Tuberculosis

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Definition

- Tuberculosis (TB) is a potentially fatal contagious disease that can affect almost any part of the body but is mainly an infection of the lungs.

- Neo - Latin word :
- ”Tubercle‘:- Round nodule/Swelling
- ”Osis‘:- Condition

Etiology

- TB is caused by an organism called Mycobacterium tuberculosis that is Transmitted from person to person through the air by coughing, sneezing ..etc
- The human type (M. Tuberculosis) - Most common cause
- The Animal type (M. Bovis)
- **Characteristics Of M. tuberculosis:**
- Aerobic bacteria
- Non-motile
- Thick lipid cell wall
- Can remain dormant for years

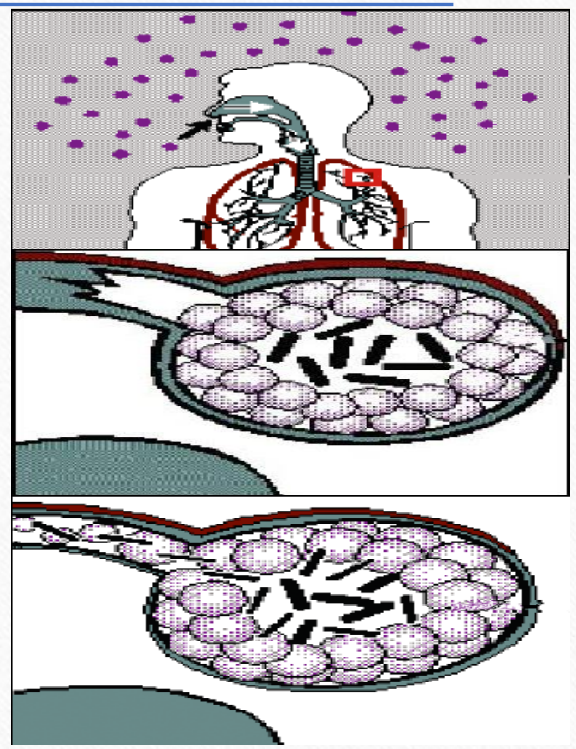
Pathophysiology

Tubercle Bacilli when inhaled from air, it will enter to Lung and Deposit in Alveoli.

A small number of tubercle bacilli enter the bloodstream and spread throughout the body. The tubercle bacilli may reach any part of the body, including areas where TB disease is more likely to develop (such as the brain, larynx, lymph node, lung, spine, bone, or kidney).

Within 2 to 8 weeks, special immune cells called macrophages ingest and surround the tubercle bacilli and form a barrier shell called granuloma.

In weaker immune system the wall will lose its integrity and bacilli will escape and spread to another alveoli or organ



Signs and Symptoms

- Persistent cough for at least 2 weeks
- Chest pains
- Hemoptysis
- Tiredness
- Night Sweats
- Urine discoloration
- Fever
- Unexplained weight loss

Diagnosis

I. **Medical History:** Physicians should ask about the patient's history of TB exposure, infection, or disease.

Also, we should determine whether the patient has medical conditions, such as HIV infection or diabetes, Because these diseases increase the risk of TB infection.

II. **TST:** tuberculin skin test (TST) can be used to test for M. tuberculosis infection by injection of fluid (Tuberculin) under the skin and according to the size of blister will indicate TB infection.

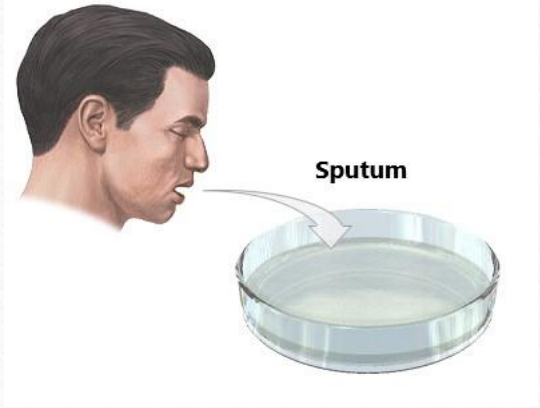
Diagnosis

III. **Chest Radiography:** X-ray is used to detect chest abnormalities such as that lungs may differ in size and shape, These abnormalities may suggest TB but cannot be used to confirm TB infection

if chest x-ray is normal. Other tests are not necessary

IV. **Sputum Culture:** a sputum sample is obtained by coughing sputum in sterile petri dish. In the Laboratory it placed under condition that allow organism to grow

Positive culture may identify the disease (Tuberculosis).



Non-Pharmacological Management

- Provide vitamins & minerals supplement
- Carefully monitoring the vital signs & symptoms
- Explain the importance of eating nutritious diet to promote healing and defense against infection
- Advise patients about the severity of disease and need for medication
- Educate patient to use tissue to cover nose and mouth while coughing and sneezing to control infection spread
- Mask Must be worn by TB patient

Pharmacological Management

- **First Line Drugs:**
  - Isoniazid
  - Rifampin
  - Pyrazinamide
  - Ethambutol
  - Streptomycin
- **Second Line Drugs:**
  - Kanamycin
  - Capreomycin
  - Ethionamide
  - Cycloserine
  - Levofloxacin

Drug	Mechanism of action	Dose	Side effects
Isoniazid	Inhibit mycolic acid synthesis.	5mg/kg/day Continued up to 6-7 months	Peripheral neuropathy Hepatotoxicity
Rifampin	Block RNA Synthesis by inhibit bacterial RNA polymerase.	10mg/kg/day continued up to 6 - 7 months	Hepatitis Renal Failure
Pyrazinamide	Inhibits fatty acid synthesis.	25mg/kg/day Continued up to 2 months	Gastrointestinal intolerance Arthralgia Arthritis
Ethambutol	Inhibit synthesis of Arabinoglycans which is essential component for bacterial cell wall.	15mg/kg/day Continued up to 2 months	Optic neuritis Hepatitis
Streptomycin	inhibition of protein synthesis by irreversible binding with bacterial 30S ribosomal subunit.	15mg/kg/day Continued up to 2 months	Ototoxicity Renal Toxicity

Treatment Protocol

- short course therapy for 6 months can be satisfactory provided
- One such regimen isoniazid + rifampin + pyrazinamide + Ethambutol or Streptomycin can be given for 2 months Then pyrazinamide and Ethambutol or Streptomycin should be stopped.
- For the remain 4 months, administer isoniazid + rifampin.

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Thank You for Attention.