TUBERCULOSIS

- **Definition:** Chronic infective granuloma caused by tubercle bacilli.
  Two types of tubercle bacilli infect man, the human and bovine types.
  Methods of Infection
  (1) **Inhalation:** The inhaled bacilli infect the tonsils and the lungs.
  (2) **Ingestion:** Infects the tonsils or the intestine.
  (3) **Skin inoculation:** By handling infected materials.
  So the site of primary T.B. are
  (a) The tonsils.
  (b) The lungs.
  (c) The intestine
  (d) The skin.

- **Tissue Reaction In Tuberculosis**
  Two types of tissue reactions occur, a proliferative reaction composed mainly of inflammatory cells and an exudative reaction formed of excess inflammatory fluid exudate.
  I. Proliferative Tissue Reaction : collection of chronic inflammatory cells mainly the rnacrophages forming granuloma (tubercle)
  Microscopic Picture: The tubercle appears as collection of epithelioid cells (macrophages), Langhan's giant cells and lymphocytes. The center of granuloma can shows caseating necrosis.
- **II. Exudative Tissue Reaction**
  Occurs when a large number of tubercle bacilli reach a serous membrane of a sensitized individual. The reaction is characterized by excess inflammatory fluid exudate.

- **Spread of Tuberculous Infection**
  (1) ***Direct spread:*** T.B. bacilli are non-motile organisms. Macrophages carry the bacilli to surrounding tissues.
  (2) ***Lymphatic spread:*** Free bacilli or macrophages carrying the bacilli pass via the lymphatic vessels to the regional lymph nodes, causing tuberculous lymphadenitis.
  (3) ***Blood spread:*** leading to military T.B. or isolated organ T.B.
  (4) ***Intracanalicular spread:*** Spread through the lumen of a natural tube e.g. spread through the bronchi or the ureter. .

- **Pulmonary Tuberculosis**
  I. Primary Pulmonary Tuberculosis
  Is the type follows the first infection by T.B.bacilli.
  This type is frequent in children.
  Non immunized persons.
  Infection by inhalation
  Pathological Features: Primary complex formed of;
  (a) T.B.granuloma called ***Ghon 's focus.*** The focus is situated underneath the pleura. In the lower portions of the upper lobes, or upper portions of the lower lobes.
  (b) ***tuberculous lymphangitis.***
  (c) ***tuberculous lymphadenitis*** is more bigger than Ghon's focus.

- **Fate of Primary Pulmonary Complex:**
  I. Healing: by fibrosis.
- **11. Spread:** Occurs with low body resistance.
  (1) ***Direct spread:***
  (a) to lung ***tuberculous pneumonia.***
  (b) to pleura causing ***tuberculo pleurisy.***

- **(2)** ***Haematogenous spread:*** .
  (a) ***Small number of bacilli:*** Destroyed
  (b) ***Moderate number of bacilli:*** causing ***isolated organ tuberculosis.***
  (c) ***Large number of bacilli:*** causing ***miiary tuberculosis*** and is rapidly fatal.

- **(3)** ***Bronchial spread:*** causes ***tuberculous bronchopneumonia***.

- **III.** ***Encapsulation and reactivation*****:**

- **II. Secondary Pulmonary Tuberculosis (Reinfection Pulmonary Tuberculosis)**
- Second infection by T.B. bacilli
  This type is frequent in adult.
  Immunized persons.
  Infection: Is either:
  (a) *Exogenous:* Inhalation.
  (b) *Endogenous:* Reactivation of a capsulated primary focus.
  The lesion usually starts at the apex of the lung, commonly the right, in the form of a small tuberculous focus. Caseation and apical cavitation occur. Highly infectious case.

- **Course:**
  (I) ***Regression:*** Occurs with small number of bacilli and high immunity. The lesion heals by fibrosis.
  (2) ***Progression:***
  (a) Moderate number of bacilli and moderate immunity causes ***chronic fibro-caseous pulmonary tuberculosis*****.**
  (b) Large number of bacilli and low immunity causes ***acute tuberculous bronchopneumonia***

- **Complications:**
  (1) Spread of infection either by:
  (a) Blood causing miliary tuberculosis or isolated organ tuberculosis.
  (b) Direct to the pericardium and mediastinum.
  (c) Direct to the pleura causing sero-fibrinous pleurisy or tuberculous empyema.
  (2) The cavity may rupture and causes pneumothorax or pyopneumothorax.
  (3) Erosion of a vessel in a tuberculous cavity causes severe haemoptysis.
  (4) Infected sputum may cause tuberculosis of the other lung, larynx, tonsils or tongue.
  (5) Swallowing infected sputum causes intestinal tuberculosis.
  (6) Extensive lung fibrosis leads to right sided heart failure.
  (7) Secondary amyloidosis.

- **Intestinal Tuberculosis**
  There are two types of intestinal tuberculosis, primary and secondary:
  I. Primary Intestinal Tuberculosis
  Aetiology: Ingestion of bovine or human bacilli commonly in milk. Usually affect terminal ileum where they cause tuberculous lesions.
  Pathology: A primary intestinal complex occurs composed of:
  (1) ***Intestinal lesions:*** Tubercles at the terminal ileum. The covering mucosa may remain intact or falls leaving ulcers with undermined edges.
  (2) ***Tuberculous lymphangitis.***
  (3) ***Tuberculo its lymphadenitis:*** The mesenteric lymph nodes become enlarged, caseous and adherent ***(Tabes mesenterica).***
  Fate:
  (1) With good body resistance fibrosis.
  (2) With low body resistance the bacilli spread:
  (a) Direct and by lymphatics causing tuberculous peritonitis.
  (b) By blood causing isolated organ tuberculosis or miliary tuberculosis.

- **II. Secondary Intestinal Tuberculosis**
  Aetiology: Occurs mostly in adult cases of chronic pulmonary tuberculosis due to swallowing infected sputum.
  Pathology: Tuberles are in the terminal ileum. The covering mucosa is cast off leaving tuberculous ulcer. The infectiction spreads transversely along the intestinal lymphatics, so the resulting ulcer are transverse ***(girdle ulcers)***. The edges of the ulcers are undermined, the floor caseous. The ulcers heal by fibrosis. The mesenteric lymph nodes are small.
  Complications:
  (1) Intestinal haemorrhage.
  (2) Spread of infection:
  (a) direct spread cause tuberculous peritonitis.
  (b) Blood spread causes miliary tuberculosis or isolated organ tuberculosis.
  (3) Perforation of a tuberculous ulcer causes peritonitis.
  (4) Healing of the ulcers by fibrosis leads to intestinal stenosis and chronic intestinal obstruction.
  (5) Adhesions between intestinal loops may cause acute intestinal obstruction.