

# Pulmonary Infections

هذه المذكرة عبارة عن هاند أوت الدكتور عمار الركابي بعد تنسيقها.  
شاملة لكل ما هو مطلوب في هذه الجزئية

وأیضا:

توجد بعض الحداول والصور التوضيحية مضافة من محاضرات الدكتورة مها عرفة.

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# PULMONARY INFECTION

## PNEUMONIA

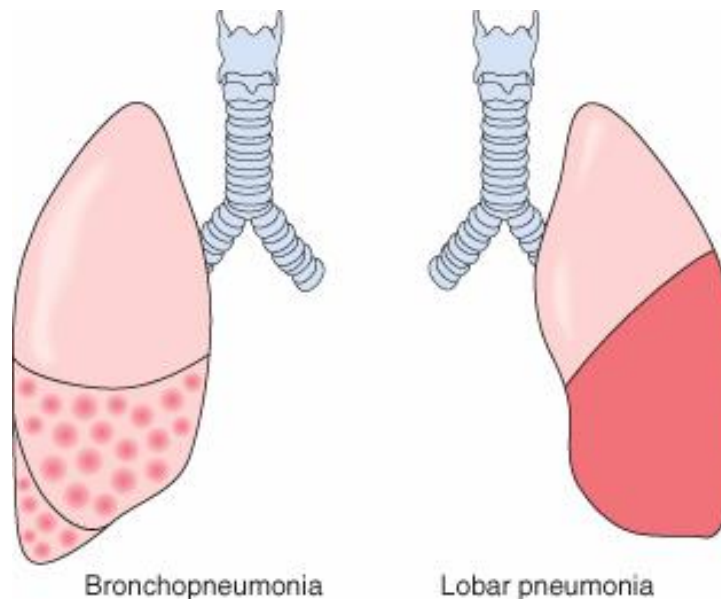
### 1- GENERAL CONSIDERATIONS AND CLINICAL CHARACTERISTICS

- (a) Pneumonia is an inflammatory process of infectious origin affecting the pulmonary parenchyma.
- (b) **Characterized By**  
chills and fever, productive cough, blood tinged or rusty sputum, pleuritic pain, hypoxia with shortness of breath and sometimes cyanosis.
- (c) ***If bacterial***, it is most characteristically associated with  
neutrophilic leukocytosis with an increase in band neutrophils ("shift-to-the-left").

### 2- MORPHOLOGIC TYPES OF PNEUMONIA

- *There are three morphologic and clinical patterns:*  
lobar pneumonia, bronchopneumonia and interstitial pneumonia.

### 3- BACTERIAL PNEUMONIAS



#### (a) LOBAR PNEUMONIA:

- is most often **caused by** *Streptococcus pneumoniae* (the pneumococcus).
- It is **characterized by** a predominantly intraalveolar exudate and may involve an entire lobe of the lung.

#### (b) BRONCHOPNEUMONIA

- is **caused by** a wide variety of organisms.
- It is **characterized by** a patchy distribution involving one or more lobes, with an inflammatory infiltrate extending from the bronchioles into the adjacent alveoli

#### 4- INTERSTITIAL (PRIMARY ATYPICAL) PNEUMONIA

##### Caused by

various infectious agents, most commonly **Mycoplasma pneumoniae** or **viruses**.

##### Characterized By

diffuse, patchy inflammation localized to interstitial areas of alveolar walls.

##### (A) **MYCOPLASMA PNEUMONIA:**

- (1) This is the most common form of interstitial pneumonia  
it usually **occurs in** children and young adults and it may occur in epidemics.
  - (2) **Onset** is more insidious (sudden) compared to bacterial pneumonia and usually follows a mild, self-limited course.
  - (3) **Characteristics include**  
an inflammatory reaction confined to the interstitium, with no exudate in alveolar spaces and intra-alveolar hyaline membranes.
  - (4) **Diagnosis is by**
    - Sputum cultures, requiring several weeks of incubation
    - Complement fixing antibodies.
  - (5) Mycoplasma pneumonia may be **associated with** non specific agglutinins reactive to red cells.
- ✓ This phenomenon is the basis for a quick and easy laboratory test that can provide early diagnostic information.

#### Morphologic Variants of Pneumonia: Causative Organisms and Characteristics

Variant Characteristics	Causative Organism	Characteristics
<b>Lobar pneumonia</b>	Most frequently <i>Streptococcus Pneumoniae</i> ( <i>pneumococcus</i> )	<ul style="list-style-type: none"> <li>- Predominantly intra-alveolar exudate <u>resulting in</u> consolidation.</li> <li>- May <u>involve</u> the entire lobe.</li> <li>- <u>If untreated</u>, may morphologically evolve through <b><i>four stages</i></b>; congestion → red hepatization → gray hepatization → resolution.</li> </ul>
<b>Broncho-pneumonia</b>	Many organisms <u>including</u> : <ul style="list-style-type: none"> <li>- <i>Staphylococcus Aureus</i>,</li> <li>- <i>Haemophilus Influenza</i>,</li> <li>- <i>Klebsiella Pneumonia</i></li> <li>- <i>Streptococcus Pyogenes</i></li> </ul>	<ul style="list-style-type: none"> <li>- Acute inflammatory infiltrates <u>extending from</u> the bron- chicles into the adjacent alveoli.</li> <li>- Patchy distribution involving one or more lobes.</li> </ul>
<b>Interstitial Pneumonia</b>	Most frequently <i>Viruses</i> or <i>Mycoplasma Pneumoniae</i>	<ul style="list-style-type: none"> <li>- Diffuse, patchy inflammation localized to interstitial areas of the alveolar walls.</li> <li>- Distribution involving one or more lobes.</li> </ul>

**(B) VIRAL PNEUMONIAS**

- are the most common types of pneumonia in childhood.
- They are **caused most commonly by** *influenza viruses, adenoviruses, rhinovirus and respiratory syncytial virus,*

may also arise after childhood *exanthems (viral eruptions)*  
[e.g. rubeola (measles) or varicella (chicken pox) ]

***the measles virus***

produces giant cell pneumonia, marked by numerous giant cells  
and often complicated by tracheobronchitis.

**(C) RICKETTSIAL PNEUMONIAS**

- Q fever is the most common rickettsial pneumonia;
- it is **caused by** *Coxiella Burnetii*.
- It may infect persons working with infected cattle or sheep, who inhale dust particles containing the organism; those who drink unpasteurized milk from infected animals.

**(D) ORNITHOSIS (PSITTACOSIS)**

- is **caused by** an organism of the Genus *Chlamydia*
- **transmitted by** inhalation of *dried -excreta of infected birds*.

**5- PNEUMOCYTIS CARINII PNEUMONIA**

- ✓ is the most common opportunistic infection in patients **with** acquired immunodeficiency syndrome (AIDS)
- ✓ it also **occurs in** other forms of immunodeficiency.

(a) It is **caused by** *Pneumocystis Carinii* (recently renamed –*Pneumocystis Jiroveci*)  
which is now classified as a **fungus**.

(b) **Diagnosis by**  
morphologic demonstration of the organism in *biopsy or bronchial washing specimens*.

**6- HOSPITAL-ACQUIRED GRAM-NEGATIVE PNEUMONIAS**

(a) These pneumonias are often **fatal**  
**occur in** hospitalized patients, usually those with serious, debilitating (weakness) diseases.

(b) **Causes** include  
many gram-negative organisms, including *Klebsiella, Pseudomonas Aeruginosa* and *Escherichia Coli*.

→ **Endotoxins** produced by these organisms play an important role in the infection.

### IMPORTANT FEATURES OF SELECTED BACTERIAL PNEUMONIAS

Organism	Characteristics	Complications
<b>Streptococcus Pneumoniae</b>	Most common in <i>elderly</i> or <i>debilitated</i> patients ((Especially those with cardiopulmonary Disease)) and <i>malnourished persons</i>	May <b>lead to</b> <i>Empyema</i> (pus in the pleural cavity).
<b>Staphylococcus Aureus</b>	Often <b>a complication of</b> <ul style="list-style-type: none"> <li>- <i>influenza or viral pneumonias</i></li> <li>- a result of <i>blood-borne infection</i> in intravenous drug users ((seen principally in debilitated hospitalized patients))</li> <li>- the elderly</li> <li>- people with COPD</li> </ul>	Focal inflammatory exudates or abscess formation frequent  may <b>lead to</b> <ul style="list-style-type: none"> <li>- <i>Empyema</i></li> <li>- <i>Bacterial Endocarditis</i></li> <li>- <i>Brain And Kidney Abscesses.</i></li> </ul>
<b>Streptococcus Pyogenes</b>	Often a complication of influenza or measles.	Lung abscess.
<b>Klebsiella Pneumoniae</b>	<u>Most frequent in</u> <ul style="list-style-type: none"> <li>- debilitated hospitalized patients</li> <li>- diabetic or alcoholic patients</li> <li>- high mortality rate in elderly patients.</li> </ul>	Considerable <i>alveolar wall damage</i> <u>leading to</u> <b>necrosis</b> ((sometimes with abscess formation))
<b>Haemophilus Influenza</b>	<u>Usually seen in</u> <ul style="list-style-type: none"> <li>- infants and children</li> <li>- debilitated adults, most often those with COPD</li> </ul>	Meningitis and epiglottitis in infants and children.
<b>Legionella Pneumophila</b>	Infection <u>from</u> inhalation of <i>aerosol</i> ((from contaminated stored water most often in AC systems))	

## LUNG ABSCESS



1. This is a localized area of suppuration within the parenchyma, usually resulting from bronchial obstruction (often by cancer) or from aspiration of gastric contents may also be a complication of bacterial pneumonia.
2. Patients predisposed to it are those who have aspiration by loss of consciousness *from* alcohol or drug overdose, neurologic disorders, or general anesthesia.
3. Frequent causes include Staphylococcus, pseudomonas, Klebsiella or Proteus ((often in combination with anaerobic organisms.))
4. Clinical manifestations include fever, foul-smelling purulent sputum and radiographic (chest x-ray) showing evidence of a fluid-filled cavity.