Cyst and Lucency

Nitra & the Gangs
Outline

- Definition of lucency, cyst and cavity.
- Lucency - categorized by pathogenesis.
Definition of Lucency

- Increased lung lucency
- Decreased lung attenuation
- Including cyst, blurred and non-round lesion
Lucency: Categorized by pathogenesis

Surface tension:

- Mechanical apical stress
  - More negative intrapleural pressure.
  - Bullet shaped apex, dragged down by gravity and restricted chest wall mobility.
  - Bulla/bleb
Bulla VS Bleb

- Fleischner Society: Glossary of Terms
  - Bleb - a small gas-containing space w/i the visceral pleura or in the subpleural lung, < 1 cm in Ø.
  - Bulla - An airspace > 1 cm, with thin wall (< 1 mm thick), usually accompanied by emphysematous changes.

- Arbitrary (size) distinction: little clinical importance.

Hansell et al, Radiology 2008
Bulla VS Bleb
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- CXR & CT: unable to determine whether the origin of the abnormal airspace is intrapleural or subpleural.
- Distinguishing the two: based mostly on location,
  - Blebs - usually located at the apices.
  - Bullae - located anywhere.

Pipavath et al, J Thorac Imaging 2009
Lucency: Categorized by pathogenesis

Surface tension:
- Marfan’s syndrome.
- Neurofibromatosis type 1.
- Chronic inflammation from smoking.
- Ankylosing spondylitis.
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Air trapping from bronchial obstruction

- Emphysema (Collapsed bronchiole)
- Air space enlargement with fibrosis (AEF)
- Bronchial stricture in TB
- Pneumatocele (Inflamed bronchus)
- Others e.g. LAM

Emphysema

Structural displacement

Non-visualized structure
Airspace enlargement with fibrosis (AEF)

- Proposed by Kawabata et al in 2008
- Smoking related destructive lesion.
- Histology: Less inflammatory cell infiltration & granulation tissue (CLE<AEF<UIP & NSIP)
- Frequent accompanying CLE
- ? Variant of emphysema (emphysema with fibrotic wall)
- ? Common tissue damage in AEF & CLE, but fibrosis develops in AEF
Post-tuberculous bronchial stricture


courtesy of Pro. Jung Gi Im
Lymphangioleiomyomatosis
Disarrangement of smooth muscles surrounding bronchiole
Lucency: Categorized by pathogenesis

Necrotic lesion with bronchial communication

- Pulmonary Langerhans cell histiocytosis (PLCH)
  - Early: Centrilobular nodule > cavity
  - Late: Bizarre-shaped cyst, DDx. emphysema
  - Most common: upper lungs
  - Associated with smoking
  - Clinical improved after smoking cessation
PLCH
Lucency: Categorized by pathogenesis

Traction airspace in fibrotic tissue

- Traction bronchiectasis.
- Honeycombing cyst: collapsing of multiple fibrotic alveoli and dilation of alveolar duct & lumen
Traction Bronchiectasis

- Bronchiectasis resulting from fibrosis
- Corkscrew appearance
- Absent mucous plugging
- A/W other findings of fibrosis e.g. honeycombing
- UIP = common cause
Honeycombing

- Air-filled cystic spaces
- 3-10 mm in Ø
- Several layers & Share walls
- Subpleural lung
- Associated traction bronchiectasis, architectural distortion, volume loss
Lucency: Categorized by pathogenesis

Bronchiectasis: Cystic

- Signet-ring sign
- Cluster of grape
Lucency: Categorized by pathogenesis

**Oligemia**

- Chronic thromboembolic pulmonary hypertension (CTEPH)
  - Decreased attenuation
  - Decreased size of pulmonary artery
CTEPH
Lucency: Categorized by pathogenesis

Aging

- Incidental cyst
  - Found $\equiv$ 25% of asymptomatic individuals $>$ 75 years.
  - None in $<$ 55 years
  - Well-defined and thin wall
  - Smoker $\equiv$ Nonsmoker

Copley et al, Radiology 2009.
Definition of Cyst

- Thin-walled round air space defined pathologically by an epithelial or fibrous outer wall.

Beddy et al, Insights imaging 2011
Raoof et al, Chest 2016
Definition of Cyst

- Radiographically: a round parenchymal lucency or low attenuation area
  - Well-defined interface with normal lung.
  - Thin wall (< 2 mm).
  - Deceptively thicker due to compression of the adjacent lung parenchyma.
  - No associated with emphysema
  - May rarely contain fluid/solid material

Beddy et al, Insights imaging 2011
Raoof et al, Chest 2016
Cyst
Centrilobular Emphysema

- Centrilobular lucency.
- No distinct wall.
- Exhibit a central dot: branch of the pulmonary artery in the 2° pulmonary lobule.
Centrilobular & Paraseptal emphysema

Cysts
Definition of Cavity

- A discrete air and/or fluid-containing space.
- Usually relatively thick wall (> 4 mm).
- Develops in an area of pulmonary consolidation, mass or nodule.

Beddy et al, Insights imaging 2011
Raoof et al, Chest 2016
Cavity: Lung abscess
Lucent Lung

- True Cystic lesions
- Mimics of cysts
  - Cavitary disease
  - Cystic bronchiectasis
  - Air trapping
  - Mosaic attenuation
  - ? Centrilobular emphysema
Thank you