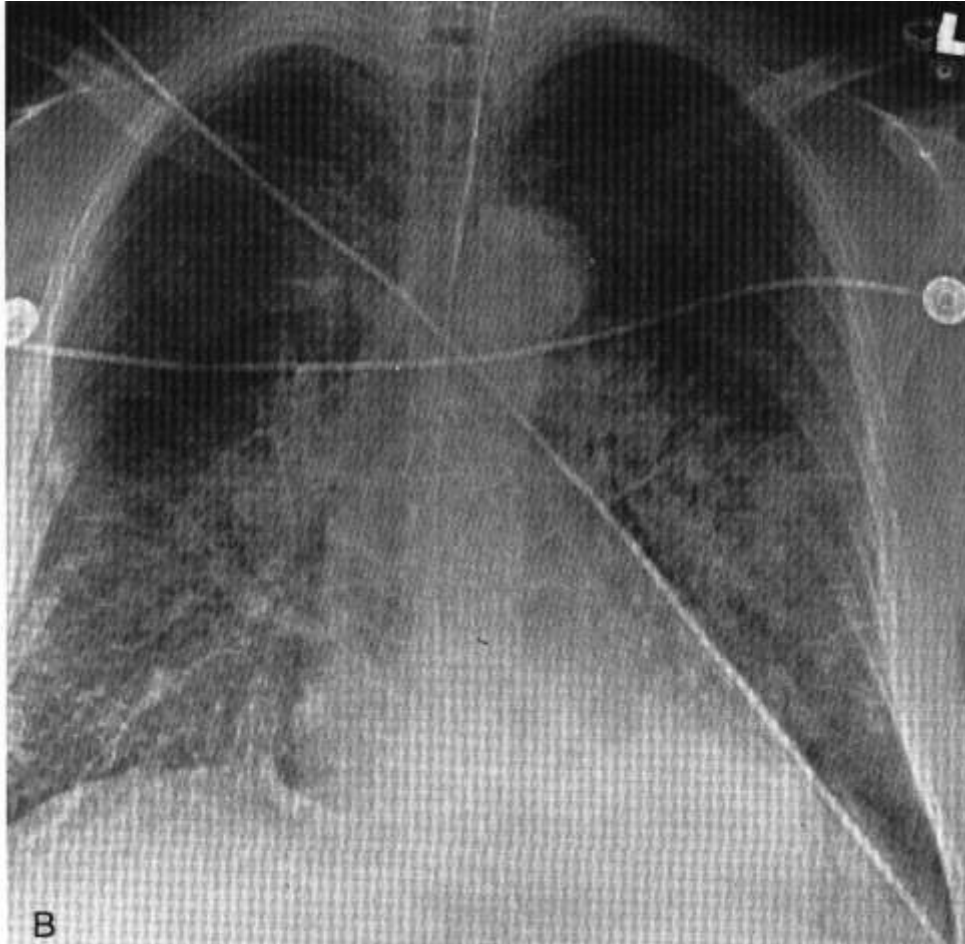
# Pulmonary Edema ( Kerley B & A line )

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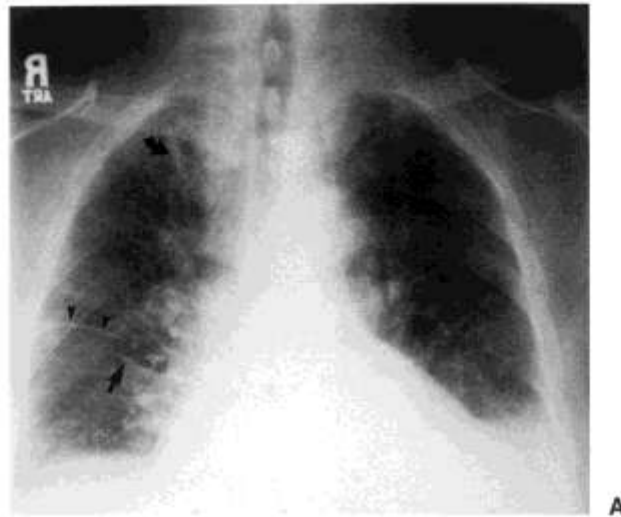
# Congestive Heart Failure Butterfly ( Bat wing )

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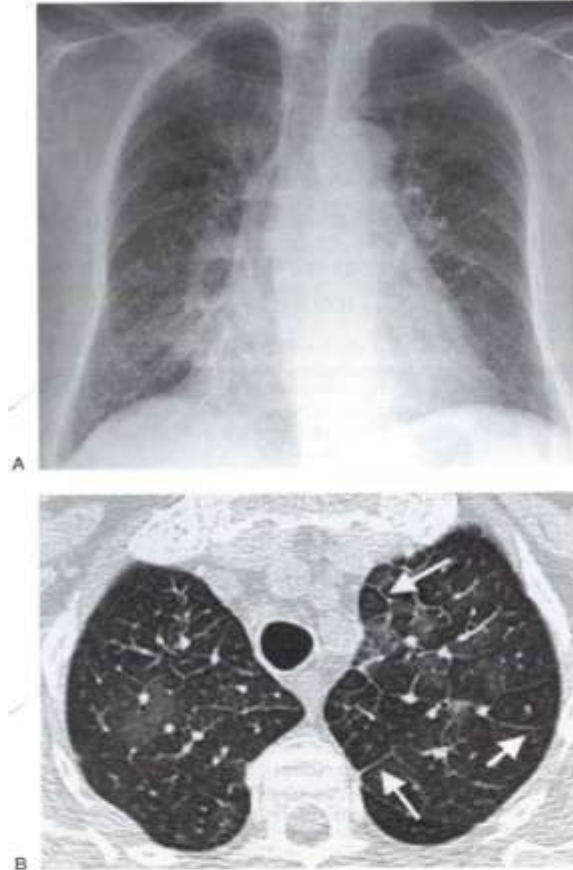
# Lymphangitic Lung Metastasis Butterfly (Bat wing )

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# Lymphangitic Carcinomatosis

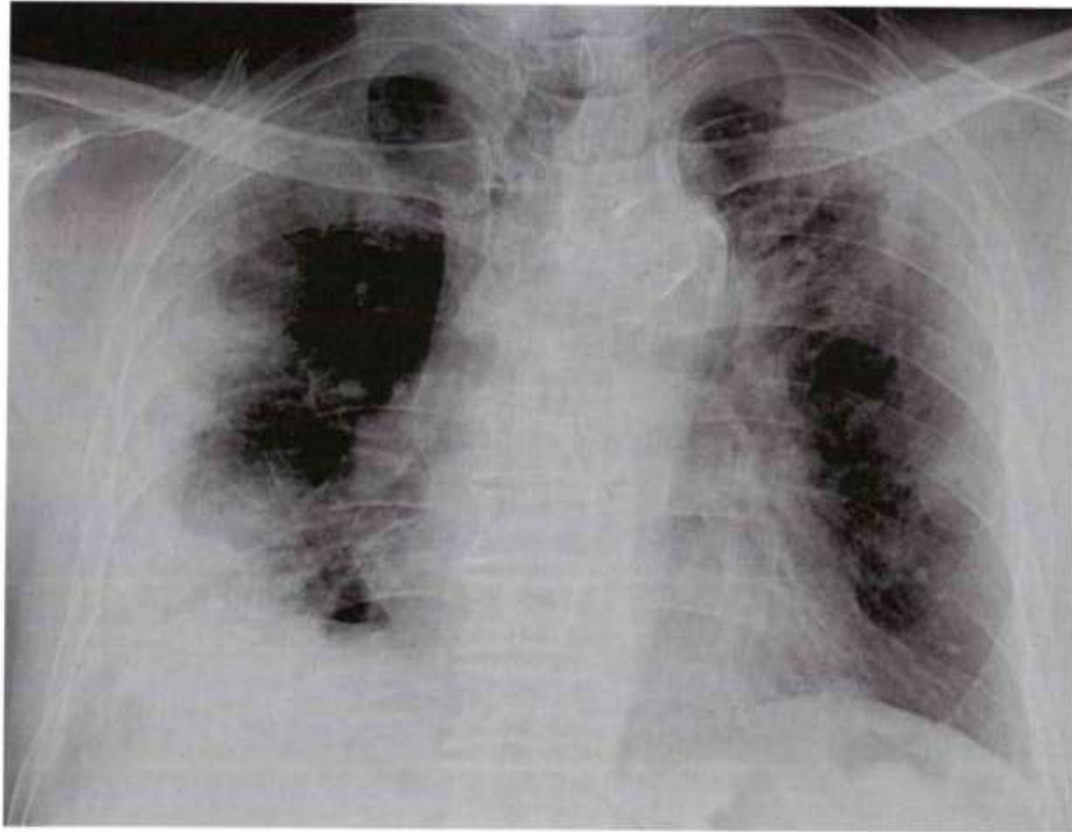
## Thickening of interlobular Septae



**FIGURE 3-19. Lymphangitic carcinomatosis.** This 68-year-old man had adenocarcinoma of the lung. He developed shortness of breath, which was initially attributed to congestive heart failure. **A:** PA chest radiograph shows bilateral ILD. The cardiac silhouette is chronically enlarged, but there is no pleural effusion or increase in the width of the vascular pedicle. **B:** CT scan shows bilateral patchy ground-glass opacities and thickening of the interlobular septae (*arrows*). The diagnosis of lymphangitic carcinomatosis was confirmed with lung biopsy.

# Reverse Butterfly Pattern Eosinophilic pneumonia

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**Fig 7-14** Eosinophilic pneumonia 肺泡型病變分佈於兩側肺之周邊區



# Reverse Butterfly Pattern sjögren's syndrome

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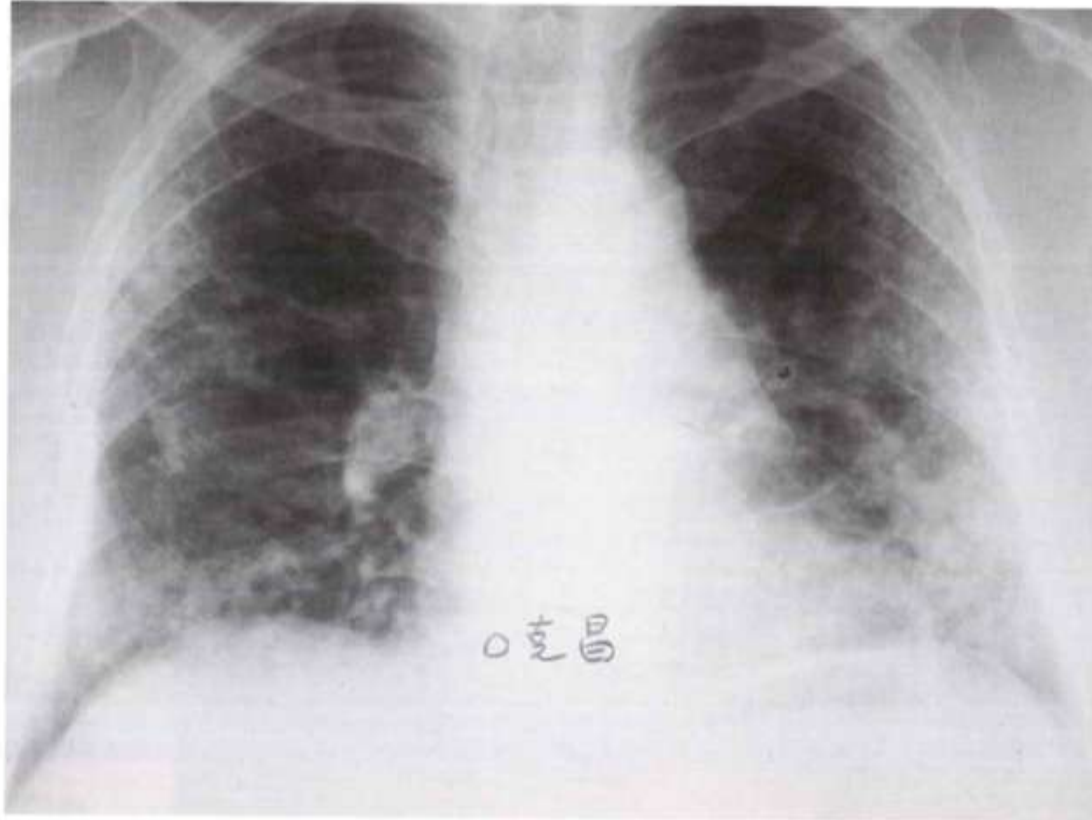


Fig 7-15 Sjögren's. syndrome/c ILD 間質型病變分佈於兩側肺之周邊區



# Langerhans cell histiocytosis (Reticular Pattern)

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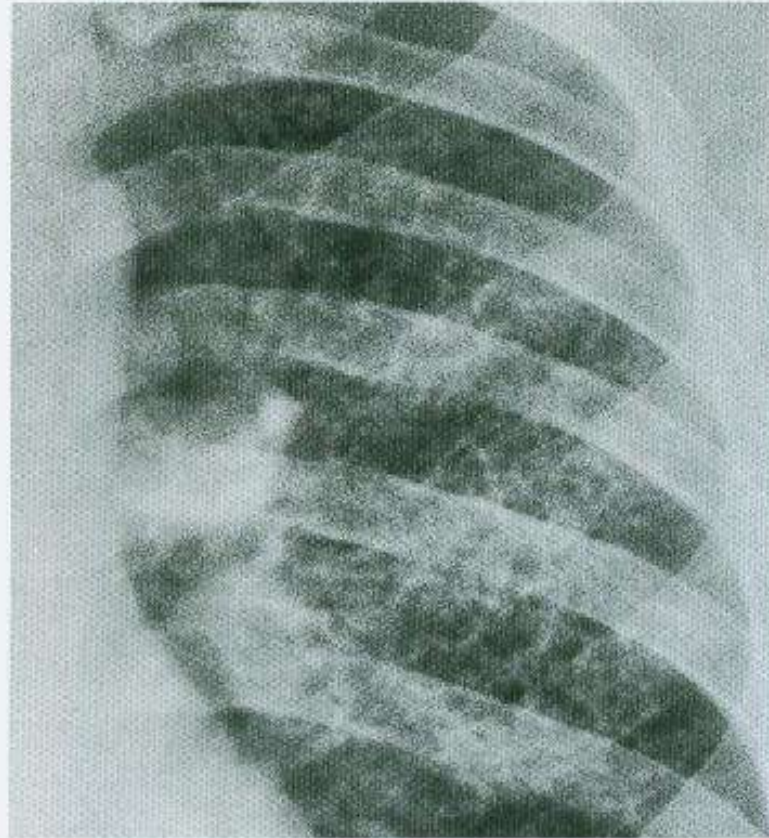


Fig. 3.105 Reticular pattern in Langerhans cell histiocytosis.

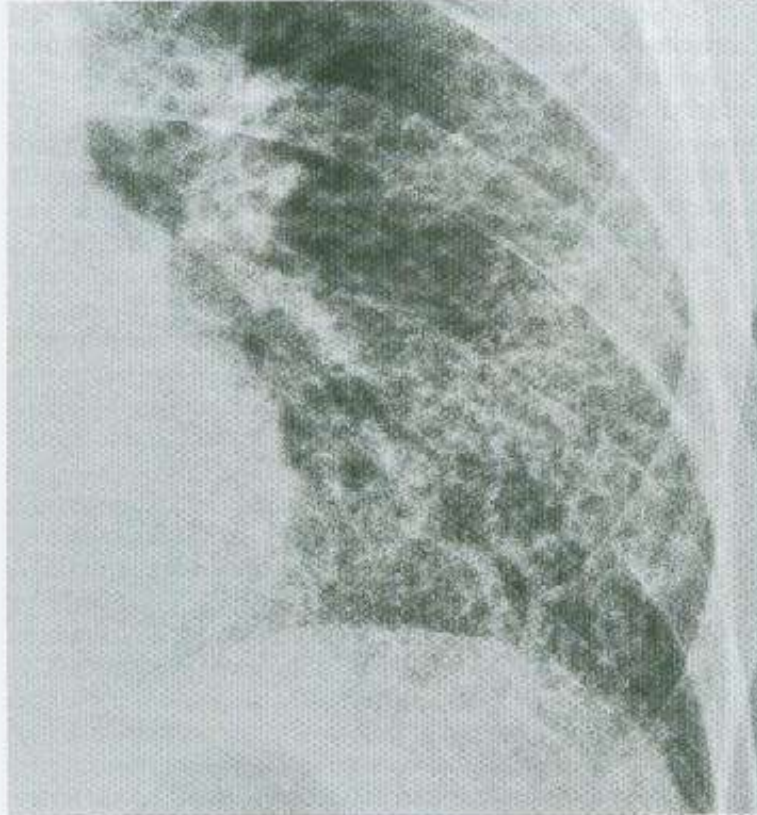
# **Diffuse Bil. Reticulonodular Pattern**

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- **Idiopathic pulmonary fibrosis**
- **Rheumatological diseases**
- **Noxious gases**
- **Pulmonary edema**
- **Extrinsic allergic alveolitis**
- **Pneumoconiosis**
- **Chronic aspiration**
- **Interstitial pneumonia**

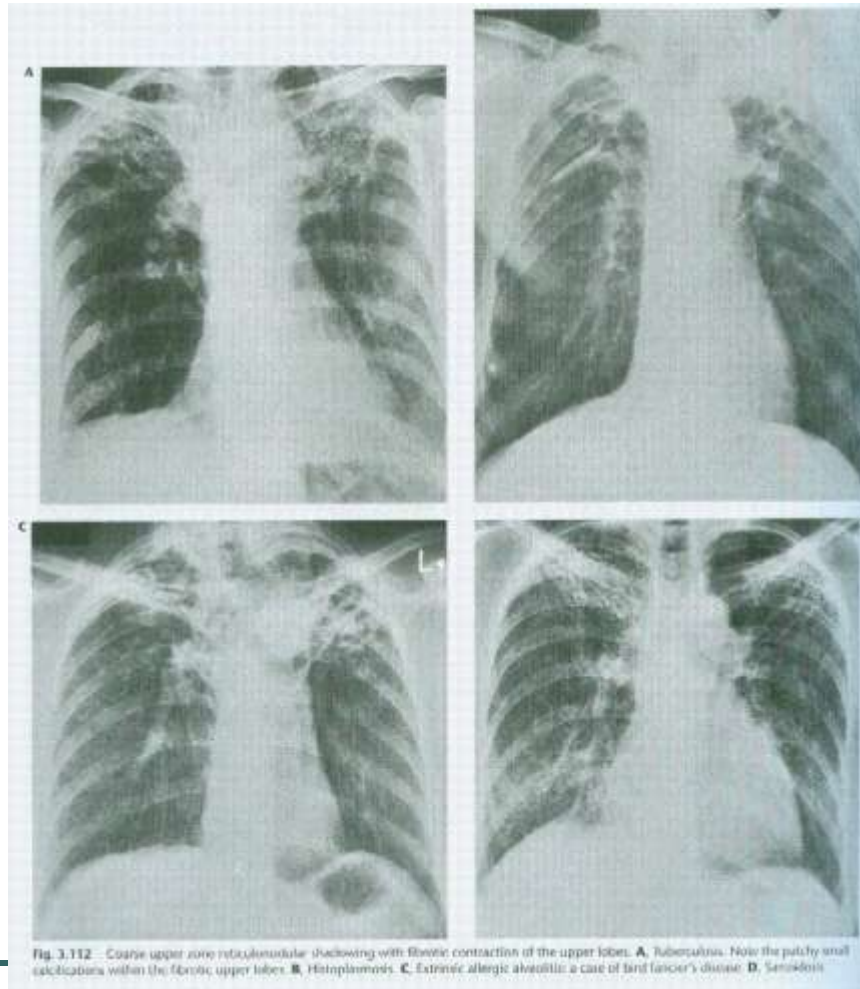
# Scleroderma Reticulo-nodular Pattern

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**Fig. 3.106** Reticulonodular pattern interstitial pulmonary fibrosis in a patient with scleroderma.

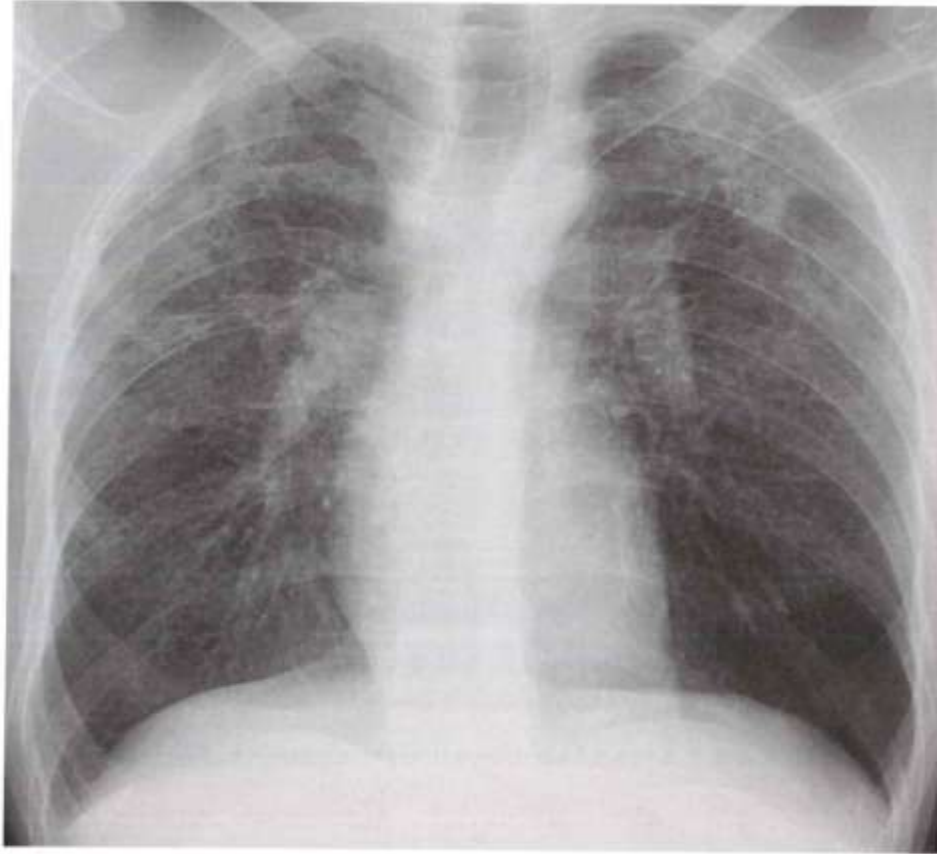
# Interstitial Pulmonary fibrosis Reticulo-nodular Pattern



# Pneumoconiosis

## Micronodules, upper predominant

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✓ Fig 7-11 Pneumoconiosis 兩側上肺野可見 micronodules 及部分融合病灶，  
下肺野則較乾淨

**TABLE 3-1**

**DIFFERENTIAL DIAGNOSIS OF INTERSTITIAL LUNG DISEASE**

**“BADLASH”**

- Bronchiectasis (ILD “look-alike”)
- Bugs (especially fungi, mycoplasma, and viruses)
- Aspiration, chronic
- Amyloidosis
- Drug toxicity
- Lymphangioliomyomatosis
- Lymphangitic carcinomatosis
- Lymphoma
- Lymphocytic interstitial pneumonia and other idiopathic interstitial pneumonias
- Asbestosis
- Sarcoidosis
- Scleroderma and other collagen vascular diseases
- Silicosis
- Hypersensitivity pneumonitis
- Heart failure
- Histiocytosis (Langerhan cell histiocytosis)

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ILD, interstitial lung disease



# Cardiogenic Pulmonary Edema

## Peripheral Cuffing

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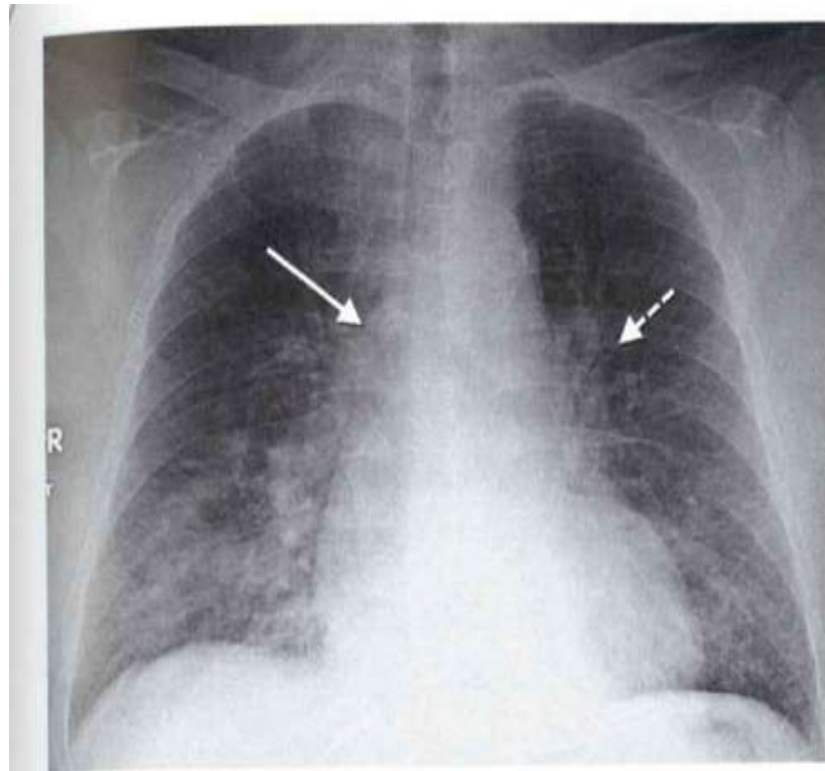
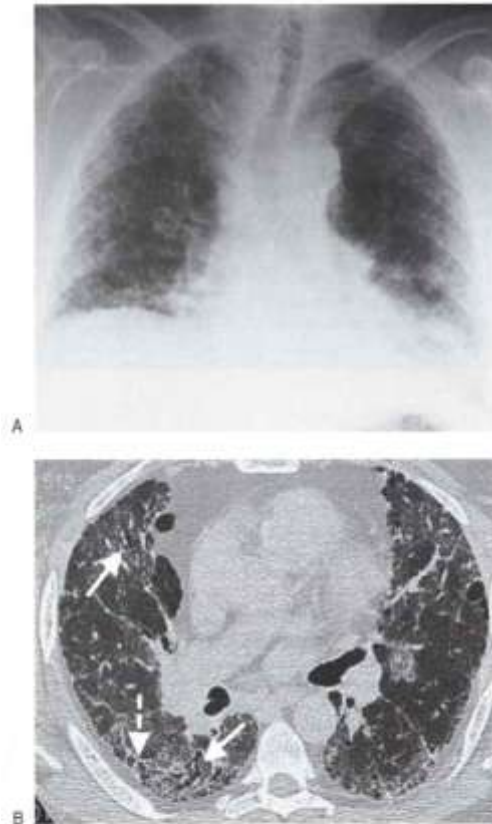


FIGURE 3-8. Cardiogenic pulmonary edema. PA chest radiograph shows enlargement of the cardiac silhouette, bilateral ILD, enlargement of the azygos vein (*solid arrow*), and peribronchial cuffing (*dashed arrow*).

# Usual Interstitial Pneumonia

## Coarse reticular & Honeycomb

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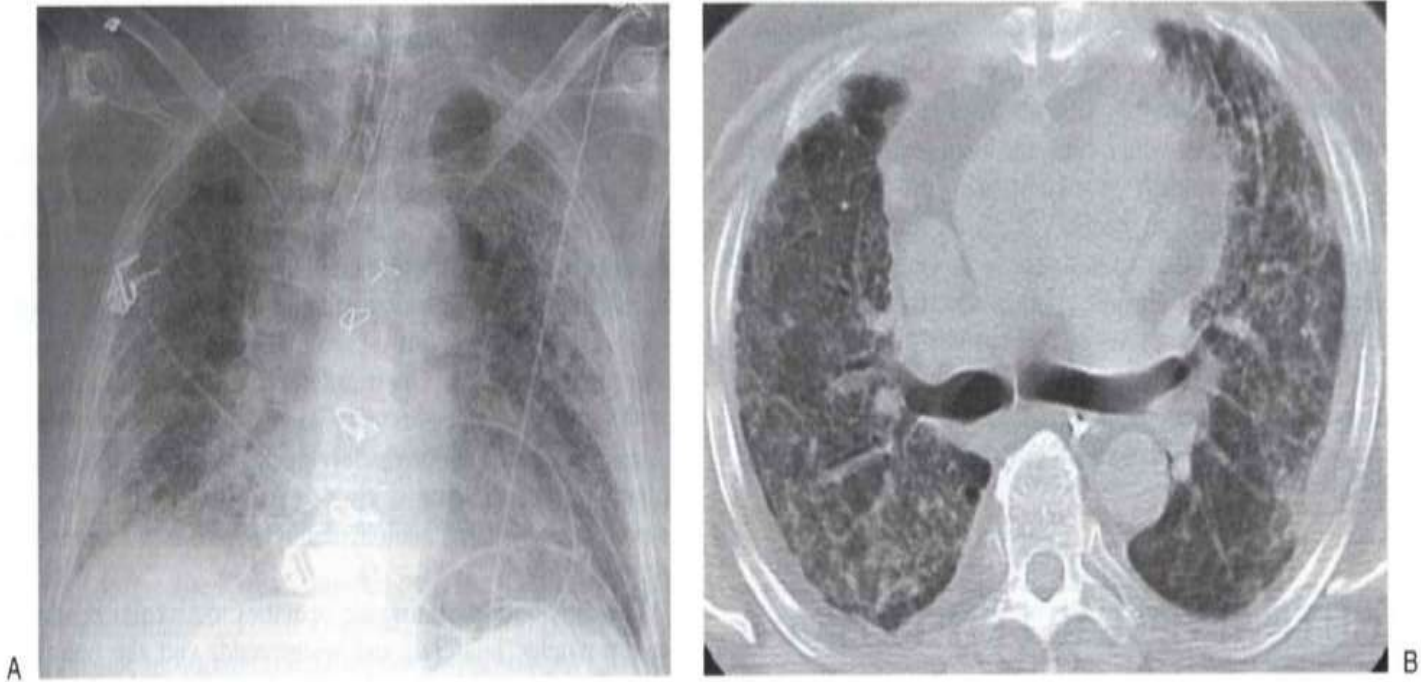
**FIGURE 3-9.** Usual interstitial pneumonia (UIP). **A:** PA chest radiograph shows medium to coarse reticular ILD with honeycombing, in a predominantly bibasilar and subpleural distribution. Lung volumes are decreased. **B:** CT scan shows bilateral subpleural honeycombing (dashed arrows), traction bronchiectasis (solid arrows), and a background of ground-glass opacity.



# ARDS

## (Diffuse Ground-glass & reticular)

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**FIGURE 4-1.** Acute respiratory distress syndrome (ARDS). This 69-year-old man had undergone a liver transplant several years earlier and developed ARDS as a result of herpes simplex virus pneumonia. **A:** Anteroposterior (AP) recumbent chest radiograph shows an endotracheal tube and bilateral interstitial and alveolar lung disease. **B:** Computed tomographic (CT) scan shows bilateral diffuse ground-glass and reticular opacities.

# Diffuse Interstitial Pulmonary Fibrosis (mid & lower) Rheumatoid Arthritis

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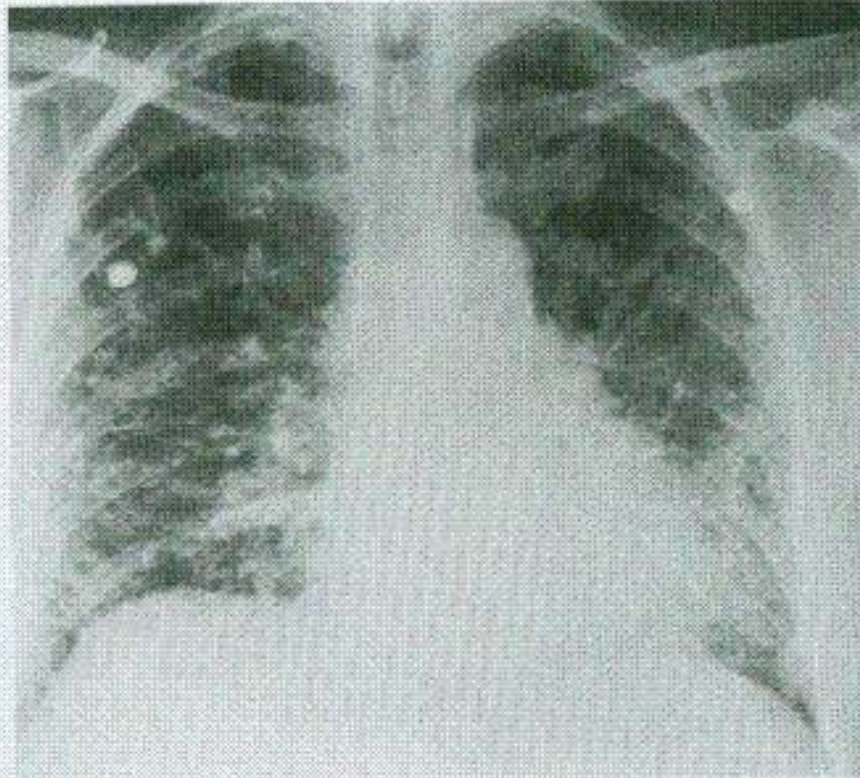


Fig. 3.109 Diffuse interstitial pulmonary fibrosis in a patient with rheumatoid arthritis. This example shows mid and lower zone predominance with only mild loss of volume.

# Causes of Bronchiectasis

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- **Postinfection**
- **ABPA**
- **Chronic granulomatosis diseases**
- **Inhalation injury**
- **Ciliary syndrome**
- **Host defense down(agammaglobulinemia)**
- **Swyer-James syndrome**
- **Cartilage deficiency  
( William-Campbell syndrome)**
- **Sarcoidosis**

# Honeycomb Pattern (Multiple Cystic Pattern)

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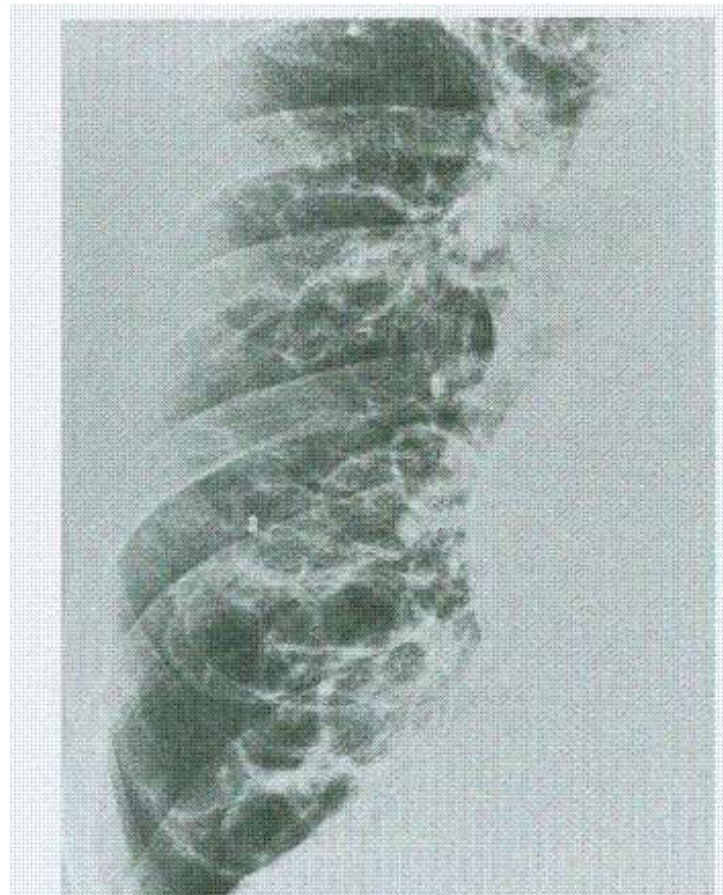
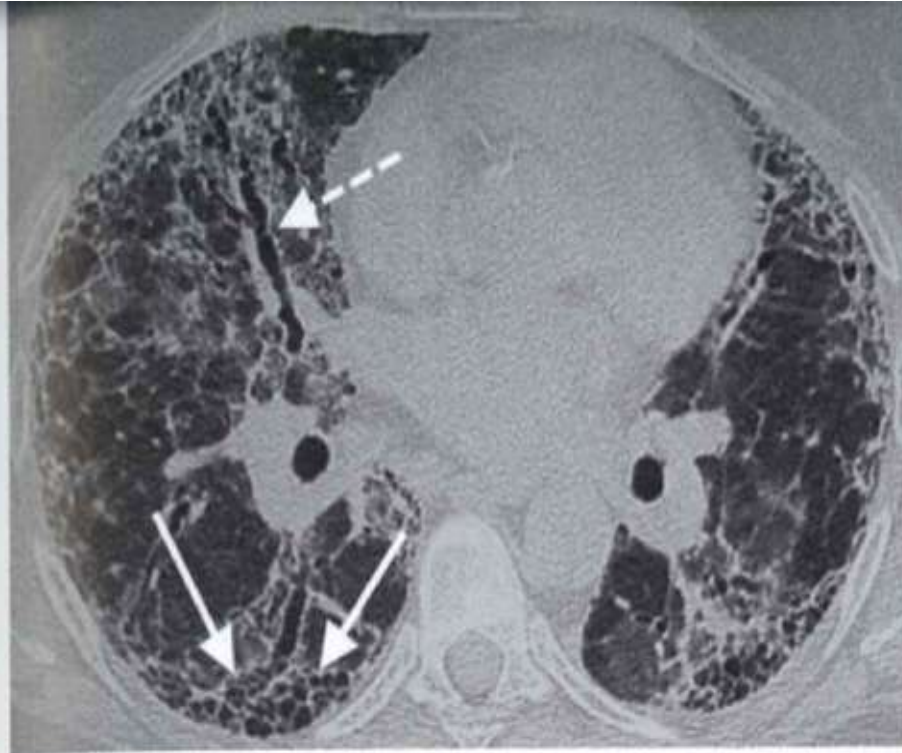


Fig. 3.107 Cystic pattern in cystic bronchiectasis.



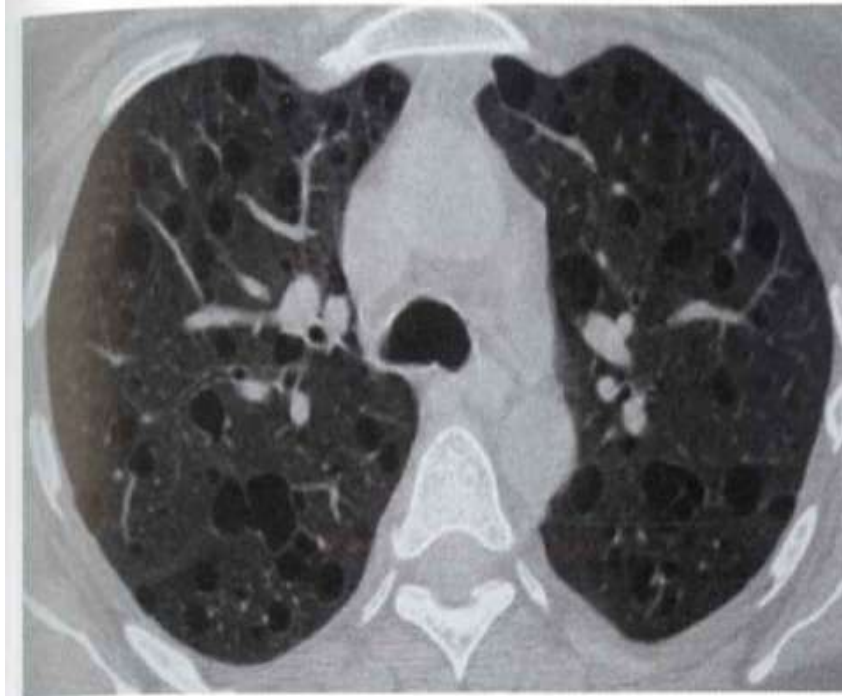
# Honeycomb Pattern (Multiple Cystic Pattern)



**FIGURE 2-23. Honeycomb pattern.** CT shows layers of subpleural cysts (*solid arrows*) representing the honeycomb pattern of pulmonary fibrosis. Also shown is traction bronchiectasis (*dashed arrow*), another sign of pulmonary fibrosis.

# Cystic Pattern

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**FIGURE 2-27.** Cystic pattern. CT scan of a woman with lymphangiomyomatosis shows fairly homogeneous thin-walled cysts with normal intervening lung parenchyma. The cysts involve the upper and lower lungs equally (not shown).

# Cystic Bronchiectasis

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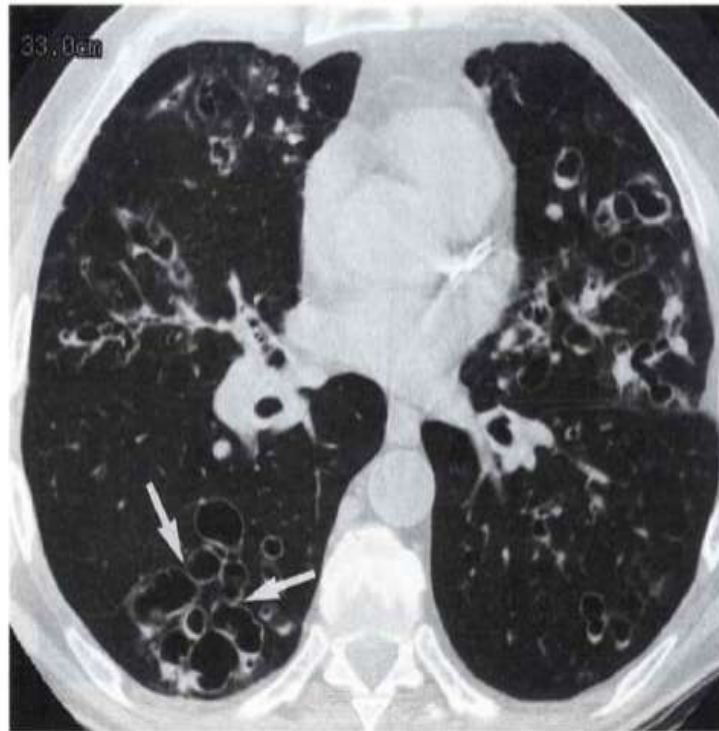
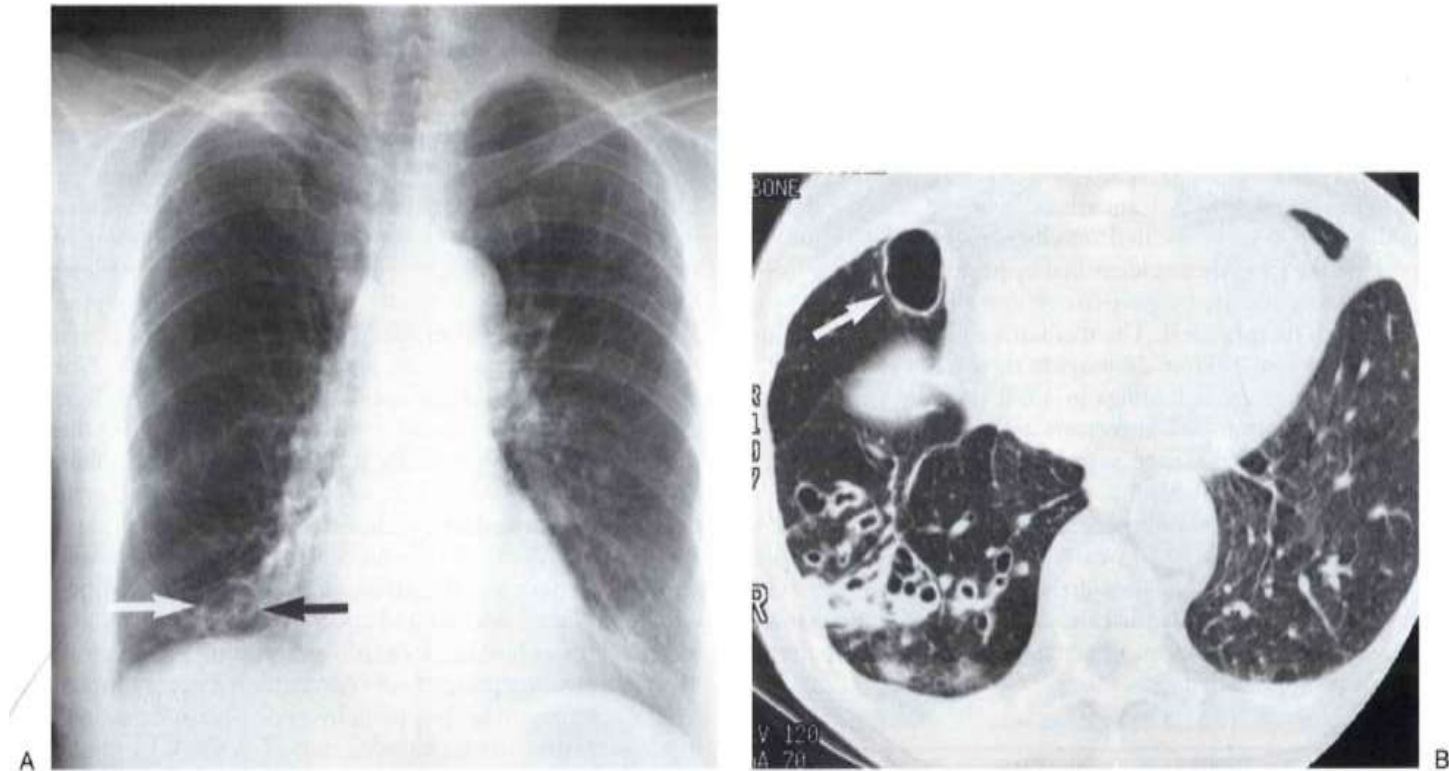


FIGURE 13-19. Cystic bronchiectasis. CT of a 65-year-old woman with a history of *Pasteurella multocida* infection of the lungs shows dilated bronchi and bronchioles, forming a “cluster of grapes” in the right lower lobe (arrows).

# Cystic Bronchiectasis

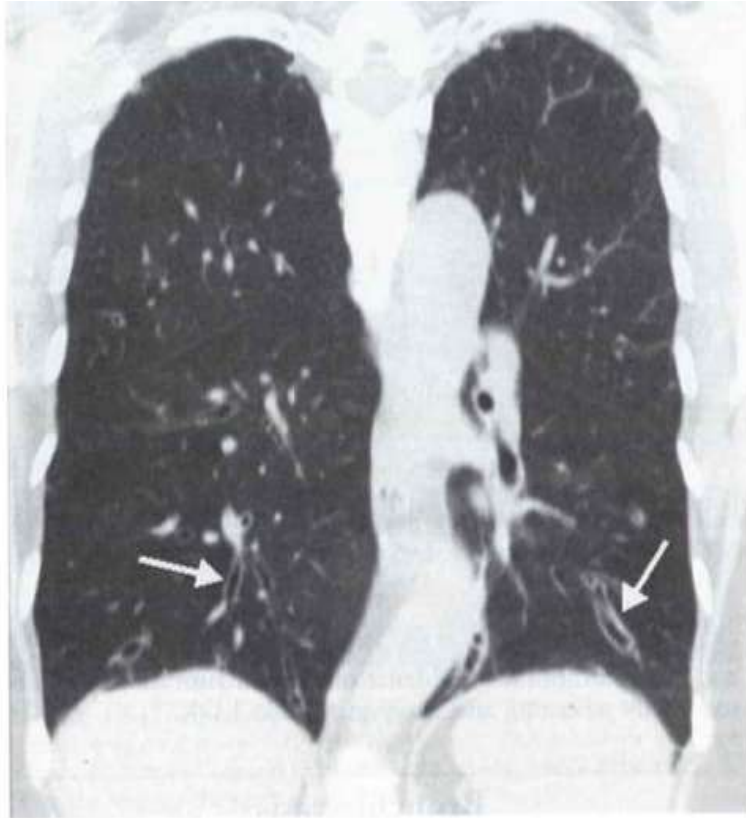


**FIGURE 13-20. Cystic bronchiectasis.** A: PA chest radiograph of a 78-year-old woman shows increased “interstitial markings” in the lower lungs. There is a prominent thin-walled “ring shadow” in the right middle lobe (*arrows*). B: CT shows thick-walled, dilated bronchioles forming a “cluster of grapes” in the right lower lobe and a large dilated airway in the right middle lobe (*arrow*). Patchy areas of dense airspace opacity in the right lower lobe were thought to represent acute pneumonia.



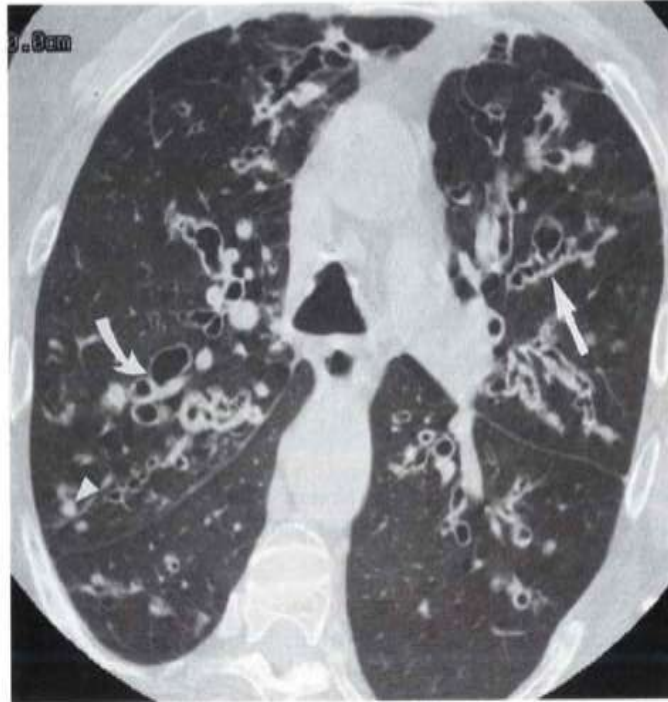
# Cylindric Bronchiectasis

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**FIGURE 13-16.** Cylindric bronchiectasis. Coronal reformatted CT shows smooth, uniformly dilated bronchi (*arrows*), predominantly in the lower lungs.

# Varicose & Cystic Bronchiectasis



**FIGURE 13-18.** Varicose and cystic bronchiectasis. CT of a 66-year-old man shows dilated bronchi and bronchioles. In profile, some of the bronchiectatic airways have the “beaded” appearance of varicose bronchiectasis (*straight arrow*); in cross section, some are grouped together like a “cluster of grapes,” as is seen with cystic bronchiectasis (*curved arrow*). The bronchial and bronchiolar walls are thickened. Some of the dilated bronchioles are filled with mucus, forming peripheral nodular opacities (*arrowhead*).

# Summary

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- 肺本質產生病變分類及臨床判讀