Introduction

- Diagnosis in chest radiography is challenging given its 2D technique
  - Low contrast ratio relative to CT and MRI
- Signs are characteristic and reproducible imaging patterns in thoracic diseases
  - Aid in conveying complex imaging pattern quickly
  - Often suggest specific diagnosis or narrow differential diagnosis

Objectives

- Recognize important signs in chest radiography
- Understand the underlying augmentations in anatomy which cause these signs
- Recall differential diagnosis / diagnoses or clinical ramifications of specific signs

Outline

Pulmonary signs
- Silhouette
- Air bronchogram
- Air crescent and Monod
- Hampton hump
- Deep sulcus
- Signs of lobar atelectasis
  - S sign of Golden
  - Luftschel
  - Flat waist

Extra-pulmonary signs
- Cervicothoracic and thoracoabdominal
- “Cervicothoracoabdominal”
- Hilum overlay and hilar convergence
- Scimitar
- Doughnut
- Incomplete border
- Cardiac and aortic signs will not discussed

Disclosures

- No pertinent disclosures
Silhouette Sign
- Four basic radiodensities
  - Air, fat, water/soft tissue, metal/bone
- Loss of normal interface when two areas of similar radiodensity contact each other (Silhouette sign)
  - First described by Felson 1950
- Basis upon which rest of chest radiography based

Air Bronchogram Sign
- Branching tubular lucent regions within opacified lung
- Suggest parenchymal disease
  - Pulmonary edema, pneumonia, aspiration, hemorrhage, low-grade adenocarcinoma, lymphoma, or atelectasis (non-obstructive)
- Effectively excludes pleural, extrapleural, or mediastinal process
**Air Crescent and Monod Sign**

- Air crescent sign: Crescent of gas surrounding necrotic focus of infection
  - Invasive aspergillosis
  - Neutropenic patients
  - Improvement of granulocytic function
- Monod Sign: Crescent of gas surrounding mycetoma
  - Different patient population and clinical presentation

**Hampton Hump Sign**

- Pulmonary infarction
  - Initial pulmonary hemorrhage may evolve into infarction
- Risk factors
  - Distal arteries (bronchial arteries collaterals)
  - Underlying malignancy
  - High embolic burden
  -HF

*Courtesy of Dr. Nicole Restauri, MD*
Deep Sulcus Sign
- Pneumothorax on supine radiograph
  - Often occult (30% miss rate)
- Air rises
  - Most nondependent portion of thorax: anteromedial, subpulmonic, and lateral basilar space

S Sign of Golden
- Lobar collapse
  - Classically, right upper lobe (RUL) from lung cancer obstructing RUL bronchus
  - Elevation of minor fissure
  - Medial displacement of RUL
  - Proximal mass prevents collapse of central portion of RUL

Courtesy of Dr. Gerald F. Abbott
Luftsichel Sign

- "Air sickle"
- Left upper lobe (LUL) collapse
  - Overinflation of superior segment of left lower lobe
  - Insinuates between atelectatic LUL and aortic arch

Flat Waist Sign

- Flattening of contours left mediastinum
  - Aortic arch
  - Pulmonary artery
- Left lower lobe collapse
  - Leftward deviation and rotation of heart
Extrapulmonary Signs

**Cervicothoracic Sign**
- If mediastinal mass well defined superior to clavicles, must be posterior
- Anterior mediastinal mass silhouetted by soft tissues of the neck

**Thoracoabdominal Sign**
- If mediastinal mass extends below dome of diaphragm must be posterior
- Anterior mediastinal masses silhouetted by diaphragm
Hilar Overlay Sign
If hilar vessels project through mass, implies that mass is either anterior or posterior to hilum

Hilar Convergence Sign
If vessels converge on hilar opacity, likely enlarged pulmonary artery
If vessels course through opacity, likely nodule/mass

Scimitar Sign
Anomalous vein (PAPVR) resembling Turkish sword, drains into IVC most often
Part of scimitar syndrome (hypogenetic lung syndrome)
Small right lung
Dextroposition of heart
Systemic arterial supply from aorta
Doughnut Sign
- Normal lateral radiograph: Inverted horse shoe configuration
- Opacification of normally clear infra hilar window
- Subcarinal and inferior hilar / peribronchial lymphadenopathy

Incomplete Border Sign
- Signals extrapulmonary nodule or mass
- Curved nature of chest wall
- Tapered margins of extrapulmonary lesions
  - Margins of nodule or mass partially tangent to x-rays and partially en-face
Conclusion

- Signs valuable
  - Quickly convey complex imaging pattern
  - Often suggests a specific diagnosis or narrows differential diagnosis
  - Mnemonic tools

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