Nontuberculous Mycobacterial Infections

Chapter 185 | Harrison's 22e

KEY CLINICAL POINTS

1. NTM are ubiquitous in soil and water but rarely cause disease in immunocompetent individuals.
2. Pulmonary NTM infection is strongly associated with bronchiectasis and occurs more frequently than tuberculosis in the elderly.
3. Diagnosis requires differentiation between active disease and commensal colonization using standardized criteria (e.g., ATS guidelines).
4. MAC is the most common cause of pulmonary NTM disease in North America, Europe, and Australia.
5. Disseminated NTM infection indicates significant immune dysfunction (e.g., advanced HIV).
6. Single-dose rifampin post-exposure prophylaxis reduces leprosy risk by ~60% in contacts.
7. WHO's 'Triple Zero Strategy' aims for zero new cases, disability, and stigma by 2030.

1. DEFINITION & OVERVIEW

- **Definition:** Nontuberculous mycobacteria (NTM) encompass all mycobacterial species except M. tuberculosis and its close relatives.
- **Characteristics:**
  - Highly adaptable organisms
  - Inhabit diverse environments including soil, water, and industrial solvents
- **Diversity:** Over 199 NTM species have been identified via DNA sequencing.
- **Terminology:** The term 'atypical mycobacteria' is sometimes used but lacks precision.

2. EPIDEMIOLOGY

- **Environmental Presence:** Ubiquitous in the environment; rarely cause disease in immunocompetent individuals.
- **Niche-Specific Species:**
  - M. simiae: found in aquifers
  - M. fortuitum: found in pedicure baths
  - M. immunogenum: found in metalworking fluids
- **Pulmonary NTM:**
  - Incidence exceeds tuberculosis in the elderly
  - MAC is the most common cause in North America, Europe, and Australia
- **Cystic Fibrosis Patients:** Infection rates range from 3-15%.
- **Data Limitations:** Reliable incidence data are limited due to underreporting and diagnostic challenges.

3. CLINICAL MANIFESTATIONS

- **Pulmonary Disease:**
  - Most common clinical manifestation
  - Strongly associated with bronchiectasis
  - Not typically associated with systemic immunodeficiency
- **Disseminated Infection:**
  - Indicates severe immune compromise (e.g., advanced HIV)
- **Cutaneous Infections:**
  - Occur via inoculation (e.g., liposuction, trauma)
  - M. ulcerans causes Buruli ulcer in tropical regions
- **Leprosy Context:**
  - In endemic areas, PEP with single-dose rifampin reduces disease risk by ~60% in contacts.

4. DIAGNOSTIC APPROACH

1. **Clinical Differentiation:**
   - Distinguish active infection from commensal colonization using standardized criteria (e.g., ATS guidelines).
2. **Laboratory Testing:**
   - Sputum culture
   - Nucleic acid amplification tests (NAAT)
   - Histopathology
3. **Specific Pathogen Identification:**
   - Buruli ulcer: Diagnosed clinically and confirmed by PCR or culture.

5. MANAGEMENT & TREATMENT

1. **Treatment Strategy:**
   - Determine treatment based on species and disease severity.
2. **MAC Pulmonary Disease:**
   - Multidrug regimen (e.g., rifampin, ethambutol, clarithromycin).
3. **Rapidly Growing NTM:**
   - Often respond to linezolid or bedaquiline.
4. **Leprosy Prophylaxis:**
   - PEP with single-dose rifampin for high-risk contacts in endemic regions.

6. GLOBAL HEALTH INITIATIVES

- **WHO Recommendations:**
  - Recommend PEP with single-dose rifampin to interrupt leprosy transmission.
- **'Zero Leprosy' Strategy:**
  - Target 120 countries for zero new cases by 2030

– Goal: 70% reduction in annual case detection• **Partnerships:** Global Partnership for Zero Leprosy and Sasakawa Health Foundation.

- **Challenges:** Declining expertise in leprosy management as care becomes deprioritized.