Clinical Features: Pulmonary Disease – Dr. Dler

Pulmonary Disease

Symptoms

Classically include cough, fever, and sweating.

- **Cough** is nearly universal; typically, it is initially dry but then progresses with increasing volumes of purulent secretions and the variable appearance of blood streaking or gross hemoptysis.
- **Feverishness** is common as the disease advances.
- **Sweating**, including drenching night sweats is typical.
- **Other common complaints** include: fatigue, weight loss, nonpleuritic chest pain, and dyspnea.

Signs

- Fever with peaks as high as 40 to 41° C, typically occurring in the evening.
- Localized rales are early findings,
- Wheezing or regionally diminished breath sounds, or both, may be heard in patients with peribronchial or endobronchial airway narrowing..

Clinical setting

Primary pulmonary TB (=infection of a previously uninfected (tuberculin-negative individual)

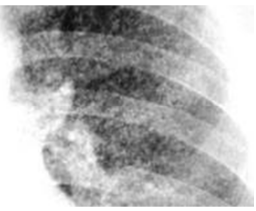
- Most patients develop a self-limiting febrile illness, usually is manifested only by development of a positive tuberculin skin test.
- Occasionally, the patient develops sufficient symptoms of fever and nonproductive cough with chest radiographic finding of patchy or lobular infiltrates, often with associated hilar adenopathy.

Progressive primary disease (=Early progression of infection to disease)

- May appear during the course of the initial illness or after a latent period of weeks or months.
- May manifest as miliary tuberculosis, sometimes with meningitis, or as pulmonary disease of the apical and posterior segments of the upper lobes or lower lobe disease.

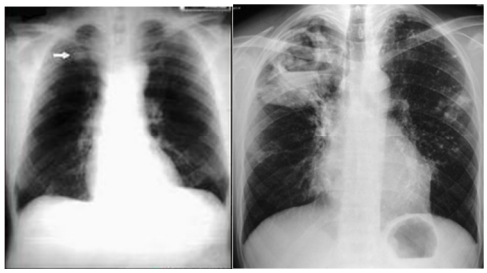
Miliary TB = Blood-borne dissemination

- May present acutely, but more frequently is characterised by 2-3 weeks of fever, night sweats, anorexia, weight loss and a dry cough.
- Hepatosplenomegaly may be present and the presence of a headache may indicate co-existent tuberculous meningitis.
- Auscultation of the chest is frequently normal, although with more advanced disease widespread crackles are evident.
- Fundoscopy may show choroidal tubercles.
- The classical appearances on chest X-ray are those of fine 1-2 mm lesions ('millet seed') distributed throughout the lung fields, although occasionally the appearances are coarser.
- Anaemia and leucopenia may be present
- Negative tuberculin skin test in 50% of pateints.
- Confirmation ; by biopsy (granulomas and/or acid-fast bacilli demonstrated) of liver or bone marrow

Miliary TB:  

Post-primary pulmonary TB = exogenous ('new' infection) or endogenous (reactivation of a dormant primary lesion) infection in a person who has been sensitized by earlier exposure.

- **It is the most frequent presentation** and characteristically occurs in the apex of an upper lobe where the oxygen tension favours survival of the strictly aerobic organism.
- **The onset is usually insidious**, developing slowly over several weeks. Systemic symptoms accompanied by progressive pulmonary symptoms .
- **Radiological changes** include ill-defined opacification in one or both of the upper lobes, and as progression occurs, consolidation, collapse and cavitation develop to varying degrees .
- In extensive disease, collapse may be marked and result in significant displacement of the trachea and mediastinum. Occasionally, a caseous lymph node may drain into an adjoining bronchus resulting in tuberculous pneumonia.



Diagnosis

- The presence of an otherwise unexplained cough for more than 2-3 weeks, particularly in an area where TB is highly prevalent, or typical chest X-ray changes should prompt further investigation.
- Direct microscopy of sputum is the most important first step. The probability of detecting acid-fast bacilli is proportional to the bacillary burden in the sputum
- The most effective techniques are the Ziehl-Neelsen and rhodamine-auramine stains. The latter causes the tuberculous bacilli to fluoresce against a dark background and is easier to use when numerous specimens need to be examined;
- A positive smear is sufficient for the presumptive diagnosis of TB but definitive diagnosis requires culture.
- Smear-negative sputum should also be cultured, as only 10-100 viable organisms are required for sputum to be culture-positive.
- Mycobacteria TB grow slowly and may take between 4 and 6 weeks to appear on solid medium such as Löwenstein-Jensen or Middlebrook.
- Faster growth (1-3 weeks) occurs in liquid media such as the radioactive BACTEC system
- The BACTEC method is commonly used in developed nations and detects mycobacterial growth by measuring the liberation of 14CO2, following metabolism of 14C-labelled substrate present in the medium.
- New strategies for the rapid confirmation of TB at low cost are being developed; these include the nucleic acid amplification test (NAT), designed to amplify nucleic acid regions specific to Mycobacteria TB
- Drug sensitivity testing is particularly important in those with a previous history of TB, treatment failure or chronic disease, those who are resident in or have visited an area of high prevalence of resistance, or those who are HIV-positive.
- The detection of rifampicin resistance, using molecular tools to test for the presence of the rpo gene currently associated with around 95% of rifampicin-resistant cases, is important as the drug forms the cornerstone of 6-month chemotherapy.

Chronic complications of pulmonary TB

Pulmonary

- Massive haemoptysis
- Cor pulmonale
- Fibrosis/emphysema
- Atypical mycobacterial infection
- Aspergilloma
- Lung/pleural calcification
- Obstructive airways disease
- Bronchiectasis
- Bronchopleural fistula

Non-pulmonary

- Empyema necessitans
- Laryngitis
- Enteritis
- Anorectal disease
- Amyloidosis
- Poncet's polyarthritis

TREATMENT OF TUBERCULOSIS

- They are based on the principle of: **initial intensive phase** (which rapidly reduces the bacterial population), followed by a **continuation phase** to destroy any remaining bacteria.
- Initial therapy with four drugs has become standard although ethambutol may be omitted.
- Six months of therapy is appropriate for all patients with new-onset, uncomplicated pulmonary TB .
- However, 9-12 months of therapy should be considered if the patient is HIV-positive, or if drug intolerance occurs and a second-line agent is substituted.
- Meningitis should be treated for a minimum of 12 months.
- Pyridoxine should be prescribed in pregnant women, malnourished patients and in some countries routinely with INH.

Category of tuberculosis	Initial Phase	Continuation Phase
New cases of smear-positive pulmonary TB	2 months $H_3R_3Z_3E_3$ Or 2 months $H_3R_3Z_3S_3$	4 months H_3R_3
Previously treated smear-positive pulmonary TB	2 months $H_3R_3Z_3E_3S_3$	5 months $H_3R_3E_3$
H= isoniazid, R= Rifampicin, Z= Pyrazinamide, S= Streptomycin, E= Ethambutol, 3= 3 days a week = DOT		

Why such combinations?

- A regimen of INH and ethambutol requires 18 months to cure the typical case of pulmonary tuberculosis.
- Adding rifampin to INH reduces the duration to 9 months,
- and when an initial 2-month phase of pyrazinamide is added to INH and rifampin, cure occurs in 6 months.

Follow up and monitoring chemotherapy

- Vague gastrointestinal complaints are relatively common, but most patients can tolerate these drugs.
- Oral medications must not be taken with meals, antacids, or H2-receptor blockers, all of which may substantially reduce absorption.
- Adults should have baseline measurement of liver function; complete blood counts, including platelets; measurement of uric acid (if pyrazinamide is included);
- and evaluation of vision, including acuity and color discrimination (if ethambutol is used).

Indications for admission to hospital:

- Uncertainty about the diagnosis,
- Intolerance of medication,
- Questionable compliance,
- A background of adverse social conditions
- A significant risk of MDRTB (culture-positive after 2 months on treatment, contact with known MDRTB).Such patients should be treated in appropriate isolation facilities.

> ***Where drug resistance is not expected patients can be assumed to be non-infectious after 2 weeks of appropriate therapy.***

Corticosteroids are indicated to reduce inflammation and limit tissue damage in:

- Pericardial or meningeal disease,
- In children with endobronchial disease.
- Also confer benefit in TB of the ureter,
- Pleural effusions and extensive pulmonary disease.