Lung Opacity: Atelectasis, Consolidation, Ground Glass Opacity, and Mosaic Attenuation

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Learning Objectives

- Identify lobar or rounded atelectasis
- Describe diff dx of consolidation
- Discuss causes of GGO
- Differential mosaic from GGO
- Recognize head cheese appearance
What sign is present?

1. S sign of Golden
2. Luftsichel sign
3. Hampton’s hump
4. Figure 3 sign
RUL Collapse

- R upper lobe: “S” sign of Golden
- L upper lobe: luftsichel sign
- RML or lingula: heart border obscured
- RML+ RLL: heart/diaphr obscured
- Lower lobes: triangular opacity

Lung Collapse
What sign is present?

1. S sign of Golden
2. Luftsichel sign
3. Hampton’s hump
4. Figure 3 sign
LUL Collapse

RML/RLL Collapse
Causes of Lobar Collapse

- Tumor -- Carcinoma, carcinoid
  Extrinsic compression
  Endobronchial (less common)
- Mucus plugging
- Foreign body
- Broncholith (TB)
- RML syndrome
- Compressive atelectasis
What is the most likely diagnosis?

1. Lung cancer
2. Pneumonia
3. Rounded atelectasis
4. Abscess

Rounded Atelectasis

- Four features
  - Volume loss
  - Ipsilateral pleural dz (plaque, eff)
  - Broad area of pleural contact
  - Swirling vessels ("comet-tail sign")
- Associated with asbestos exposure
- Need follow-up CT to exclude cancer
Rounded Atelectasis

Increased Lung Opacity

- Vessels obscured
- Vessels not obscured

- Consolidation
- Ground-glass opacity
What is the most likely diagnosis?

1. Pulmonary infarcts
2. Septic emboli
3. Organizing pneumonia
4. Eosinophilic pneumonia
**Consolidation**

- Alveolar air replaced by: water, blood pus, protein, cells
- Underlying vessels obscured
- If another pattern is present, use other pattern for diagnosis

**Consolidation**

- Pneumonia
- Tuberculosis
- Aspiration
- Atelectasis
- Contusion
- Hemorrhage
  (Plain film: consolid / CT: GGO)
Peripheral Consolidation

- Cryptogenic organizing pna (COP)
- Chronic eosinophilic pneumonia
- Pulmonary infarct (single focus)
Eosinophilic Pneumonia
What sign is present?

1. Bird’s nest sign
2. Atoll sign
3. Halo sign
4. Crazy paving sign
5. Sun shine
### What is the most likely diagnosis?

1. Pulmonary infarcts
2. Septic emboli
3. Organizing pneumonia
4. Eosinophilic pneumonia

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**COP**
Chronic Consolidation

- Adenocarcinoma in situ (Bronchoalveolar carcinoma) Poss GGO on CT / false neg PET
- COP/ Eosinophilic pneumonia Peripheral
- Lipoid pneumonia
- Hodgkin lymphoma (rare)
What is the most appropriate next imaging study?

1. None
2. Follow-up chest radiography
3. CT
4. PET
Adenocarcinoma in situ (Bronchoalveolar Carcinoma)
What is the predominant finding?

1. Consolidation
2. Ground glass opacity
3. Mosaic attenuation
4. Emphysema

In this patient with GPA (Wegener), what is the most likely diagnosis?

1. Alveolar hemorrhage
2. Hypersensitivity pneumonitis
3. Pulmonary edema
4. Pneumonia
Ground Glass

- Air space, interstitial, or mixed
- Hazy increase in lung opacity
- Underlying vessels not obscured
- Usually indicates active process
  Leads to biopsy
- Fibrosis: GGO likely NOT active
Ground-Glass Opacity

No reticulation

Reticulation

Active disease likely (80%)

- Hypersensitivity pn.
- Pneumocystis, CMV
- Edema
- Hemorrhage
- COP
- Eosinophilic pn.

Hemorrhage
Pt is HIV+. Most likely diagnosis?

1. Alveolar hemorrhage
2. Pneumonia
3. Pulmonary edema
4. Hypersensitivity pneumonitis
Pneumocystis pneumonia

CMV
Ground-Glass Opacity

- No reticulation
  - Fibrosis / honeycombing
    - Honeycombing
      - Diff Dx
  - Reticulation
    - Septal thickening
      - Active dz likely
    - NSIP
      - “Crazy Paving”
        - Edema
        - Pneumocystis, CMV
        - Hemorrhage
        - Alv proteinosis
What imaging sign is seen?

1. Head cheese
2. Cheese head
3. Crazy paving
4. Sane paving
Chronic SOB. Most likely dx?

1. Idiopathic pulmonary fibrosis
2. Adenocarcinoma in situ (BAC)
3. Pneumocystis pneumonia
4. Alveolar proteinosis
Viral Pneumonia

Pneumocystis pneumonia
Alveolar Proteinosis

Heterogeneous/Decreased Attenuation

- Diffuse
- Patchy
  - Small vessels *Mosaic Perfusion*
  - Uniform vessels *GGO*

*GGO diff dx*
Pt is HIV+. Most likely diagnosis?

1. Alveolar hemorrhage
2. Pneumonia
3. Pulmonary edema
4. Hypersensitivity pneumonitis
Hypersensitivity pneumonitis
What is the predominant finding (other than bronchiectasis)?

1. Consolidation
2. Ground glass opacity
3. Mosaic attenuation
4. Emphysema

Mosaic Attenuation
Mosaic

Heterogeneous/Decreased Attenuation

Diffuse

Patchy

Small vessels
Mosaic Perfusion

Uniform vessels
GGO

Air trapping

Airways dz
• Bronchiolitis oblit.
• Hypersensitivity pn.
• Asthma

No air trapping

Vascular dz
• Chronic PE
Asthma

Expiratory

HP
HP: Head Cheese Sign

Head Cheese
Conclusions

- Characteristic appearance of lobar atelectasis: helps with diagnosis
- Rounded atelectasis: four features
- Pattern of consolidation: diff dix
- GGO is nonspecific: history is key
- Mosaic: small airway/small vessel dz
- Head cheese: often HP