Tuberculosis - Imaging

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Disclosure

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A posterior-anterior chest radiograph is used to detect chest abnormalities. Lesions may appear anywhere in the lungs and may differ in size, shape, density, and cavitation. These abnormalities may suggest TB, but cannot be used to definitively diagnose TB. However, a chest radiograph may be used to rule out the possibility of pulmonary TB in a person who has had a positive reaction to a TST or special TB blood test and no symptoms of disease.

http://www.cdc.gov/tb/publications/factsheets/testing/diagnosis.htm

TB - Introduction

*Mycobacterium tuberculosis*

*AIDS epidemic – Resurgence*

*Prefers chest but can affect any organ system*

*In AIDS, extrapulmonary involvement is more common*
TB Types

- Primary
- Re-activation

Imaging Issues

- Primary Vs. Re-activation
- Active Vs. Inactive Vs. Indeterminate
- Mimics of TB
- When do I call the clinician?
Primary TB

- More common in infants and children
- Increasing in adults (23-34%)

Primary TB - Imaging

- Parenchymal disease
- Lymphadenopathy
- Pleural effusion
- Miliary disease
- Atelectasis lobar or segmental
- Chest radiograph may be normal (15%)
CT in Primary Tuberculosis

- Confirms the presence of parenchymal disease, as well as lymphadenopathy

- Lymph nodes - characterization

- Additional abnormalities:
  - Dissemination
  - Extrapulmonary
Postprimary – Re-activation TB

- Patients in whom initial infection contained successfully by pulmonary macrophages

- Bacilli remain viable within the macrophages
Re-activation TB
Distinguishing Imaging Features

- Predilection for the upper lobes
- Absence of lymphadenopathy
- Cavitation
**Endobronchial spread of infection**

- Organisms pass via the airways
- Imaging shows centrilobular nodules, tree-in-bud, ill-defined acinar shadows
- May become confluent and mimic “pneumonia”
CT Features: Re-activation TB

- Cavitation
- Bronchiectasis, bronchial stenosis etc.
- Endobronchial spread of TB
- Tree-in-Bud
Tree-in-Bud
Tree-in-Bud

Twig = airway
Leaf = Centrilobular Bronchiole
Pleural TB - Imaging

- Effusion
- Empyema
- Thickening
- Calcification
- Bronchopleural fistula (BPF)
- Lung disease at CT is a useful clue
- Primary>>Reactivation
Pleural and Lung involvement

Bronchopleural Fistula
TB in the HIV patient

M. tuberculosis
Re-infection pattern  Primary pattern  Atypical pattern

CD4 Count (cells/mm³)
500  200  50  0

MDR TB doesn't look any different
TB in the HIV patient

CD4 count : 150 cells/mm³
Not everything is TB!

Aspiration pneumonia
Pneumonia

Atypical Mycobacteria

Mycobacterium kansasi
Panbronchiolitis

Kartagener’s Syndrome
Aspergillus Infection

Summary

- Chest radiograph is a great initial tool
- Radiologic features of TB mimic other diseases
- CT often helps in further characterization
- Understanding the spectrum of imaging features of TB aids in making early diagnosis