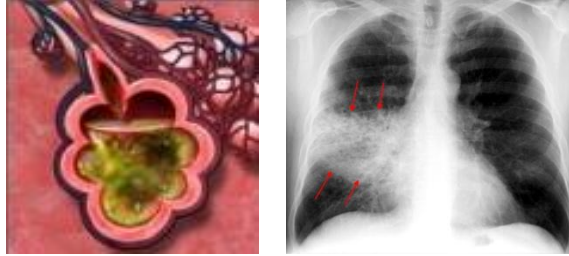




- **Definition:** it is infection of the lung parenchyma resulting in consolidation (if it is typical pneumonia) due to an inflammatory exudates (air spaces will be involved).



- **Clinical classification of pneumonia:**

- **Community-acquired pneumonia:** which can be typical or atypical.
- **Hospital-acquired pneumonia (nosocomial).**
- **Aspiration acquired pneumonia.**

- **Transmission of pneumonia:**

- Aspiration of organisms which colonize the oropharynx.
- Inhalation of airborne droplets.
- Hematogenous dissemination from extra-pulmonary site (such as genitourinary tract).
- Direct inoculation and contiguous (IV drug users).

- **Etiology:**

- **Typical pneumonia (classical signs and symptoms: high-grade fever, cough and sputum production; consolidation):**
 - ✓ S. pneumoniae: it is the most common cause of community-acquired pneumonia.
 - ✓ H.influenzae: causing pneumonia in smoker and those with COPD
 - ✓ Moraxella catarrhalis.
 - ✓ Klebsiella: causing pneumonia in alcoholics.
- **Atypical pneumonia (less respiratory symptoms: low-grade fever with dry non-productive cough; interstitial infiltrates):**
 - ✓ Mycoplasma pneumoniae: it is seen in young healthy patients. It presents with dry cough.
 - ✓ Chlamydia pneumoniae.
 - ✓ Legionella: from infected water-sources (such as air-conditioning systems). CNS manifestations (headache, confusion and lethargy) + GI manifestations (vomiting and diarrhea) might occur.
 - ✓ Viral causes are common in children < 5 years of age.
 - ✓ Pneumocystis jiroveci: causing pneumonia in HIV-positive patients with CD4 count < 200 cells/mm³.
- **Notes:**
 - ✓ Most common causes of hospital-acquired pneumonia and ventilator-associated pneumonia are:
 - ❖ E.coli and other enterobacteriaceae.
 - ❖ Pseudomonas.
 - ❖ MRSA.

- **Clinical manifestations of typical pneumonia (bacterial pneumonia):**

- **Usually high-grade fever.**
- **Cough.**
- **Sputum production:**
 - ✓ Rust red sputum: suggesting infection with S.pneumoniae.
 - ✓ Currant-jelly sputum: suggesting infection with Klebsiella.Notice that sputum may cause partial airway obstruction resulting in wheezing
- **Dyspnea.**



- **Pleuritic chest pain** which is associated with consolidation and is increased with inspiration, cough, sneezing and chest movements.

- **Physical examination:**

- **Vital signs:**

- ✓ Temperature: high-grade in young patients with typical pneumonia; low-grade in atypical pneumonia.
- ✓ Pulse: tachycardia.
- ✓ Respiratory rate: tachypnea when there is severe pneumonia or association with pleural effusion.
- ✓ Blood pressure: normal (if it is low, this indicates the presence of dehydration and shock).

- **General inspection:**

- ✓ Patients look tired and he will be sweating.
- ✓ Continuous cough.
- ✓ May be cyanosed or confused.
- ✓ Dyspnea with use of accessory respiratory muscles.

- **Chest examination:**

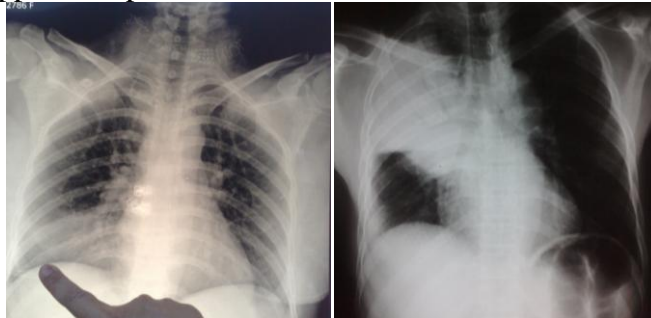
- ✓ Palpation: increased tactile fremitus.
- ✓ Percussion: dullness.
- ✓ Auscultation: decreased air entry, bronchial breathing, rales and egophony (E changes to A).

- **Diagnosis:**

- **CBC (leukocytosis with neutrophils predominance indicate bacterial infection while leukocytosis with lymphocytes predominance indicate viral infection), Arterial blood gas (especially for severe pneumonia with respiratory distress), Urea and Liver Function Test (LFT).**

- **The most important INITIAL diagnostic test is CXR:**

- ✓ Typical pneumonia: lobar consolidation and usually parapneumonic pleural effusion. Left image shows right lower lobe pneumonia while right image shows right upper lobe pneumonia.



- ✓ Atypical pneumonia: bilateral interstitial infiltrates.

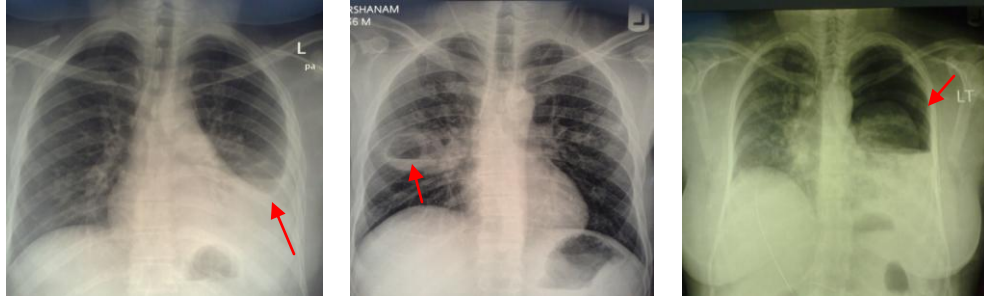


- **The most SPECIFIC diagnostic test for LOBAR PNEUMONIA is sputum culture.**
- **Atypical pneumonia organisms (Mycoplasma and Chlamydia) are detected by serology (antibody titers).**



- **Complications of pneumonia (from left to right):**

- Pleural effusion.
- Lung abscess and cavitation.
- Pneumothorax.



- **Empiric treatment:**

• **Community-acquired pneumonia:**

- ✓ CURB-65 indicating the a patient with pneumonia must be hospitalized:

- ❖ C: Confusion.
- ❖ U: Uremia.
- ❖ R: Respiratory distress ($PO_2 < 60$ mmH, oxygen saturation $< 95\%$ and respiratory rate > 30 breaths/minute).
- ❖ B: Blood pressure low (systolic < 90 mmHg or diastolic < 60 mmHg).
- ❖ Age > 65 years.

These inpatients will be treated with ceftriaxone + azithromycin.

- ✓ Outpatients are those who present with clinical manifestations corresponding to atypical pneumonia and will be treated with macrolides. Alternative are new fluoroquinolones (such as levofloxacin).
- ✓ Hospital-acquired pneumonia (pneumoniae which develops in patients 5-7 days while staying in hospital):
 - ❖ *Carbapenems (imipenem) or piperacillin/ tazobactam + vancomycin (to cover MRSA).*

- **Vaccination:**

- Those who should receive a pneumococcal vaccine are immunocompromised patients, diabetics, smokers, alcoholics and patients > 65 years of age.