Tuberculosis Disease

by
Konrad T Juszkiewicz, MD, MPH
Donald Burgess, PhD DRK Biomedical Research and Development LLC
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Tuberculosis – Clinical Features

- Localized type may be asymptomatic
- Low grade remittent fever, night sweats, malaise, anorexia, weight loss
- Sputum at first mucoid and later purulent
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- Haemoptysis in half of the patients
- Pleuretic pain

Tuberculosis – Diagnosis

- History, physical examination, radiological findings ***"consolidation & cavitation"***
- Identification of the acid-fast bacilli in smears and culture of sputum "10 weeks"
- PCR amplification of M. tuberculosis DNA

Tuberculosis – Prognosis

- Depends on:
  - ✔ The extent of the disease and the patient immune status

- Secondary amyloidosis may occur in persistent cases

Tuberculosis – Chronic Consequences

1. ***Pulmonary fibrosis***

- The lung lesions may heal with fibrosis at any stage, particularly with treatment
- This ranges from minor apical scarring to extensive and severe widespread fibrosis producing localized to widespread honey-comb appearance of the lung tissue. It is particularly seen in relapsing and progressive untreated disease
- This is complicated by respiratory failure & cor pulmonale

2. ***Pleural fibrosis***

- Fibrosis commonly obliterate the pleural space

3. ***Bronchiectasis***

- Damage to the bronchial walls and scarring can cause distal pulmonary collapse, secondary infection and bronchiectasis

Infection in Immunocompromised Individuals

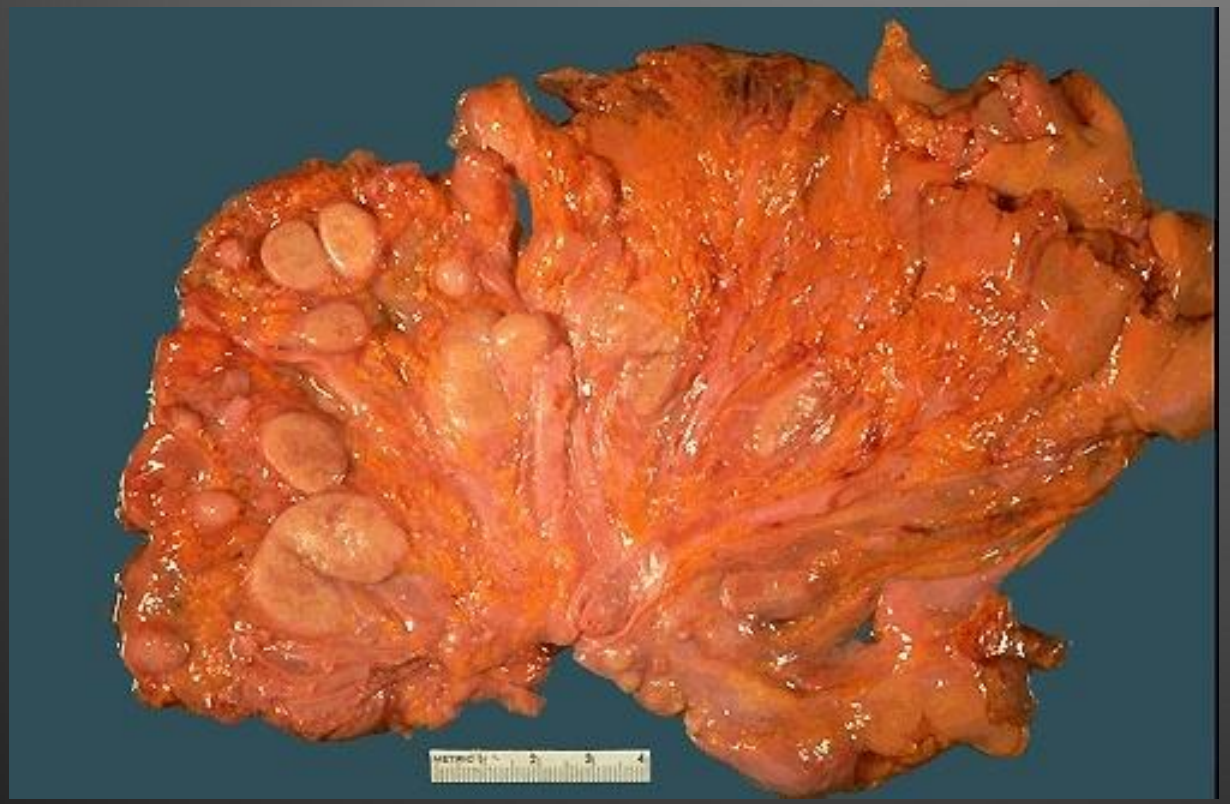
- Mycobacterial infection of all types are increased in immunocompromised individuals and is in most cases due to ***reactivation of latent infection***

- Features are similar to infection in immunocompetent individuals but disease usually ***progresses more rapidly*** due to decreased host response

Atypical Mycobacterial Infection

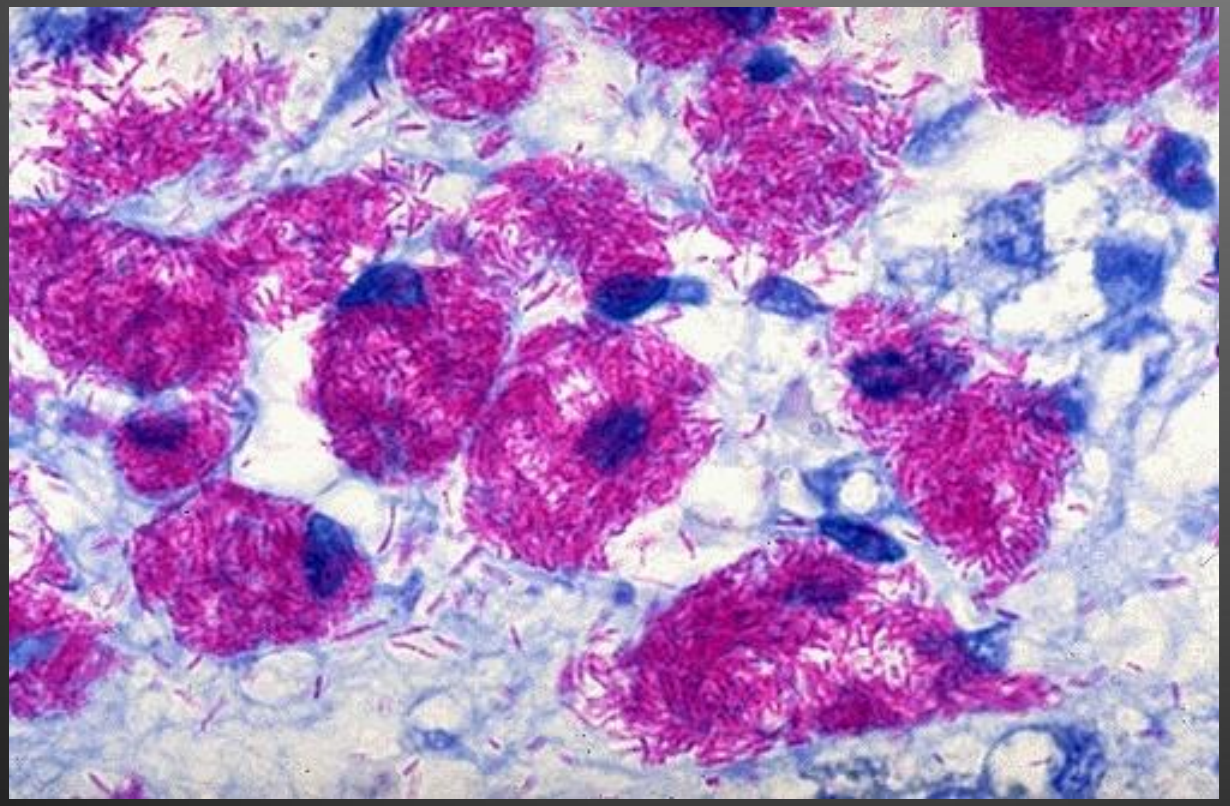
- These infections are caused by a group of non-tuberculous mycobacteria of which the most important types are ***M. avium-intracellulare*** and ***M. kanasii***
- The organisms are widely distributed in ***soil, water & domestic animals***
- Infection is ***acquired directly from the environment*** and not by case to case contact
- Infection by these organisms is seen in immunocompromised patients particularly AIDS
- It can be seen also in immunocompetent individuals with chronic pulmonary disease

Atypical Mycobacterial Infection – Gross Morphology



The lymph nodes in this mesentery, best seen at the left, are enlarged and have cut surfaces that appear yellow-tan. These nodes are filled with sheets of Mycobacterium avium-complex (MAC) organisms, and the immune response is so poor in this AIDS patient that there is **no focal granuloma formation**

Atypical Mycobacterial Infection – Microscopic Morphology



Microscopically, Mycobacterium avium-intracellulare infection is marked by **numerous acid fast organisms growing within macrophages**. Lots of bright red rods are seen, particularly in macrophages, in this acid fast stain of lymph node

PRIMARY	SECONDARY
Affect: * Previously unexposed, unsensitized persons * Non immune children * Elderly & immuncomprised * Very young Source: * Exogenous * 5% develop significant disease Morphology & Site: * Primary T.B. mostly in lung rarely in intestine, pharynx, larynx & skin * Involve lower part of upper lobe or upper part of lower lobe close to pleura * Ghon-focus A 1-1.5 cm gray white inflammatory consolidation with involvement of hilar lymph node * In 95% of cases the development of cell-mediated immunity control the infection & no lesion develops	Affect: * Previously sensitized persons Sources: * Develop from: - Reactivation of dormant lesion - Primary lesion if immunity of host is lowered "exogenous reinfection" - 5% of primary T.B. develop secondary T.B Morphology & Site: * Localized at the apex of both or one upper lobes because of better 0_2 tension * Less lymph node involvement than the primary * Cavitation is more common with dissemination along air ways - Cavitation is a source of infection by sputum * Typically consolidating lesion 1-2 cm, firm gray-yellow at apical pleura with central caseation & peripheral fibrosis

Histology:
* Typically granulomatous inflammation, both caseating and non-caseating

Outcome:
* Hypersensitivity & increased resistance
* Healing & scarring of Ghon-focus but may be still a focus for reactivation
* May progress to progressive primary T.B. or disseminated T.B. especially in AIDS, malnourished, very old, very young & Eskimos

Progressive primary T.B.:
1. Progressive enlargement of the primary focus with lung destruction & cavitation
2. Extension to the pleura pleural effusion or empyema
3. Enlarged lymph nodes obstruct bronchi bronchiectasis

Histology:
* Same

Outcome:
* The apical lesion may heal spontaneously Or with treatment and become a fibrocalcific Scar
* Depress and pucker the pleural surface and can cause pleural adhesion

Progressive pulmonary tuberculosis:
1. Apical lesion enlarge with expansion of caseation.(cavitary fibrocaseous TB)
2. Erosion into bronchus with evacuation forming irregular cavity poorly delineated by fibrosis open lung lesion
3. Erosion into blood vessels hemoptysis
4. Invasion of pleural space pleural effusion, tuberculous empyema or obliteraytive fibrous pleuritis

Dissemination:

* Erosion into bronchi with spread of the Infection □
  - Foci of infection in other parts of the lung
  - Tuberculous pneumonia
  - Laryngeal T.B. from coughed sputum
  - Intestinal T.B. from swallowing of infected material

* Erosion of vessels
  - Lymphatics □ foci of infection in the lung □ lung miliary T.B.
  - Blood vessels □ systemic miliary T.B.
  - Single-organ T.B. in bone, kidney, joint, brain…

Fate:

* With adequate treatment:
  - The process is arrested by healing with fibrosis & destruction of the lung architecture

•If treatment is inadequate and host defence is impaired:
  - Spread of infection occurs

Spread:

* Dissemination via airways, lymphatics & BV

•Miliary pulnmonary disease when bacilli drain via lymphatics in lymphatic duct to the right heart back to the lung and give miliary T.B.

• Miliary systemic T.B. when infective foci seed the pulmonary venous return to the heart to the systemic circulation (liver, bone, spleen, adrenals, fallopian tubes)

• Endobronchial, endotracheal laryngeal miliary granuloma

• Isolated organ T.B.

• Intestinal T.B.

Thanks

Spasiba

Rakhmet

Deburgess@drkbiomed.org
Kjuszkiewicz@drkbiomed.org
Cell.: +7 701 218 2377