Pneumonia

- **Pneumonia** is inflammation of the pulmonary tissue.
- **Lobar pneumonia**: describes pneumonia localized to one or more lobes of the lung in which the affected lobes are completely consolidated.
- **Bronchopneumonia**: inflammation of the lung that is centered in the bronchioles and leads to the production of mucopurulent exudate that obstructed some of the airways and lead to patchy consolidation of the adjacent lobules.
- **Interstitial pneumonia**: refers to inflammation of the interstitium which is composed of the walls of the alveoli, the alveolar sacs and ducts and bronchioles.

Etiology

- **Infectious agents**: Virus, bacteria, fungi, rickettsia, and parasite.
- **Inflammatory process**: SLE, sarcoidosis.
- **Toxic substance**: Hydrocarbons, smoke, molds, dust.
- The most common cause of pneumonia in children is viral, bacterial pneumonia accounts for only 10-30% of cases of pediatric pneumonia.
- RSV, influenza virus, and parainfluenza viruses are common causes of viral pneumonia. Measles and adenovirus causes severe disease.
- **Streptococcus pneumoniae** is the most common bacterial cause of pneumonia. H. influenzae are common in unvaccinated communities and usually associated with meningitis or bacteremia. Staph. aureus is a rare cause of pneumonia in infants usually the child is acutely ill with empyema or pneumatoceles on CXR, and has respiratory failure.
- Other causes are mycoplasma hominis, Ureaplasma urealyticum in neonates. Chlamydia trachomatis in first 3 months of life. Mycoplasma pneumoniae, Chlamydia pneumoniae, and Legionella after the age of 5 years.

Clinical manifestation;

- Tachypnea, cough
- malaise, fever
- pleuritic chest pain
- signs of dyspnea
- Viral pneumonic; wheeze, or stridor, usually low fever and normal WBCC
- Bacterial; usually high grade fever, toxic, high WBC (15000-20000) with neutrophilia, may be consolidation.
- Most cases of pneumonia fall in between the characteristics of viral and bacterial pneumonia.
- Lower lobe pneumonia may present with abdominal pain.
Diagnosis

- CXR; may shown local consolidation, or sign of bronchopneumonia
- Culture and sensitivity of the sputum which may difficult in younger children and more liable for contamination with upper airway secretions.
- Serological tests; IgM for
  - pneumococcus infection or
  - H. influenzae.
  - mycoplasma.
  - viral infection such RSV, influenza virus, adenovirus.
- PCR; detection of the type of virus or bacteria.
- When we suspect tuberculosis; tuberculin skin test, culture or PCR should be done from gastric aspirates or sputum.
- bronchoscopy and bronchoalveolar lavage or lung biopsy are indicated
  - to obtain culture specimens;
  - When the clinical picture is unusual
  - when the patient is Immunocompromised

- **Viral pneumonia** 70% of cases. RSV, Influenza, Parainfluenza (most common)
- **Bacterial pneumonia** 10-30%. Streptococcal pneumonia, H. influenzae (most common)
- In infancy; staph. aureus becomes more likely in toxic patient with pneumatoceal.
- In neonates; Group B streptococci
  - E. coli
  - L. monocytogen
  - Ureaplasma. urealyticum
  - Chlamydia. trachomatis
- After 5 years; Mycoplasma. pneumonia
  - Chlamydia. pneumonia
  - Legionella

Treatment

- Treatment depends on the age of the patient and on the clinical presentation.
- Those younger than 2 months should all be hospitalized and given I.V antibiotics that cover group B streptococcus and gram negative organism and also L. monocytogen.
- Penicillin + an aminoglycoside (gentamycine) is effective.
- After the first week of life antibiotic coverage for staph. aureus should be included if there is XR evidence of effusions or pneumatoceles. e.g. Cloxacillin
- In older children drugs effective on S. pneumoniae should be used (amoxillin, ceftriaxone, Clarithromycin or trimethoprim-salfamethoxazole) for 10 days.
- Children between 5-10 of age frequently become infected with Mycoplasma. pneumoniae may be treated with erythromycin or clarithromycin, these patients are usually non febrile and may have wheeze.
- Vancomycin should be added in patient with fulminant life threatening disease or if the patient does not improve with in 24-48 hrs.
- Ribavirin aerosol for patients infected with RSV.
- Oseltamivir for patient infected with influenza virus can be given to selected patients who are very tiered or those with underlying congenital heart disease or bronchopulmonary dysplasia.
Prognosis;

- Most children recover from pneumonia rapidly and completely, Roentgenographic changes return to normal after 6-8 weeks.
- Further evaluation in children with persistent for more than 1 month, or recurrent pneumonia
  - Tuberculin skin test
  - Sweat test
  - Immunoglobulin assay,
  - Bronchoscopy and barium swallow

Foreign Body Aspiration

- Aspiration of foreign body is more common than recognized, it usually occurs in ages less than 4 years, and most mortalities are in this age group.
- Young children most commonly aspirate food, balloons, small toys and other small objects. Older children may also aspirate objects that they may hold in their mouth.

Clinical manifestations

- Clear cut history of choking (witnessed aspiration)
- or roentgenographic evidence of foreign body in the airways
- small percentage of children may have a negative history (episode of choking may be un witnessed)
- Many of foreign bodies are small and are usually coughed up
- some may remain unrecognized and may come to medical attention because of symptoms of fever, cough, sputum production and chest pain.

Physical findings

- Unilateral absence of breath sounds,
- localized wheeze
- Strider
- May be hemoptysis
- Persistent wheezing unresponsive to bronchodilators
- Persistent atelectasis
- Recurrent or persistent pneumonia
- Persistent cough with out any other explanation
- Foreign bodies tend to enter the right main bronchus more than the left, but they are also more easily coughed out from the right bronchus so many studies have found same amount of foreign bodies been removed from both sides.
- Some foreign bodies especially nuts and seeds, may migrate from place to place in the airway and even lodge in the larynx on coughing totally occluding the airway. Such migrating foreign bodies are often not associated with roentgenographic abnormalities and are difficult to detect.
- Foreign bodies may also lodge in the esophagus and cause compression of the trachea causing respiratory symptoms. An esophageal foreign body should be included in the deferential diagnosis of an infant or young child with persistent wheezing or stridor especially if associated with dysphagia.
Diagnosis

1. Roentgenographic study; expiratory or lateral decubitus chest films should be requested, fluoroscopy may be more beneficial;
   a. Radiopaque object
   b. Evidence of air trapping on expiratory film.
2. Bronchoscopy; Rigid bronchoscopy is usually performed. Flexible bronchoscopy is beneficial when the presentation is not straightforward.

Treatment;

- Bronchoscopy is both diagnostic and therapeutic.

Prevention;

- The main prevention tool is education;
- Children should not eat nuts or hard vegetables before they erupt their molars;
- Small children's toys should be free of small particles that may be aspirated.