Infectious diseases

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Infectious Diseases

1. **Meningitis**
2. **Typhoid**
3. **Leprosy**
4. **Tuberculosis**

- Infectious Diseases Are Illnesses Caused By Pathogenic Microorganisms, Such As **Bacteria, Viruses, Fungi, And Parasites**, That Invade The Body And Multiply.
- These Diseases Can Be Spread In Various Ways And Range From Mild To Life-threatening Conditions.

1. Meningitis

S.No	Heading	Details
1	**Definition**	Inflammation of the meninges (protective membranes covering brain & spinal cord).
2	**Types**	Bacterial, Viral, Fungal, Parasitic, Tuberculous (TB), Aseptic.
3	**Severity**	Bacterial = medical emergency; Viral = usually mild.
4	**Transmission**	Respiratory droplets, close contact, bloodstream spread.
5	**Clinical Features**	Fever, headache, stiff neck, photophobia, vomiting, altered mental status.

I. Etiology of Meningitis

S.No	Type	Common Causative Agents
1	**Bacterial**	Neisseria meningitidis, Streptococcus pneumoniae, Haemophilus influenzae, Listeria monocytogenes, Group B Streptococci.
2	**Viral**	Enteroviruses, Herpes simplex virus, Varicella, Mumps, HIV.
3	**Tuberculous (TB)**	Mycobacterium tuberculosis.
4	**Fungal**	Cryptococcus neoformans, Histoplasma, Candida.
5	**Parasitic**	Naegleria fowleri, Toxoplasma gondii.
6	**Non-infectious / Aseptic**	Drugs (NSAIDs, antibiotics), cancer, autoimmune disorders.

II. Pathogenesis of Meningitis

III. Diagnostic Tests for Meningitis

S.No	Diagnostic Test	Purpose / Findings
1	**Lumbar Puncture (CSF Analysis)**	Gold standard—checks WBC, glucose, protein, culture.
2	**CSF Culture / Gram Stain**	Identifies bacteria.
3	**CSF PCR**	Detects viral, TB, fungal pathogens.
4	**Blood Culture**	Identifies systemic infection source.
5	**CBC**	Elevated WBC count.
6	**C-reactive Protein (CRP)**	Elevated in bacterial meningitis.
7	**CT/MRI Brain**	Rule out abscess, increased intracranial pressure.

IV. Treatment of Meningitis

S.No	Type of Meningitis	Treatment
1	**Bacterial**	Immediate IV antibiotics: Ceftriaxone/Cefotaxime + Vancomycin; add Ampicillin for Listeria. Dexamethasone to reduce inflammation.
2	**Viral**	Supportive care; IV Acyclovir for HSV meningitis.
3	**TB Meningitis**	Anti-TB drugs: HRZE (Isoniazid, Rifampicin, Pyrazinamide, Ethambutol) + corticosteroids.
4	**Fungal**	Amphotericin B + Flucytosine; Fluconazole for maintenance.
5	**Parasitic**	Amphotericin B (for Naegleria), antiparasitic drugs.
6	**Supportive Treatment**	IV fluids, analgesics, antipyretics, anticonvulsants, oxygen therapy.
7	**Prevention**	Vaccines: Hib, Meningococcal, Pneumococcal vaccines.

2. Typhoid

S.No	Heading	Details
1	**Definition**	Typhoid fever is a systemic infectious disease caused by Salmonella typhi, characterized by prolonged fever, abdominal pain, and intestinal involvement.
2	**Transmission**	Feco-oral route through contaminated food/water.
3	**Incubation Period**	7–14 days.
4	**Affected System**	Gastrointestinal tract → bloodstream → multiple organs.
5	**Key Symptoms**	Step-ladder fever, abdominal pain, rose spots, diarrhea/constipation, hepatosplenomegaly.

I. Etiology of Typhoid

S.No	Category	Details
1	**Causative Agent**	Salmonella enterica serotype Typhi (most common).
2	**Related Organisms**	Salmonella Paratyphi A, B, C (cause paratyphoid fever – milder).
3	**Source**	Infected humans (carriers/hospital cases).
4	**Mode of Spread**	Contaminated water, food, poor sanitation, poor hygiene.
5	**Risk Factors**	Overcrowding, unsafe drinking water, poor hand hygiene, travel to endemic areas.

II. Pathogenesis of *Typhoid*

III. Diagnostic Tests for Typhoid

S.No	Diagnostic Test	Purpose / Findings
1	Blood Culture	Gold standard; positive in 1st week.
2	Widal Test	Detects antibodies (TO, TH); used after 1st week, but low specificity.
3	TyphiDot / Rapid Tests	Detect IgM/IgG antibodies quickly.
4	Stool Culture	Positive in 2nd–3rd week.
5	Urine Culture	May detect organism in later stages.
6	CBC	Leukopenia, anemia, relative lymphocytosis.
7	Bone Marrow Culture	Most sensitive; positive even after antibiotics.

IV. Treatment of Typhoid

S.No	Category	Drugs / Management
1	**First-line Antibiotics**	Ceftriaxone, Cefotaxime, Ciprofloxacin (where sensitive).
2	**Drug-resistant Typhoid**	Azithromycin, Cefixime; for XDR strains: Meropenem.
3	**Supportive Treatment**	ORS/IV fluids, antipyretics (paracetamol), nutrition.
4	**Severe Case Management**	Hospitalization, IV antibiotics, monitoring for complications.
5	**Prevention**	Typhoid vaccines (Vi polysaccharide, Typhoid conjugate vaccine TCV), safe water, hygiene.

3. Leprosy

S.No	Heading	Details
1	**Definition**	Leprosy (Hansen's disease) is a chronic infectious disease caused by Mycobacterium leprae, affecting skin, peripheral nerves, eyes, and mucosa.
2	**Nature**	Slowly progressive; leads to sensory loss and deformities if untreated.
3	**Transmission**	Prolonged close contact; respiratory droplets from untreated cases.
4	**Incubation Period**	Long (2–10 years).
5	**Systems Affected**	Skin, nerves, eyes, upper respiratory tract.

I. Etiology of Leprosy

S.No	Category	Details
1	**Causative Agent**	Mycobacterium leprae (acid-fast bacillus).
2	**Mode of Transmission**	Inhalation of droplets, long-term contact with infected individuals.
3	**Reservoir**	Humans (primary), armadillos (in some countries).
4	**Risk Factors**	Poor immunity, malnutrition, overcrowding, genetic susceptibility (HLA-linked), close household contact.
5	**Types (Cause-Based)**	- Paucibacillary (PB): Low bacterial load - Multibacillary (MB): High bacterial load

II. Pathogenesis of Leprosy

PATHOGENESIS OF LEPROSY

TRANSMISSION

↓

INITIAL COLONIZATION

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PROLIFERATION IN SCHWANN CELLS

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INFECTION OF MACROPHAGES

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IMMUNE RESPONSE

↓

TISSUE DAMAGE

III. Diagnostic Tests for Leprosy

S.No	Diagnostic Test	Purpose / Findings
1	**Clinical Examination**	Skin lesions with sensory loss, nerve thickening.
2	**Skin Smear (AFB Test)**	Detects acid-fast bacilli; positive in MB leprosy.
3	**Skin Biopsy**	Histopathology (granulomas, AFB presence).
4	**Lepromin Test**	Measures immune response; positive in tuberculoid type.
5	**PCR Test**	Detects M. leprae DNA (high sensitivity).
6	**Nerve Conduction Studies**	Assess peripheral nerve damage.

III. Treatment of Leprosy

S.No	Category	Treatment / Drugs
1	**WHO Multi-Drug Therapy (MDT)**	PB Leprosy: Rifampicin + Dapsone (6 months) MB Leprosy: Rifampicin + Clofazimine + Dapsone (12 months)
2	**Anti-inflammatory**	Prednisolone for nerve pain, lepra reactions.
3	**Clofazimine**	Anti-inflammatory and anti-mycobacterial.
4	**Supportive Therapy**	Physiotherapy, skincare, ulcer prevention.
5	**Surgery**	For deformities (reconstructive surgery).
6	**Prevention**	Early detection, MDT, contact tracing; BCG offers partial protection.

4. Tuberculosis

S.No	Heading	Details
1	Definition	Tuberculosis is a chronic infectious disease caused by Mycobacterium tuberculosis, primarily affecting the lungs (pulmonary TB), but can involve any organ (extra-pulmonary TB).
2	Mode of Transmission	Airborne droplets via coughing, sneezing, talking.
3	Affected Organs	Lungs (most common), lymph nodes, bones, kidneys, CNS, GI tract.
4	Pathology	Formation of granulomas and caseous necrosis in infected tissues.
5	Key Feature	Slow-progressing infection due to intracellular survival of bacteria.

II. Etiology of Tuberculosis

S.No	Type	Causative Agent / Risk Factor
1	**Causative Agent**	Mycobacterium tuberculosis (main), M. bovis, M. africanum.
2	**Mode of Spread**	Inhalation of infected aerosols, rarely ingestion of infected milk (M. bovis).
3	**Risk Factors**	HIV/AIDS, malnutrition, diabetes, smoking, alcoholism, overcrowding, poverty, immunosuppression, chronic diseases.
4	**Predisposing Conditions**	Silicosis, renal failure, malignancy, long-term steroid therapy.

II. Pathogenesis of Tuberculosis

III. Diagnostic Tests for Tuberculosis

S.No	Test / Method	Purpose / Findings
1	**Tuberculin Skin Test (Mantoux)**	Detects delayed hypersensitivity to TB antigen.
2	**Chest X-ray**	Shows consolidation, cavitation, nodules, lymphadenopathy.
3	**Sputum AFB (Acid Fast Bacilli)**	Direct smear to detect mycobacteria.
4	**CBNAAT / GeneXpert**	Rapid molecular test for TB and rifampicin resistance.
5	**Culture (Löwenstein–Jensen)**	Gold standard; confirms TB and drug sensitivity.
6	**IGRA (Interferon Gamma Release Assay)**	Used in latent TB; unaffected by BCG vaccine.
7	**CT / MRI**	Helpful in extra-pulmonary TB like CNS or bone involvement.

IV. Treatment of Tuberculosis

S.No	Type of TB	Treatment
1	**Drug-Sensitive TB (DOTS Regimen)**	2 months Intensive Phase (HRZE): Isoniazid (H), Rifampicin (R), Pyrazinamide (Z), Ethambutol (E) → 4 months Continuation Phase (HR).
2	**MDR-TB (Multi-Drug Resistant)**	Second-line drugs: Fluoroquinolones (Levofloxacin), Amikacin, Linezolid, Clofazimine, Cycloserine.
3	**XDR-TB**	Advanced regimen: Bedaquiline, Delamanid, Linezolid.
4	**Latent TB**	Isoniazid for 6–9 months OR Rifampicin-based therapy.
5	**Supportive Treatment**	Nutrition, hydration, management of symptoms, oxygen if needed.
6	**Prevention**	BCG vaccination, mask use, good ventilation, early detection.

Thank you