Infectious Diseases

Meningitis – Pharmacotherapeutics

Definition and Overview

- **Meningitis** is inflammation of the **meninges (protective membranes covering brain and spinal cord)**.
- It is a medical emergency, especially in bacterial cases.
- **Can be:**
  - Bacterial (severe, life-threatening)
  - Viral (less severe)
  - Fungal (in immunocompromised patients)

Common Causative Organisms

- **Bacterial**:
  - *Neisseria meningitidis*
  - *Streptococcus pneumoniae*
  - *Haemophilus influenzae*
- **Viral**: Enteroviruses
- **Fungal**: *Cryptococcus neoformans*

First Hope

Etiopathogenesis

- Pathogens enter bloodstream → cross blood-brain barrier
- Cause inflammation of meninges
- Increased intracranial pressure and neuronal damage

Clinical Features

- High fever
- Severe headache
- Neck stiffness (classic sign)
- Photophobia (light sensitivity)
- Vomiting
- Altered mental status
- Seizures (in severe cases)

Goals of Pharmacotherapy

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- Rapid eradication of infection
- Reduce inflammation
- Prevent neurological complications

Drug Therapy



1. Empirical Therapy (Immediate)

- **IV broad-spectrum antibiotics:** Ceftriaxone or Cefotaxime + Vancomycin
- Start before culture results

2. Definitive Therapy

- **Based on organism:**
  - *Neisseria*: Penicillin or Ceftriaxone
  - *Streptococcus pneumoniae*: Ceftriaxone + Vancomycin
  - *H. influenzae*: Ceftriaxone

3. Adjunct Therapy

- **Dexamethasone**: Reduces inflammation and complications

4. Fungal Meningitis

- Amphotericin B + Flucytosine

Duration of Therapy

- Usually 7–14 days (longer in some cases)

Monitoring Parameters

- Neurological status
- Fever
- CSF (cerebrospinal fluid) findings
- Renal function (drug toxicity)

Patient-Specific Considerations

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- Age (neonates need different regimen)
- Immunocompromised patients
- Renal function for dose adjustment

Important Clinical Points

- Immediate treatment is critical
- Delay can lead to brain damage or death
- Vaccination helps prevent some types

HIV and Opportunistic Infections – Pharmacotherapeutics

Definition and Overview

- **HIV** (Human Immunodeficiency Virus) attacks the immune system, especially **CD4 T-cells**.
- Leads to **AIDS (Acquired Immunodeficiency Syndrome)** if untreated.
- Opportunistic infections occur due to weakened immunity.

Common Opportunistic Infections

- Tuberculosis
- Pneumocystis pneumonia (PCP)
- Candidiasis
- Toxoplasmosis
- Cryptococcal meningitis

Goals of Pharmacotherapy

- Suppress viral replication
- Restore immune function
- Prevent and treat opportunistic infections

Antiretroviral Therapy (ART)

Classes of Drugs

1. **NRTIs (Nucleoside Reverse Transcriptase Inhibitors)**
    - **Examples:** Zidovudine, Lamivudine, Tenofovir
2. **NNRTIs**
    - **Example:** Efavirenz
3. **Protease Inhibitors**

First Hope

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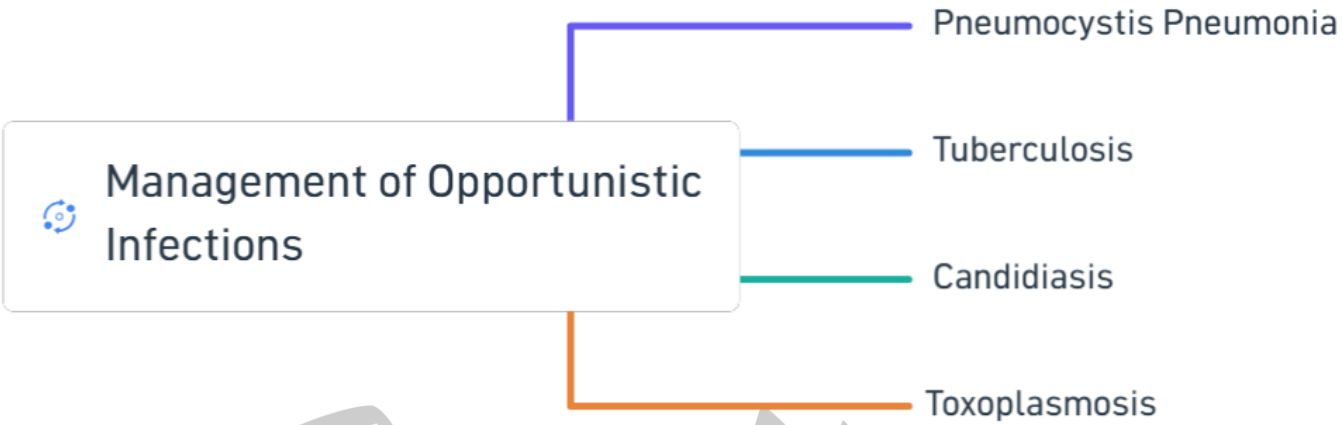
- **Example:** Ritonavir

4. **Integrase Inhibitors**
    - **Example:** Dolutegravir (commonly used)

Standard Regimen

- **Combination of 3 drugs:**
    - Example: Tenofovir + Lamivudine + Dolutegravir (TLD)

Management of Opportunistic Infections



1. **Pneumocystis pneumonia (PCP)**
    - TMP-SMX (first-line)
2. **Tuberculosis**
    - Standard anti-TB therapy
3. **Candidiasis**
    - Fluconazole
4. **Toxoplasmosis**
    - Pyrimethamine + Sulfadiazine

Prophylaxis of Opportunistic Infections

- TMP-SMX for PCP prevention (low CD4 count)
- Isoniazid for TB prophylaxis

Monitoring Parameters

- CD4 count
- Viral load
- Drug adherence
- Side effects

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Patient-Specific Considerations

- Lifelong therapy required
- Drug interactions (especially with TB drugs)
- Pregnancy considerations
- Adherence is critical

Important Clinical Points

- Early initiation of ART improves survival
- Combination therapy prevents resistance
- Regular monitoring is essential

Rheumatic Fever – Pharmacotherapeutics

Definition and Overview

- **Rheumatic fever** is an inflammatory disease that occurs as a complication of untreated Group a Streptococcal throat infection.
- **It mainly affects:**
    - Heart (carditis)
    - Joints (arthritis)
    - Brain (chorea)
    - Skin

First Hope

Etiopathogenesis

- **Autoimmune reaction:**
    - Antibodies formed against *Streptococcus* cross-react with body tissues
- Leads to inflammation, especially in heart valves
- Can cause permanent valvular damage (rheumatic heart disease)

Clinical Features (Jones Criteria)

A. Major Manifestations

- Carditis (inflammation of heart)
- Polyarthritis (migratory joint pain)
- Sydenham's chorea (involuntary movements)
- Erythema marginatum (skin rash)

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