

AMSER Case of the Month

June 2023

47-year-old female presents with complaints of shortness of breath, cough productive of green sputum, and subjective fever.

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Patient Presentation

- 47-year-old female with a past medical history of chronic rhinosinusitis presented with complaints of shortness of breath, cough productive of green sputum, and subjective fever.
- Vitals: BP 124/68 mm Hg, HR 89 bpm, RR 19, Temp 97.8 °F, SpO2 99% on room air.
- Physical Exam: Rales appreciated on auscultation of both lung. Heart – regular rate and rhythm. Normal S1 and S2. No clubbing or cyanosis of the extremities.

Pertinent Labs

- WBC 12.6 (4.2 – 11.0)
- Neutrophils 77.1% (36.0 – 66.0)
- Hgb 8.6 (11.5 – 15.3)
- Procalcitonin .26 (0.0 – 0.08)

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 2:

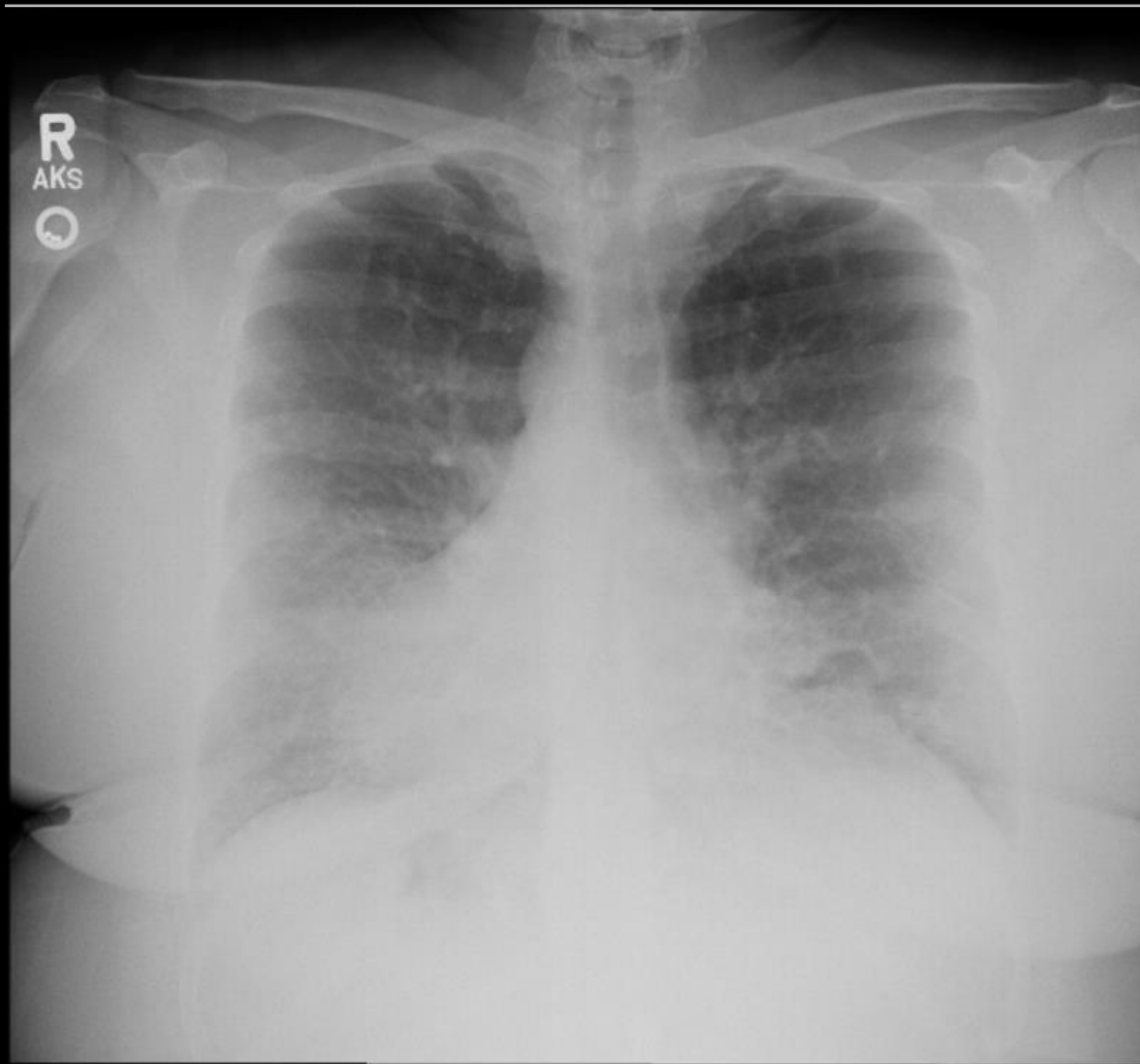
Acute respiratory illnesses in immunocompetent patients with positive physical examination, abnormal vital signs, organic brain disease, or other risk factors. Initial imaging.

Procedure	Appropriateness Category	Relative Radiation Level
Radiography chest	Usually Appropriate	⊕
US chest	May Be Appropriate	○
CT chest with IV contrast	Usually Not Appropriate	⊕ ⊕ ⊕
CT chest without and with IV contrast	Usually Not Appropriate	⊕ ⊕ ⊕
CT chest without IV contrast	Usually Not Appropriate	⊕ ⊕ ⊕
MRI chest without and with IV contrast	Usually Not Appropriate	○
MRI chest without IV contrast	Usually Not Appropriate	○

This imaging modality was ordered by the internist



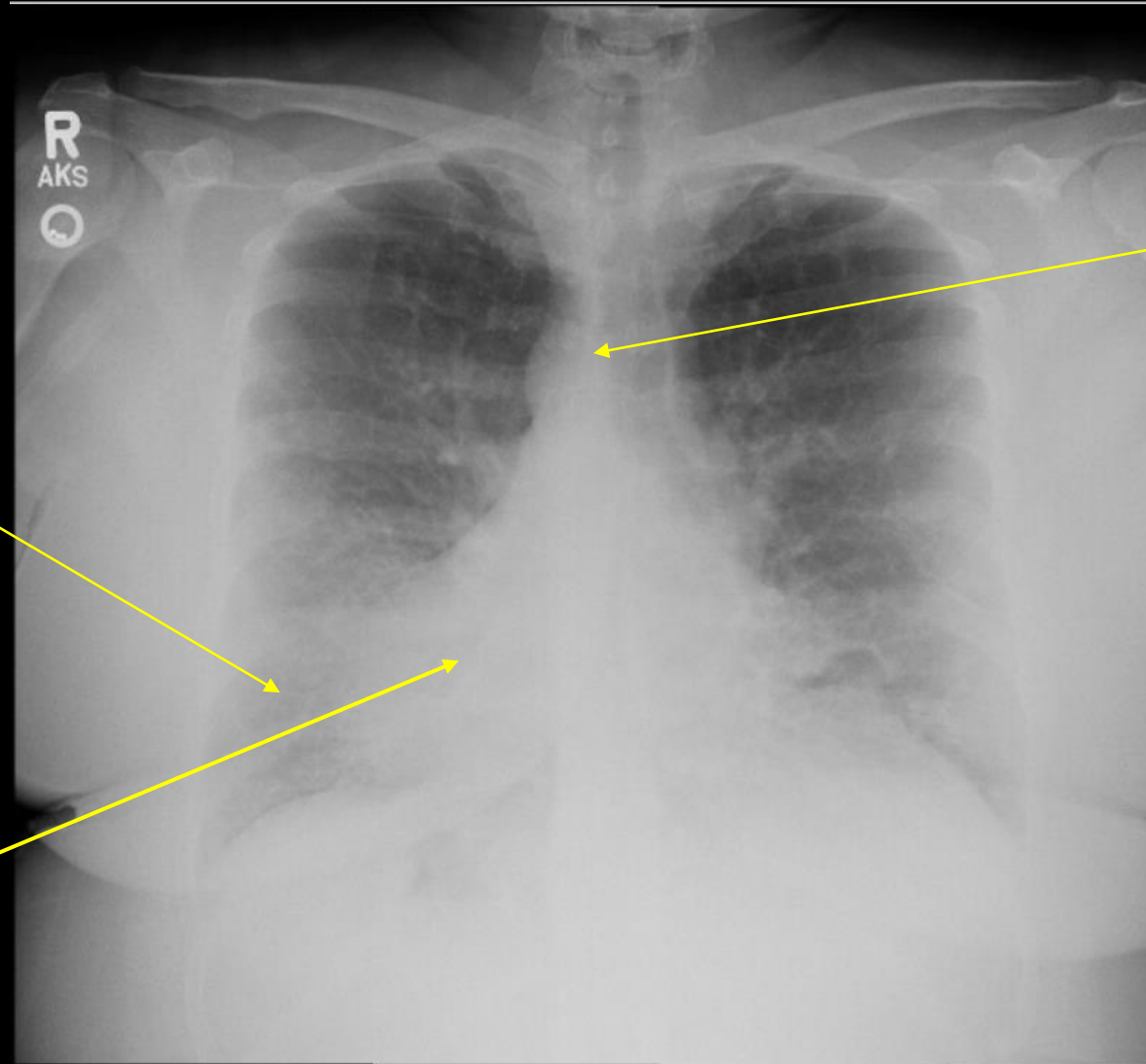
Findings (unlabeled)



Findings (labeled)

Subtle bilateral lower lobe infiltrates with faint nodules, possibly reflecting acute bronchiolitis on chronic change. Consider chest CT

Dextrocardia with heart size at upper limit of normal



Right aortic arch

Select the applicable ACR Appropriateness Criteria

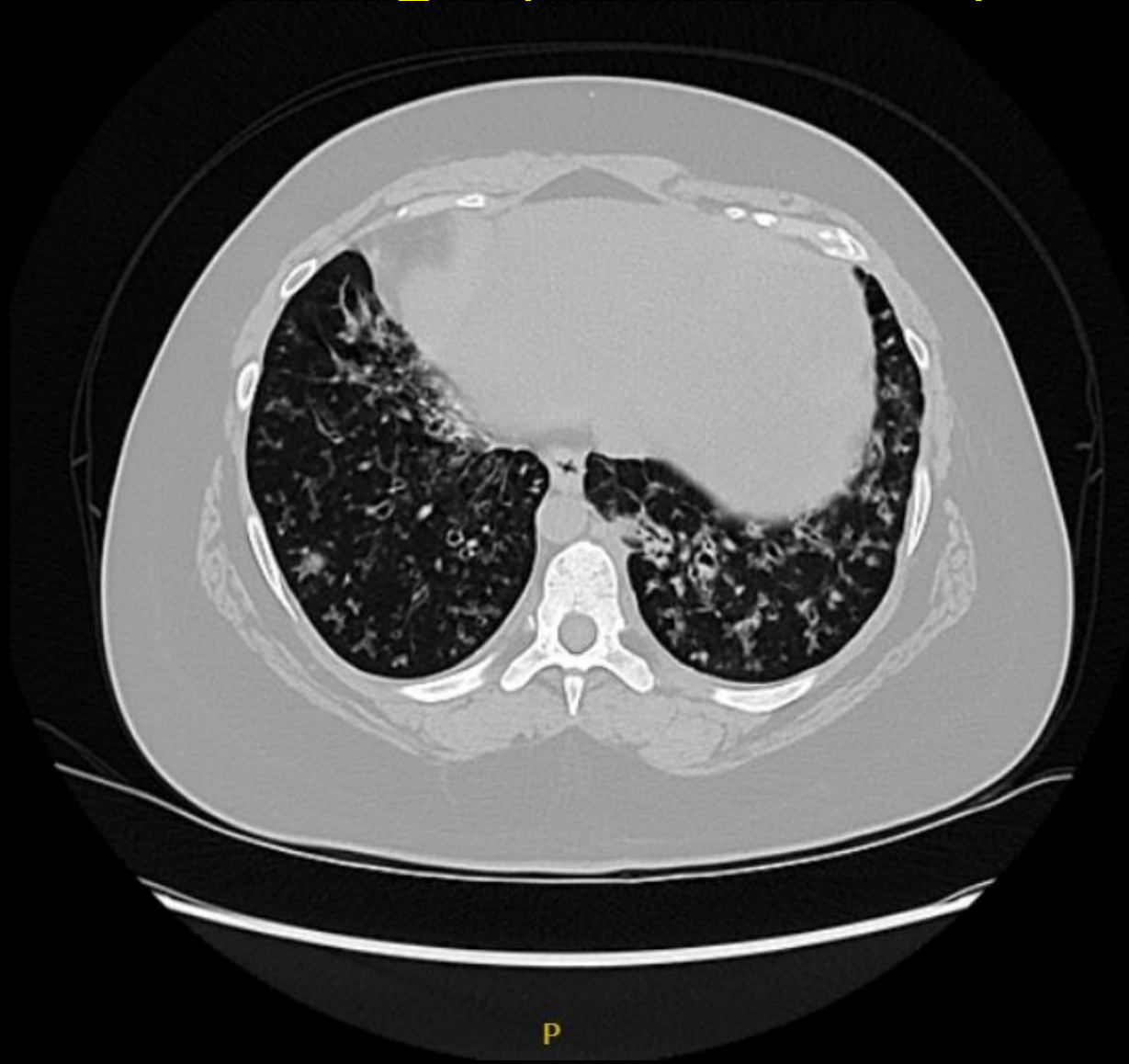
Variant 4:

Acute respiratory illnesses in immunocompetent patients with pneumonia complicated by suspected parapneumonic effusion or abscess on initial chest radiograph. Next imaging study.

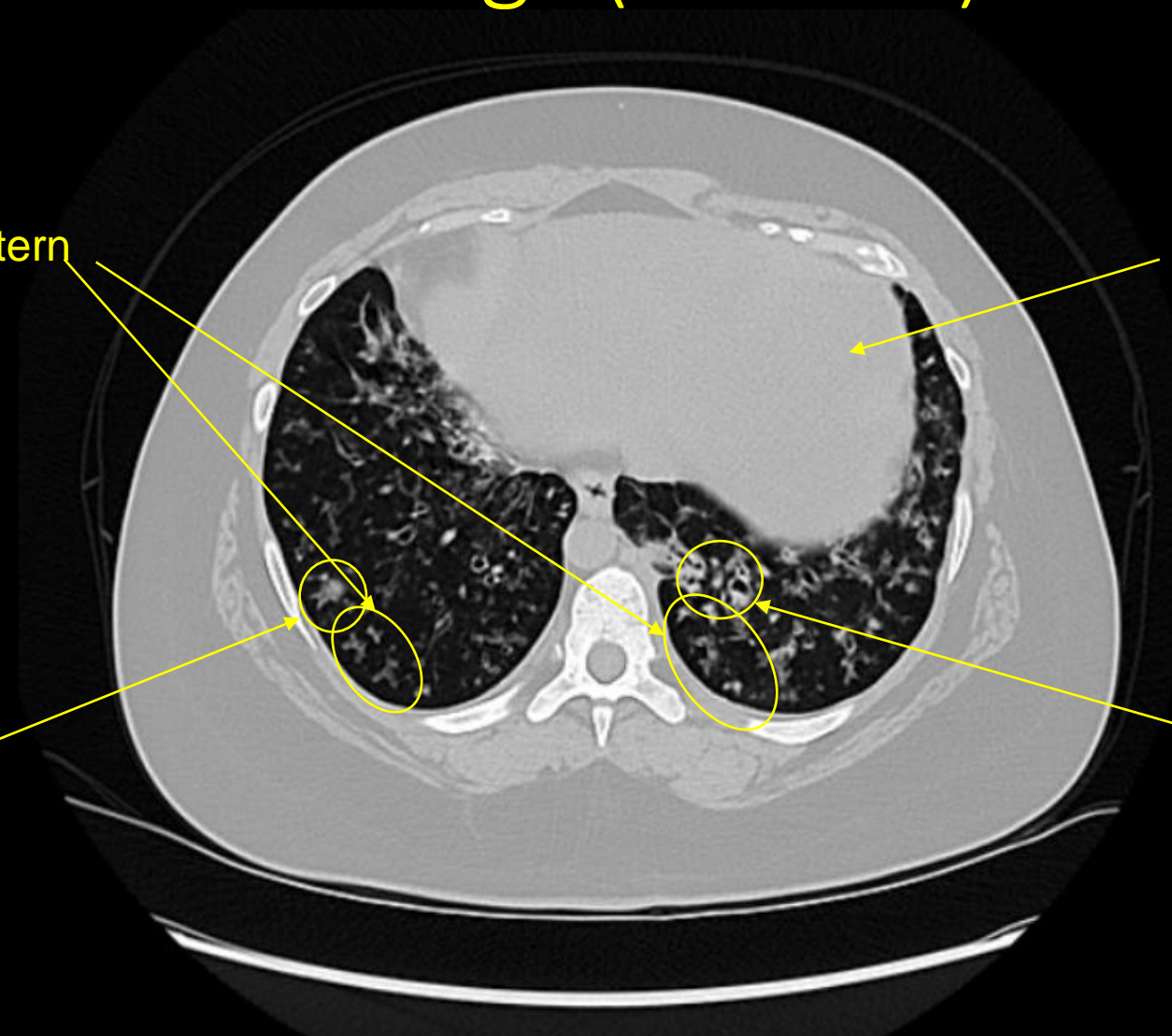
Procedure	Appropriateness Category	Relative Radiation Level
CT chest with IV contrast	Usually Appropriate	☼ ☼ ☼
CT chest without IV contrast	Usually Appropriate	☼ ☼ ☼
MRI chest without and with IV contrast	May Be Appropriate (Disagreement)	○
MRI chest without IV contrast	May Be Appropriate (Disagreement)	○
US chest	May Be Appropriate	○
CT chest without and with IV contrast	Usually Not Appropriate	☼ ☼ ☼

This imaging modality was ordered by the internist

Findings (unlabeled)



Findings (labeled)



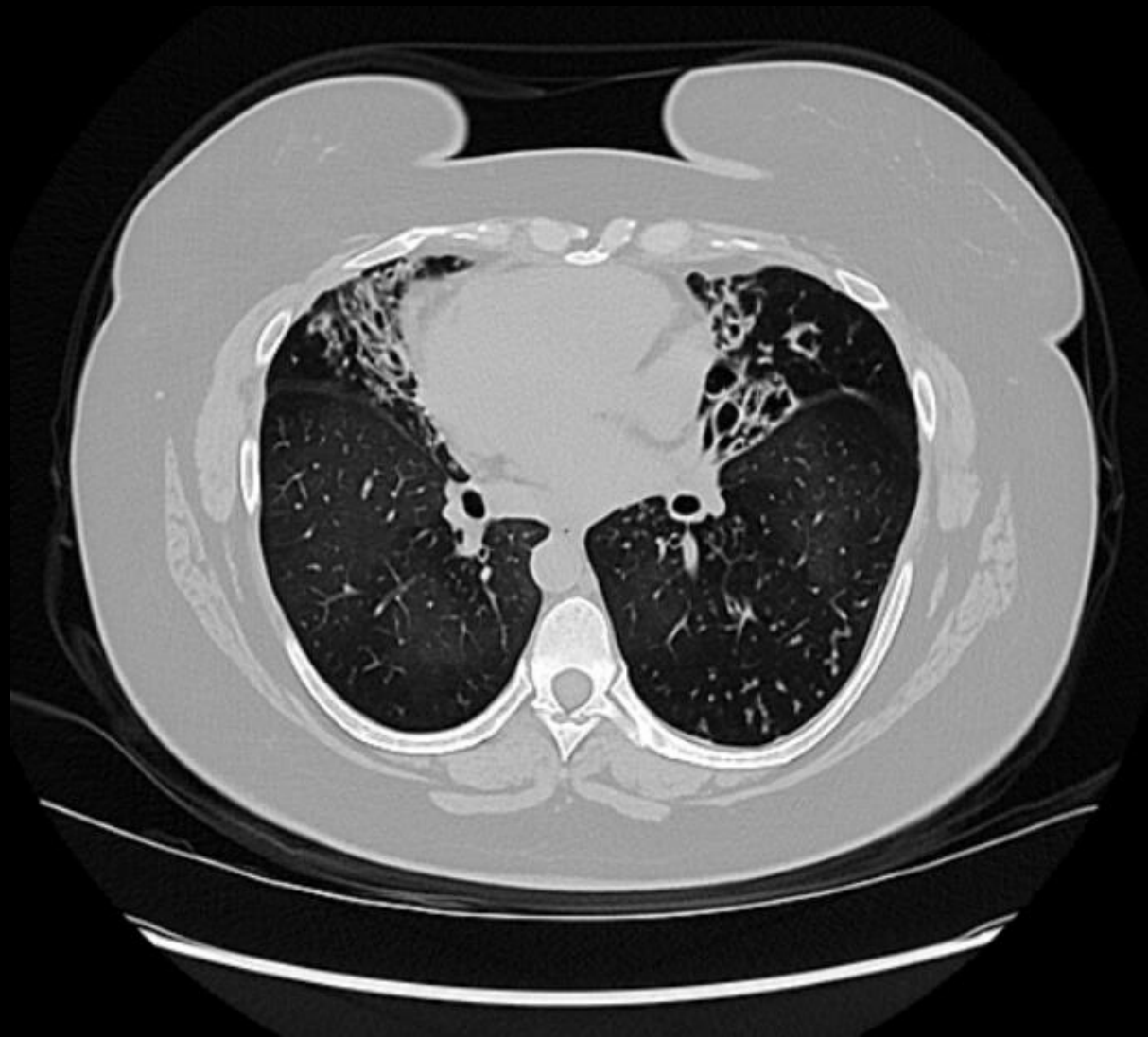
Nodules with tree-in-bud pattern

Situs Inversus – liver on the left side

Peripheral nodule with surrounding ground glass opacities

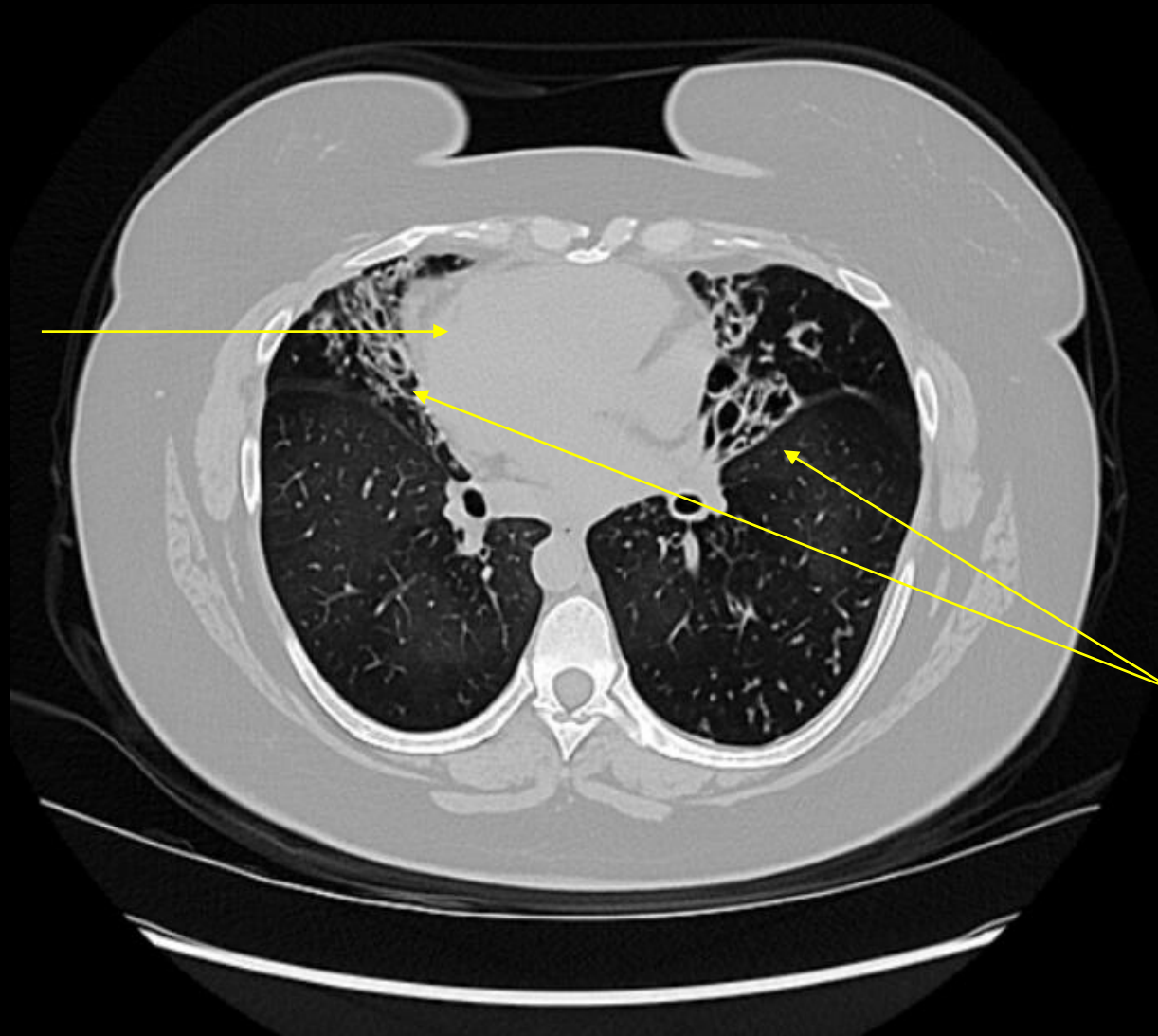
Bilateral lower lobe bronchiectasis with peribronchiolar wall thickening

Findings (unlabeled)



Findings (labeled)

Dextrocardia



Right middle lobe and
lingula bronchiectasis
with peribronchiolar wall
thickening

Final Dx:

- 1) Kartagener Syndrome
- 2) Pneumonia

Case Discussion

- Primary ciliary dyskinesia (PCD) is a genetic disease characterized by congenital dysfunction of cilia in the airway
- Incidence: 1/10,000 – 30,000
- Clinical features:
 - Recurrent upper and lower respiratory tract infections
 - Chronic rhinosinusitis
 - Situs Inversus – present in about ½ of patients with PCD
 - Male infertility and decreased fertility in females
- Kartagener syndrome is defined as the presence of situs inversus, chronic rhinosinusitis, and bronchiectasis in a patient with PCD

Case Discussion

- Radiological features of Kartagener syndrome
 - Situs inversus
 - Hyperinflation of the lungs
 - Peribronchial thickening
 - Atelectasis
 - Mucus plugging
 - Bronchiectasis – usually cylindrical or saccular
 - Bronchiectasis, when it does occur, usually found in the the right middle lobe and lingula, and lower lobes

Case Discussion

- Pneumonia is defined as an infection involving pulmonary parenchyma
- Recurrent pneumonias are often seen in patients with Kartagener Syndrome secondary to impaired mucociliary clearance
- Radiological features of pneumonia:
 - Lobar pneumonia: confluent consolidations of one lung segment or lobe
 - Bronchopneumonia: centrilobular nodules that coalesce throughout one or multiple lobes of the lung
 - Interstitial pneumonia: Septal thickening, nodules, and areas of ground glass opacities
 - These features may overlap and can be present regardless of the causative organism

References

1. Bergstrom, S.-E., & Das, S. (n.d.). *Primary Ciliary Dyskinesia* . UpToDate. Retrieved March 18, 2023, from https://www.uptodate.com/contents/primary-ciliary-dyskinesia-immotile-cilia-syndrome?search=pneumonia+in+context+of+primary+ciliary+dyskinesia&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1
2. Garg M, Prabhakar N, Gulati A, Agarwal R, Dhooria S. Spectrum of imaging findings in pulmonary infections. Part 1: Bacterial and viral. *Pol J Radiol*. 2019 Apr 18;84:e205-e213. doi: 10.5114/pjr.2019.85812. PMID: 31481992; PMCID: PMC6717952.
3. Ramirez, J. (n.d.). Overview of Community-Acquired Pneumonia in Adults. UpToDate. Retrieved March 18, 2023, from <https://www.uptodate.com/contents/overview-of-community-acquired-pneumonia-in-adults>