Chronic Cough and Weight Loss in Rural El Salvador

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Objectives

• To appreciate the radiological and clinical context of a very different setting
• To understand the role of imaging in the diagnosis and management of CENSORED
• To develop visual images of the key findings in CENSORED

CENSORED
We start with a patient, M.L.

Our patient lives in the poor, rural community of Estancia in northeastern El Salvador.
Context - Social

A typical home

Courtesy Ilille Sawady Photography
Context - Clinical

- Rural clinic
- No imaging available locally
- Nearest imaging facility ½ day away
  - Plain film only
  - No radiologist
- CT only in private system, further away

The clinic

Courtesy Ilille Sawady Photography
Our Patient

• 55 year old woman with 20 years of cough and weight loss
• Over last 2 weeks worsening symptoms, w/ blood–tinged sputum and dyspnea
• S/P multiple courses of TB treatment
• On exam emaciated, tachypneic, lungs wheezy, crackly, patchy reduced BS
• Brought to hospital for workup, including CXR
Evaluate our patient’s CXR. Look for the relevant findings and see if you can make the correct diagnosis.
Findings

- Decreased soft tissue
- Hyperinflation
- R lung field: Nonspecific
- L lung field:
  - Volume loss
  - Scarring
  - “Tram tracks”
  - Ring shadows
  - Fluid levels
- Note: Multiple TB smears were negative
These are classic radiologic findings for bronchiectasis.

They are illustrated in the following slides.
“Tram tracks”
Ring shadows
Bronchiectasis - Overview

• Dilation of the airways
• The result of underlying damage, from a variety of causes
• Clinically, leads to obstructive symptoms, coughing, purulent sputum, and frequent exacerbations
• Characterized by the pattern and distribution of dilation
Bronchiectasis Mini-Seminar

*We will cover:*

- Patterns of dilation
- Distribution of dilation
- Etiology
- Role of imaging
- Menu of tests
  - CXR
  - Bronchiography
  - CT
  - Emerging modalities
Patterns of Dilation

- Originally a pathologic classification, today radiologic
- Clinical significance unclear
- Three patterns
  - Cylindrical
  - Varicose
  - Saccular / cystic
Distribution of Dilation

• Also determined radiologically
• Important in determining etiology
• Focal vs diffuse
Focal Bronchiectasis

Part of lung affected

From Netter, FH. The CIBA Collection of Medical Illustrations: Respiratory System. 1969; CIBA Corporation.
Diffuse Bronchiectasis

Damage throughout both lungs

From Netter, FH. The CIBA Collection of Medical Illustrations: Respiratory System. 1969; CIBA Corporation.
Etiology

• Focal vs diffuse have different etiologies (local vs systemic processes)
• Most common: Post-infectious
  – Bacterial
  – Mycobacterial
  – Fungal (including allergic bronchopulmonary aspergillosis)
  – Viral
• Impaired mucociliary clearance (e.g. CF)
Etiology - Other Causes

- Congenital bronchial abnormalities (Williams-Campbell syndrome)
- Post-obstructive
- Post-pneumonitis
- Immune deficiency
- Collagen vascular disease
- Miscellaneous (e.g. sarcoidosis)
- 60% of cases are idiopathic
Role of Imaging

• Diagnosis
• Characterization
  – Focal vs diffuse
  – Morphologic pattern
  – Underlying causes
• Evaluation of exacerbations
Menu of Tests

- Chest radiograph
- Bronchography
- High-resolution chest CT
- Possibilities for the future
Chest Radiography

- Increased interstitial markings
- Dilated airways
  - Tram tracks
  - Ring shadows
- Honeycombing
- Focal loss of volume
- Overall increased volume

CXR of another patient with bronchiectasis

Courtesy Phillip Boiselle, MD
Chest Radiography

- Increased interstitial markings
- Dilated airways
  - Tram tracks
  - Ring shadows
- Honeycombing
- Focal loss of volume
- Overall increased volume

CXR of our patient

Courtesy Hospital Nacional San Francisco Gotera
Bronchography

- Of historic interest
- Instillation of contrast medium in airways
- Visualization of ectatic airways
- Permits definition of severity and extent
- Superseded by high-res CT

From Meschan I. Analysis of Roentgen Signs in General Radiology. 1973; W.B. Saunders and Company
High-Resolution Chest CT

• Study of choice for diagnosing and characterizing bronchiectasis
• Visualize dilated airways themselves
• Indirect signs
High-Resolution Chest CT

- Signet ring sign
- Non-tapering bronchi
- Cystic lesions
- Bronchi at periphery
- Indirect signs
  - Bronchial wall thickening
  - Air trapping
Signet Ring Sign

Courtesy Phillip Boiselle, MD
Non-Tapering Airways

Courtesy Phillip Boiselle, MD
Cystic Lesions

Courtesy Phillip Boiselle, MD
Emerging Modalities

- Functional CT – inspiration / expiration
- Virtual bronchoscopy
- CT angiography

*From McGuinness G, Naidich DP. CT of airway disease and bronchiectasis.*

Back to Our Patient

• Diagnosed on the basis of chest radiograph and clinical scenario; no CT
• Presumptive cause is post-infectious, from TB versus recurrent bacterial pneumonias
• Therapy initiated, follow-up chest film pending
Summary

- Bronchiectasis: Dilation of the airways
- Differential diagnosis: Broad range of etiologies
- Often picked up by CXR, but characterized by CT (focal versus diffuse, pattern)
- Findings: CXR: Tram tracks, ring shadows, scarring; CT: Signet rings, non-tapering, cystic lesions, peripheral bronchi, thickened walls, air trapping
References

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