**Pneumonia**

Pneumonia is an acute inflammation of the lungs commonly caused by bacteria, and can caused by fungi, parasites and viruses.

**Classification of pneumonia**

Community-Acquired Pneumonia (CAP): Any pneumonia acquired outside of a hospital in a community setting.

Hospital-Acquired Pneumonia (HAP): Any pneumonia acquired 48 hours after being admitted in an inpatient setting such as a hospital and not incubating at the time of admission is considered as HAP

Ventilator Associated Pneumonia (VAP): Any pneumonia acquired 48 hours after endotracheal intubation is considered as VAP.

**Aspiration pneumonia**

Aspiration pneumonia develops after the inhalation of oropharyngeal secretions and colonized organisms.

**Anatomical classification**

Lobar/focal/ nonsegmental pneumonia

Bronchopneumonia/Multifocal pneumonia

Interstitial pneumonia

**Risk factors**

Coinfection with influenza increases the risk of secondary bacterial pneumonia,

Other risk factors include local lung diseases (eg, tumors, chronic obstructive pulmonary disease [COPD], bronchiectasis), chronic gingivitis and periodontitis,

Smoking which impairs resistance to infection is another risk factor.

Individual with an altered sensorium (eg, seizures, alcohol or drug intoxication) or central nervous system (CNS) impairment (eg, stroke) may have a reduced gag reflex, which allows aspiration of stomach or oropharyngeal contents and contributes to the development of aspiration pneumonias.

Advanced age, comorbidities such as HIV/AIDS, diabetes mellitus, chronic use of steroids are other risk factors

**Etiology of bacterial pneumonia**

**Bacterial causes**

They are classified as "typical" and "atypical" organisms.

Common typical organisms include Streptococcus pneumoniae, Staphylococcus aureus, Enterococcus faecalis, Klebsiella pneumoniae, Pseudomonas aeruginosa, Haemophilus influenzae, Moraxella catarrhalis,

Atypical organisms commonly seen in clinical practice include Legionella, Mycoplasma, Chlamydia, among others

**Pathophysiology of Pneumonia**

Under a normal condition, microorganisms regularly enter airways, but many factors prevent colonization:

mucous entrapment

ciliary clearance

immune surveillance

intact epithelial barrier

secreted factors such as: secretory IgA, surfactant proteins, defensins

If the defense mechanisms are disrupted or overwhelmed, microorganisms may colonize the lungs, resulting in pneumonia

The four pathologic phases of Pneumonia are

Phase 1: Congestion: usually occurs within the first 24 hours of pneumonia. Patients will experience vascular engorgement, intra-alveolar fluid, and multiple bacteria. The lungs will be very heavy. Capillaries in the alveolar walls become congested, and the infection will spread to the hilum and pleura. During this stage, a person will experience coughing and difficult breathing

Phase 2: Red hepatization occurs a few days after congestion; the lungs will be red, firm, and airless with a resemblance to the liver. Alveolar capillaries will be engorged with blood, and vascular congestion will persist. During the red hepatization stage, the alveoli will contain many erythrocytes, neutrophils, desquamated epithelial cells, and fibrin.

Phase 3: Gray hepatization late consolidation occurs 2 to 3 days following red hepatization and lasts for 4 to 8 days. The red cells have been broken down and appear gray with liver-like consistency due to fibrinopurulent exudate, progressive disintegration of red blood cells, and hemosiderin. The macrophages begin to appear.

Phase 4: Resolution and restoration of the pulmonary architecture start by the eighth day. The enzymatic action begins centrally and spreads peripherally, which liquefies the previous solid fibrinous content and eventually restores aeration. Macrophages are the predominant cells that contain engulfed neutrophils and debris.

**Signs of bacterial pneumonia** may include the following:

Hyperthermia (fever, typically >38°C) or hypothermia (< 35°C), Tachypnea (>18 respirations/min), Use of accessory respiratory muscles, Tachycardia (>100 bpm), Central cyanosis, Altered mental status

**Investigations**

Pulse oximetry with or without cardiac monitoring, as indicated

Full blood cell count with differential

Imaging studies such as Chest radiography, Chest computed tomography scanning, Chest ultrasonography

**Management of bacterial pneumonia**

The mainstay of drug therapy for bacterial pneumonia is antibiotic treatment. First-line antimicrobials for S pneumoniae, the most prevalent cause of bacterial pneumonia, are, for the penicillin-susceptible form of the bacterium, penicillin G and amoxicillin. Other members of beta-lactam antibiotics such as cephalosporin are also Indicated in the treatment.

For the penicillin-resistant form of S pneumoniae, first-line agents are chosen on the basis of sensitivity.

Supportive measures include the following: Analgesia and antipyretics, Chest physiotherapy, Intravenous fluids, Oxygen susupplementatio