AMSER Case of the Month August 2023

53 y.o. female with anasarca

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Patient Presentation

- HPI: 53 y.o. female presented to the ED with shortness of breath, upper and lower extremity edema, and leg erythema.
- Past Medical History: DM2, CHF (EF 25%), CV, methamphetamine abuse.
- Past Surgical History: None.
- Allergies: NKDA.
- Medications: Apixaban, aspirin, carvedilol, lisinopril, nitroglycerin.
- Social History: Daily methamphetamine use. Medication non-compliance.

Patient Presentation

- Physical Exam
- Vitals: BP: 143/94, Pulse: 105, Temp 36.7 C (98.1), resp 21, SpO2 100% on room air, BMI 40.74
- General: Acute distress
- HEENT: No edema of head and neck
- Cardiopulmonary: RRR, no murmurs. Wheezing present.
- MSK: Upper and lower extremity edema, bilaterally.

Pertinent Labs

- CBC:
  - WBC 20.5
- BNP: 2,847
- Troponin: negative
- D-dimer: Not obtained.
- INR: 2.2
- aPTT: 37
- Urine toxicology: Positive for amphetamines.

What Imaging Should We Order?

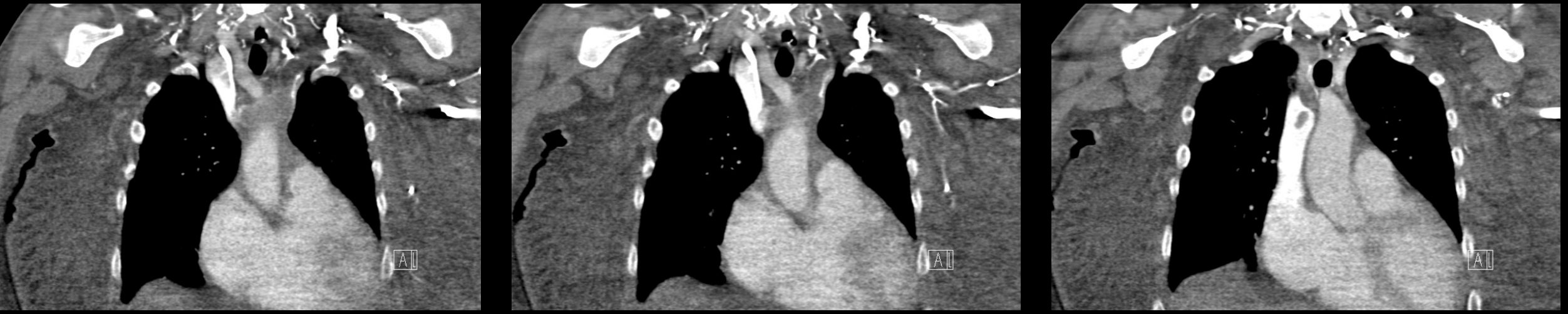
Select the applicable ACR Appropriateness Criteria

Variant 3: **Suspected pulmonary embolism. High pretest probability. Initial imaging.**

Procedure	Appropriateness Category	Relative Radiation Level
CTA pulmonary arteries with IV contrast	Usually Appropriate	☢☢☢
V/Q scan lung	Usually Appropriate	☢☢☢
US duplex Doppler lower extremity	May Be Appropriate (Disagreement)	O
US echocardiography transthoracic resting	May Be Appropriate	O
MRA pulmonary arteries without and with IV contrast	May Be Appropriate	O
US echocardiography transesophageal	Usually Not Appropriate	O
Arteriography pulmonary with right heart catheterization	Usually Not Appropriate	☢☢☢☢
MRA pulmonary arteries without IV contrast	Usually Not Appropriate	O
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	☢☢☢
CTA chest with IV contrast with CTV lower extremities	Usually Not Appropriate	☢☢☢
CTA triple rule out	Usually Not Appropriate	☢☢☢

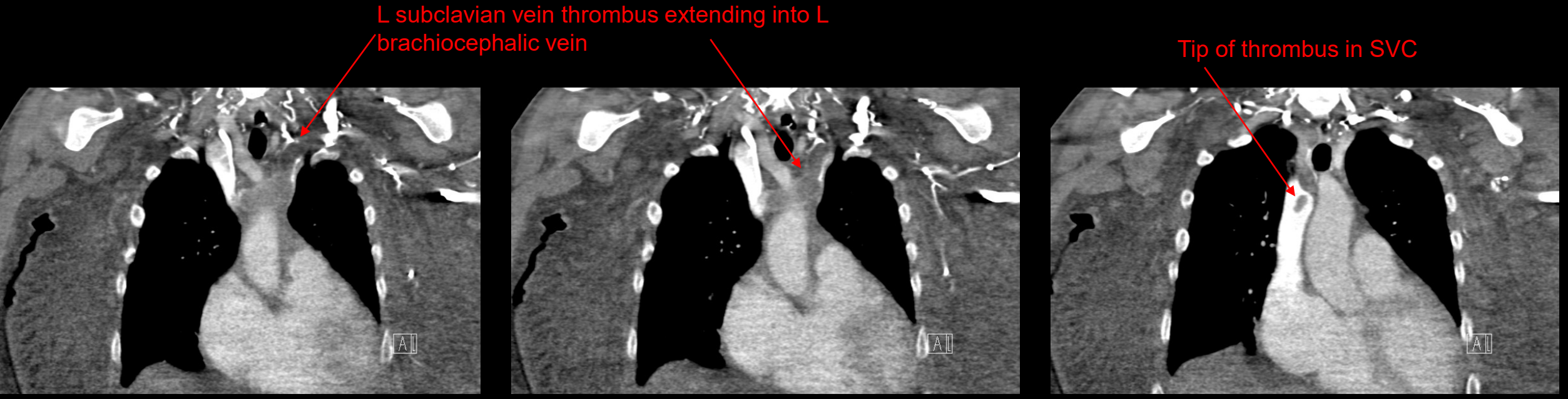
Well's Criteria score was 4.5.

Findings (Unlabeled)



CT angiogram chest, coronal

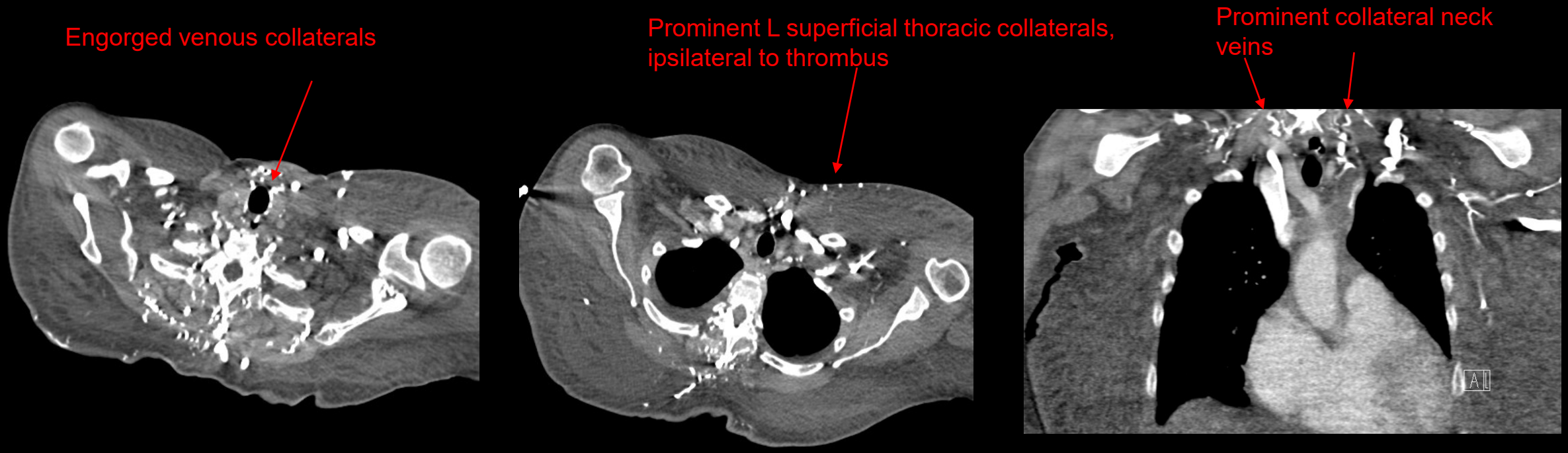
Findings labeled



CT Angiogram Chest, coronal

Findings: Occlusive thrombus from L subclavian extending to SVC. No pulmonary embolism.

Findings labeled (cont)

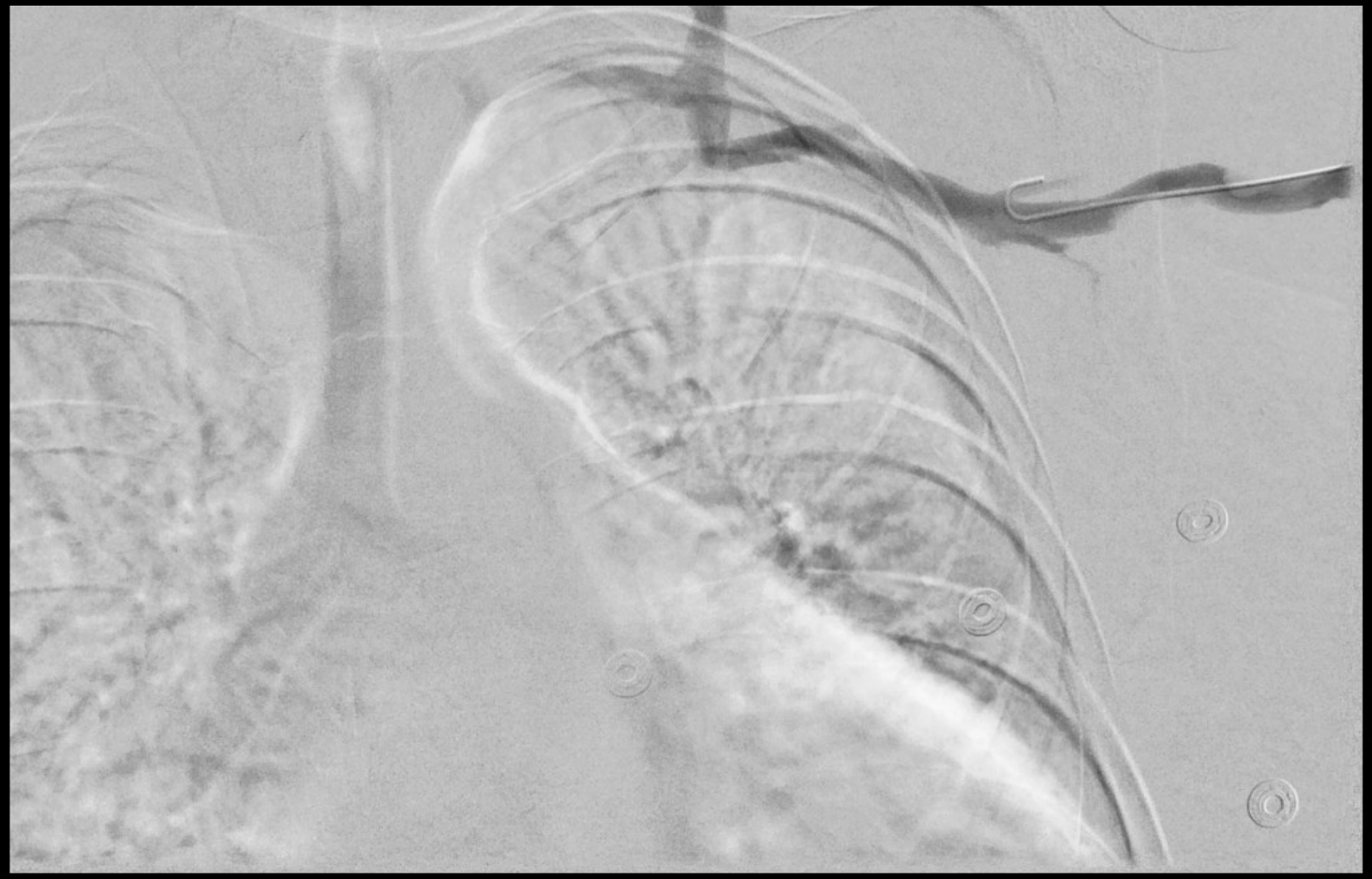


CT Angiogram Chest, coronal

Findings: Note the engorged venous collaterals in the head, neck, chest.

Next step? IR thrombolysis.

Findings (Unlabeled)



Left UE, subclavian, BCV, and SVC angiography

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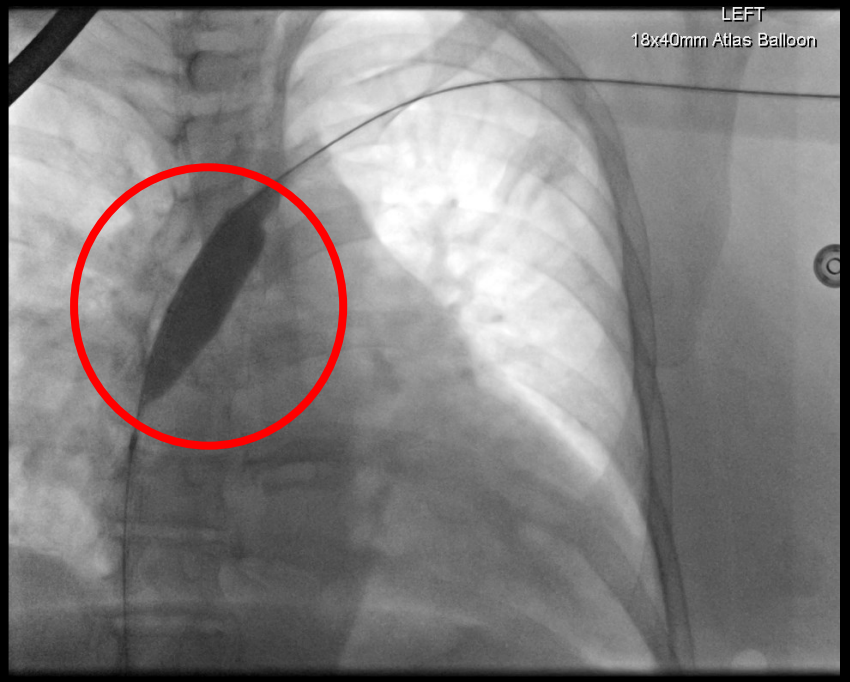
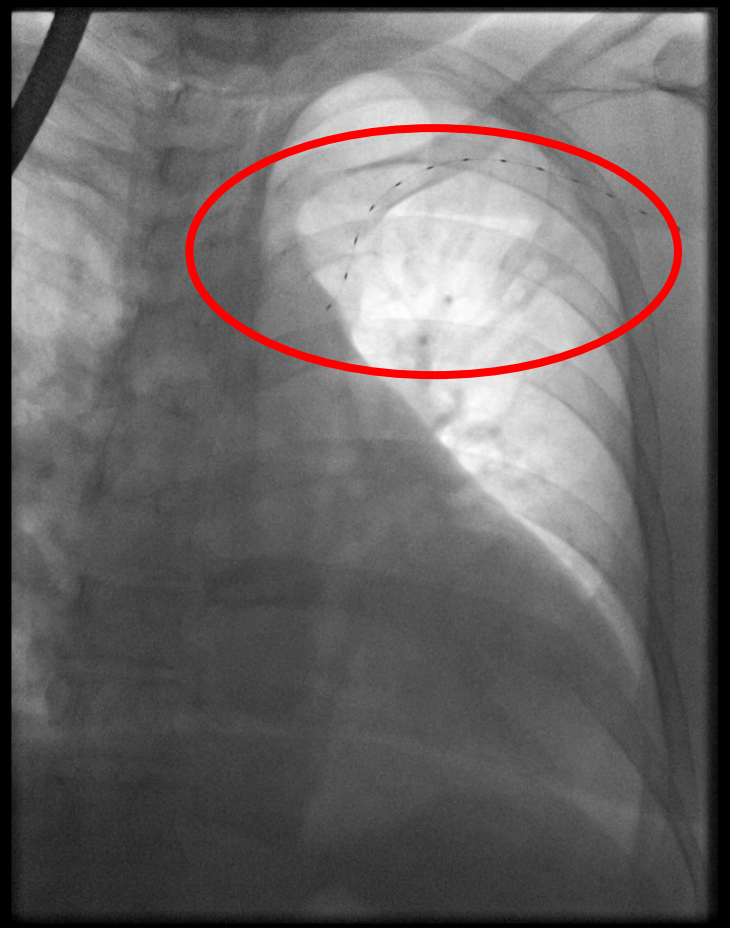
Findings labeled

Findings: Abrupt loss of flow involving left brachiocephalic vein

Findings (s/p interventions)



Balloon angioplasty of L-BCV



L-BCV lytic catheter placement

Findings: Improved flow of L BCV, near resolution of thrombus.

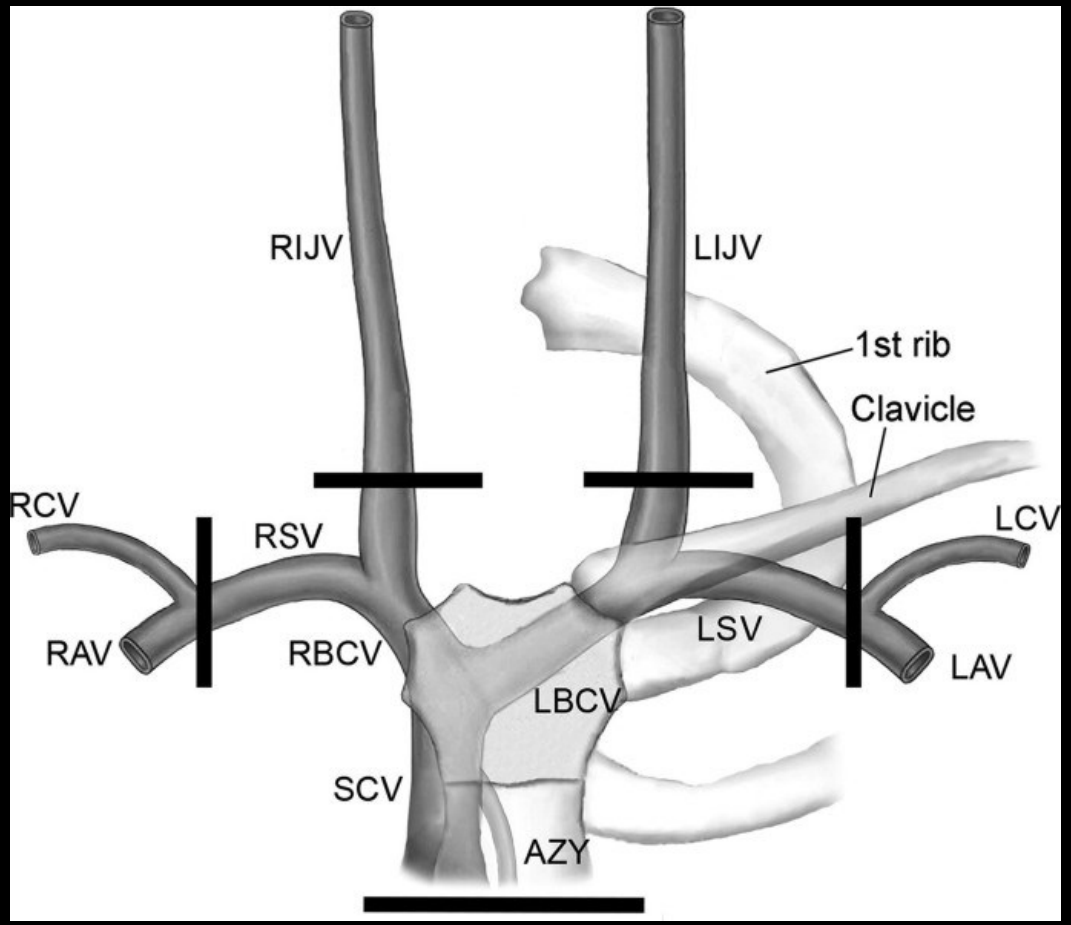
Final Dx:

Thoracic central venous obstruction, venous thoracic outlet syndrome

Thoracic central venous obstruction

- TCVO is a syndrome referring to obstruction of central thoracic veins - Subclavian, internal jugular, brachiocephalic, SVC, suprahepatic IVC.
- Etiology: (non-exhaustive)
  - Upper extremity DVT
  - Extrinsic compression – venous thoracic outlet syndrome, tumor/malignancy
  - Systemic hypercoagulability – thrombophilia, malignancy
  - Luminal narrowing – prior instrumentation
- Clinical features:
  - Head/neck/extremity edema, chest pain, arm pain, engorged superficial collateral veins.

Types of TCVO



- There are four patterns, classified anatomically based on the location of affected veins:
  - Type 1: One IJV or SCV is obstructed, both BCVs and the SVC are patent
  - Type 2: Unilateral BCV obstruction or ipsilateral obstruction of the IJV and SCV
  - Type 3: Both BCVs are obstructed, but flow to the right atrium passes through the SVC
  - Type 4: Total SVC obstruction with no contribution to right atrium
- Each type is associated with development of collateral circulation, the pattern of which is different for each category and typical for the location of the obstruction.

Beathard, G.A. (2021). Thoracic Central Vein Obstruction. In: Wu, S., Kalva, S., Park, H., Tan, C.S., Beathard, G.A. (eds) Dialysis Access Management. Springer, Cham. https://doi.org/10.1007/978-3-030-52994-9_17

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References:

- Beathard, G.A. (2021). Thoracic Central Vein Obstruction. In: Wu, S., Kalva, S., Park, H., Tan, C.S., Beathard, G.A. (eds) Dialysis Access Management. Springer, Cham. https://doi.org/10.1007/978-3-030-52994-9_17

- Dolmatch BL, Gurley JC, Baskin KM, et al. Society of Interventional Radiology Reporting Standards for Thoracic Central Vein Obstruction: Endorsed by the American Society of Diagnostic and Interventional Nephrology (ASDIN), British Society of Interventional Radiology (BSIR), Canadian Interventional Radiology Association (CIRA), Heart Rhythm Society (HRS), Indian Society of Vascular and Interventional Radiology (ISVIR), Vascular Access Society of the Americas (VASA), and Vascular Access Society of Britain and Ireland (VASBI). *J Vasc Interv Radiol*. 2018;29(4):454-460.e3. doi:10.1016/j.jvir.2017.12.013