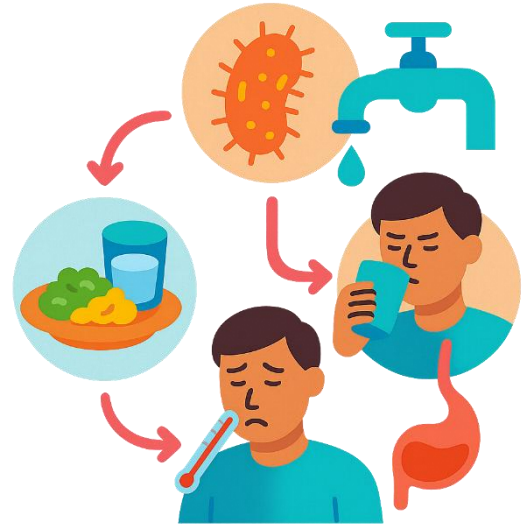


Typhoid

Introduction

- Typhoid fever is a bacterial infectious disease caused primarily by *Salmonella enterica* serotype Typhi.
- It mainly affects the intestinal tract and bloodstream and is common in regions with poor sanitation and limited access to clean water.
- Typhoid is a systemic infection, meaning it can affect multiple organs and systems in the body.



Causative Agent

- **Bacterium:** *Salmonella typhi* (a Gram-negative, rod-shaped bacterium).
- **Related species:** *Salmonella paratyphi* A, B, and C cause a milder illness called paratyphoid fever.
- **Characteristics:**
 - Facultative anaerobe (can live with or without oxygen).
 - Motile due to flagella.
 - Survives for weeks in water or dried sewage.

Mode of Transmission

- **Route:** Fecal-oral route.
- **Sources of infection:**
 - Consuming contaminated food or water.
 - Close contact with infected individuals or carriers (people who harbor the bacteria without symptoms).
- **Carriers:** The bacteria can persist in the **gall bladder** of chronic carriers for months or years. Example: "Typhoid Mary" (Mary Mallon), a famous carrier.

Incubation Period

- Usually **7–14 days**, but may range from **3 to 30 days** depending on dose and immune status.

Pathophysiology

1. After ingestion, *S. typhi* invades the small intestine and penetrates the intestinal mucosa.
2. It enters the lymphatic system and then the bloodstream (bacteremia).
3. The bacteria multiply in the liver, spleen, bone marrow, and gall bladder.
4. They re-enter the intestines, causing ulceration and bleeding in the intestinal walls.

Symptoms

1. First week:

- High, step-ladder type fever (increases day by day).
- Headache, weakness, body pain.
- Loss of appetite, constipation.

2. Second week:

- Continuous high fever (up to 104°F).
- **Rose spots** on the abdomen and chest.
- Enlarged spleen and liver.
- Abdominal pain and diarrhea (sometimes constipation).

3. Third week:

- Severe intestinal ulceration leading to **intestinal perforation** or **bleeding**.
- Delirium or “typhoid state” (patient appears weak, confused, semi-conscious).

4. Convalescence (recovery):

- Slow recovery, fatigue may persist for weeks.

Diagnosis

- **Blood culture:** Detects *S. typhi* in the first week.
- **Widal test:** Detects antibodies (agglutination test).
- **Stool and urine culture:** Used in later stages.
- **PCR (Polymerase Chain Reaction):** For rapid and specific detection.

Treatment

- **Antibiotics:** Ciprofloxacin, Azithromycin, or Ceftriaxone (depending on resistance pattern).
- **Supportive care:** Fluid replacement, proper nutrition, rest.
- **Severe cases:** Hospitalization with IV antibiotics.

Prevention

- **Vaccination:** Typhoid vaccines (Ty21a oral vaccine, Vi polysaccharide injectable vaccine).
- **Hygiene:** Wash hands before meals and after using the toilet.
- **Safe water:** Boil or filter drinking water.
- **Proper sanitation:** Avoid open defecation and maintain food hygiene.

Complications

- Intestinal bleeding or perforation.

- Encephalopathy (brain involvement).
- Myocarditis (heart inflammation).
- Chronic carrier state (bacteria remain in gall bladder).

Tuberculosis (TB)

Introduction

- Tuberculosis is a chronic bacterial infectious disease caused by *Mycobacterium tuberculosis*.
- It primarily affects the lungs (pulmonary tuberculosis) but can also spread to other parts of the body such as the kidneys, spine, brain, and lymph nodes (extrapulmonary TB).
- TB is one of the world's leading causes of death from infectious diseases.



Causative Agent

- **Bacterium:** *Mycobacterium tuberculosis*.
- **Characteristics:**
 - Acid-fast bacillus (retains color when stained by acid-fast stain).
 - Slow-growing organism.
 - Resistant to drying and mild disinfectants.
 - Obligate aerobe (needs oxygen).

Mode of Transmission

- **Airborne transmission:** Spread through droplets when an infected person coughs, sneezes, or speaks.
- **Entry point:** Inhalation of infected droplets leads to infection in the lungs.
- **Not spread by:** Handshakes, sharing food, or touching surfaces.

Incubation Period

- Variable; typically **2–12 weeks** after exposure, but symptoms may appear months or years later if immunity weakens.

Pathophysiology

1. Inhaled bacteria reach the **alveoli** in the lungs.
2. **Macrophages** engulf the bacteria but cannot destroy them completely.

3. The bacteria multiply inside macrophages and form **granulomas** (tubercles) to contain the infection.
4. When immunity weakens, bacteria can become active again, causing **active tuberculosis**.
5. If not controlled, the bacteria can spread through blood or lymph to other organs (miliary TB).

Types

1. Latent TB infection (LTBI):

- Bacteria are present but inactive.
- No symptoms.
- Non-contagious.

2. Active TB disease:

- Bacteria multiply actively.
- Symptoms are present.
- Contagious.

Symptoms (Active TB)

- Persistent cough for more than 3 weeks.
- Blood-stained sputum.
- Chest pain and breathing difficulty.
- Fever and night sweats.
- Weight loss and loss of appetite.
- Fatigue and weakness.

Diagnosis

- **Sputum microscopy:** Ziehl–Neelsen staining for acid-fast bacilli.
- **Chest X-ray:** Shows lung lesions or cavities.
- **Mantoux test (Tuberculin skin test):** Measures immune response to TB antigen.
- **Interferon Gamma Release Assays (IGRAs):** Blood test for latent infection.
- **Culture tests:** Confirms and checks antibiotic sensitivity.
- **Molecular tests:** e.g., GeneXpert for rapid detection and drug resistance.

Treatment

A. Standard regimen (DOTS – Directly Observed Treatment Short-course):

- Intensive phase (2 months): Isoniazid (INH), Rifampicin, Pyrazinamide, Ethambutol.
- Continuation phase (4 months): Isoniazid and Rifampicin.

B. For drug-resistant TB (MDR-TB, XDR-TB):

- Use of second-line drugs (e.g., Bedaquiline, Linezolid).

C. Supportive therapy:

- Nutrition, rest, and regular follow-up.

Prevention

- **BCG vaccine:** Given at birth; protects mainly against severe forms in children.
- **Early diagnosis and treatment:** To prevent spread.
- **Ventilation:** Ensure open windows and sunlight exposure (TB bacteria are killed by UV light).
- **Respiratory hygiene:** Cover mouth when coughing or sneezing.

Complications

- Lung damage and fibrosis.
- Pleural effusion (fluid around lungs).
- Miliary TB (spread to multiple organs).
- TB meningitis (infection of brain membranes).
- Drug resistance due to incomplete treatment.

Malaria

Introduction

- Malaria is a life-threatening parasitic disease transmitted to humans through the bite of infected female *Anopheles* mosquitoes.
- It is caused by *Plasmodium* species that infect and destroy red blood cells.
- Malaria is one of the most ancient and significant diseases in human history, particularly prevalent in tropical and subtropical regions.



Causative Agent

- **Protozoan parasite:** *Plasmodium* genus.
- **Main species infecting humans:**
 1. *Plasmodium falciparum* — most severe and often fatal.
 2. *Plasmodium vivax* — causes relapses due to dormant liver forms.
 3. *Plasmodium malariae* — chronic infection, low-grade symptoms.



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