

Bacterial Pneumonia

Healthy Airway



Normal airway:
Airways are open

Airway with Pneumonia



Mucus:
Increases,
reducing
airspace

Swelling:
Narrows the airway,
decreasing air flow

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Etiologic classification of pneumonias

A) Bacterial Pneumonia

- 1) Lobar pneumonia
- 2) Bronchopneumonia (Lobular pneumonia)

B) Viral and Mycoplasmal Pneumonia (Primary atypical Pneumonia)

C) Other types of pneumonias

- 1) Pneumocystis carinii pneumonia
- 2) Legionella pneumonia
- 3) Aspiration pneumonia
- 4) Hypostatic pneumonia
- 5) Lipid pneumonia

Bacterial Pneumonia

- **Definition:** Bacterial invasion of the lung parenchyma evokes exudative solidification (consolidation) of the pulmonary tissue, known as **bacterial pneumonia**.
- **Aetiopathogenesis:**
 1. Inhalation of the microbes
 2. Aspiration of organism from the nasopharynx or oropharynx
 3. Haematogenous spread
 4. Direct spread



■ Potent defense mechanism:

1. Nasal clearance
2. Tracheobronchial clearance
3. Alveolar clearance

The defense mechanism can be interfered by:

- i. Loss or suppression of the cough reflex
- ii. Injury to the mucociliary apparatus
- iii. Interference with the phagocytic or bactericidal action of alveolar macrophages
- iv. Pulmonary congestion and edema
- v. Accumulation of secretions as in cystic fibrosis and bronchial obstruction

Decreased Host resistance:

- Chronic diseases
- Immunologic deficiency
- Immunosuppressive agents
- Leukopenia



Bacterial Pneumonia

- **Depending upon the gross anatomic distribution of the disease:**

1. Bronchopneumonia (Lobular pneumonia)
2. Lobar pneumonia

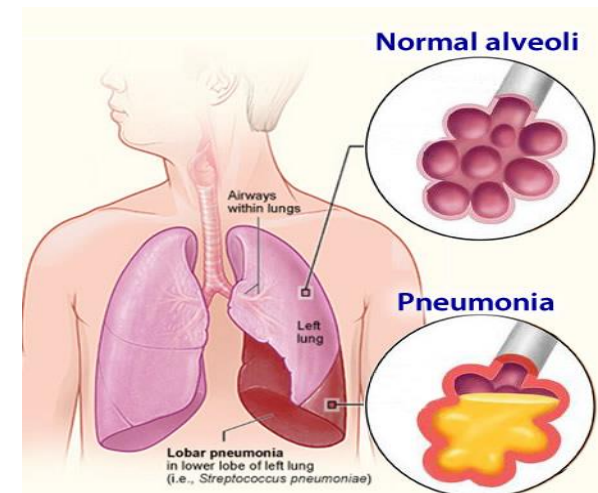
Etiology

1. Bronchopneumonia (Lobular pneumonia)

- Staphylococci
- Streptococci
- Pneumococci
- H.influenzae
- Psudomonas aeruginosa

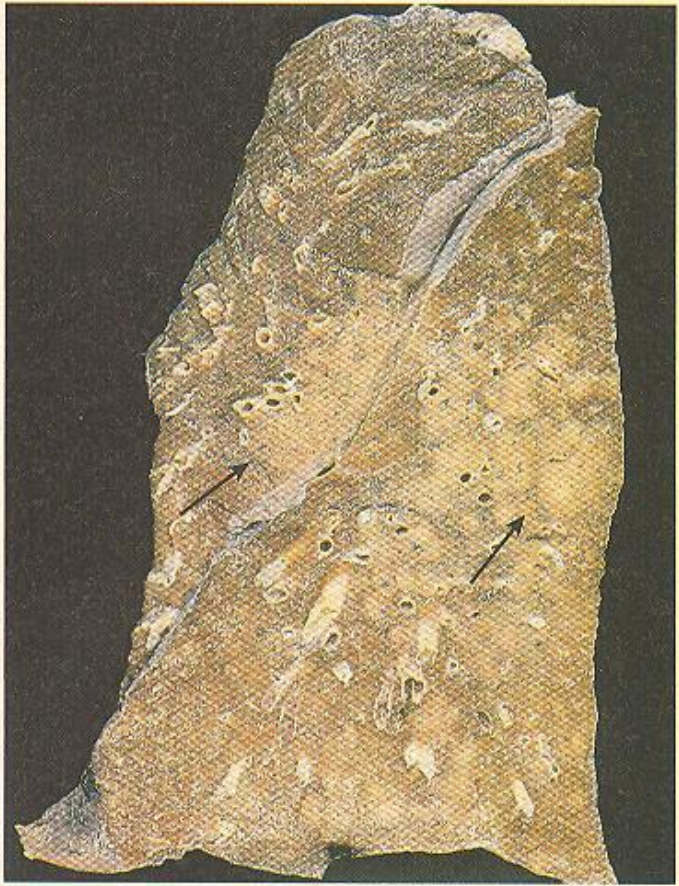
2. Lobar pneumonia

- Streptococcus pneumoniae (90-95%) types 1,3,7 and 2
- Klebsiella pneumoniae
- Staphylococci
- Streptococci
- H. influenzae

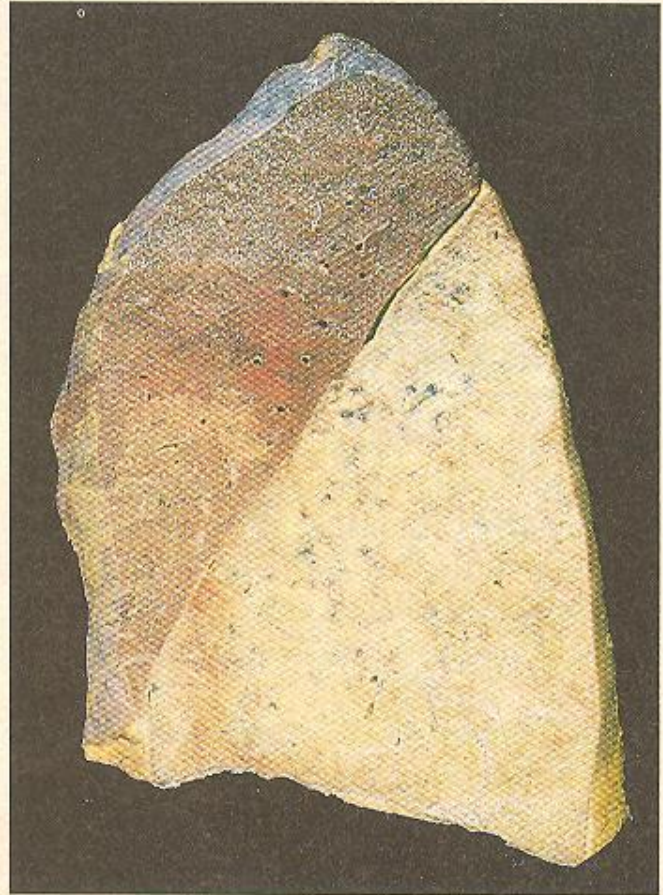


Morphology

- **4 stages of Lobar Pneumonia**
 - 1) Stage of Congestion
 - 2) Stage of Red Hepatization
 - 3) Stage of Gray Hepatization
 - 4) Stage of Resolution



Bronchopneumonia



Lobar Pneumonia

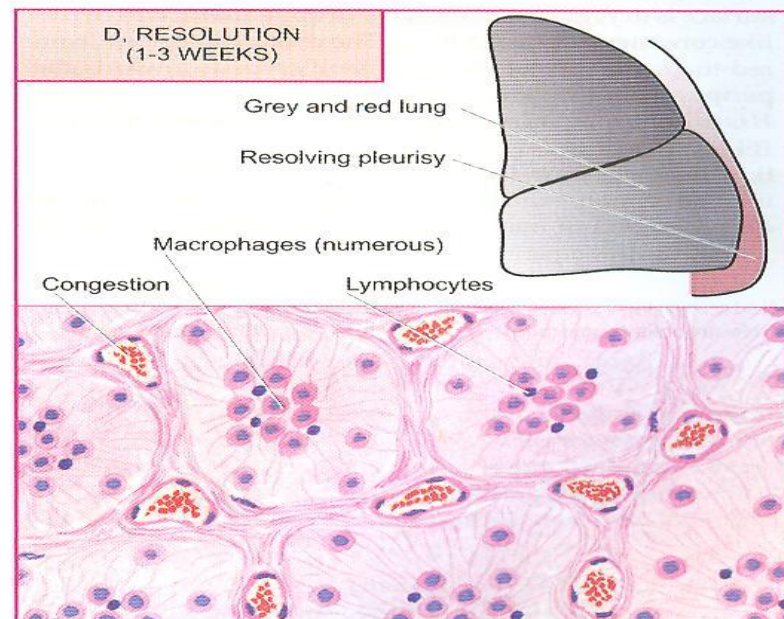
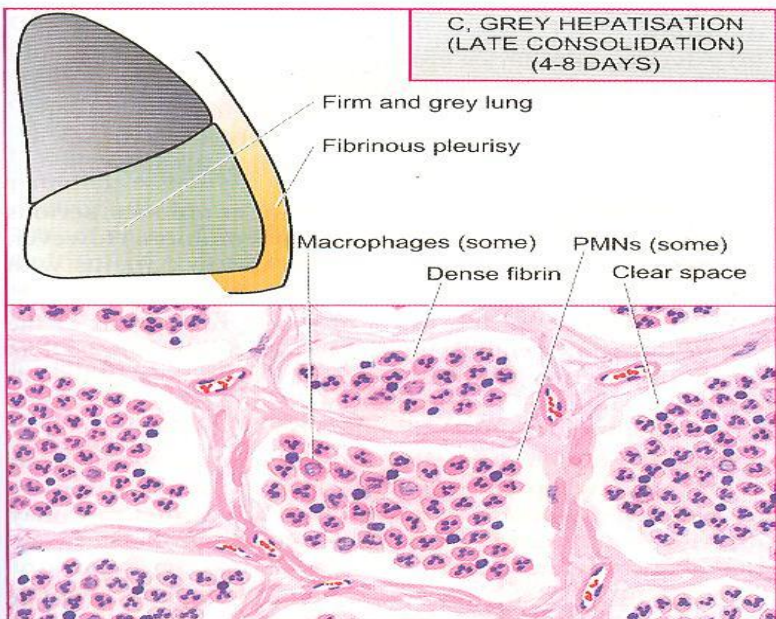
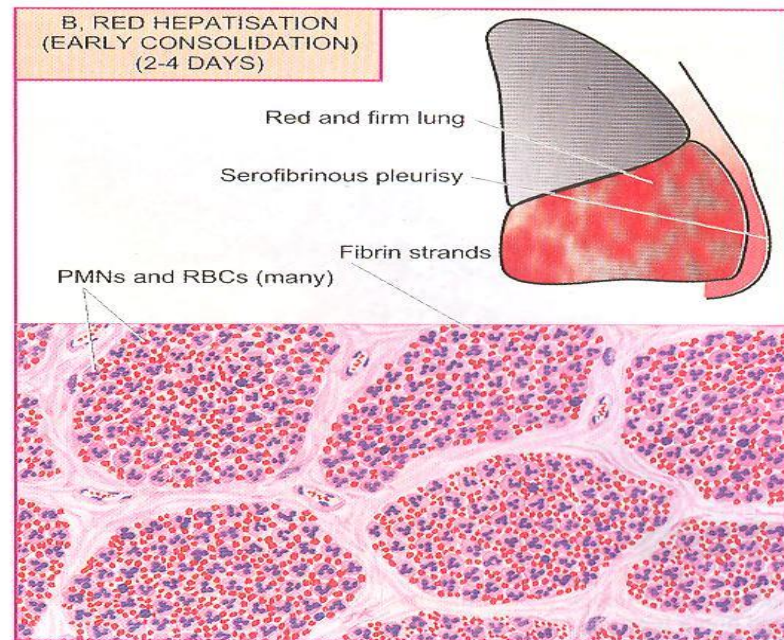
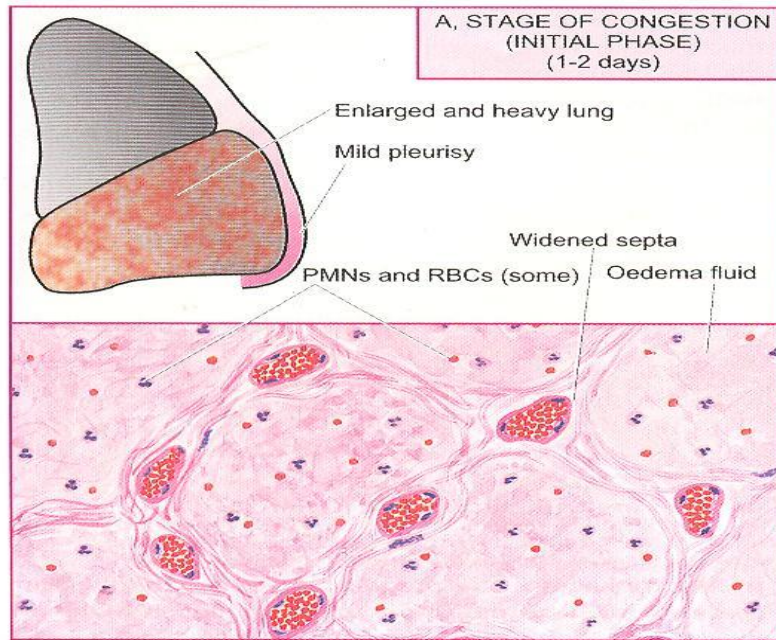
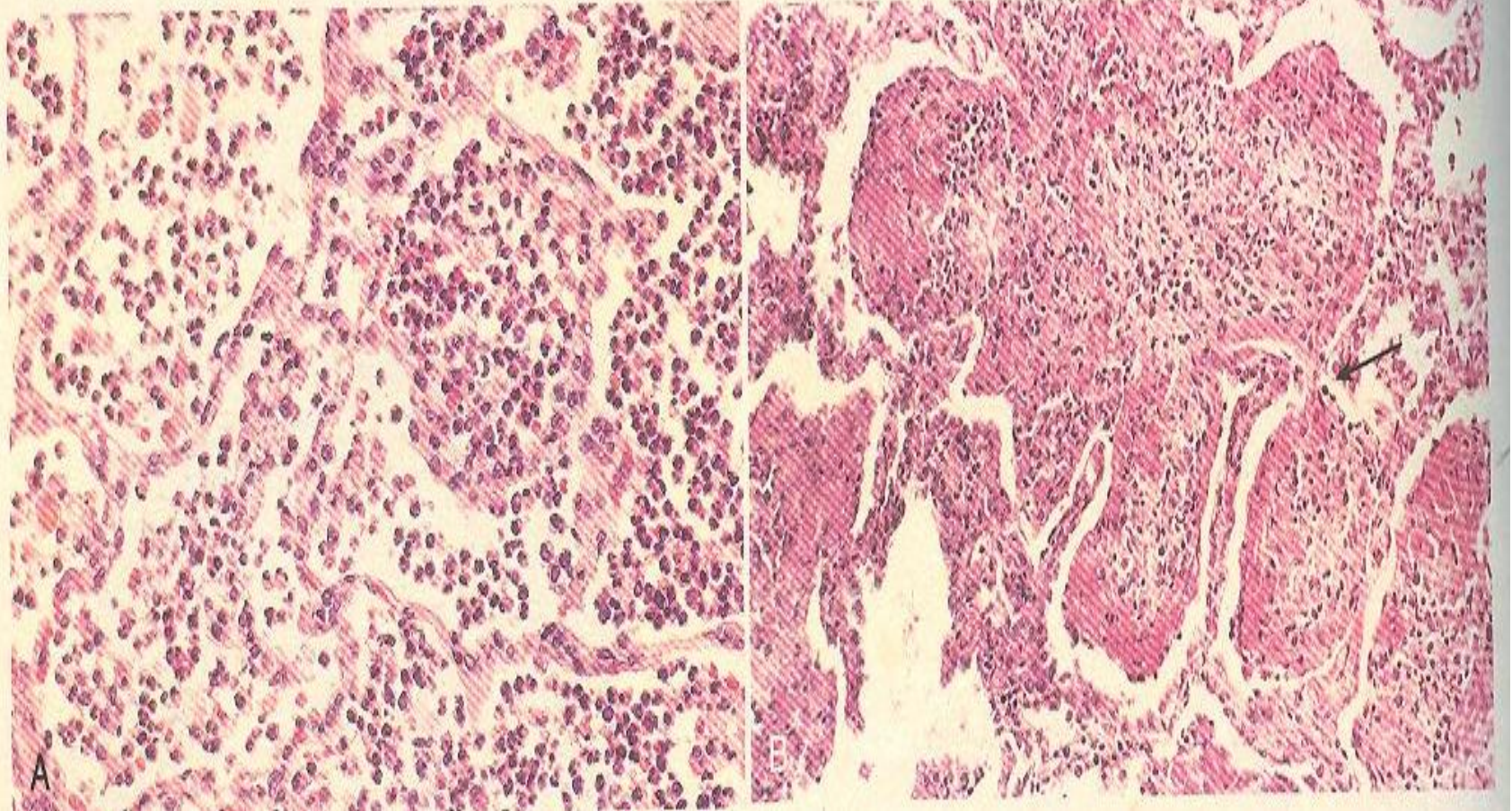


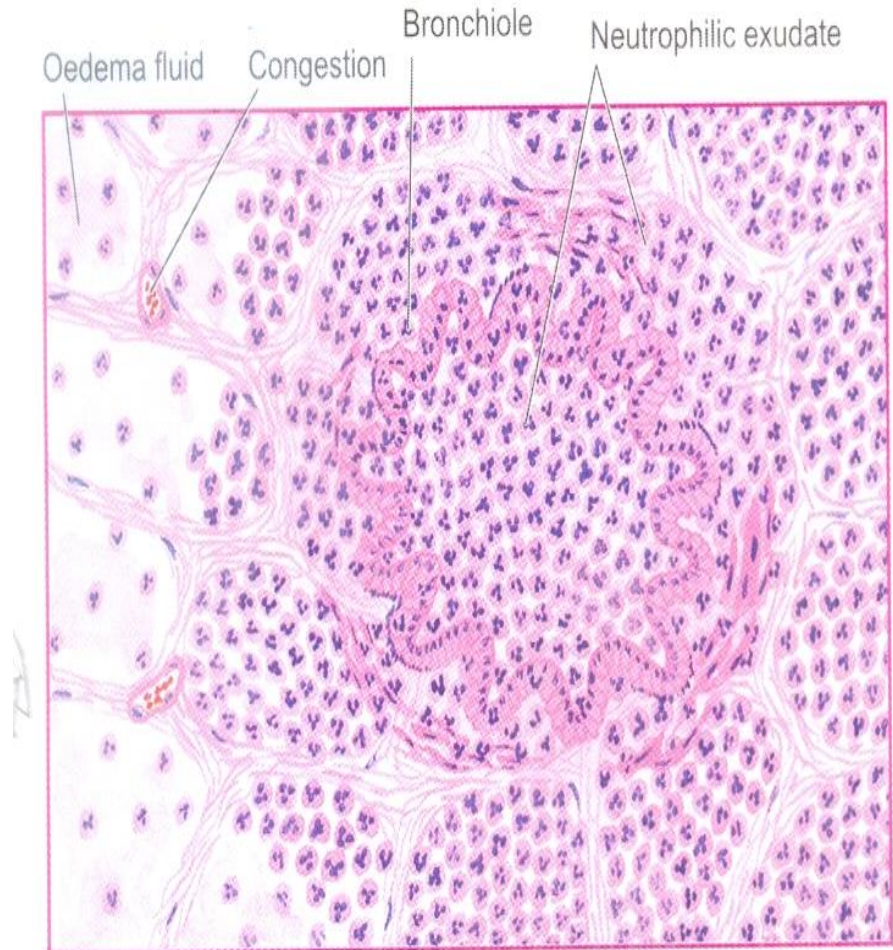
Figure 17.6 The four stages of lobar pneumonia, showing correlation of gross appearance of the lung with microscopic appearance in each stage. For details consult the text.

Lobar Pneumonia



Bronchopneumonia

- **Patchy acute suppurative inflammation**



■ Compication

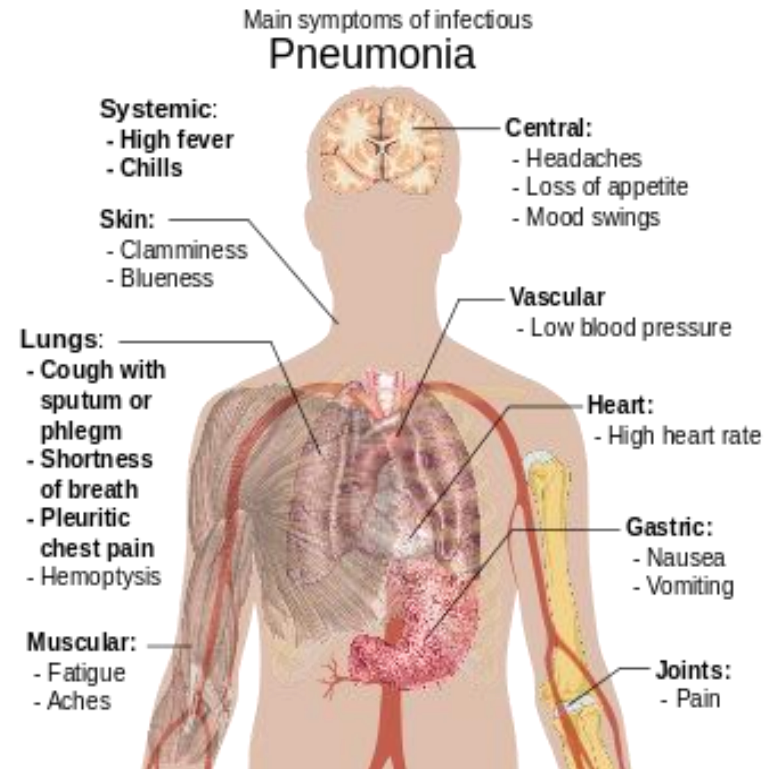
- Lung Abscess
- Empyema
- Organization
- Bacteremic dissemination

■ C/F

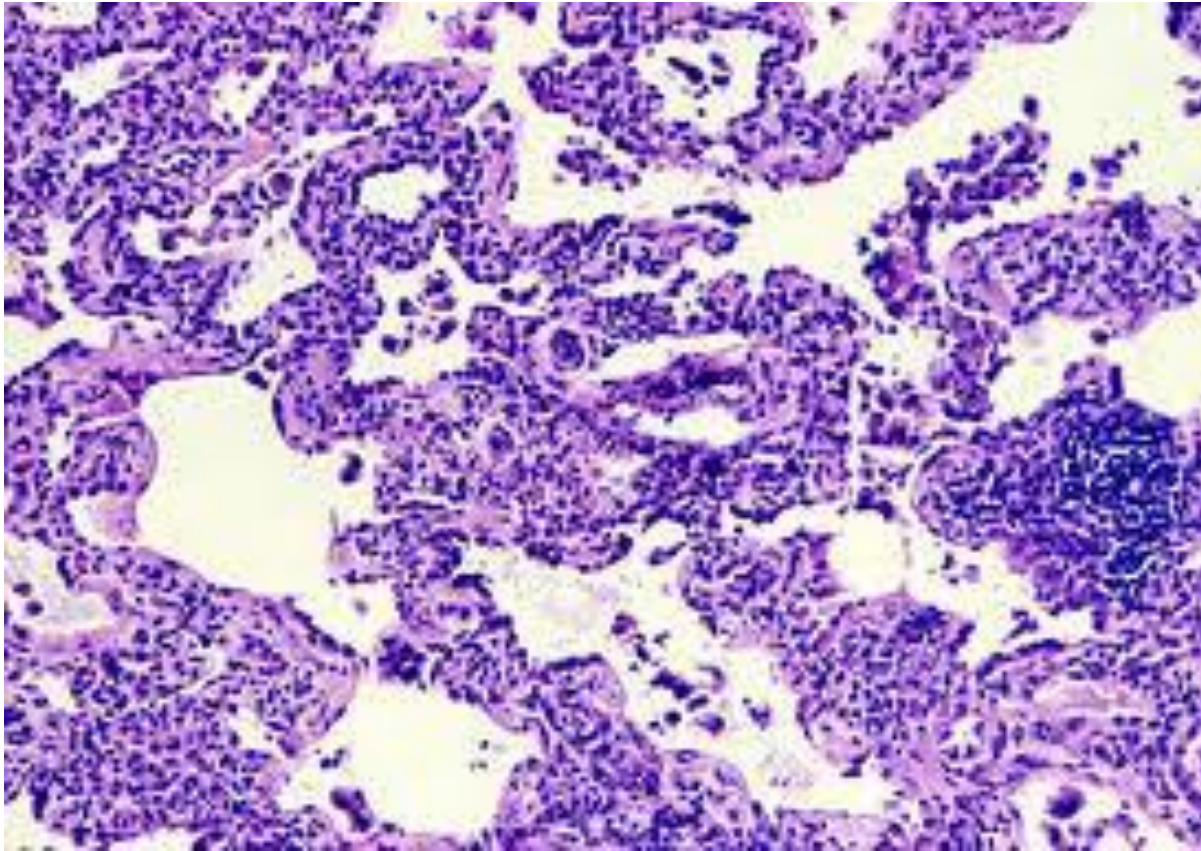
- Fever
- Malaise
- Cough with sputum

■ Treatment

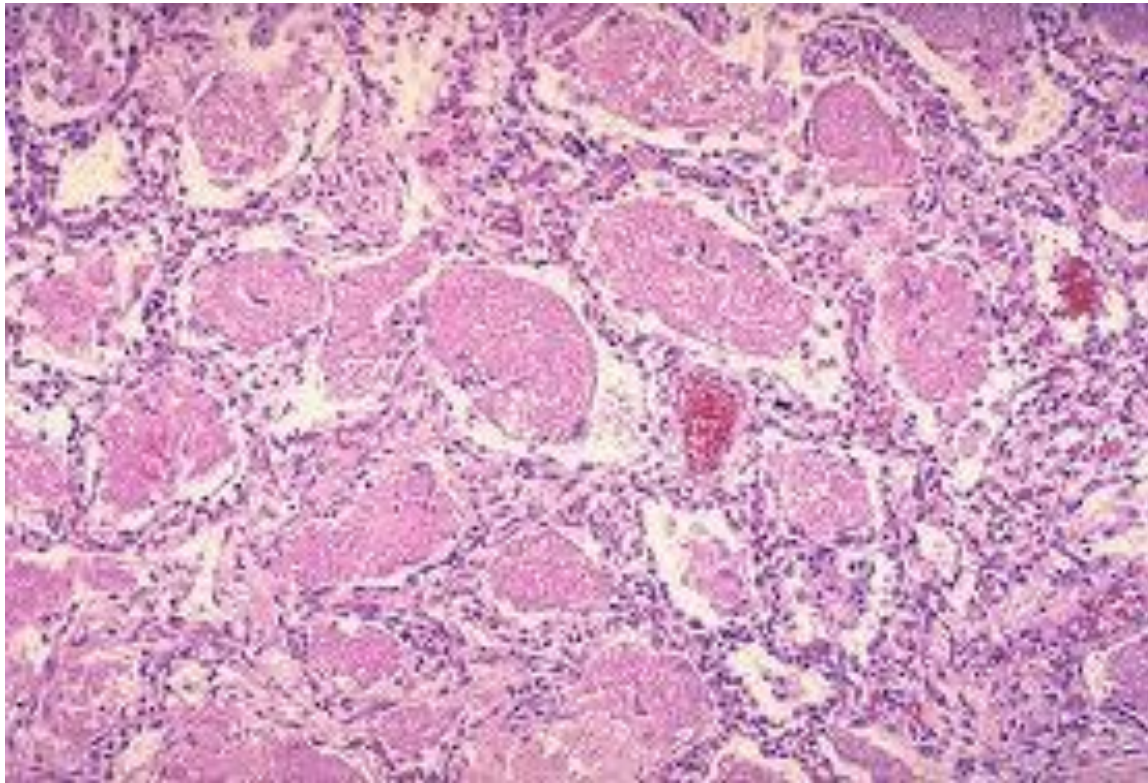
- Antibiotics



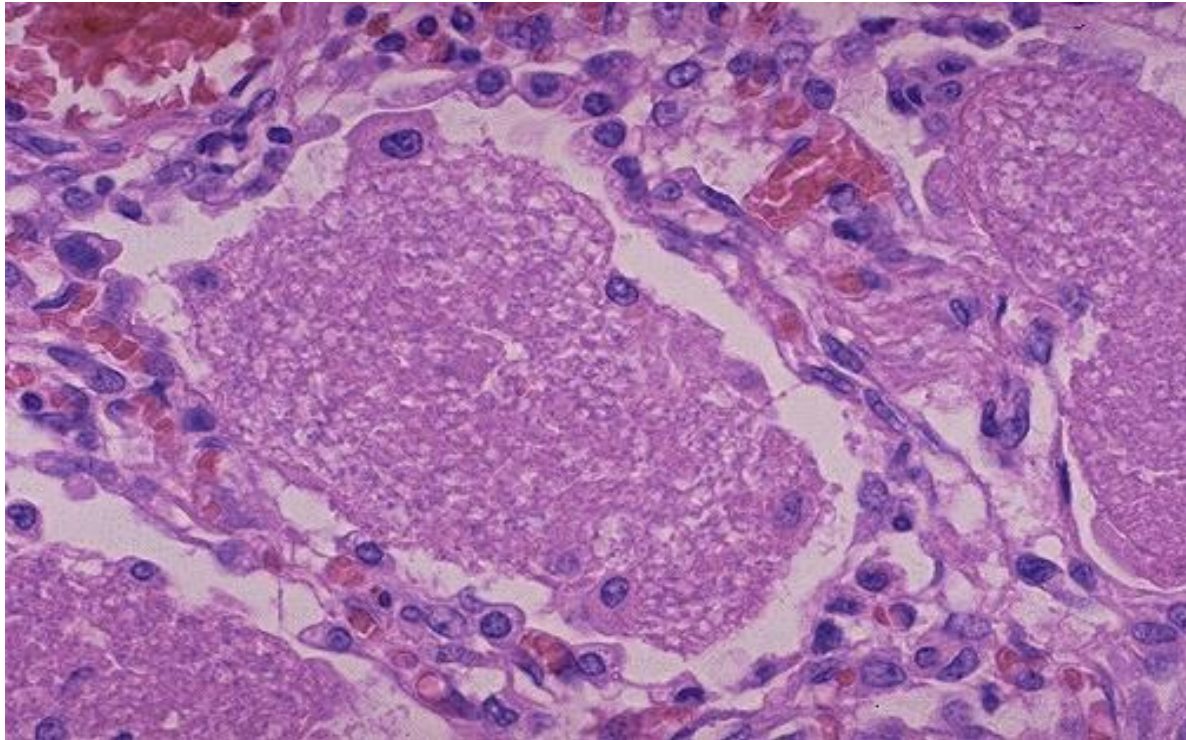
Interstitial Pneumonia



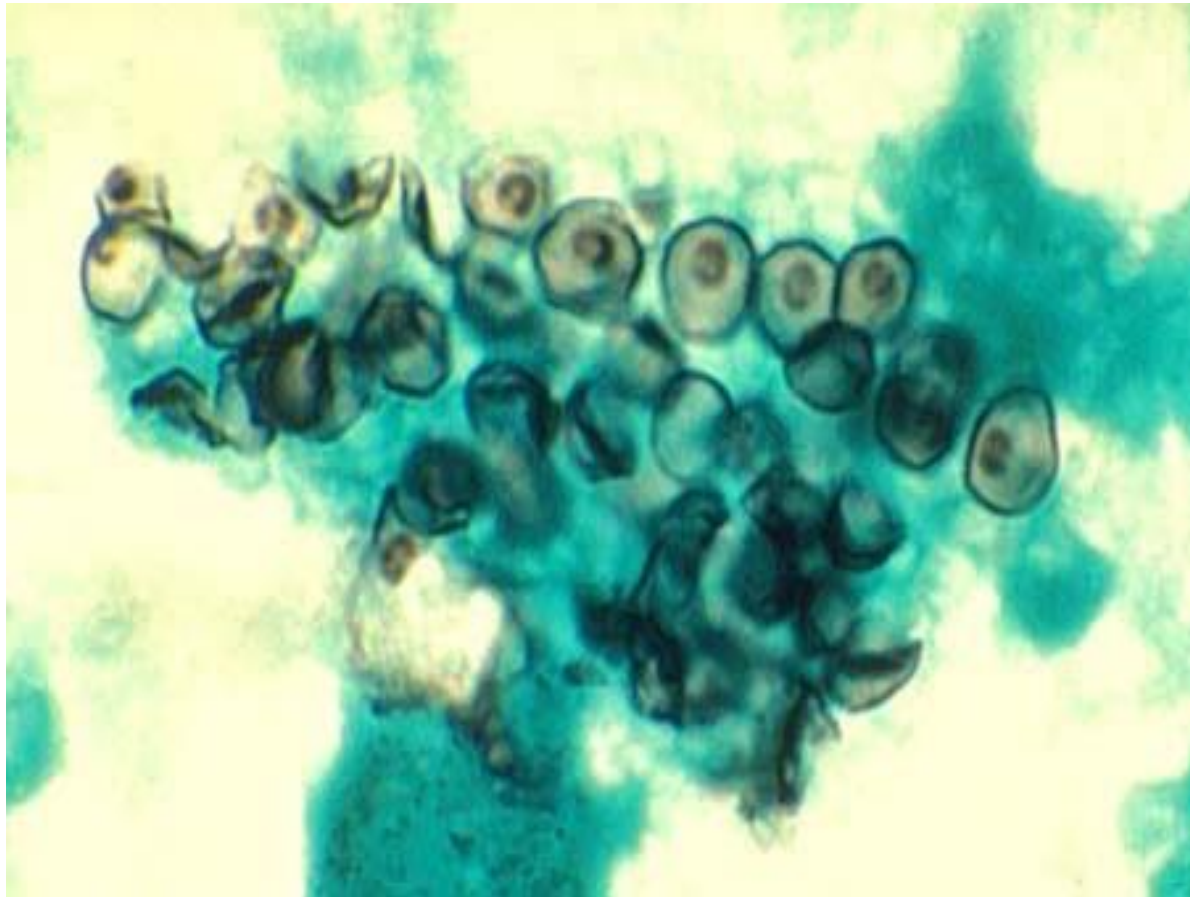
Pneumocystis Carini Pneumonia(Jirovecii)



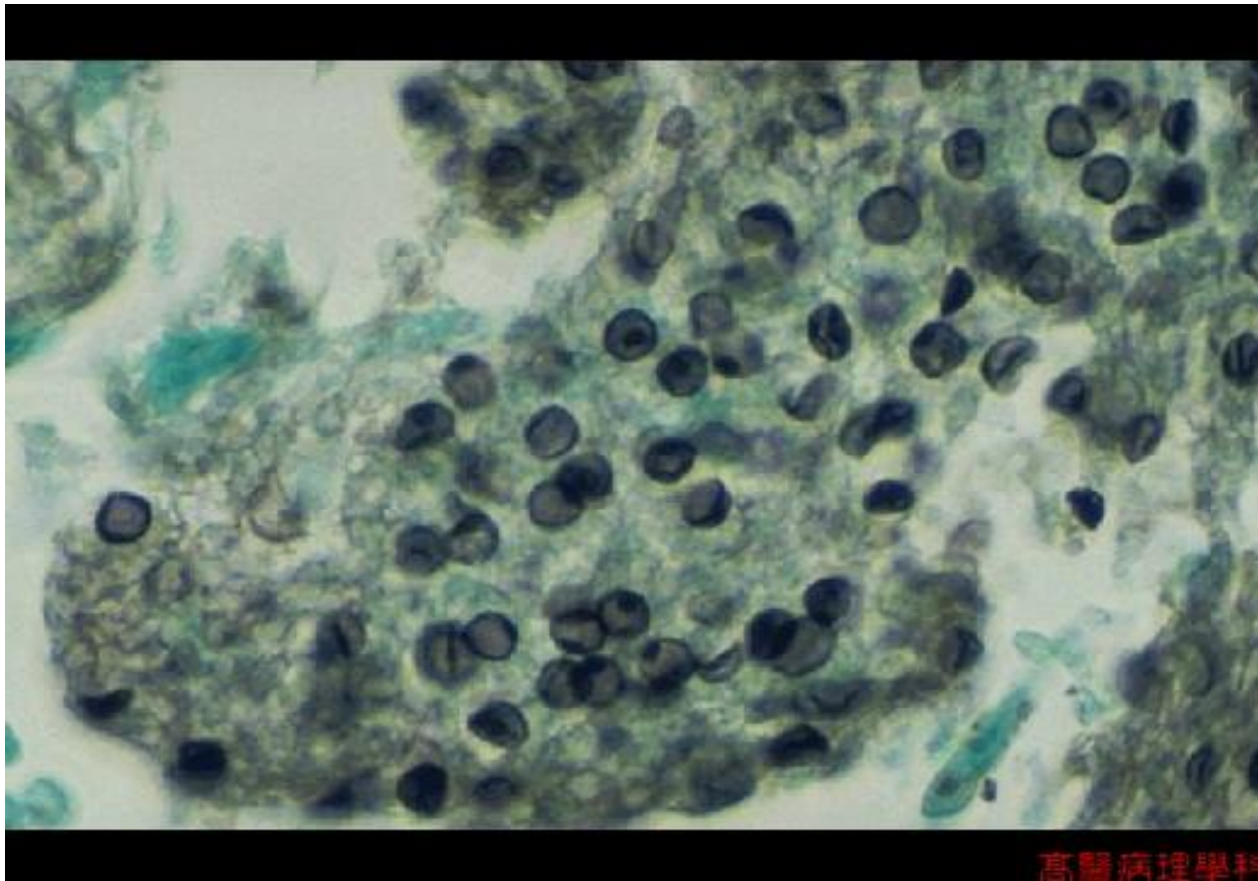
Pneumocystis Carini Pneumonia(PCP)



PCP(Gomori Silver Methenamine)



Pneumocystis Carini Pneumonia(PCP)



Lung Abscess

- **Definition:**

The term “Pulmonary abscess” describes a local suppurative process within the lung, characterised by necrosis of lung tissue.

Etiopathogenesis

- Streptococci
- Staphylococcus aureus
- Gram –ve organisms

Causative organisms are introduced by the following mechanism:

i) **Aspiration of infective material →**

- Acute alcoholism
- Coma
- Anaesthesia

ii) **Antecedant primary bacterial infection →**

- Post – pneumonic abscess
- Fungal infection
- Bronchiectasis

iii) **Septic embolism**

iv) **Neoplasia**

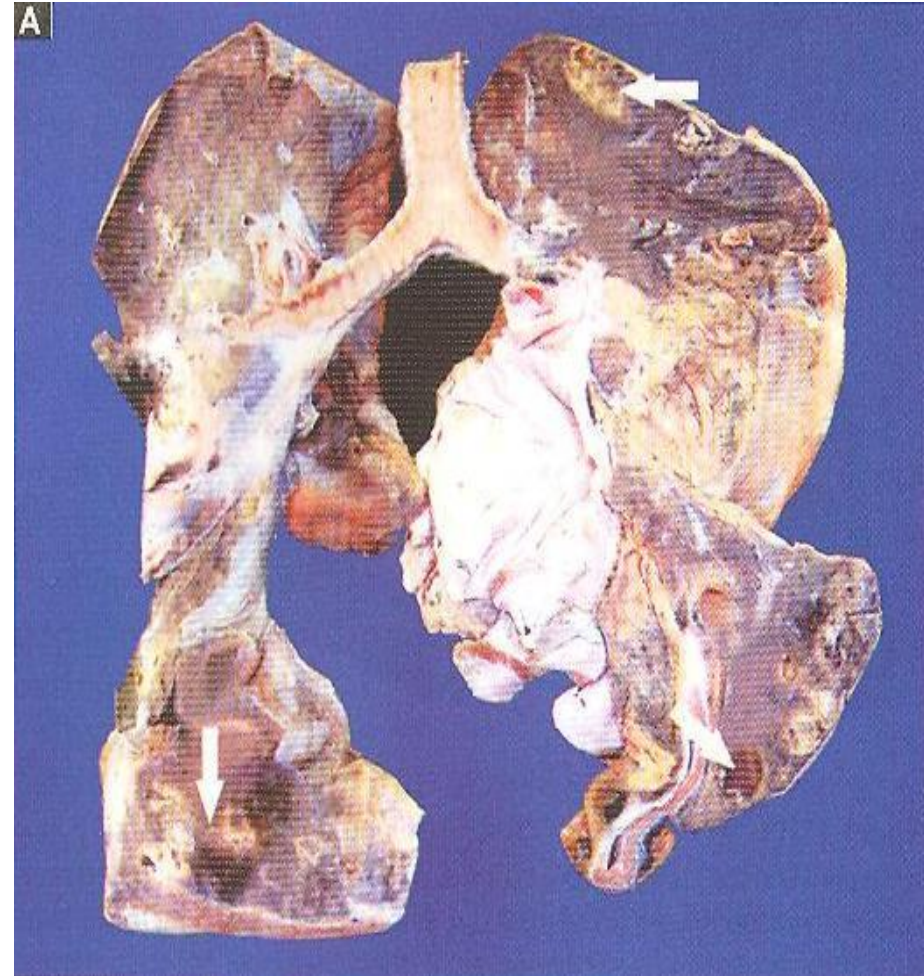
v) **Miscellaneous →**

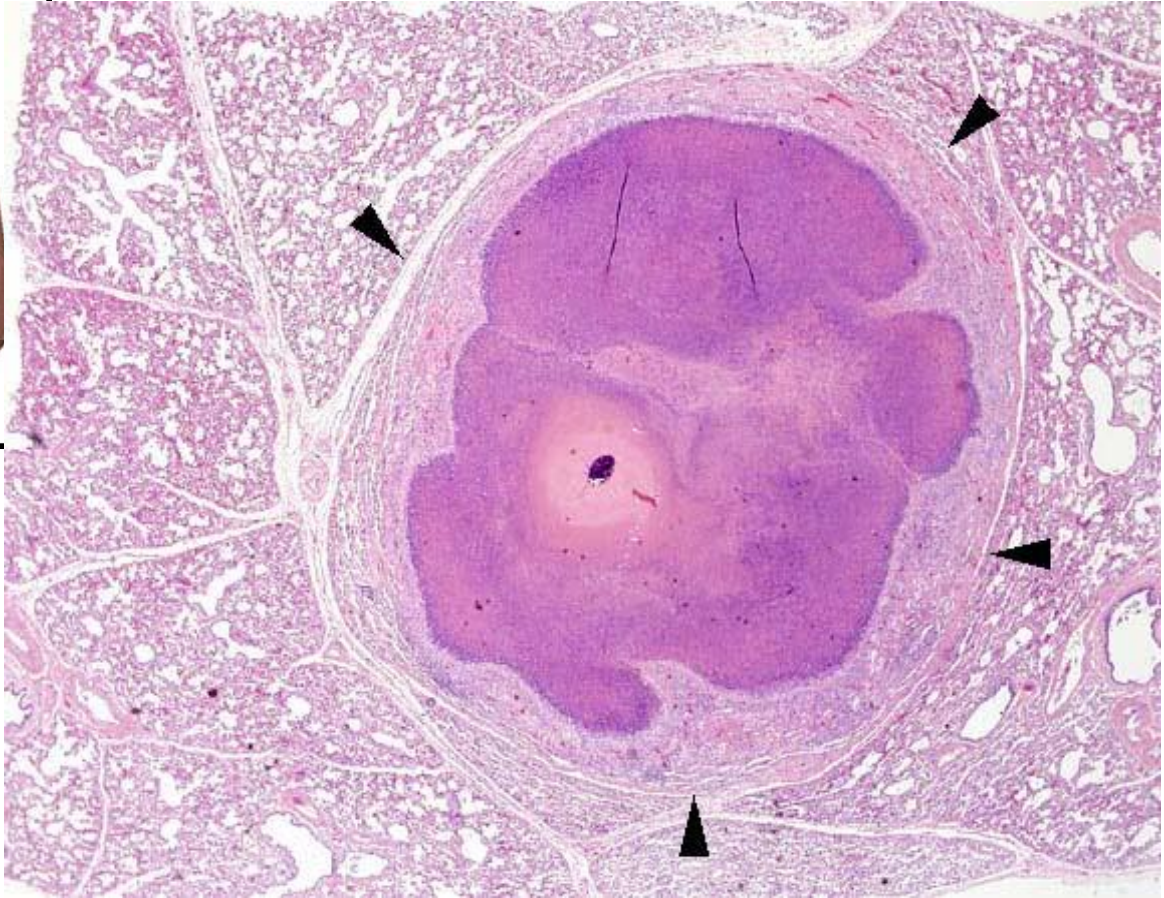
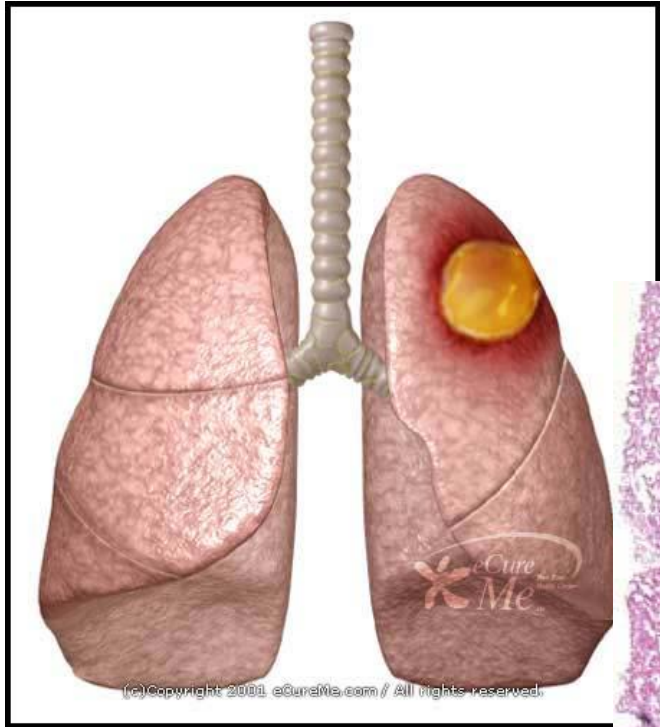
- Direct traumatic penetrations
- Spread from neighbouring organ
- Haematogenous seeding

Morphology

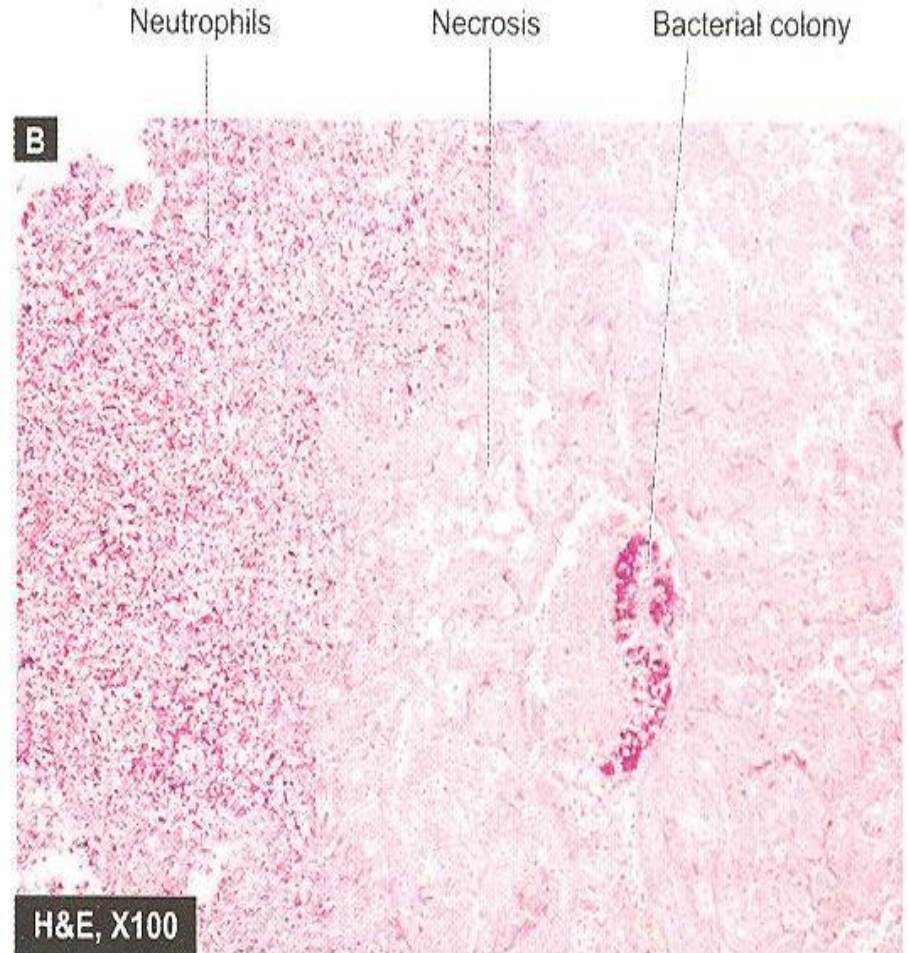
■ Gross:

- Abscess vary in diameter from lesions of a few millimeter to large cavities of 5 to 6 cm
- Abscess cavity may be filled with suppurative debris





- **Microscopic:**
 - Suppurative destruction of the lung parenchyma within the central area of cavitations



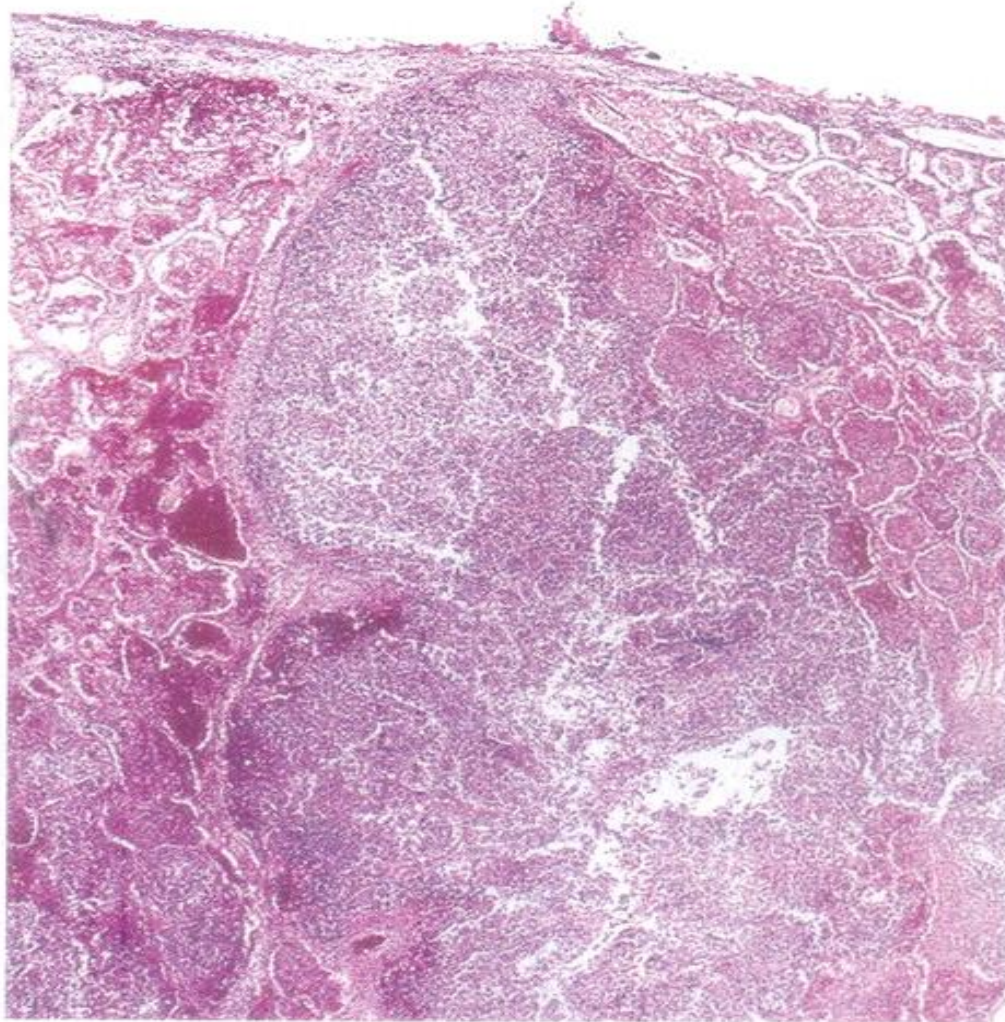


FIGURE 15-35 Pyemic lung abscess (center) with complete destruction of underlying parenchyma within the focus of involvement.



- **Clinical features:**

- Fever

- Cough with foul – smelling, purulent sputum

- Chest pain

- Weight loss

- **Complications:**

- Empyema

- Brain abscess, meningitis

- Amyloidosis