AMSER Case of the Month August 2025

17-year-old male with acute myeloid leukemia presents with cough and chest pain

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Patient Presentation

- HPI: Patient is a 17-year-old boy with acute myeloid leukemia, admitted to the hospital for chemotherapy. He developed neutropenic fevers, cough, and chest pain which persisted even while on broad-spectrum antibiotics (cefepime and vancomyocin). Initial CXR showed no opacities.
- Past medical history: Acute myeloid leukemia, venous malformation controlled with Xarelto and alpelisib
- Social history: None
- Family history: None
- Medications: 4 cycles of chemo following protocol AAML 1831

Pertinent Labs

- Positive serum aspergillosis galactomannan and Fungitell
- CMP: mild hyponatremia at 134, mild hypocalcemia at 8.7
- CBC: pancytopenia with absolute neutropenia due to chemotherapy

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 3: **Nontraumatic chest wall pain. Suspected infectious or inflammatory condition. Secondary evaluation after normal 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	☢☢☢
US chest	May Be Appropriate	O
MRI chest without and with IV contrast	May Be Appropriate	O
MRI chest without IV contrast	May Be Appropriate (Disagreement)	O
Bone scan whole body	May Be Appropriate (Disagreement)	☢☢☢
FDG-PET/CT skull base to mid-thigh	May Be Appropriate	☢☢☢☢
WBC scan chest	May Be Appropriate	☢☢☢☢
Radiography rib views	Usually Not Appropriate	☢☢☢
CT chest without and with IV contrast	Usually Not Appropriate	☢☢☢

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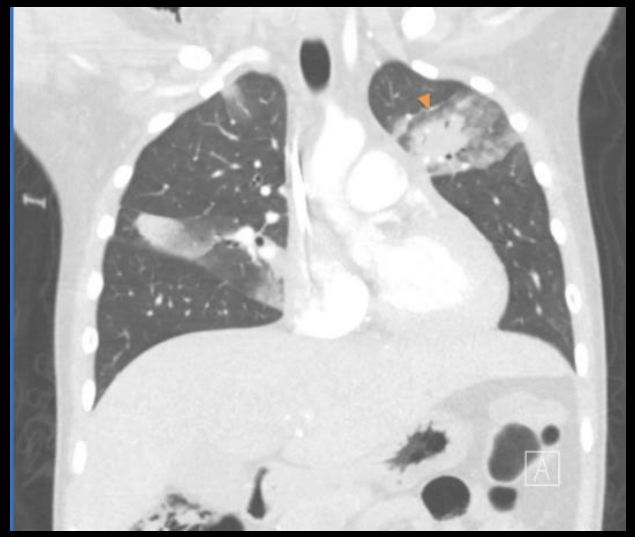
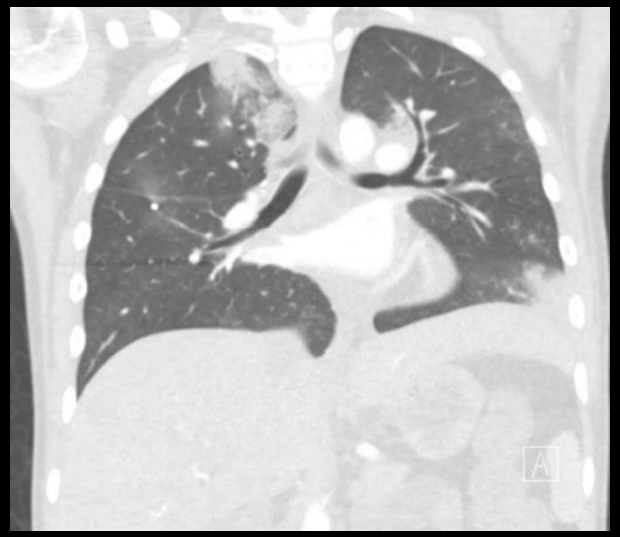
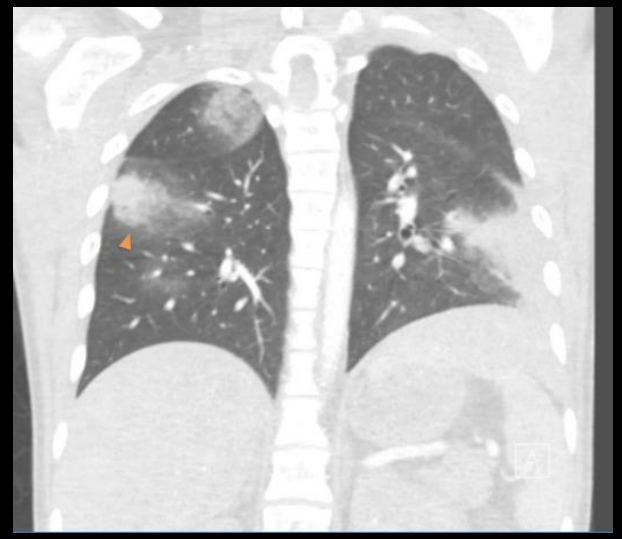
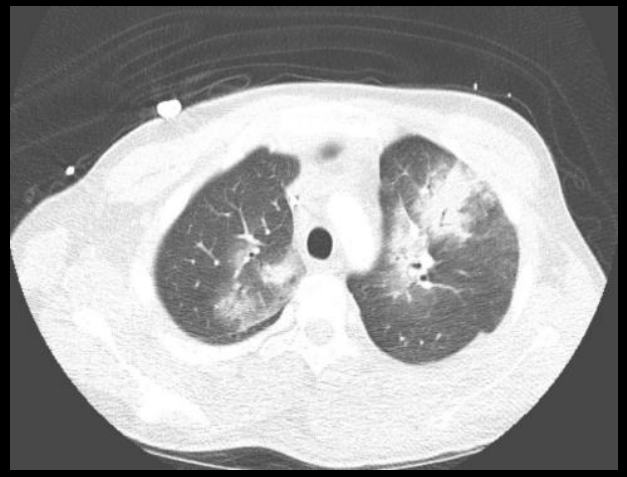
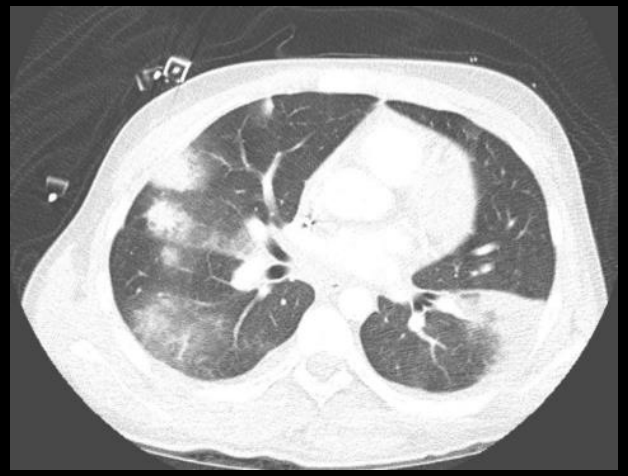
Treatment

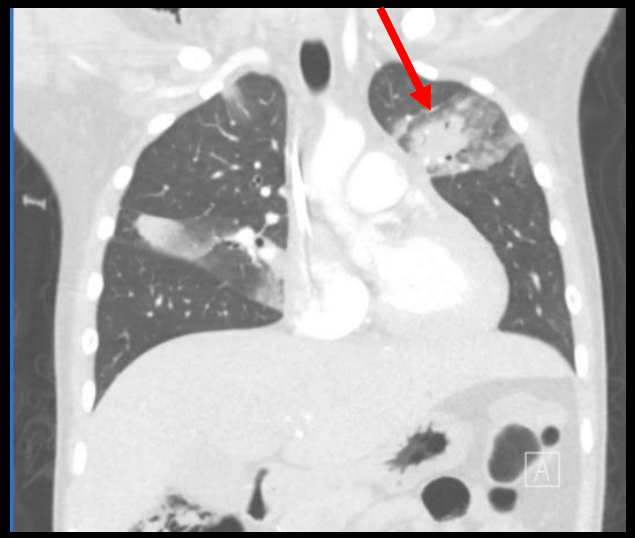
- Patient started on micafungin and imaging was obtained initially and at 2 weeks

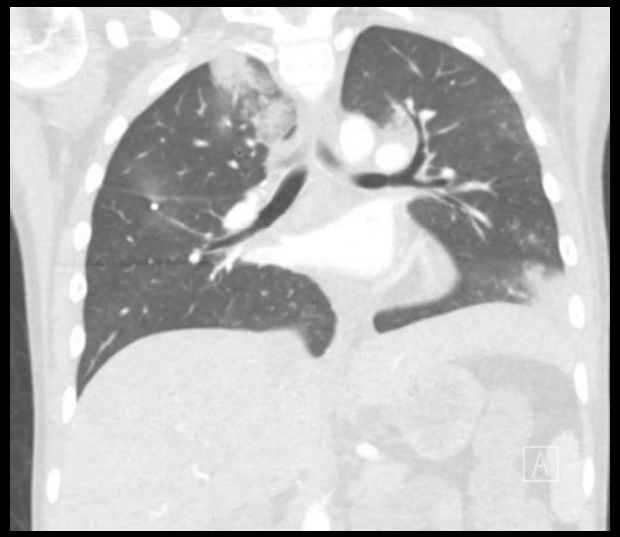
CT Chest (unlabeled)

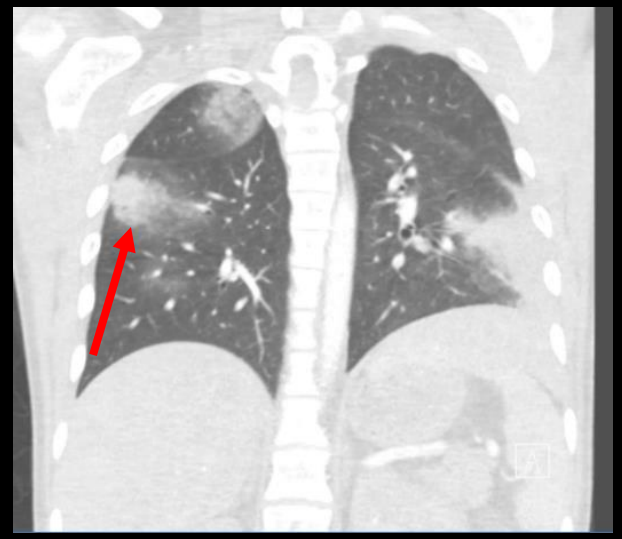






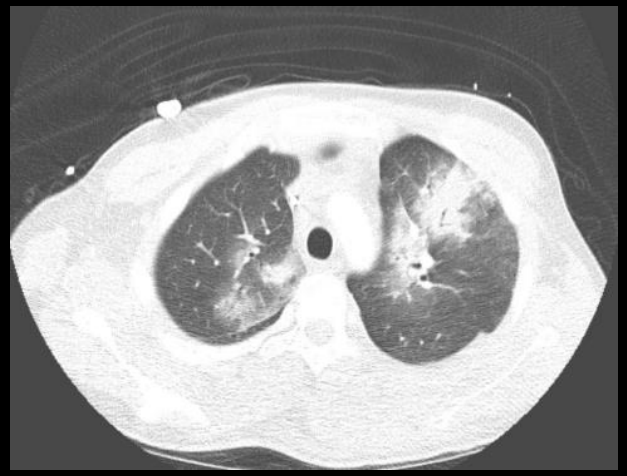

CT Chest (labeled)

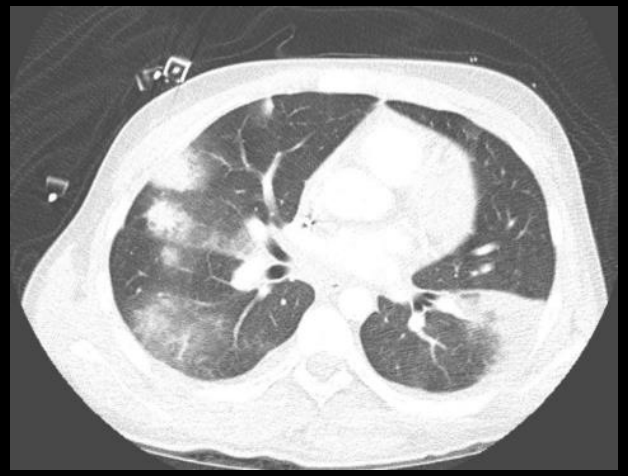
"Halo" sign- consolidation with ground-glass opacities



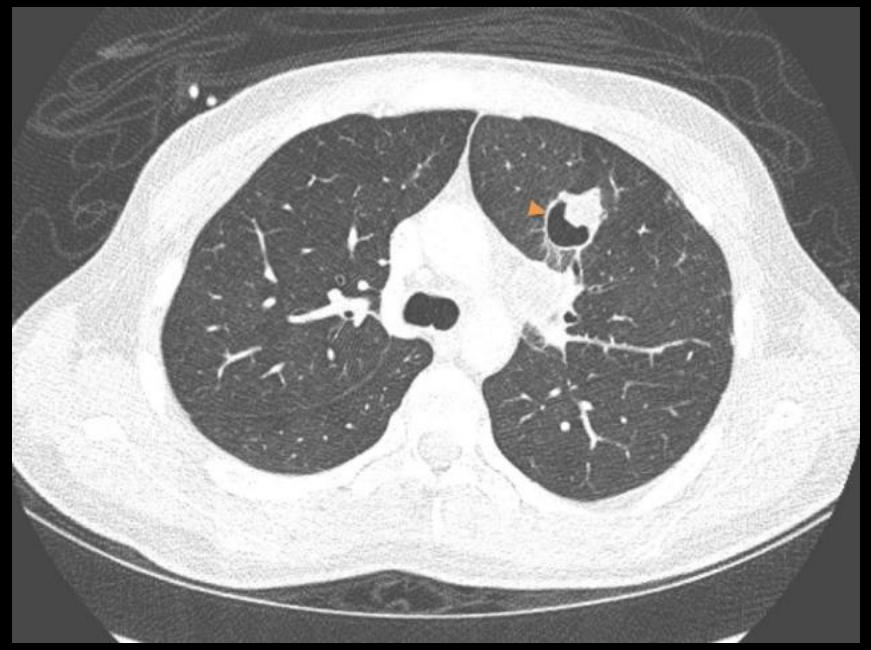




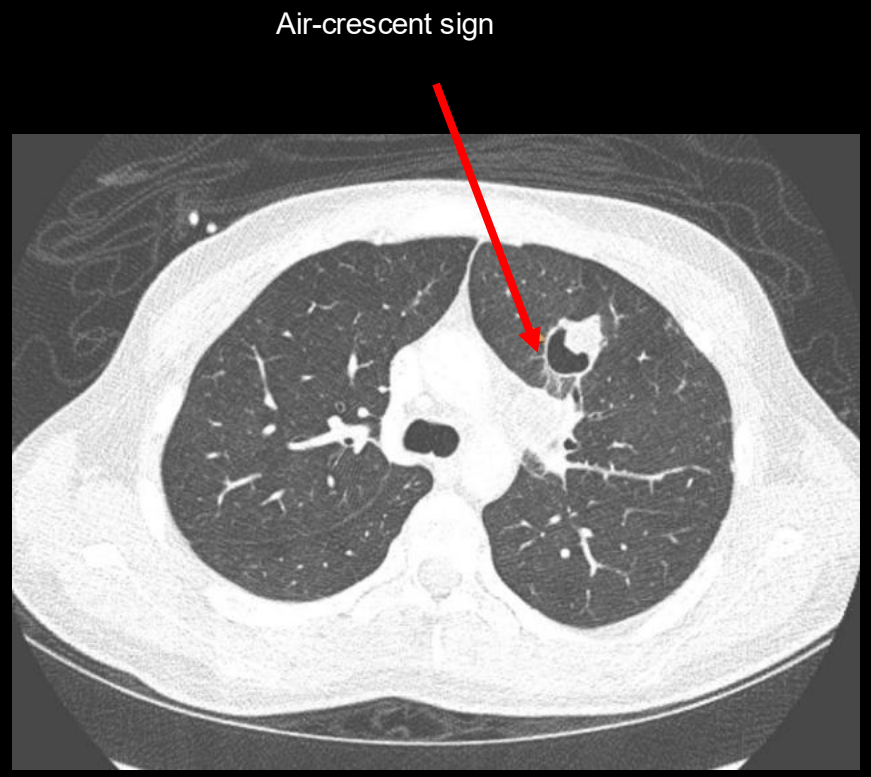




CT Chest after 2 weeks (unlabeled)



CT Chest after 2 weeks (labeled)



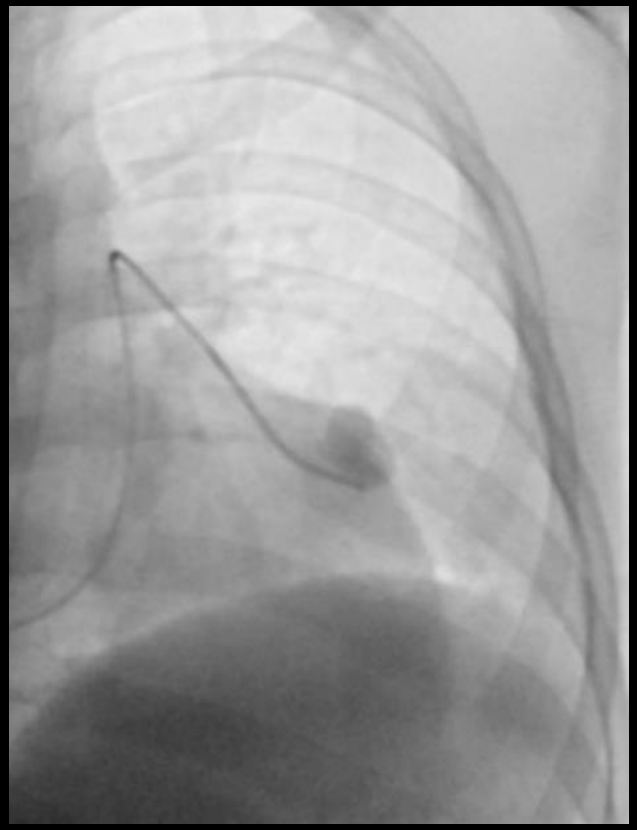
Treatment

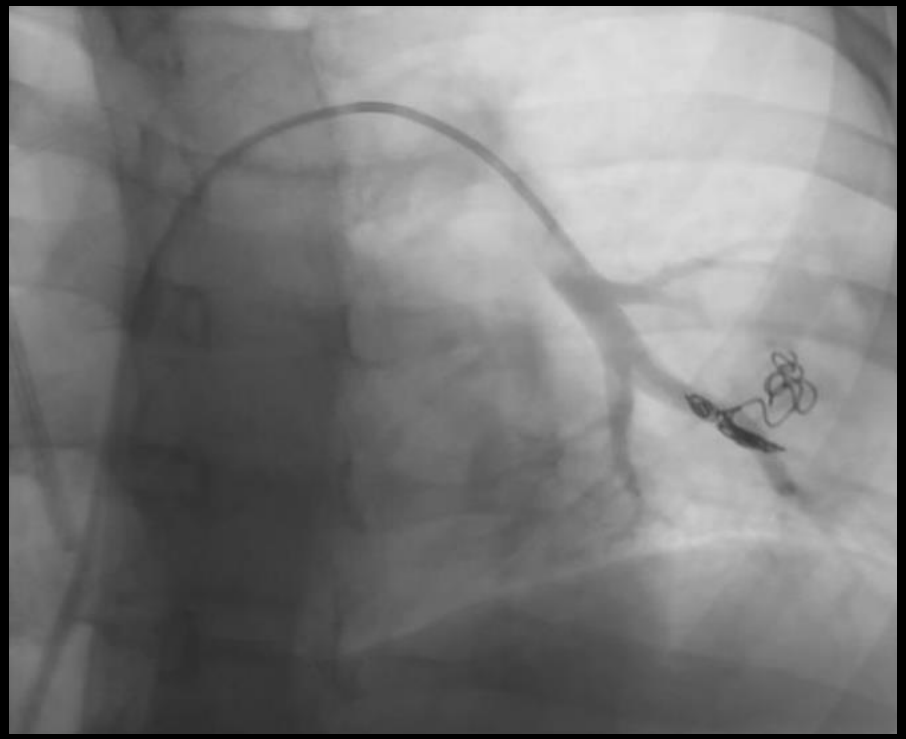
- Presence of “air-crescent” sign suggested response to treatment
- Voriconazole added to patient’s regimen, and repeat imaging was obtained at 6 weeks

Treatment

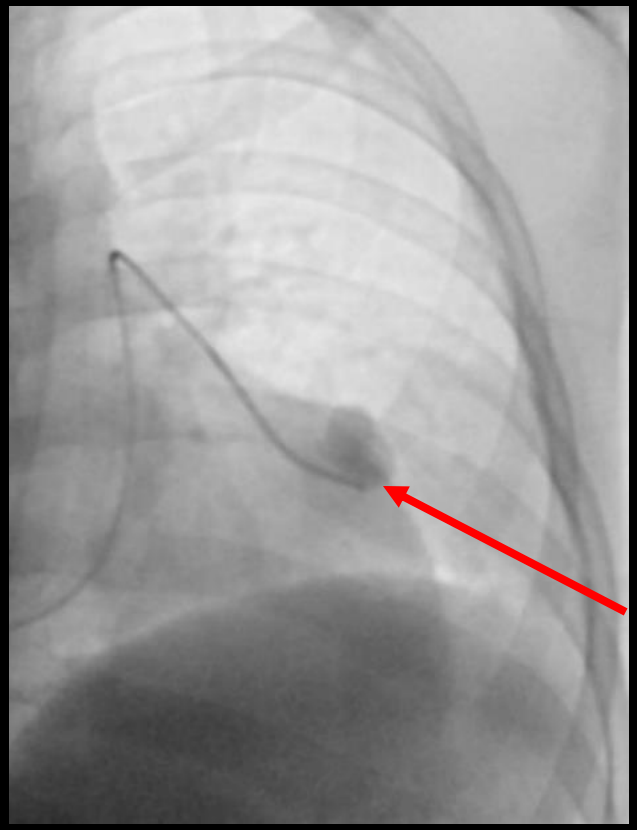
- Patient underwent pulmonary angiogram and coil embolization with IR team due to apparent pseudoaneurysm in left lower lobe.

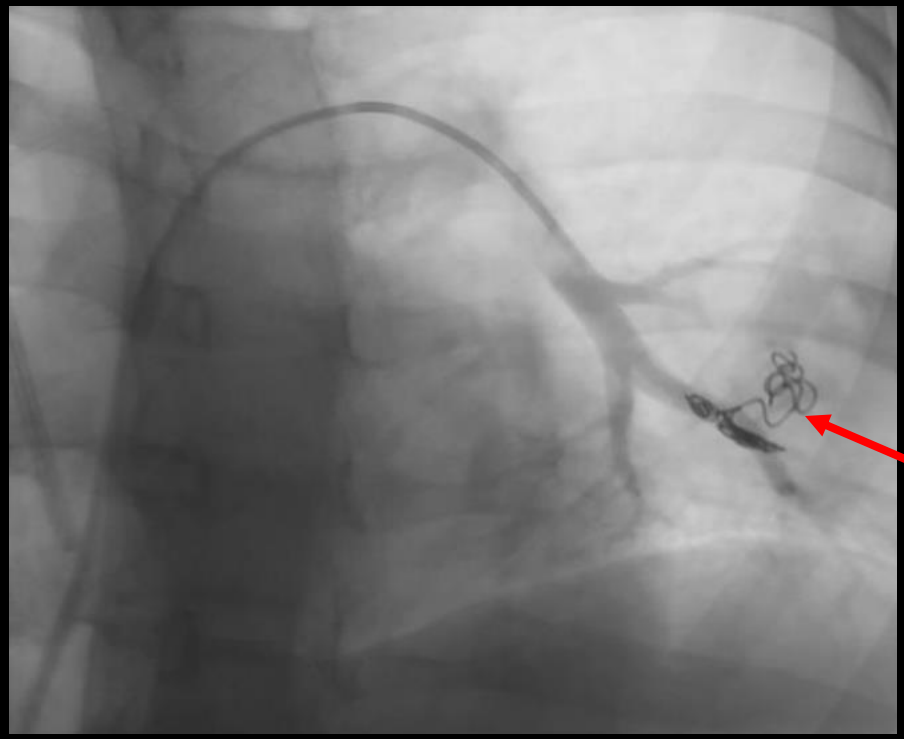
CT pulmonary angiography (unlabeled)





CT pulmonary angiography (labeled)

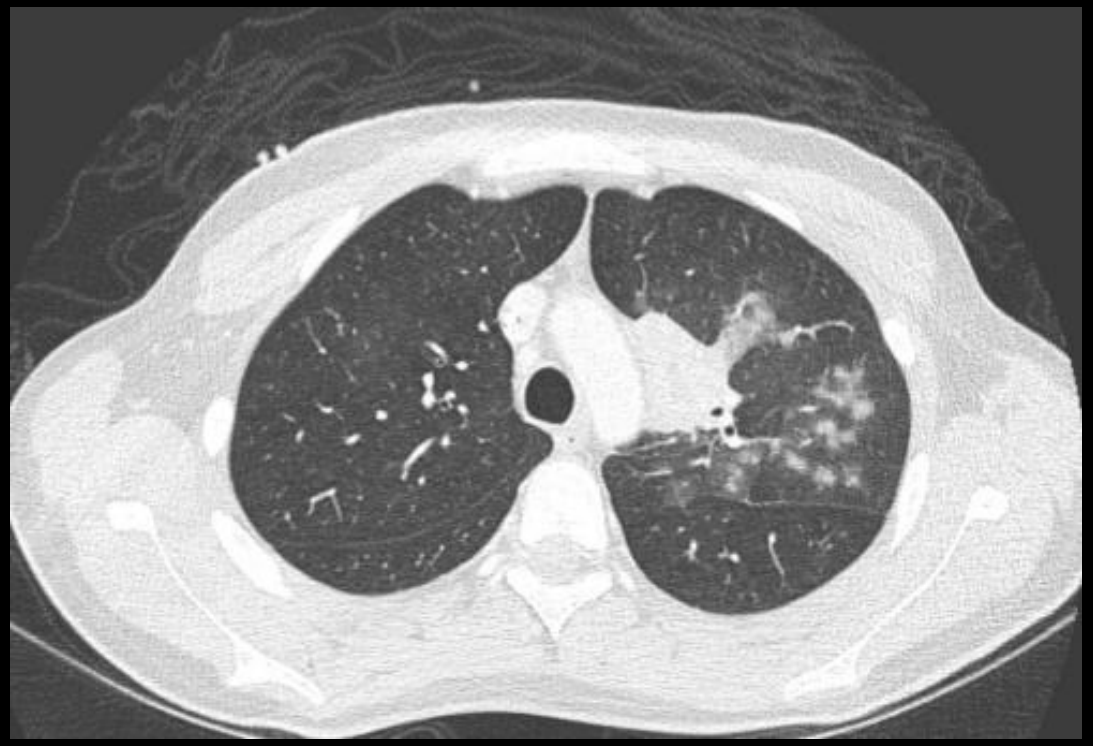




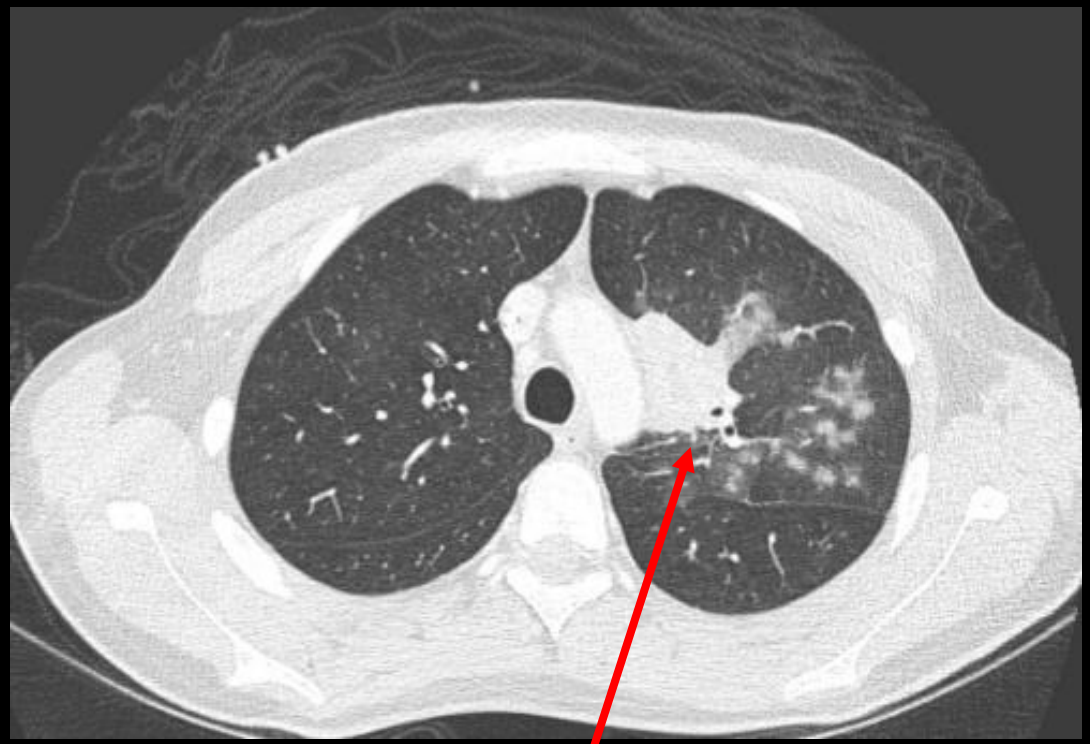
Treatment

- Patient presented to ED with hemoptysis 1 month later
- Pseudoaneurysm of left upper lobe was revealed on CT Chest, and IR deemed another embolization too risky. Stent placement was considered, but long-term effects of stent placement were unknown. The patient's care team proceeded with left upper lobectomy.

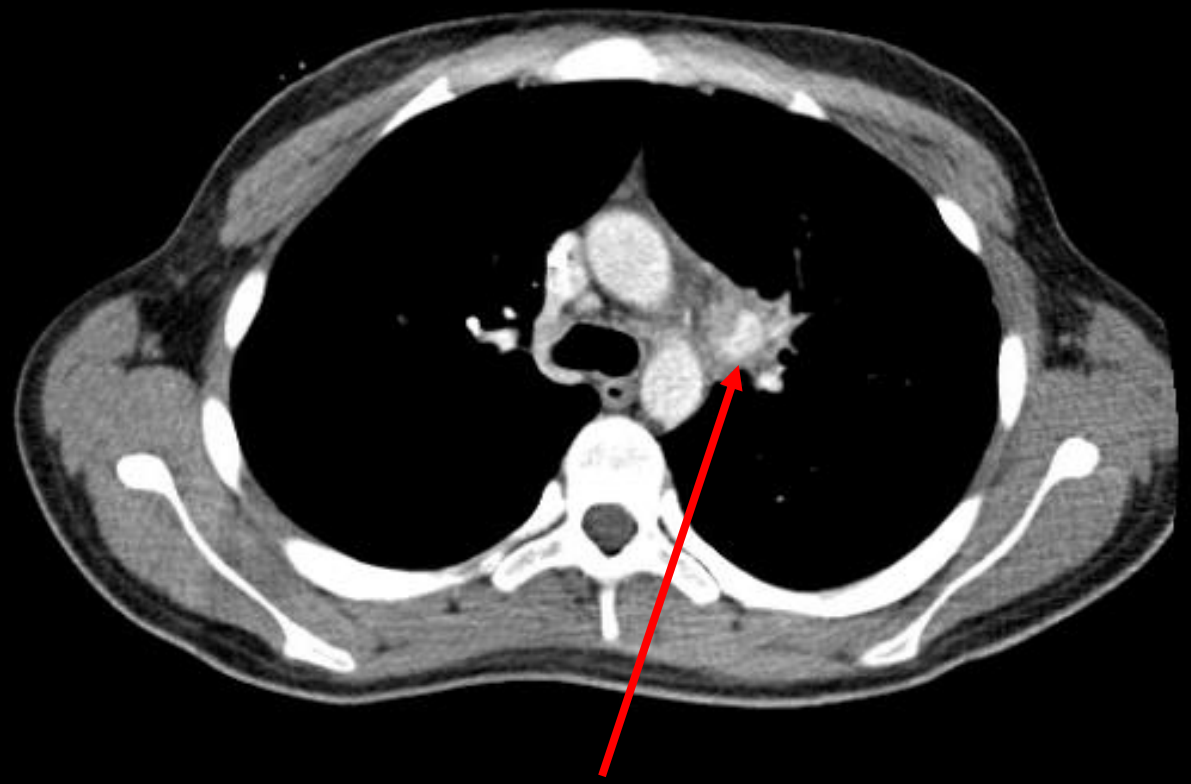
Findings (unlabeled)



Findings (labeled)

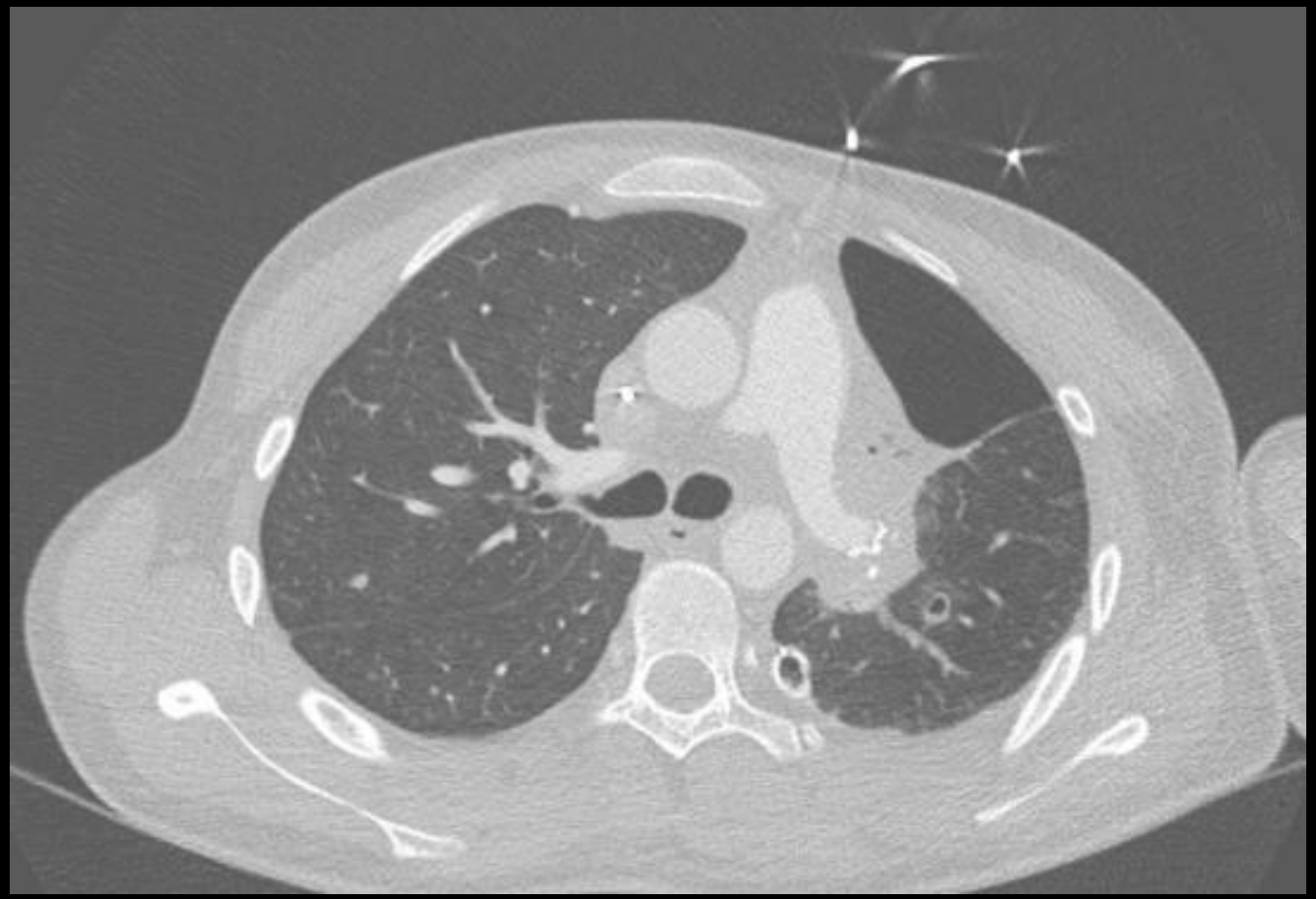


Left upper lobe consolidation with adjacent ground-glass opacities

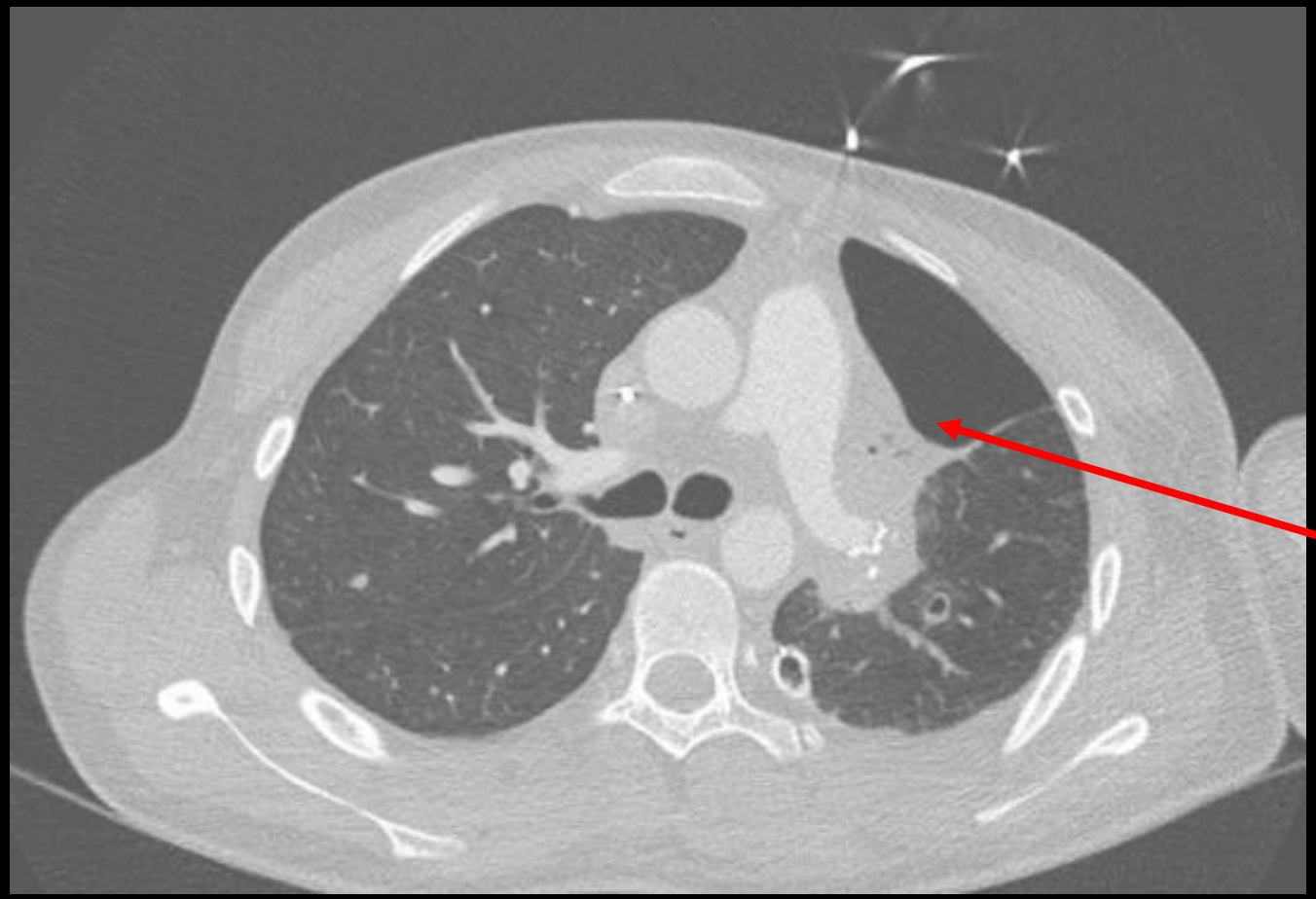


Enhancing focus within consolidation

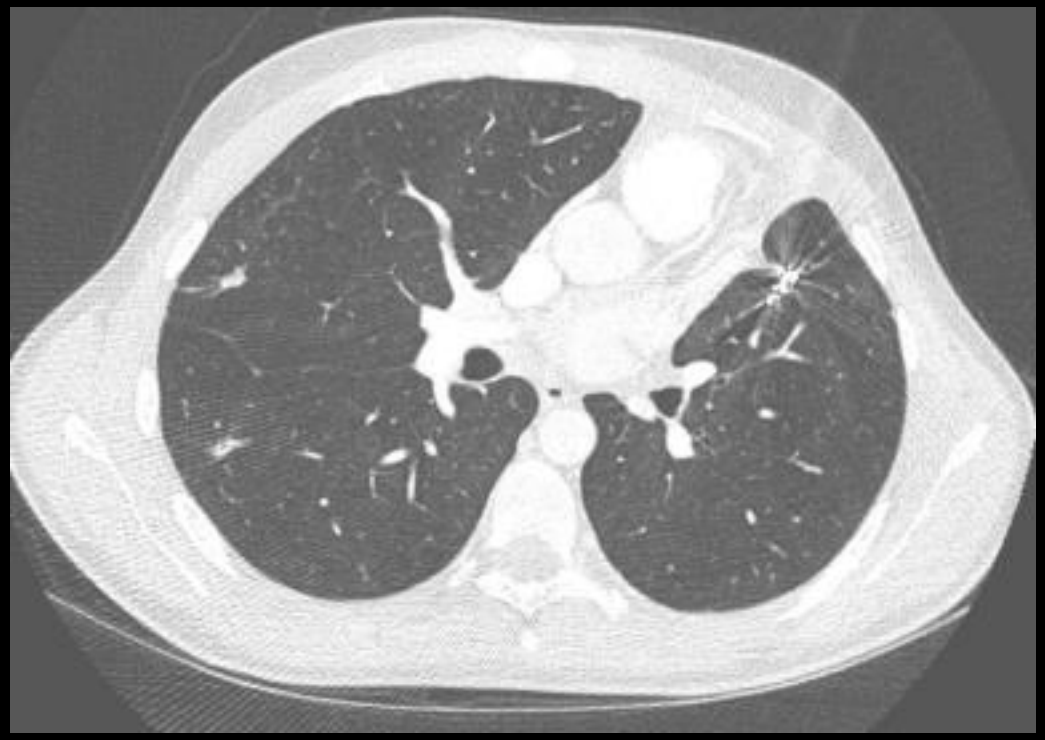
Findings (unlabeled)

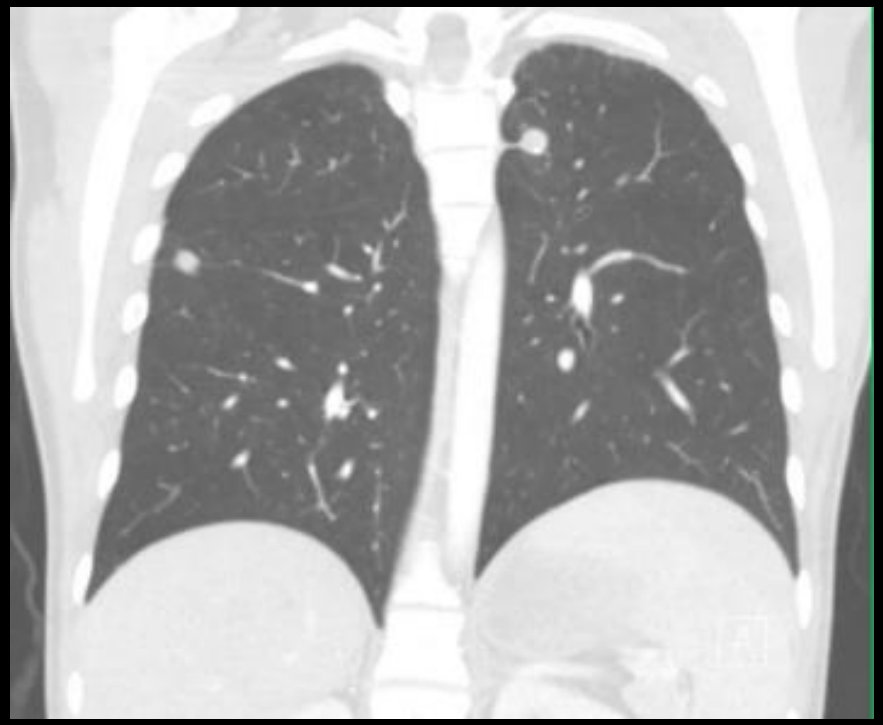


Findings (labeled)

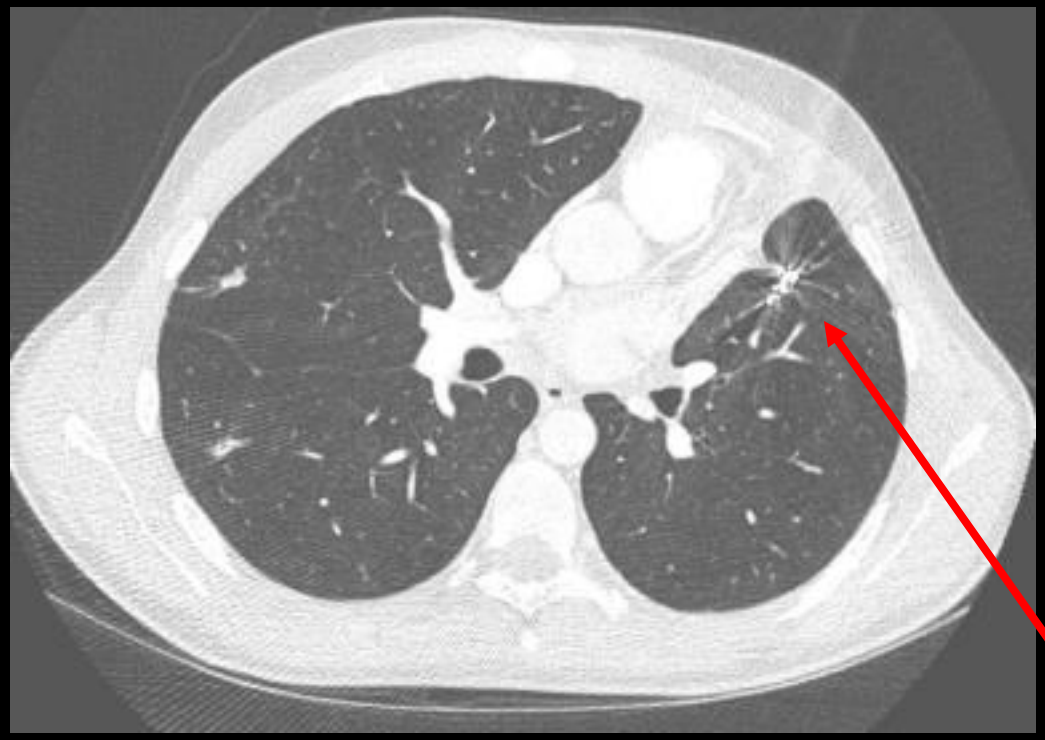


Findings @ 6-9 months (unlabeled)

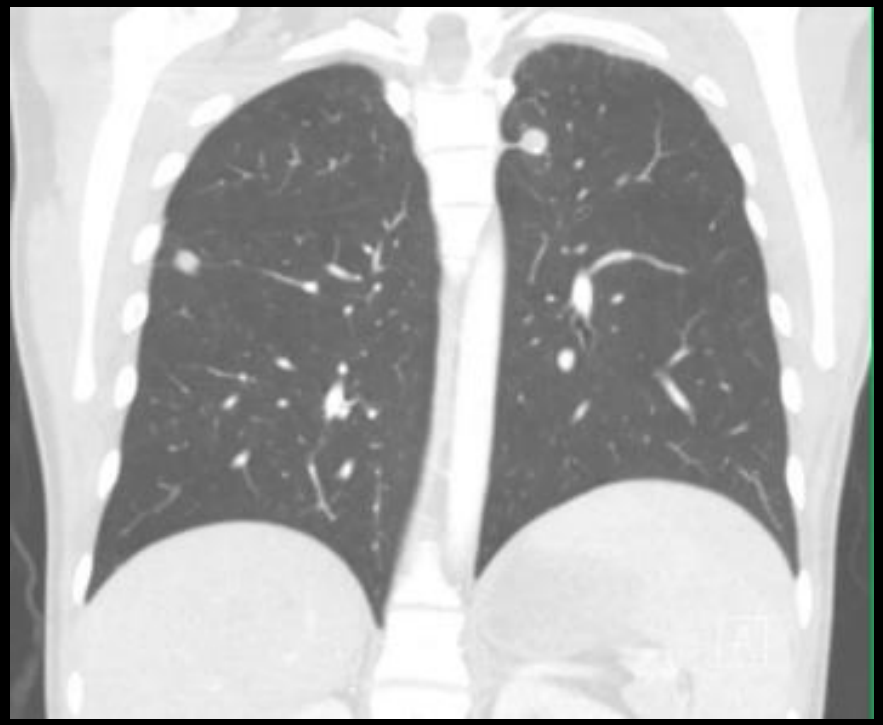




Findings @ 6-9 months (labeled)



S/p left upper lobectomy with expansion of left lower lobe



Resolving/stable pulmonary nodules

Final Dx:

Angioinvasive aspergillosis complicated by pulmonary artery pseudoaneurysm

Case Discussion

- The presence of cyclic fevers, neutropenia and pleuritic chest pain while on broad-spectrum antibiotics in an immunocompromised patient strongly indicated a process in the lung parenchyma
- Initial imaging revealed a halo sign and the patient was started on micafungin
- Follow-up imaging revealed an air crescent sign, a hallmark of aspergillosis, which was complicated by pulmonary artery pseudoaneurysm, as confirmed by CT pulmonary angiography
- Successful embolization of the pseudoaneurysm and broader anti-fungal treatment started

Case Discussion

- Patient underwent left upper lobectomy after episodes of hemoptysis due to size and location of newly developed pseudoaneurysm
- Patient completed 1 year of dual-antifungal therapy
- Imaging at 6-9 months showed continued improvement of pulmonary nodules

Invasive Aspergillosis in Immunocompromised

- Invasive aspergillosis cases are rising in the immunocompromised, particularly in those with neutropenia, as in the case of our patient.
- Aspergillosis manifests in a variety of ways, with the invasive form having the most severe presentation.
- Angio-invasive aspergillosis is more common, and occurs as a result of invasion of the fungus into the pulmonary arteries and subsequent hemorrhage, identified by CT.
- Treatment should involve early antifungal therapy. In this case, progression prompted further imaging and treatment.

References:

1. Fred HL, Gardiner CL. The air crescent sign: causes and characteristics. Tex Heart Inst J. 2009;36(3):264-5. PMID: 19568404; PMCID: PMC2696502.

2. Georgiadou SP, Sipsas NV, Marom EM, Kontoyiannis DP. The diagnostic value of halo and reversed halo signs for invasive mold infections in compromised hosts. Clin Infect Dis. 2011 May;52(9):1144-55. doi: 10.1093/cid/cir122. PMID: 21467021; PMCID: PMC3106265.

3. Greene R. The radiological spectrum of pulmonary aspergillosis. Med Mycol. 2005 May;43 Suppl 1:S147-54. doi: 10.1080/13693780500064771. PMID: 16110807.

4. Lafita V, Borge MA, Demos TC. Pulmonary artery pseudoaneurysm: etiology, presentation, diagnosis, and treatment. Semin Intervent Radiol. 2007 Mar;24(1):119-23. doi: 10.1055/s-2007-971202. PMID: 21326750; PMCID: PMC3036336.

5. Prasad Panse, Maxwell Smith, Kristopher Cummings, Eric Jensen, Michael Gotway, Clinton Jokerst, The many faces of pulmonary aspergillosis: Imaging findings with pathologic correlation, Radiology of Infectious Diseases, Volume 3, Issue 4, 2016, Pages 192-200, ISSN 2352-6211, https://doi.org/10.1016/j.jrid.2016.10.002. (https://www.sciencedirect.com/science/article/pii/S2352621116300821)