

TUBERCULOSIS Pham (P)

Definition: Tuberculosis is an infection disease caused by microorganism called Mycobacterium tuberculosis. This bacteria can settle any part of body such as lung, brain, intestine, bones, skin etc., commonly affects lungs

- » Pulmonary T.B is infectious form of TB
- » In 1882 Dr. Robert Koch discovered Mycobacterium bacillus in Germany

Risk Factors:

- * low social economic status
- * crowded living condition
- * Disease that weakens immune system like HIV
- * Person on immuno suppressants → steroids
- * Health care workers
- * close contact of a person with active disease

Etiology:

TB is a curable illness of respiratory system more than 80,000 new cases are reported each year in western Europe

- * Mycobacterium TB is rod shape bacteria, each of organism include

M. Africanum

M. Microti

M. Bovis

All these cause T.B & one member of tuberculosis species the main M.T.B

Transmission

- * Mycobacterium spreads through small air born droplets called droplet nuclei generated by coughing, sneezing, talking to a person with T.B
- * Entry to mycobacterium into lungs leads to infection in the respiratory system

Pathophysiology

usually result from inhaling air born droplets of M.T.B called droplet of nuclei

- * progression to clinical disease depends on

3 Factors

- 1) * the no. of MTB organism inhaled
- 2) the virulence of organisms
- 3) The host cell mediated immune response
- 4) All the alveolar surface the bacilli was deliver by droplet nuclei.

↓
travel through respiratory tract to the alveolae
injected by pulmonary macrophages
↓
engulfment by activated alveolar macrophages, dendritic cells

if the macrophage can't do this

↓
the organism continues to multiply & replicate

↓

Macrophage eventually inputs release of many bacilli

↓

Mycobacterium then phagocytosis by macrophage ↓

Cycle continue until the host is available to multiply more

↓

during this early phase of infection

M-TB multiplies logarithmically

✓ Some of the intracellular organisms are transported from macrophage to lymph nodes.

✓ The cycle of phagocytosis and cell rupture continue during lymph node involvement in the mycobacterium may help to check.

✓ More frequently M-TB spread throughout the body through blood stream

✓ when intravascular dissemination occurs

↓

The M-TB can infect any tissue (or)

organ of the body

↓

After 1-3 months activated lymphocytes reach an adequate number and tissue

hypersensitivity result

↓

shown by tuberculin test

Reactivation of the disease

10% of the infected patient develop reactivation diseases lungs are the most common site from the reactivation.

The immune response contribute to the several of the lung damage

↓
targetted killing of immature macrophages that are allowing mycobacterium multiplication.

↓
killing the host cell & locally thromboses blood vessel

↓
killing the mycobacterium, macrophage and neutrophils enter to release the cytokines and lysosomes the infectious foci

↓
toxic mixture surround the alveoli and airway

↓
Regional necrosis (or) spectral damage / collapse

↓
Cough out producing droplet nuclei.

* If left untreated pulmonary T.B.

continuous and destroy the lungs result in hypoxia and that result in

↓
Respiratory acidosis

↓ leads
death

Sign & symp

Inactive T.B:-

Called latent TB it is non-contagious

Active T.B:-

This condition makes the person sick & spread to others.

- * Cough that last for 3 or more months
- * Coughing of blood
- * Chest pain / pain with breathing
- * Fever, ^{night} sweats, weight loss, fatigue

Diagnosis

a) Simple skin test

Mantoux test is preferred TB skin test uses tuberculin purified protein derivative (PPD) of *M. tuberculosis*

Small amount of P.T.B of tuberculin is injected into the skin within 40-72 hours a hard mixed red bump likely to have TB

- 1) The size of the bump determine the TB
- 2) Imaging studies
- 3) Sputum test

TREATMENT

Non-Pharmacological treatment:-

Rehabilitation | prevent spread of TB

Nutritional support services

Surgery

Vaccination (VCG)

Education

Exercise training

provide vitamins & mineral supplements when required
good cough hygiene

pharmacological treatment

1st line drugs :-

Isoniazid - 300mg

Rifampacin - 600mg

Rifabutin - 300mg

Pyrazinamide - 100 to 500mg

Ethambutol - 800mg

Secondline drugs

Cycloserine - Adult dose - 1g in 2 divided dose

Ethionamide - 1g a day - 2 divided dose

Streptomycin - 1g vial 11/1mg

Ampicillin - 500mg