TUBERCULOSIS

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Introduction

- **Tuberculosis (TB) is one of the most** prevalent infections of human beings and contributes considerably to illness and death around the world. It is spread by inhaling tiny droplets of saliva from the coughs or sneezes of an infected person. It is a slowly spreading, chronic, granulomatous bacterial infection, characterized by gradual weight loss.
- TB is the world's second most common cause of death from infectious disease after HIV/AIDS.

DEFINITION

- Tuberculosis is the infectious disease primarily affecting lung parenchyma is most often caused by **Mycobacterium Tuberculosis**. It may spread to any part of the body including meninges, kidney, bones and lymph-nodes.

TYPES

1. PULMONARY TUBERCULOSIS
2. AVIAN TUBERCULOSIS (Micobacterium avium; of birds)
3. BOVINE TUBERCULOSIS (Mycobacterium bovis; of cattle)
4. MILIARY TUBERCULOSIS /DISSEMINATED TUBERCULOSIS (Invade the blood stream and spread to all body organs.

INCEDENTS

- With the increased incidence of AIDS, TB has become a great problem in the U.S., and the world.
- India is the highest TB burden country in the world, home to 20 percent of cases occurring globally.
- Each year 1.8 million develop TB.
- In India 0.37 million people die because of TB every year.

Risk factors

- Close contact with some one who have active TB.
- Immuno compromised status (elderly, cancer)
- Drug abuse and alcoholism.
- People lacking adequate health care.
- Pre existing medical conditions (diabetes mellitus, chronic renal failure).
- Immigrants from countries with higher incidence of TB.
- Institutionalization (long term care facilities)
- Living in substandard conditions.
- Occupation (health care workers)

PATHOPHYSIOLOGY

- (Initial infection or primary infection)

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- Entry of micro organism through droplet nuclei

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- Bacteria is transmitted to alveoli through airways

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- Deposition and multiplication of bacteria

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- Bacilli are also transported to other parts of the body via blood stream and phagocytosis by **neutrophils and macrophages**

PATHOPHYSIOLOGY

Mycobacteriam

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Pulmonary alveoli

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Immune system has lodged in (Alveolar Macrophages)

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Detects presence of pathogen and engoulph the bacteria

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Mycobacterium bacteria inhibits the Macrophages (phagosome+ Lysosome) to forms phagolysosome and remains protected inside the macrophages.

PATHOPHYSIOLOGY

Starts replication inside macrophages.

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Primary infection occurs.

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Cell mediated immunity gets activated, surrounds the cell to forms granuloma (3weeks)

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Leads to necrosis of tissues at infection site(TERMINUS GONE FOCUS)

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Involve nearby lymph nodes (CONE COMPLEX)

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Calcification of cone complex(LATENT T.B.)

CLINICAL MENIFESTATION

CONSTITUTIONAL SYMPTOMS

- Anorexia
- Low grade fever
- Night sweats
- Fatique
- Weight loss

CONT…

PULMONARY SYMPTOMS

- Dyspnea
- Non resolving bronchopneumonia
- Chest tightness
- Non productive cough
- Mucopurulent sputum with hemoptpysis
- Chest pain
- EXTRA PULMONARY SYMPTOMS
- Pain
- Inflammation

ASSESSMENT AND DIAGNOSIS

- HISTORY COLLECTION
- PHYSICAL EXAMINATION
- Clubbing of the fingers or toes (in people with advanced disease)
- Swollen or tender lymph nodes in the neck or other areas
- Fluid around a lung (pleural effusion)
- Unusual breath sounds (crackles)

- IF MILIARY TB;
- Physical exam may show:
- Swollen liver
- Swollen lymph nodes
- Swollen spleen

Tests may include:

- Biopsy of the affected tissue (rare)
- Bronchoscopy
- Chest CT scan
- Chest x-ray
- Interferon-gamma release blood test such as the QFT-Gold test to test for TB infection
- Sputum examination and cultures
- Thoracentesis
- Tuberculin skin test (also called a PPD test)

QUANTIFERON GOLD TEST

- QFT-Gold test measures interferon-gamma in the testee's blood after incubating the blood with specific antigens from M. Tuberculosis proteins.

TUBERCULIN SKIN TEST:-

- 0.1 ml of PPD is injected forearm (s/c)
- After 48-72 hrs check for induration at the site
- If induration is equal to and more than 10mm:-Positive

COMPLECATION

- **Bones.** Spinal pain and joint destruction may result from TB that infects your bones(TB spine or pot's spine)
- Brain(meningitis)
- Liver or kidneys
- Heart(cardiac tamponade)
- Pleural effusion
- Tb pneumonia
- Serious reactions to drug therapy(hepato-toxicity; hypersentivity)

MEDICAL MANAGEMENT

PULMONARY TB is treated primarily with antituberculosis agents for 6 to 12 months.

- ***Pharmacological management***
- **First line antitubercular medications**
- **Streptomycin** 15mg/kg/day.
- **Isoniazid** or INH (Nydrazid) 5 mg/kg (300 mg max/day)
- **Rifampicin** 10 mg/kg/day.
- **Pyrazinamide** 15 – 30 mg/kg/day.
- **Ethambutol** (Myambutol) 15 -25 mg/kg daily for 8 weeks and continuing for up to 4 to 7 months

Second line medications

- Capreomycin 12 -15 mg/kg
- Ethionamide 15mg/kg
- Para-aminosalycilate sodium 200 - 300 mg/kg
- Cycloserine 15 mg/kg
- **Vitamin b(pyridoxine) usually adminstered with INH**

THIRD LINE DRUGS

- Other drugs that may be useful, but are not on the WHO list of SLDs:
- Rifabutin
- Macrolides:e.g.,clarithromycin (CLR)
- Linezolid(LZD)
- Thioacetazone(T)
- Thioridazine
- Arginine

DOTS

DOTS (directly observed treatment, short-course), is the name given to the World Health Organization-recommended tuberculosis control strategy that combines five components:

1. Government commitment (including both political will at all levels, and establishing a centralized and prioritized system of TB monitoring, recording and training)
2. Case detection by sputum smear microscopy
3. Standardized treatment regimen directly observed by a healthcare worker or community health worker for at least the first two months
4. A regular drug supply
5. A standardized recording and reporting system that allows assessment of treatment results

- **DOT** is especially critical for patients with drug resistant TB, HIV-infected patients, and those on intermittent treatment regimens (i.e., 2 or 3 times weekly).

Multiple-drug therapy

- Means taking several different antitubercular drugs at the same time.
- The standard treatment is to take isoniazid, rifampin, ethambutol, and pyrazinamide for 2 months. Treatment is then continued for at least 4months with fewer medicines

NURSING MANAGEMENT

- Assessment
- Obtain history of exposure to TB
- Assess for symptoms of active disease
- Auscultate lungs for crackles
- During drug therapy assess for liver function

NURSING DIAGNOSIS

1. **Ineffective breathing pattern related to pulmonary infection and potential for long term scarring with decreased lung capacity**

- ***Interventions***
- Administer and teach self administration of medications ordered
- Encourage rest and avoidance of exertion
- Moniter breath sounds respiratory rates , sputum production and dyspnoea
- Provide supplymental oxygen as ordered
- Encourage increased fluid intake
- Instruct about best position to facilitate drainage

2. Risk for spreading infection related to nature of disease and patients symptoms

- Be aware that TB is transmitted by respiratory droplets
- Use high efficiency particulate masks for high risk procedures including endoscopy
- Educate patient to control the spread of infection by covering mouth and nose while coughing and sneezing
- Isolation of patient
- Instruct about risk of drug resistance if drug regimen is not strictly and continuosly followed
- Carefully moniter vital signs and observe for temperature changes

3. Imbalanced nutrition less than body requirement related to poor appetite ,fatigue and productive cough

- Explain the importance of eating nutritious diet to promote healing and defense against infection
- Provide small frequent meals
- Moniter weight of the patient
- Administer vitamin supplyments as ordered

4. Non compliance related to lack of motivation and lack of treatment

- Educate patient about etiology transmission and effects of TB
- Review adverse effects of drug therapy
- Participate in observation of medicine taking, weekly pill counts or programmes designed to increase compliance with the treatment for TB
- Explain that TB is a communicable disease and that taking medications is most effective way of preventing transmission
- Instruct about medications schedule and side effects

Prevention

- ISOLATION
- Ventilate the room
- Cover the mouth
- Wear mask
- Finish entire course of medication
- Vaccinations

Summarization

References

Thank you