AMSER Rad Path Case of the Month:

67-year-old female with cough and shortness of breath with lung opacity

Karthik Kolisetty, MS4, Wayne State School of Medicine

Priya Gupta, MD, PGY3, Henry Ford Health – Interventional Radiology

Dharshan Vummidi, MD, Henry Ford Health – Diagnostic Radiology

Joseph Montecalvo, MD, Henry Ford Health – Pathology

Patient Presentation

HPI: Patient is a 67 y/o woman who had cough and shortness of breath that initially resolved. One month later, she again became short of breath and again developed cough and fever. X-ray showed a focal left lung opacity possibly concerning for malignancy.

Past History: Congestive Heart Failure s/p cardiac defibrillator, Type 2 Diabetes Mellitus, Hypertension, smoked for 10 years and stopped 35 years ago

Vitals: BP 128/71 mmHg, HR: 86 bpm, RR: 16 bpm, O2 Sat: 94%

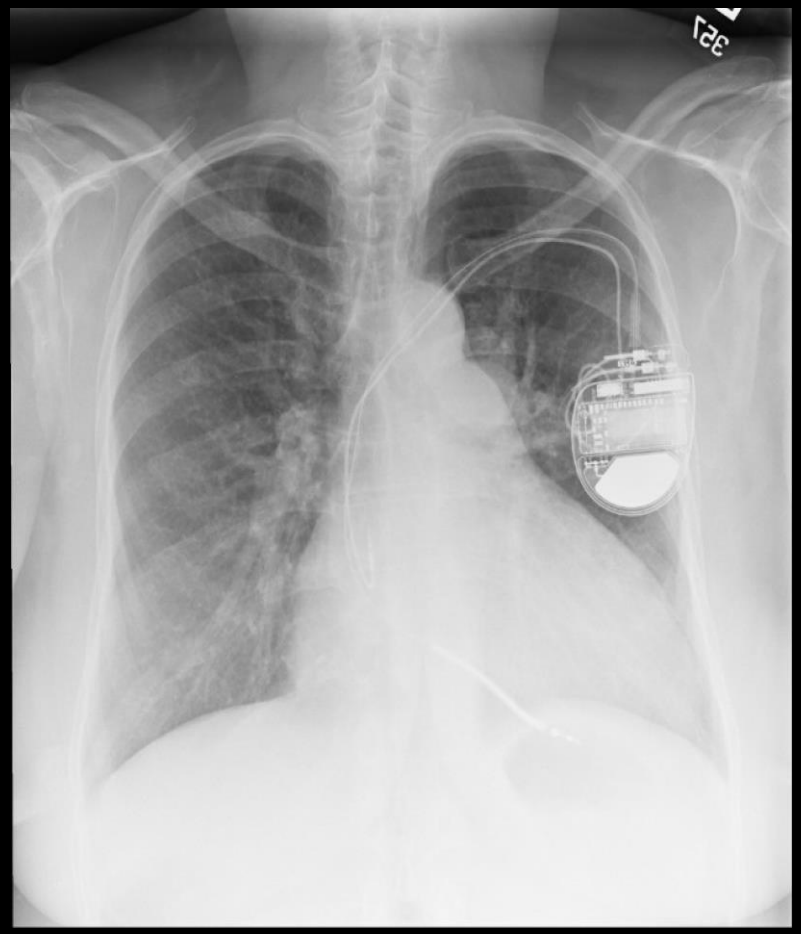
Physical Exam: Clear to auscultation bilaterally and normal work of breathing. No wheezes, rhonchi, or rales

Labs:

Respiratory panel: negative including Covid , Influenza A, Influenza B, and RSV

CBC: WBC- 6.8 X 10^9/L

Initial X-Ray



AP View

Left Lateral View

There is a 5 cm region of unknown confluent airspace opacity within the posterior medial left midlung shown on the left lateral view.

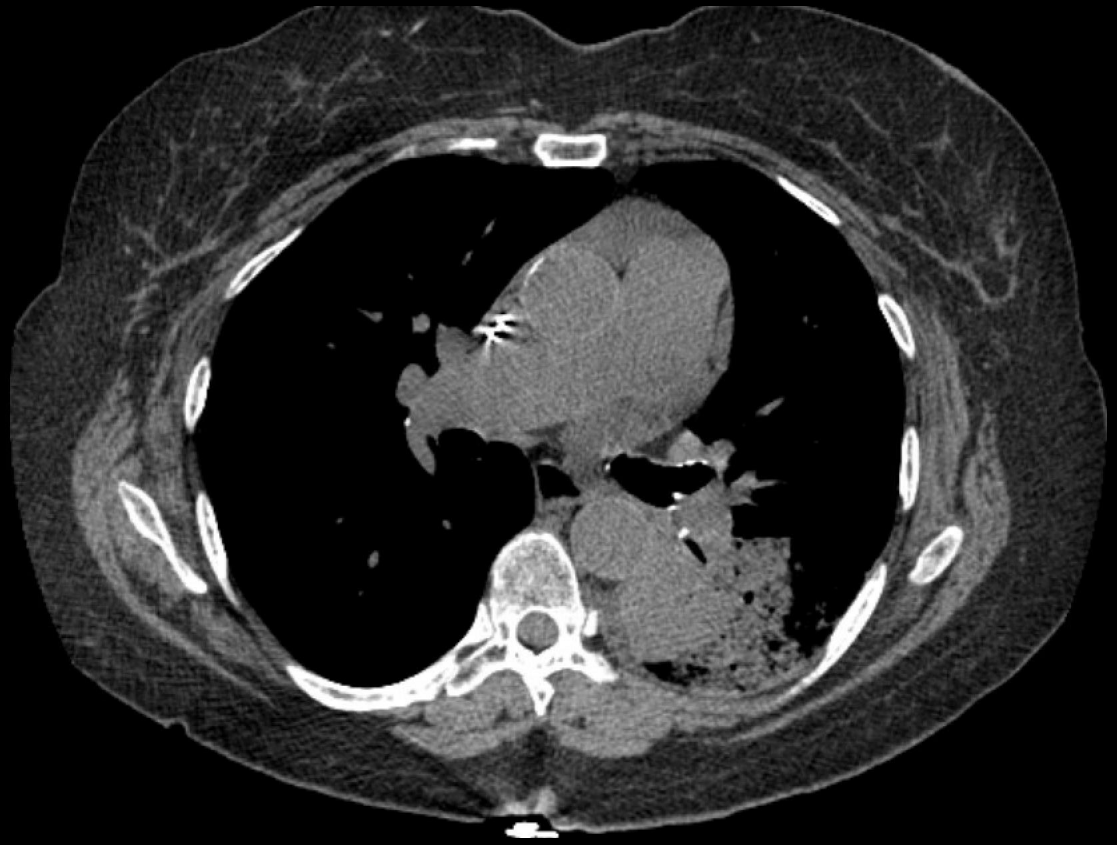
AMSER

ACR Appropriateness Criteria

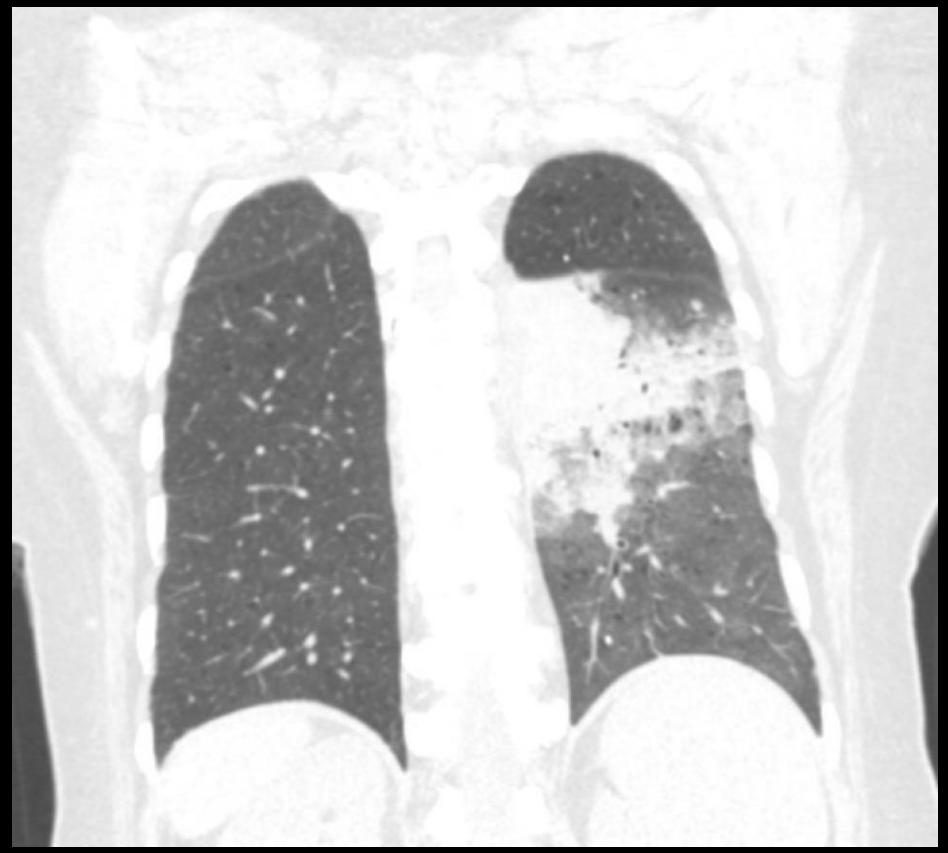
Variant 3: **Adult. Acute respiratory illness in immunocompetent patients with positive physical examination or abnormal vital signs or organic brain disease or other risk factors and negative or indeterminate initial chest radiograph. Next imaging study.**

Procedure	Appropriateness Category	Relative Radiation Level
CT chest with IV contrast	Usually Appropriate	☢☢☢
CT chest without IV contrast	Usually Appropriate	☢☢☢
CTA chest with IV contrast	May Be Appropriate	☢☢☢
US chest	Usually Not Appropriate	O
MRI chest without and with IV contrast	Usually Not Appropriate	O
MRI chest without IV contrast	Usually Not Appropriate	O
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢
V/Q scan lung	Usually Not Appropriate	☢☢☢

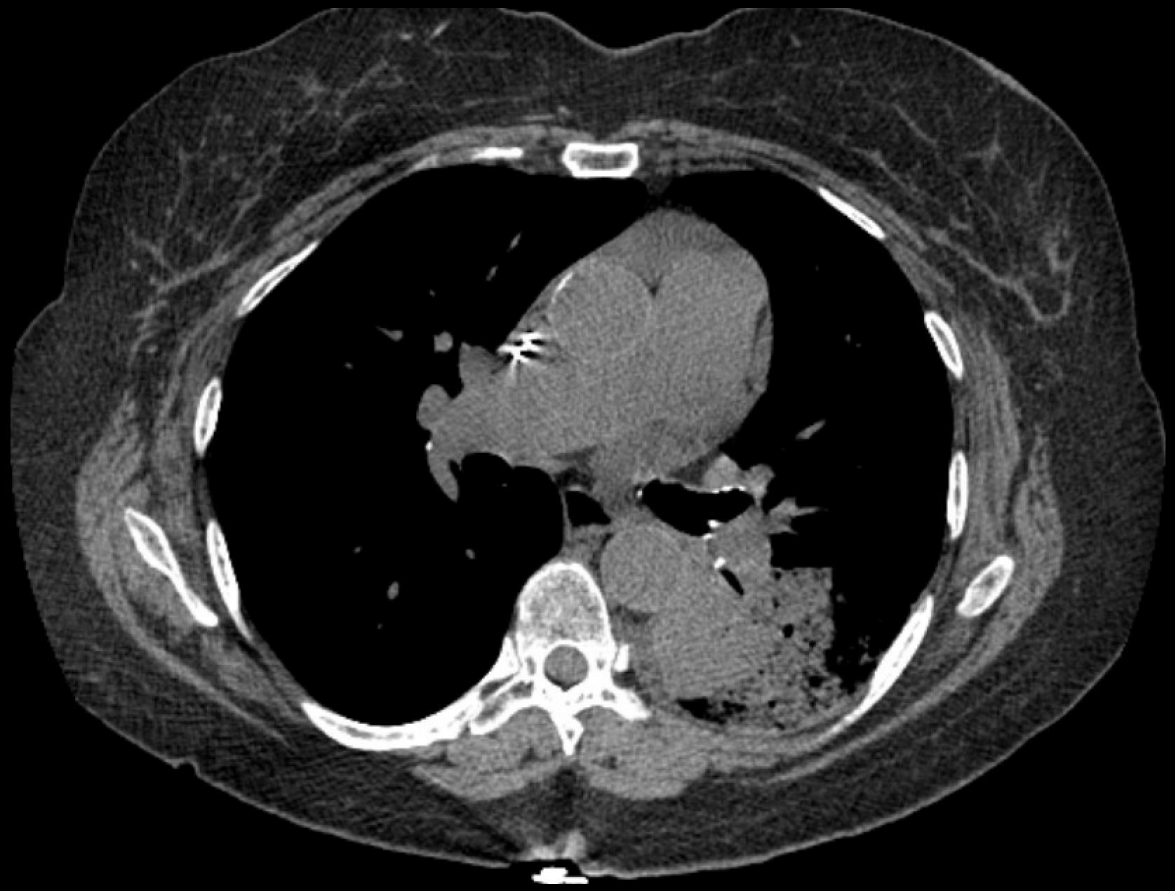
CT Chest – Soft Tissue Window (unlabeled)



CT Chest – Lung Window (unlabeled)

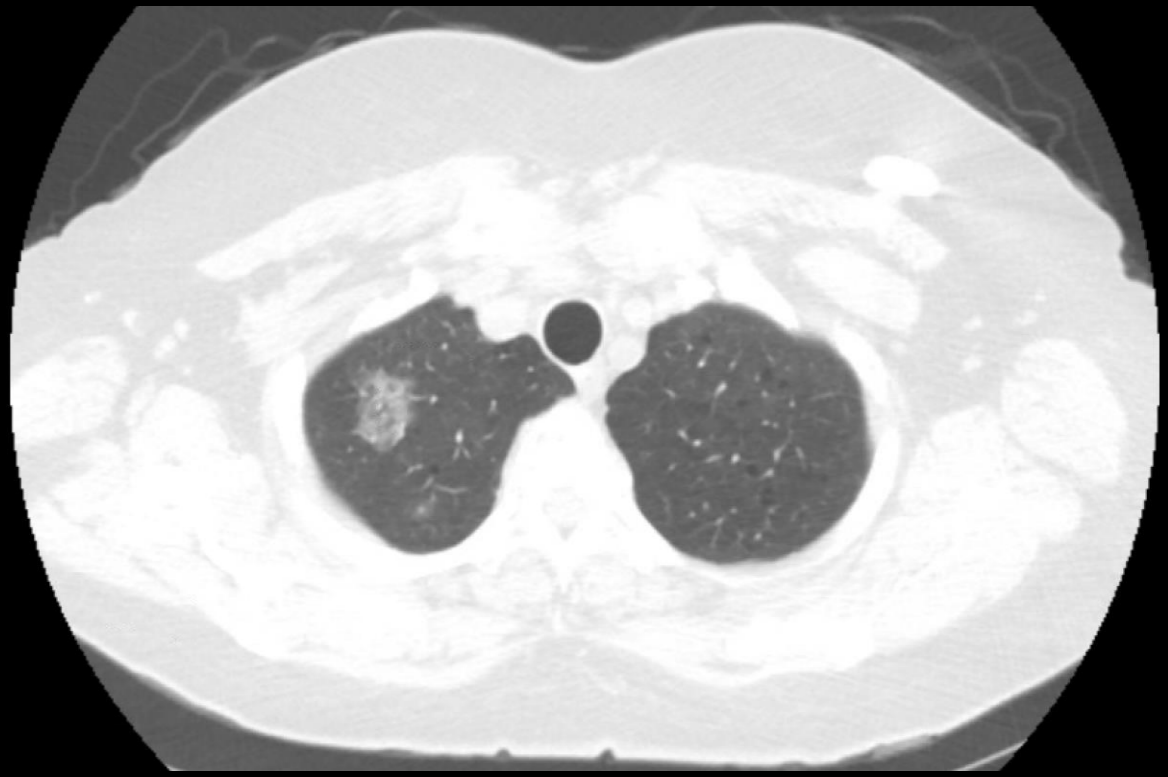


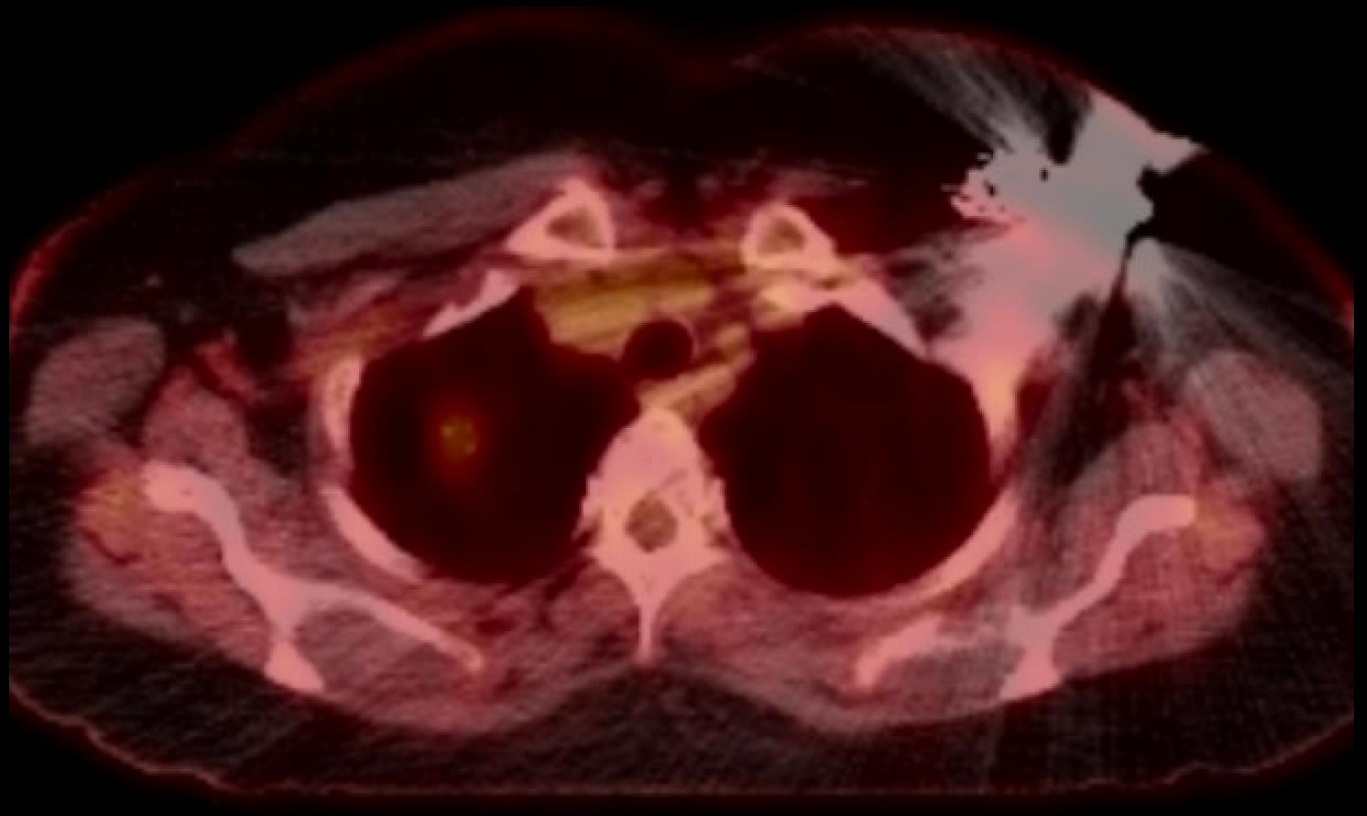
CT and Corresponding PET-CT (unlabeled)



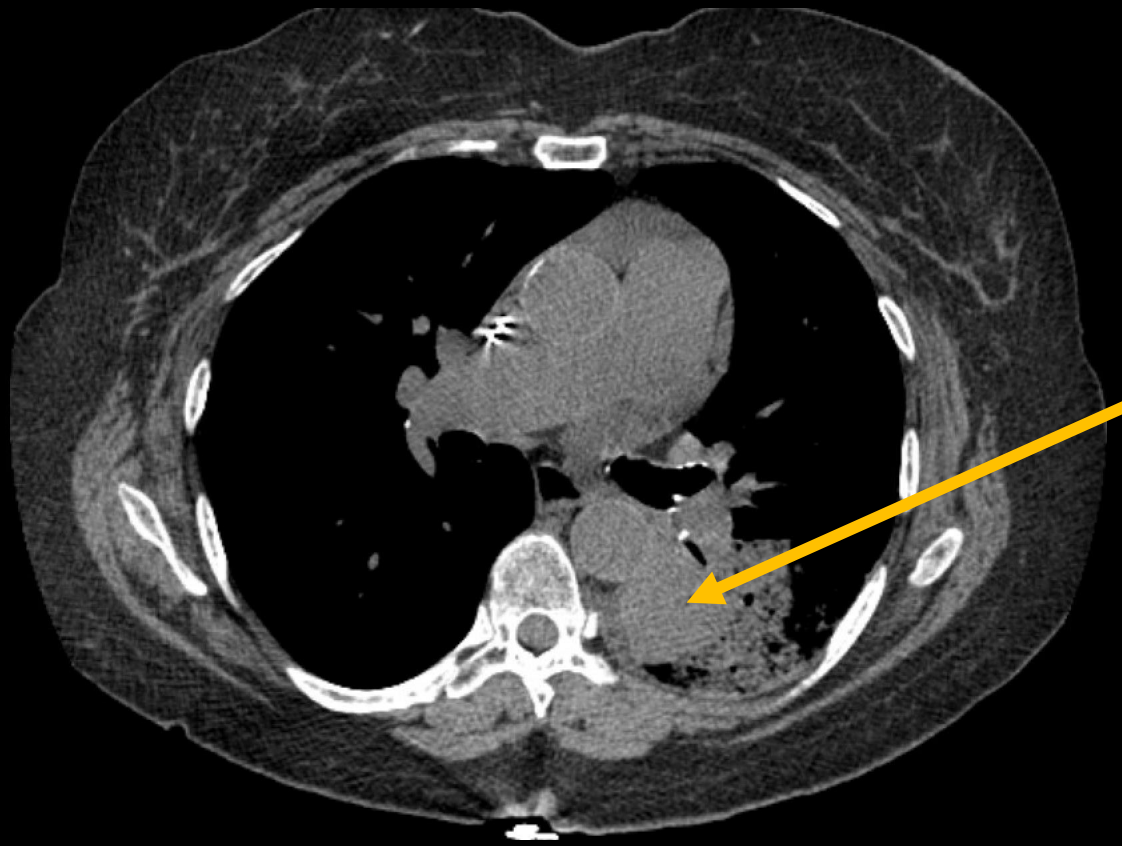
AMSER

CT and Corresponding PET (unlabeled)

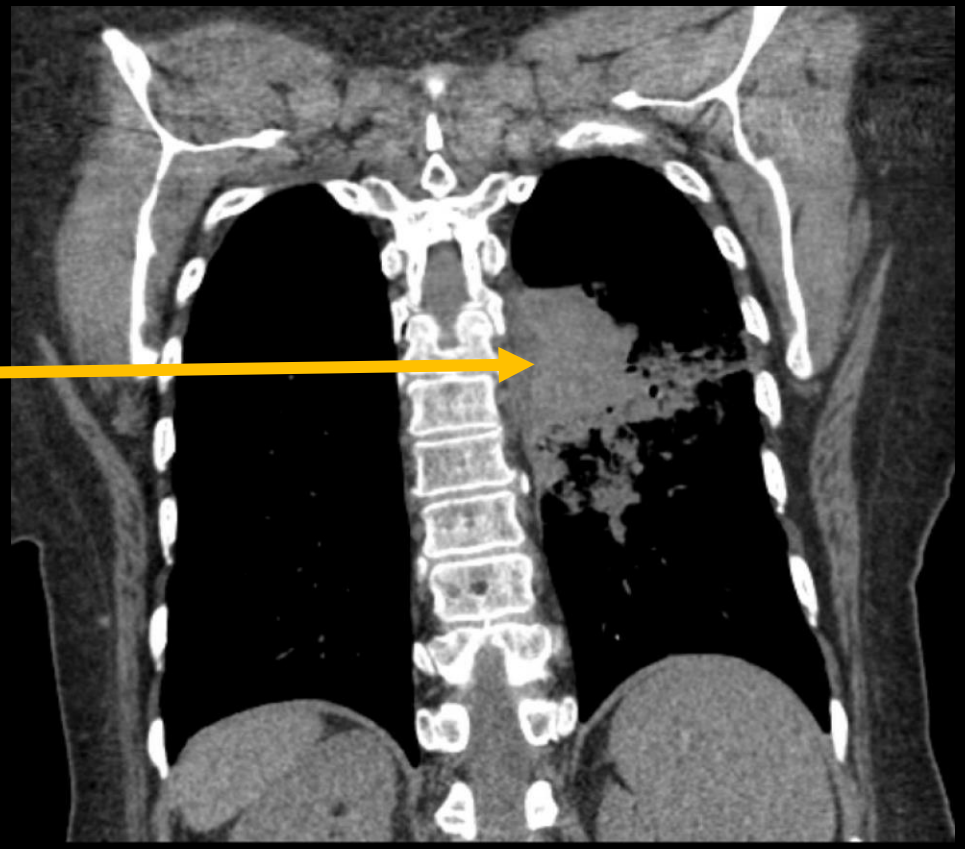




CT Images – Soft Tissue Window (labeled)



A. Axial noncontrast CT chest in soft tissue window

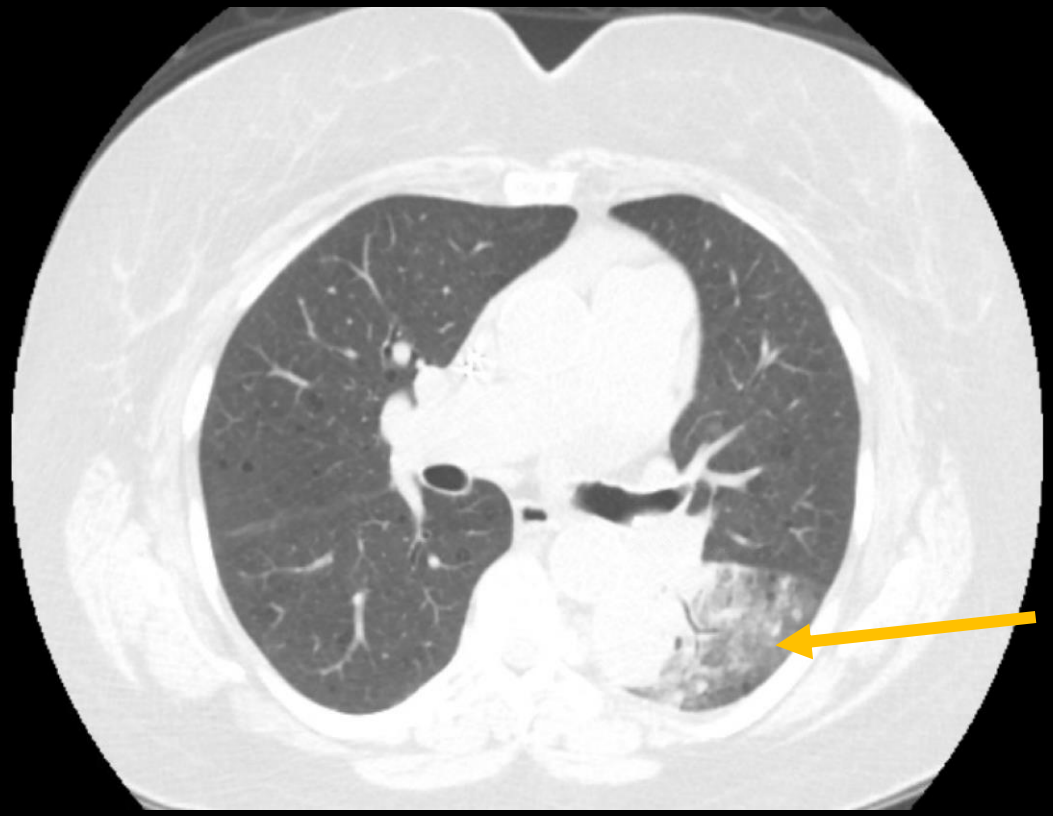


B. Coronal noncontrast chest in soft tissue window

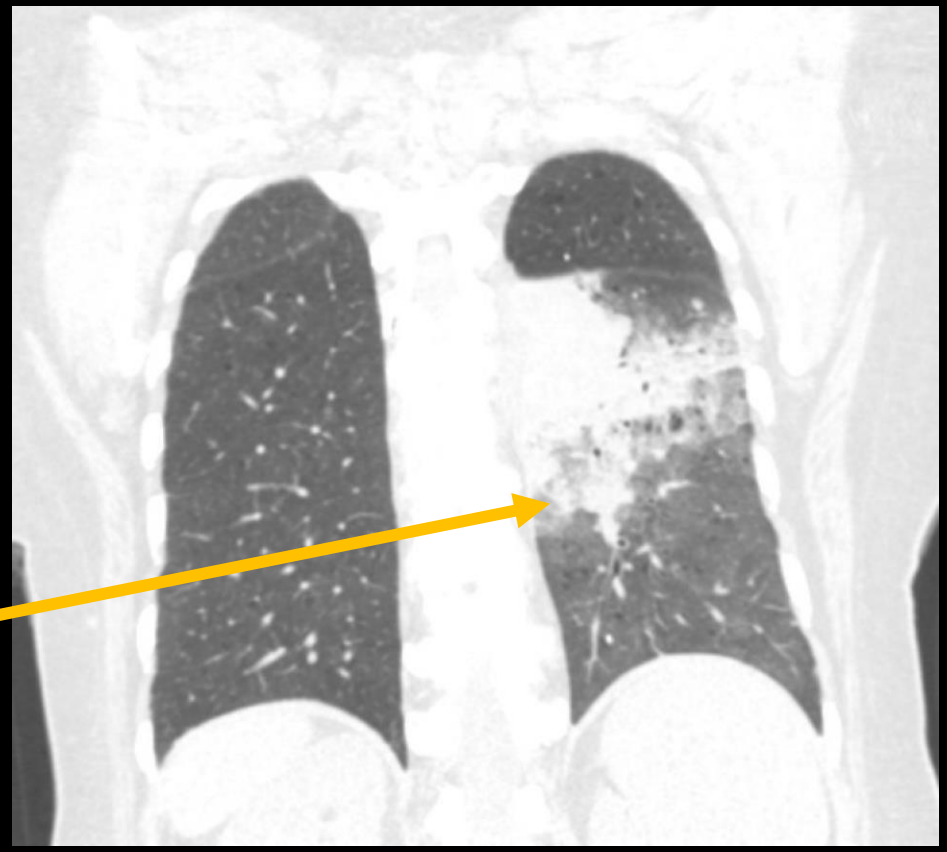
A mass-like area of airspace consolidation measuring 5.2 cm × 3.6 cm in the superior segment of the left lower lobe encasing the left lower lobe superior segment bronchus.

AMSER

CT Images – Lung Window (labeled)



Ground glass opacities in the parenchyma



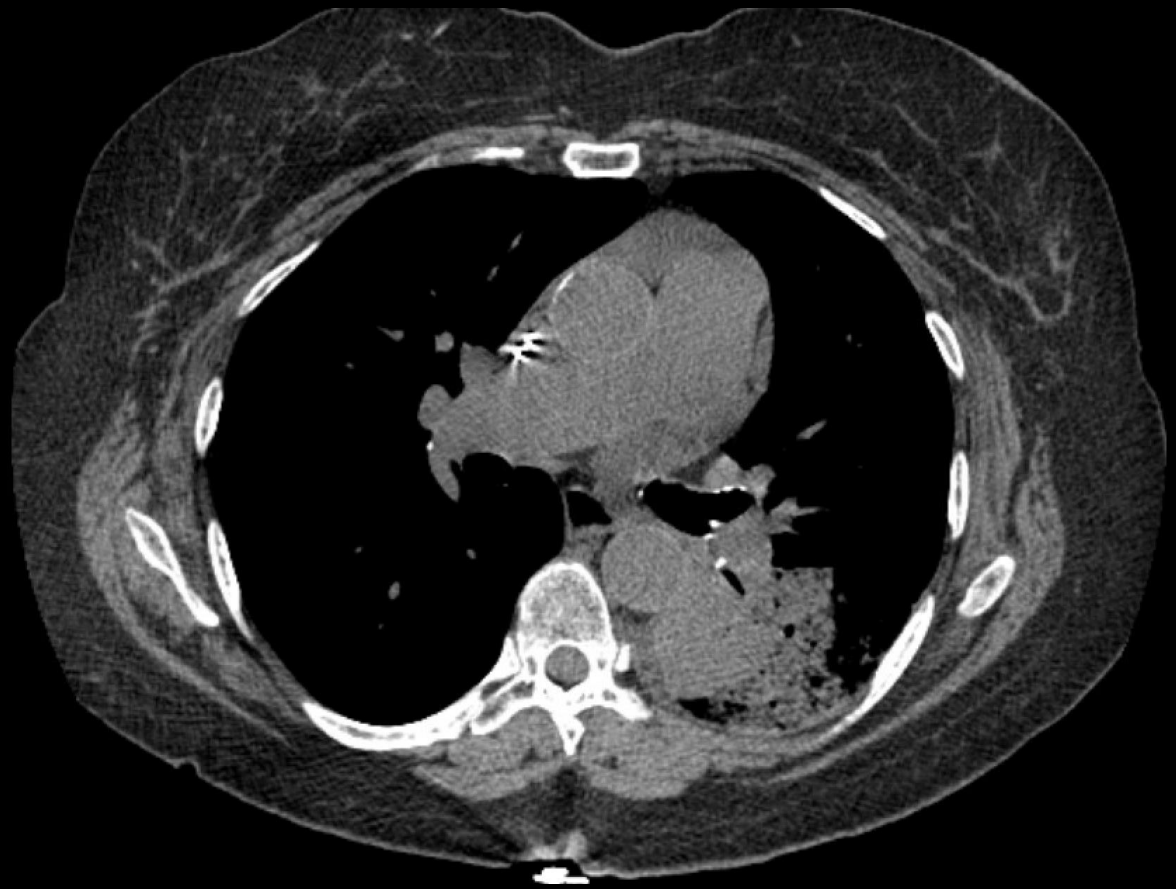
C. Axial non-contrast CT chest in lung window

D. Coronal non-contrast CT chest in lung window

Ground glass opacities are seen surrounding the previously described soft tissue component of the mass.

AMSER

CT and Corresponding PET-CT (labeled)



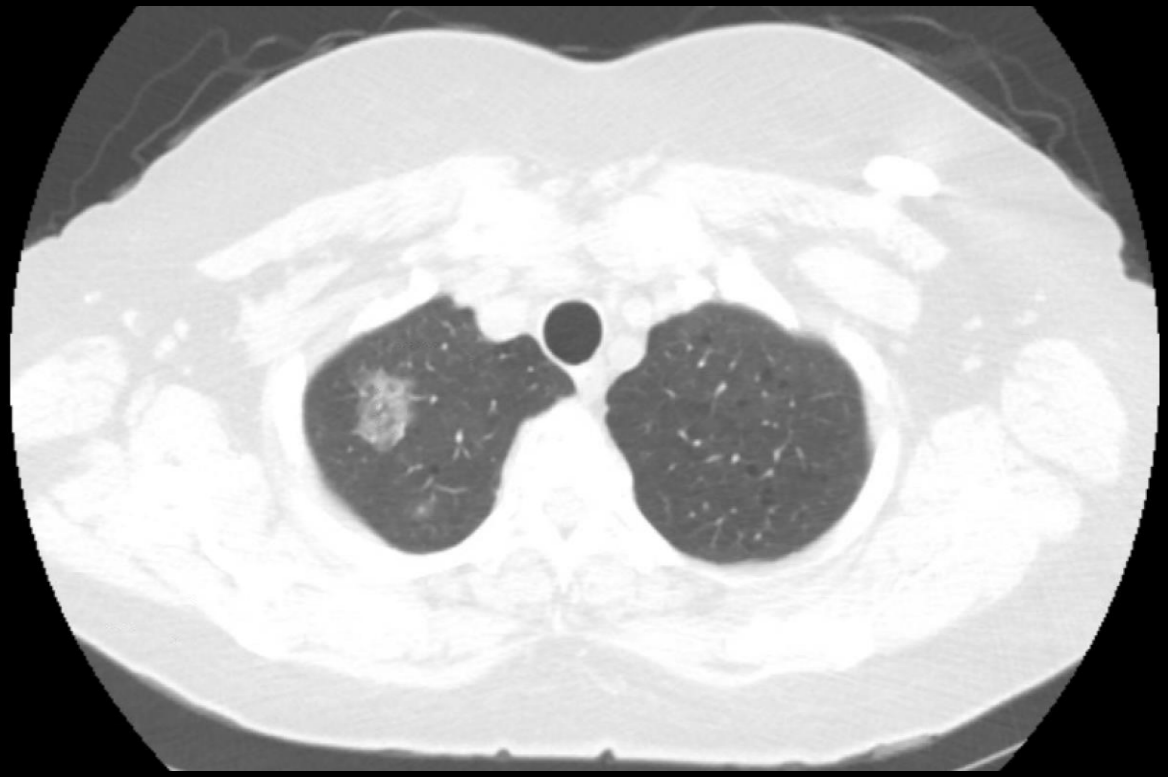
E. Axial noncontrast CT chest soft tissue window

F. Axial fused F18-FDG PET/CT

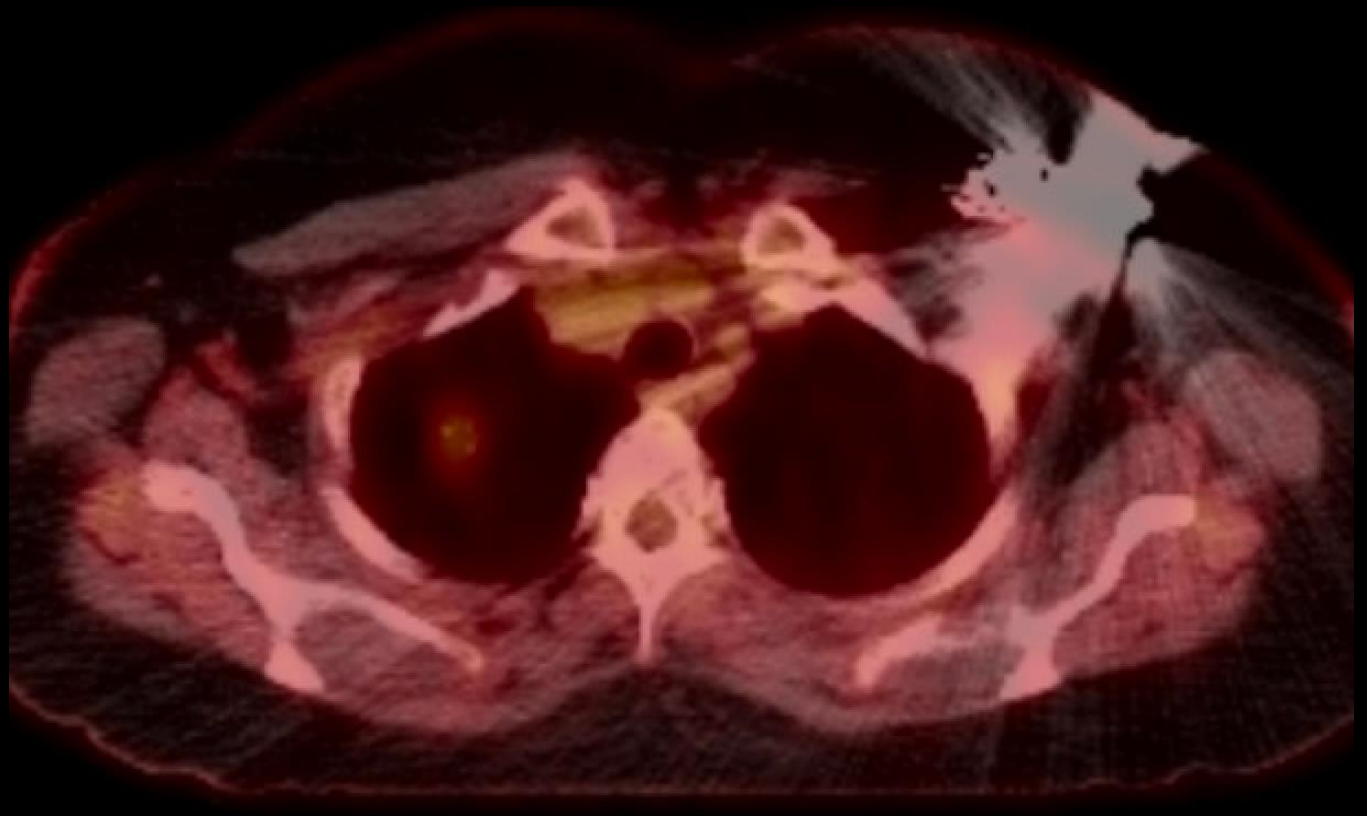
The soft tissue mass in the superior segment of the left lower lobe (Figure E) demonstrates mildly intense hypermetabolism on fused axial F18-FDG PET/CT (Figure F).

AMSER

CT and Corresponding PET (labeled)



G. Axial CT noncontrast in lung window



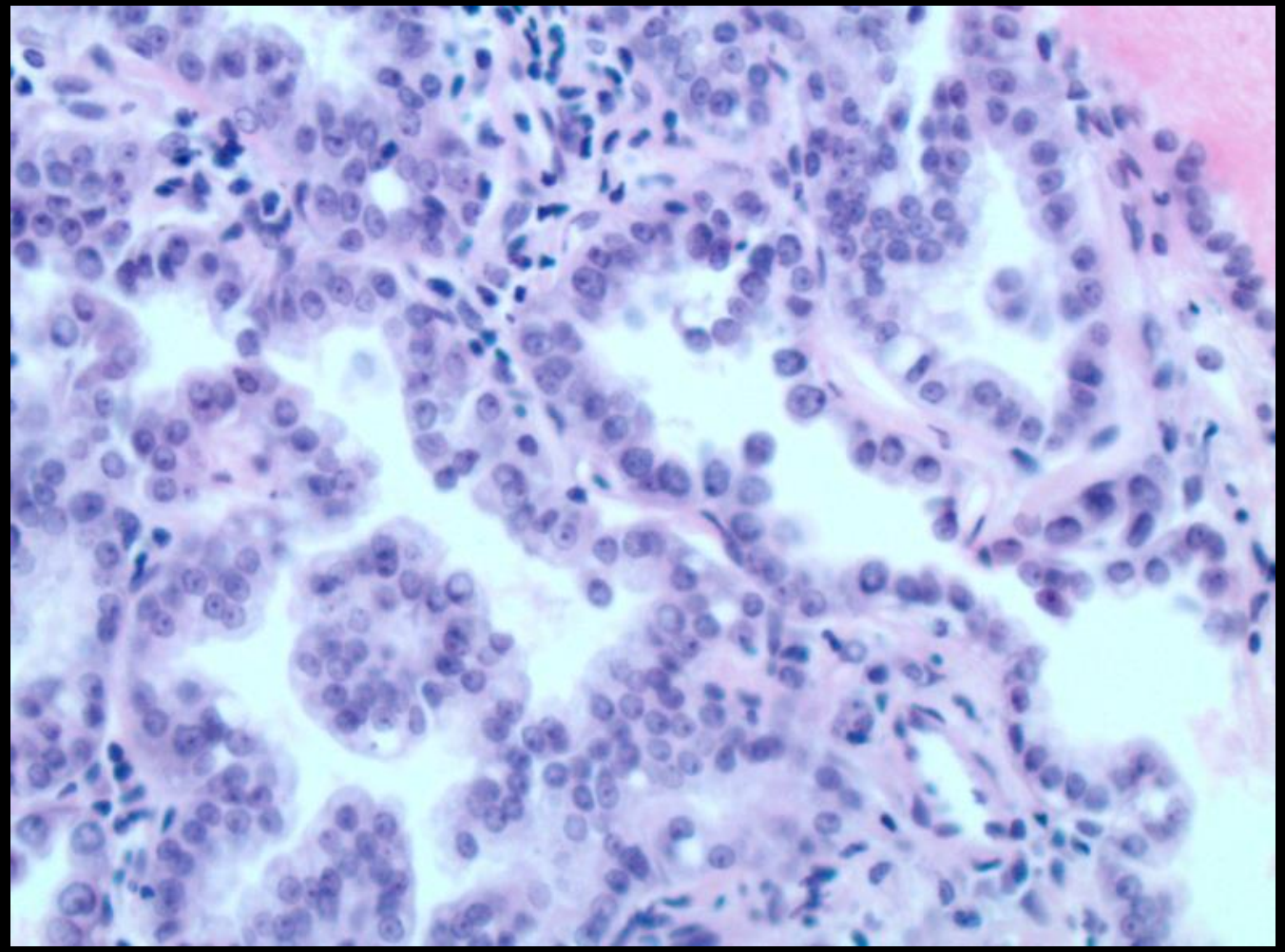
H. Axial fused F18-FDG PET/CT

Multiple additional subsolid masses were seen with a representative lesion in the right upper lobe (Figure G) demonstrating low-level FDG uptake on fused axial F18-FDG PET/CT (Figure H), a feature characteristic of adenocarcinoma of the lung.

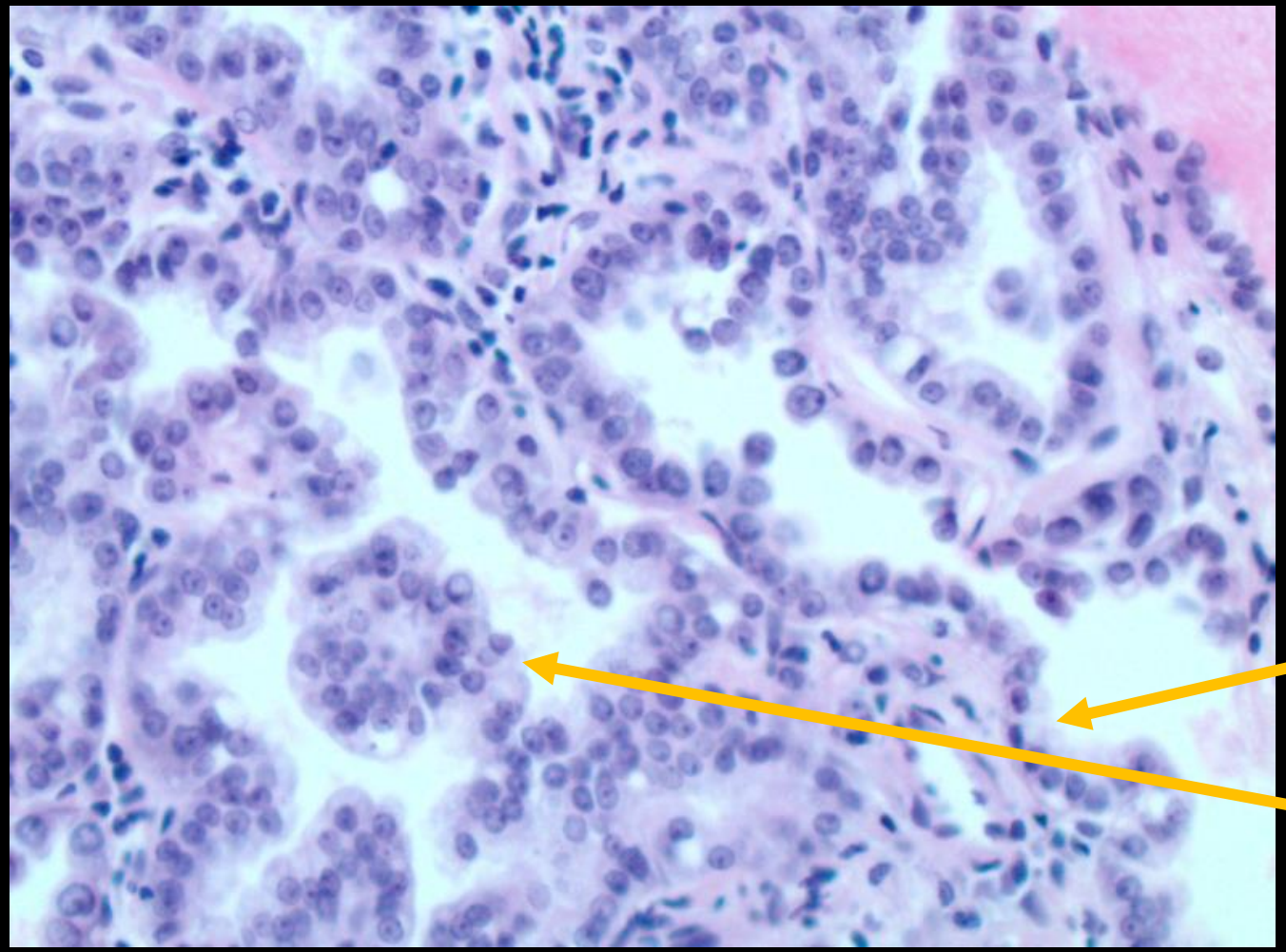
DDX (based on imaging)

- Adenocarcinoma of the lung, various types:
  - Adenocarcinoma in-situ
  - Minimally invasive adenocarcinoma
  - Lepidic predominant adenocarcinoma
  - Invasive mucinous adenocarcinoma
- Pneumonia
  - Pneumocystis jirovecii pneumonia
  - Aspergillosis
- Interstitial lung disease - interstitial pneumonia
- Pulmonary edema

Micro Pathology (unlabeled)



Micro Pathology (labeled)



Lepidic Pattern: tumor cells that resembles pneumocytes that grows along the alveolar wall

Acinar Pattern: crowding of cells and loss of normal lung gland architecture

I. Histopathology of the lung biopsy in H&E stain with 400X magnification demonstrating atypical gland-forming epithelial cells arranged in acinar and lepidic patterns, consistent with adenocarcinoma.

AMSER

Final Dx:

Adenocarcinoma of the lung with mixed lepidic and acinar type

Case Discussion

- Lung adenocarcinoma is the most common type of lung cancer for nonsmokers and in females
- Lung adenocarcinoma is a neoplasm arising from the mucin-producing glands of the lung
- There are different glandular differentiations including lepidic, acinar, papillary, micropapillary, and solid.
- Lepidic-type adenocarcinoma is noninvasive and grows along the alveoli, whereas acinar-type adenocarcinoma is malignant tissue along the glands
- The presence of mixed lepidic and acinar glandular differentiation is common in pulmonary adenocarcinoma

Differentiations of Invasive Adenocarcinoma and Radiological Findings

1) Lepidic: Usually part-solid including ground-glass and solid components
2) Acinar: solid mass
3) Papillary: solid mass
4) Micropapillary: solid mass

Acinar, papillary, and micropapillary patterns are indistinguishable on CT and require pathology for differentiation

Differentiations of Invasive Adenocarcinoma and Histopathological Findings

1) Lepidic: Tumor cells proliferating along alveolar walls
2) Acinar: Invasive glandular structures forming acini or small tubules
3) Papillary: Papillary structures with fibrovascular cores
4) Micropapillary: Small clusters/tufts of tumor cells lacking fibrovascular cores

Prognosis and Treatment

- Prognosis is based on histologic subtype:
  - Lepidic: Best prognosis
  - Acinar and Papillary: Intermediate prognosis
  - Micropapillary: Poorest prognosis

- Treatment is guided by stage on presentation:
  - Stage I and II: Surgical resection
  - Stage III: Chemotherapy with possible surgical resection
  - Stage IV: Targeted immunotherapy, with possible palliative care

References:

1. Collins J, Stern EJ. Ground-glass opacity at CT: the ABCs. AJR Am J Roentgenol. 1997 Aug;169(2):355-67. doi: 10.2214/ajr.169.2.9242736. PMID: 9242736.

2. Gardiner, N., Jogai, S., & Wallis, A. (2014). The revised lung adenocarcinoma classification—An imaging guide. *Journal of Thoracic Disease, 6*(Suppl 5), S537–S546. https://doi.org/10.3978/j.issn.2072-1439.2014.04.05

3. Keow, J., & Cecchini, M. J. (n.d.). Lepidic adenocarcinoma. *PathologyOutlines.com*. Retrieved August 6, 2025, from https://www.pathologyoutlines.com/topic/lungtumoradenolepidic.html

4. Lambe, G., Durand, M., Buckley, A. *et al.* Adenocarcinoma of the lung: from BAC to the future. *Insights Imaging* **11**, 69 (2020). https://doi.org/10.1186/s13244-020-00875-6

5. Nicholson, A. G., et al. (2022). The 2021 WHO classification of lung tumors: Impact of advances since 2015. *Journal of Thoracic Oncology, 17*(3), 362–380.