Management of Opportunistic Infections in HIV/AIDS

HIV progressively depletes CD4+ T lymphocytes, weakening the immune system. As the CD4 count declines, patients become increasingly susceptible to opportunistic infections (OIs) and certain malignancies. Effective management of OIs is crucial to reduce morbidity and mortality in HIV-positive patients.

General Principles

- Opportunistic infections typically respond to conventional antimicrobial therapies but may require longer treatment durations or higher doses compared to HIV-negative patients.
- Prophylaxis strategies are critical and often based on CD4 thresholds.
- Early diagnosis and prompt treatment improve outcomes.

Common Opportunistic Infections in HIV/AIDS

1. Pneumocystis jirovecii Pneumonia (PJP)

Epidemiology:
Occurs primarily when CD4 count falls below 200 cells/µL.

Clinical Presentation:

- Subacute onset of progressive dyspnea on exertion
- Nonproductive cough
- Fever
- Chest discomfort

Diagnosis:

- Chest X-ray: Bilateral, diffuse interstitial infiltrates
- Bronchoalveolar lavage (BAL) with staining to identify P. jirovecii
- Elevated serum lactate dehydrogenase (LDH) common but nonspecific

Treatment:

- First-line: Trimethoprim-sulfamethoxazole (TMP-SMX)
    - Dosage: 15–20 mg/kg/day TMP divided every 6–8 hours for 21 days
- Adjunctive corticosteroids (prednisone) recommended for moderate to severe cases (PaO2 <70 mmHg or A-a gradient >35 mmHg):
    - Prednisone 40 mg twice daily for 5 days, then 40 mg daily for 5 days, followed by 20 mg daily for 11 days
- Alternatives for mild-to-moderate disease or TMP-SMX intolerance:
    - Atovaquone, clindamycin plus primaquine, or intravenous pentamidine

Adverse Effects:

- TMP-SMX hepatotoxicity may occur, characterized by rash, eosinophilia, and hypersensitivity features.

Prophylaxis:

- Indicated if CD4 <200 cells/µL
- Discontinued when CD4 >200 cells/µL for at least 3–6 months on ART

2. Bacterial Pneumonia

Common Pathogens:

- Streptococcus pneumoniae is the most frequent cause.

Management:

- Empiric treatment with ampicillin or penicillin for susceptible strains
- Add gentamicin or use TMP-SMX in resistant or unresponsive cases

3. Diarrheal Illnesses

Management:

- Correction of dehydration is critical.
- Treatment depends on the causative agent (bacterial, protozoal, or viral).
- Empiric therapy may include TMP-SMX plus metronidazole or chloramphenicol plus metronidazole.

4. Cytomegalovirus (CMV) Infection

Epidemiology:

- Occurs mainly in patients with CD4 <50 cells/µL.

Clinical Manifestations:

- Retinitis: Blurred or double vision, visual field defects
- Colitis: Diarrhea with possible bleeding
- Esophagitis: Odynophagia, retrosternal pain; endoscopy shows shallow ulcers
- Encephalitis: Altered mental status, cranial nerve abnormalities

Diagnosis:

- Fundoscopy for retinitis
- Colonoscopy with biopsy for colitis
- Upper GI endoscopy with biopsy for esophagitis

Treatment:

- Ganciclovir or valganciclovir are first-line agents.

5. Oropharyngeal Candidiasis

Presentation:

- White plaques on oral mucosa causing discomfort.

Treatment:

- Topical agents: Nystatin suspension or 1% gentian violet applied TID
- Oral antifungals: Fluconazole 100–200 mg daily for 7–14 days or ketoconazole as alternatives
- Miconazole oral gel also effective

6. Skin and Soft Tissue Infections (Boils/Furuncles)

Treatment:

- Oral cloxacillin 500 mg QID for 10–14 days
- Erythromycin or topical mupirocin (Bactroban) if penicillin-allergic

7. Cryptococcal Meningitis

Epidemiology:

- Common in patients with CD4 <100 cells/µL.

Clinical Presentation:

- Subacute meningitis symptoms: headache, fever, malaise, neck stiffness.

Diagnosis:

- Lumbar puncture with India ink stain and cryptococcal antigen testing
- Elevated opening pressure indicates severity
- Serum cryptococcal antigen predicts prognosis

Treatment:

- Induction: Amphotericin B (0.7–1 mg/kg/day IV) plus flucytosine for 2 weeks
- Consolidation: Fluconazole 400 mg daily for 8 weeks
- Maintenance: Fluconazole 200 mg daily until immune reconstitution

Monitoring:

- Monitor renal function and electrolytes (risk of hypokalemia with amphotericin B)

Prophylaxis:

- Not routinely recommended due to low incidence and potential toxicity

8. Toxoplasmosis

Epidemiology:

- Occurs with CD4 <100 cells/µL.

Clinical Features:

- Focal neurological signs: headache, confusion, seizures, hemiparesis
- Imaging (CT/MRI): Multiple ring-enhancing lesions with surrounding edema

Diagnosis:

- Clinical response to therapy within 2 weeks is diagnostic
- Brain biopsy reserved for non-responders

Treatment:

- Pyrimethamine plus sulfadiazine plus leucovorin (folinic acid)
- Alternatives: Clindamycin substitutes sulfadiazine in sulfa allergy; azithromycin also used
- Duration: At least 6 weeks followed by maintenance therapy

Prophylaxis:

- TMP-SMX or dapsone with pyrimethamine

9. Mycobacterium avium Complex (MAC)

Epidemiology:

- Occurs in patients with CD4 <50 cells/µL.

Clinical Presentation:

- Fever, night sweats, weight loss, anemia, diarrhea, hepatosplenomegaly.

Diagnosis:

- Blood cultures or tissue biopsy cultures

Treatment:

- Combination therapy with clarithromycin or azithromycin plus ethambutol
- Rifabutin may be added

Prophylaxis:

- Azithromycin weekly or clarithromycin BID if CD4 <50 cells/µL
- Discontinue when CD4 >100 cells/µL for ?3 months

10. Tuberculosis (TB) in HIV

- Careful selection of antiretroviral therapy (ART) during TB treatment is essential due to drug interactions.
- Avoid protease inhibitors with rifampicin.
- Recommended ART regimens often include efavirenz.
- Monitor for immune reconstitution inflammatory syndrome (IRIS).

Indications for Hospital Admission

- Diagnostic uncertainty requiring inpatient investigations
- Severe infections needing intravenous therapy (e.g., amphotericin B for cryptococcal meningitis)
- Significant clinical instability or complications