AMSER Case of the Month: March 2025

39-year-old male presenting to ED after being found unconscious next to his bike

Dr. Ashish Nicodemus, MD
Gregory Puthoff, DO
Matthew McLaughlin, MD
Jeanne Hill, MD
Medical University of South Carolina

Patient Presentation

- HPI
  - 39 y/o M presenting to ED after being found unconscious next to his bike by a bystander
  - Patient found to have hematoma on forehead
  - Combative and uncooperative with EMS
    - Given 5mg IM versed
  - GCS of 7 on arrival to ED
    - Hypoxic to 86%
    - Eventually intubated due to poor mental status and hypoxia
  - Appeared intoxicated

Patient Presentation

- Vitals
  - BP: 99/67
  - Pulse: 77 bpm
  - Respiratory rate: 26
- Pertinent labs
  - Ethanol: 213
  - UDS: positive for benzodiazepines

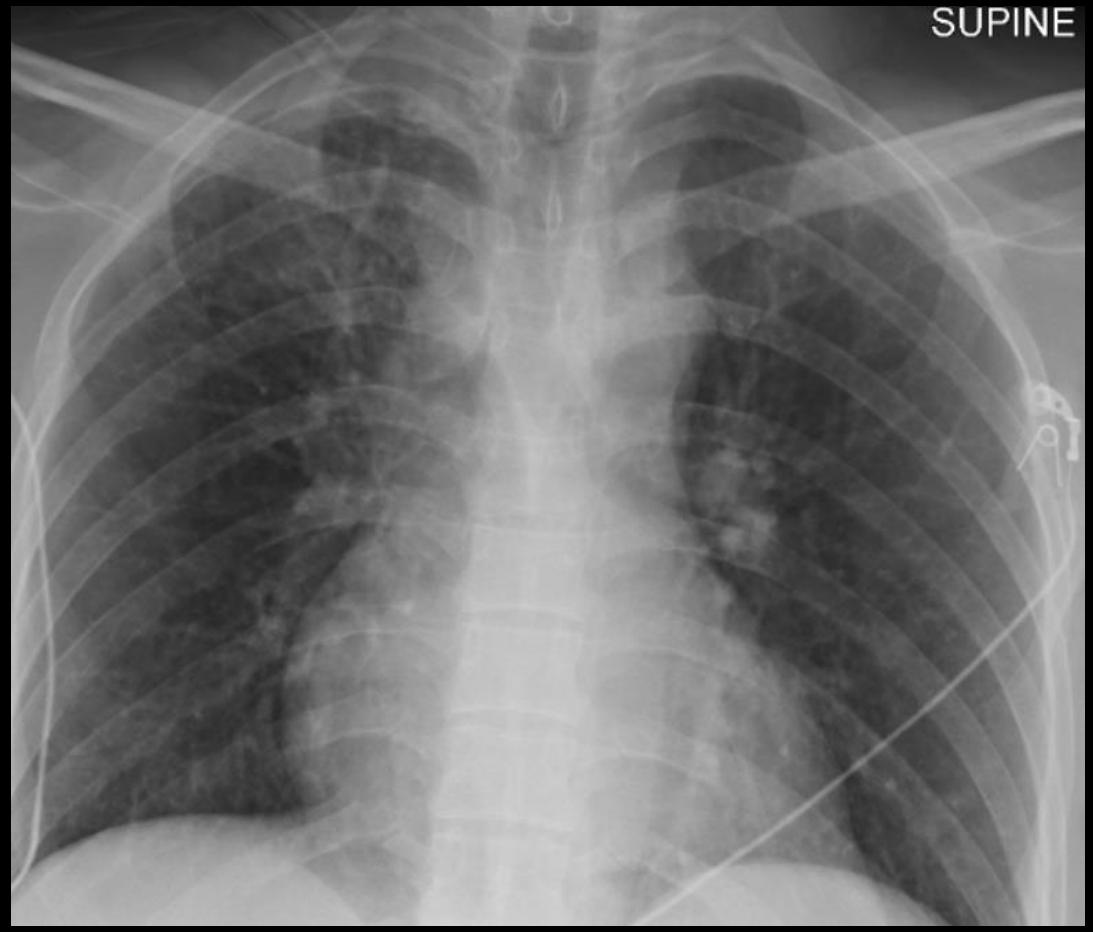
What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 2: **Major blunt trauma. Hemodynamically stable. Not otherwise specified. Initial imaging.**

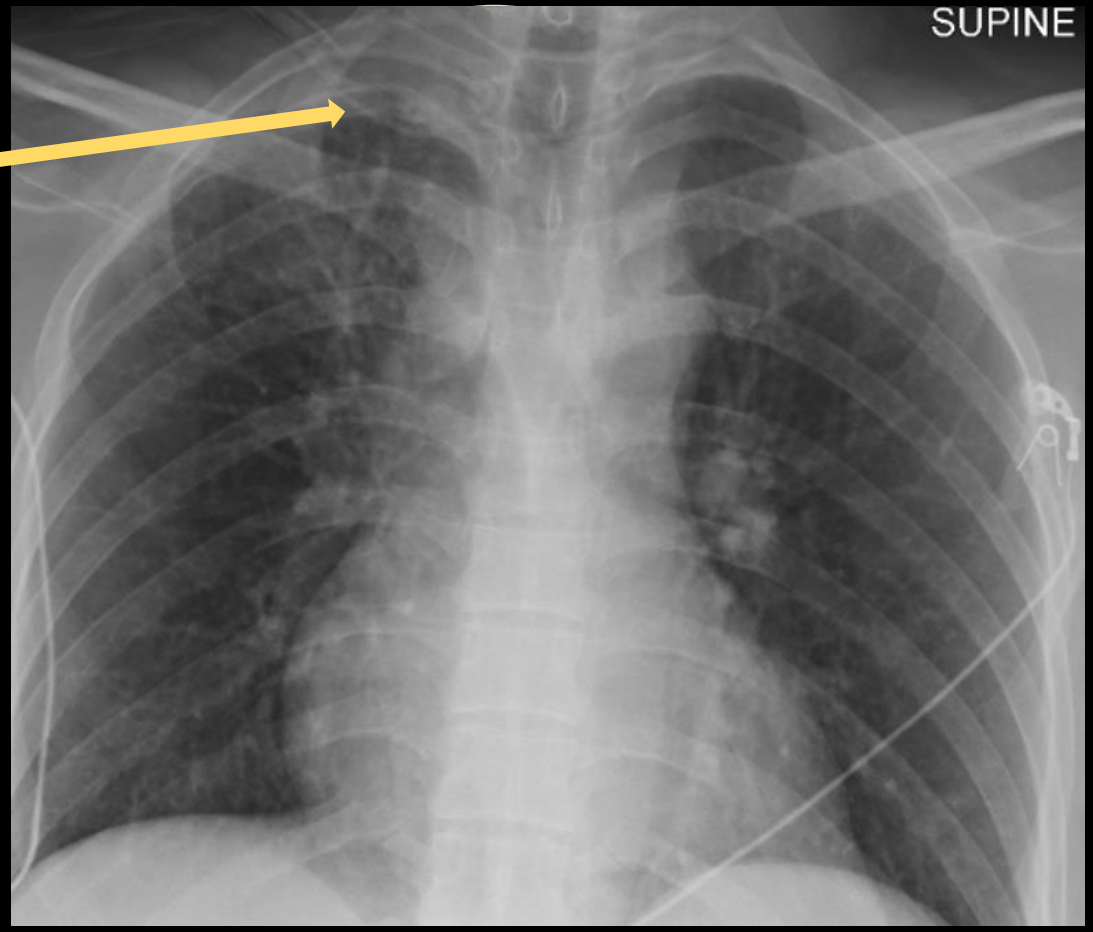
Procedure	Appropriateness Category	Relative Radiation Level
CT whole body with IV contrast	Usually Appropriate	☢☢☢☢
Radiography trauma series	Usually Appropriate	☢☢☢
US FAST scan chest abdomen pelvis	Usually Appropriate	O
CT whole body without IV contrast	May Be Appropriate	☢☢☢☢
Fluoroscopy retrograde urethrography	Usually Not Appropriate	☢☢☢
MRI abdomen and pelvis without and with IV contrast	Usually Not Appropriate	O
MRI abdomen and pelvis without IV contrast	Usually Not Appropriate	O

Findings: CXR (unlabeled)

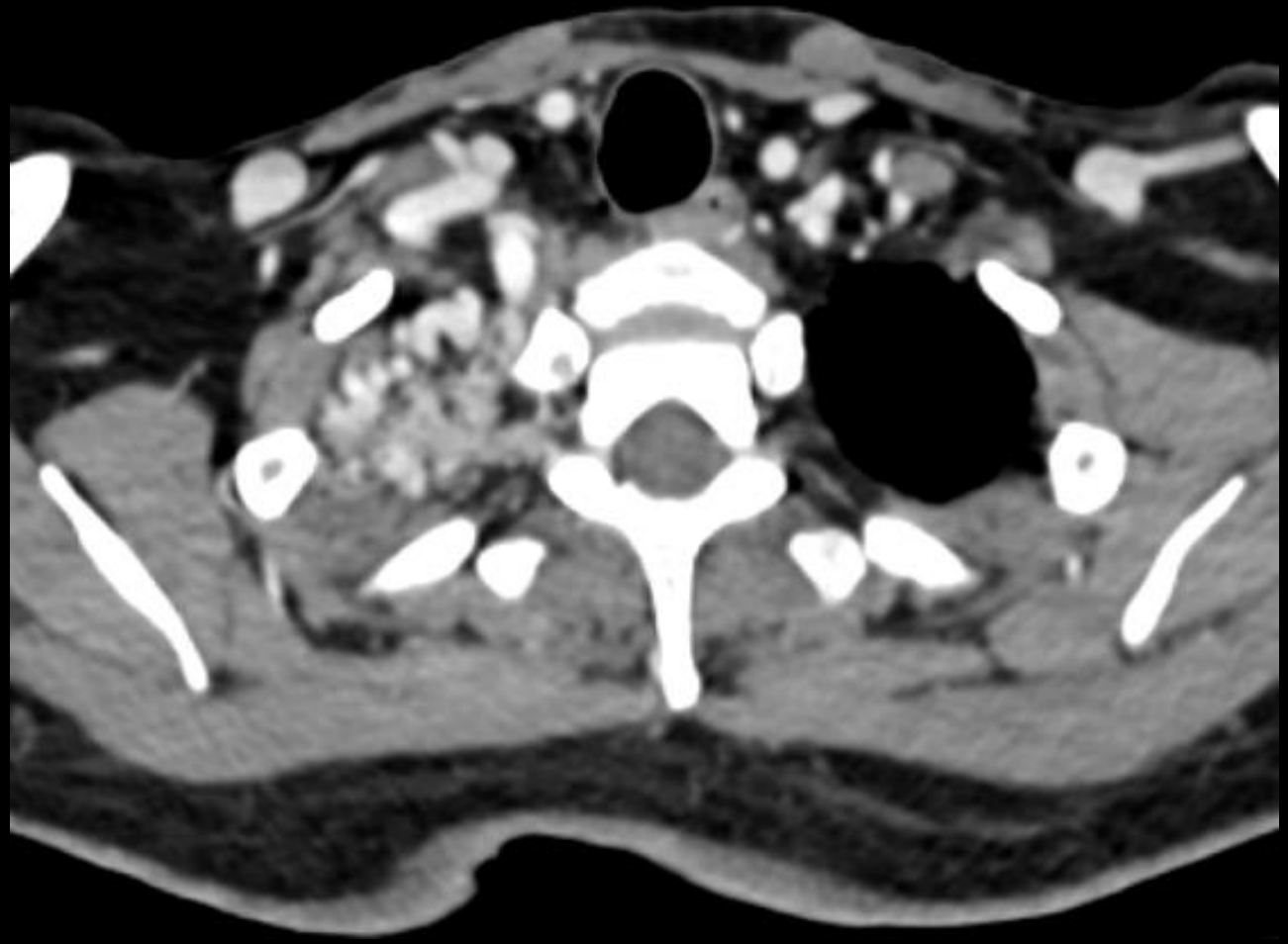


Findings (labeled)

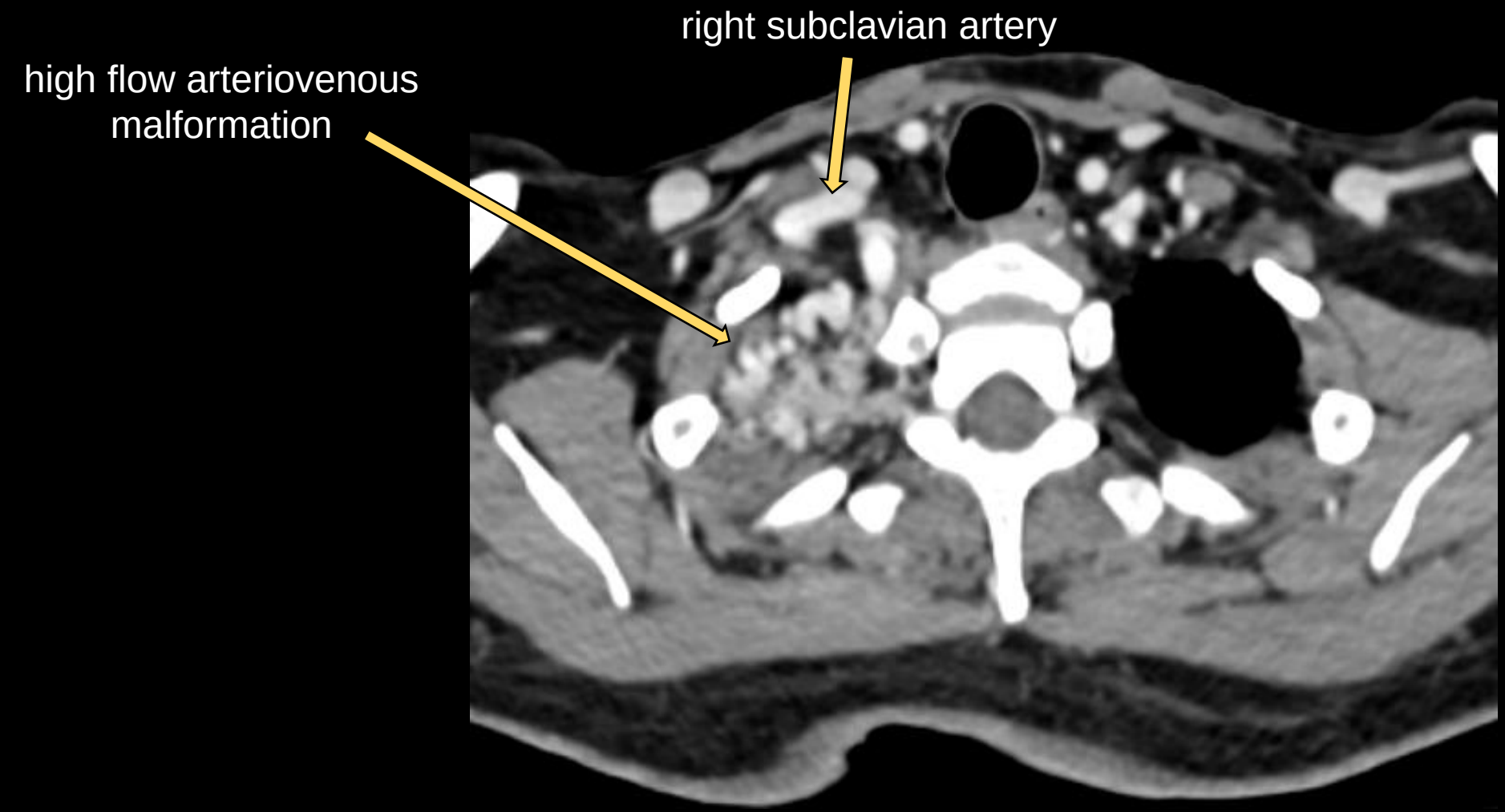
asymmetric right apical pleural thickening (pleural cap)



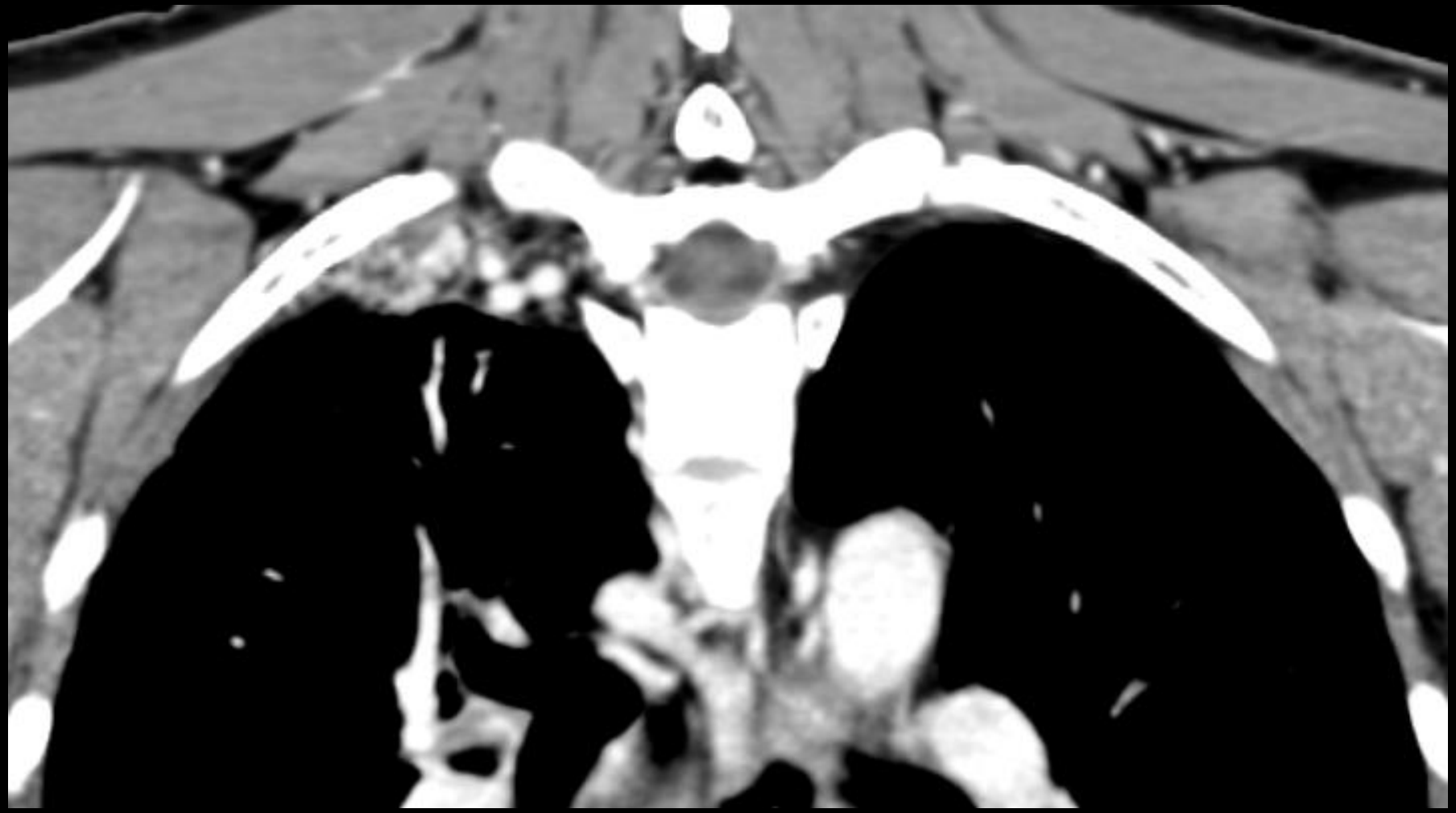
Findings: Chest CT with contrast (unlabeled)



Findings: Chest CT with contrast (labeled)

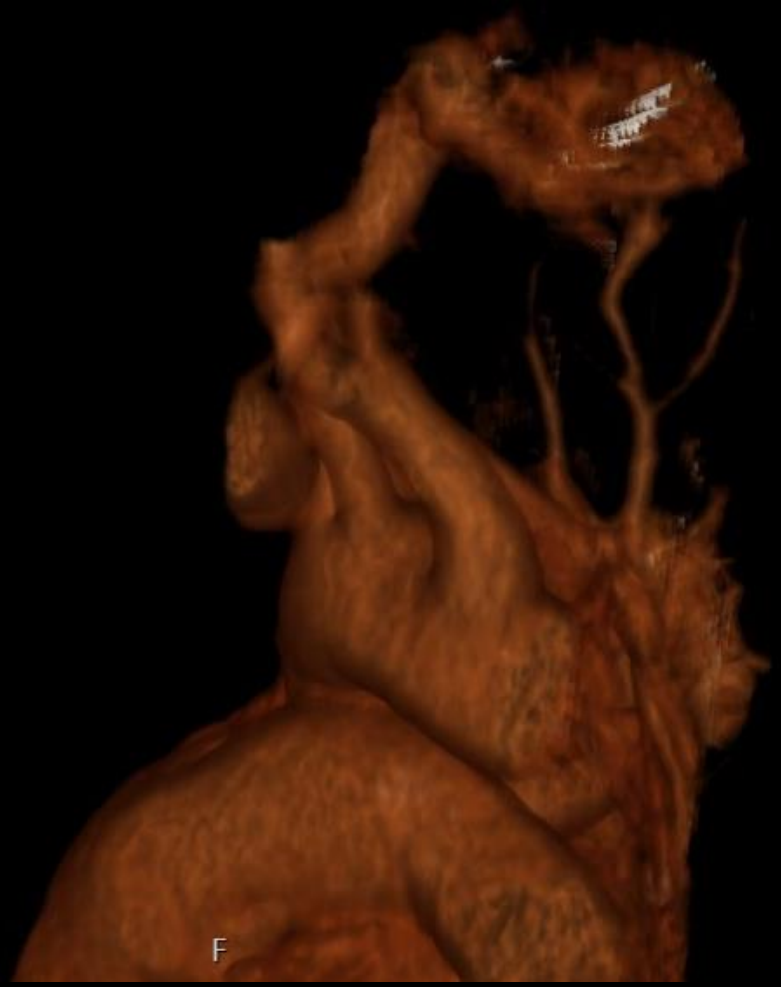


Findings: Chest CT with contrast (unlabeled)

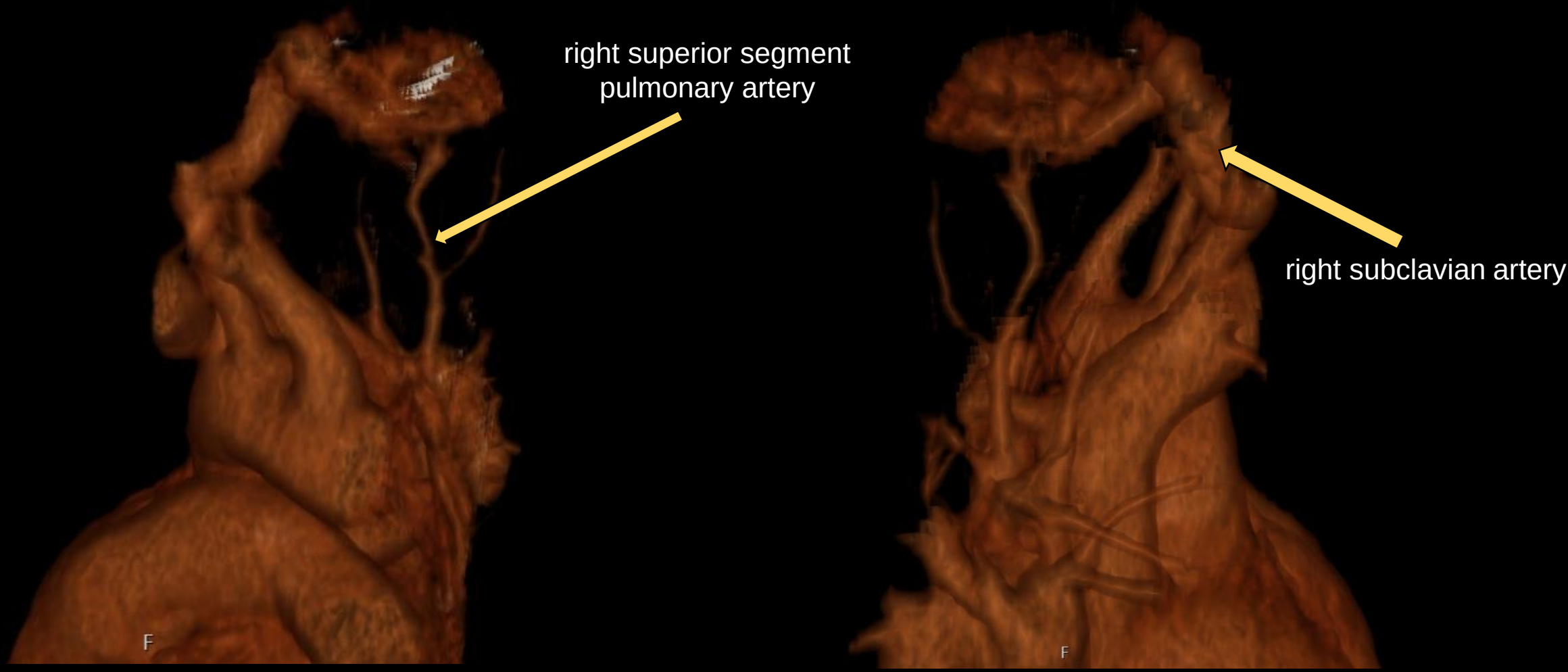


Findings: Chest CT with contrast (unlabeled)

Findings: 3D reconstruction (unlabeled)



Findings: 3D reconstruction (labeled)



Final Diagnosis

Right Apical Pleural Cap Due To Rare Arteriovenous Malformation

Case Discussion: Apical Pleural Cap

- Pleural apical caps are curved densities at the lung apex that can be seen with a chest radiograph
- Often bilateral
  - If unilateral, it is more common on the right
- DDx
  - Pleural thickening
  - Pancoast tumor
  - Hematoma
    - Often due to trauma
  - Lymphoma
  - Abscess

Case Discussion: Arteriovenous Malformations

- Pulmonary arteriovenous malformations are rare abnormal communications between an artery and vein in the lung that is rarely seen as a pleural cap
  - Typically found in lower lobes of lung
    - Apical pulmonary AVMs, seen in this case, are extremely rare
- Patients' symptoms can range from asymptomatic to severe dyspnea
  - Dependent on the degree of right to left shunting of blood
  - Other risks include stroke, brain abscess/other infection and hemoptysis
- AVMs are typically congenital
  - Most patients have the autosomal dominant condition: hereditary hemorrhagic telangiectasia (HHT)
  - May also be found in patients with liver cirrhosis

Case Discussion: Arteriovenous Malformations

- Diagnosis
  - Transthoracic contrast echocardiography is the ideal screening test to detect intrapulmonary shunting
    - If an AVM is present, contrast will be observed in left atrium 3-8 cardiac cycles after it is seen in the right atrium due to the increased time needed to transverse pulmonary vasculature
  - CT Chest is performed in patients with known AVM

- Treatment
  - Embolization is treatment of choice if feeding vessel is > 3mm
    - Coil are typically utilized to occlude the abnormal communication
    - Success rate from embolization is 98%

References:

- Martinez-Pitre PJ, Khan YS. Pulmonary Arteriovenous Malformation (AVMs) [Updated 2023 May 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK559289/

- Cartin-Ceba R, Swanson KL, Krowka MJ. Pulmonary arteriovenous malformations. Chest. 2013 Sep;144(3): 1033-1044. doi: 10.1378/chest.12-0924. PMID: 24008954.

- Danyalian A, Hernandez F. Pulmonary Arteriovenous Malformation. [Updated 2022 Jul 25]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560696/

- Raptis D, Short R. CT Appearance of Pulmonary Arteriovenous Malformations and Mimics. Radiographics. 2022 Jan-Feb; 42(1): 56-68. doi: 10.1148/rg.210076. PMID: 34990315

- Pollak J, Henderson K, White R. (2014). Pulmonary Arteriovenous Malformations: Diagnosis and Management. In Image-Guided Interventions (2nd ed., pp. 608-612). Elsevier.