

AMSER Case of the Month

November 2025

19-year-old female with acute left-sided chest pain



SAINT LOUIS
UNIVERSITY™

— EST. 1818 —

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AMSER

Patient Presentation

- **HPI:** Left-sided chest pain 3 months before admission which has acutely worsened and found to have a saddle pulmonary embolus with concomitant LLE DVT. POCUS shows Dilated RV and thrombus seen in RV and RA. Outside CTA showed heavy clot burden in the iliocaval venous system
- **PMH:** no history of thrombosis or DVT's
- **Family History:** no known history of thrombosis or autoimmune disease
- **PSH:** denies smoking and drug use, no history of long travel
- **Vitals:** 134/66, Pulse 140, RR 34, SpO2 96%
- **Medications:** not on OCP's or implant contraceptives

Pertinent Labs

- **Hematological work-up:** (-) factor V Leiden, (-) lupus anticoagulant panel, (-) prothrombin gene mutation, (-) antithrombin III
- **Autoimmune work-up:** (-) Anticardiolipin antibodies and (-) beta-2 glycoprotein antibodies
- (-) pregnancy test
- Troponin elevated at 2.3, D-Dimer greater than 20

Continued hospital course

- The patient was taken to the OR for pulmonary embolectomy, total cardiopulmonary bypass, and resection of the RA mass/clot in transit.
- There was a failure of IVC filter placement due to “small IVC caliber”, arousing initial suspicion of an anatomic anomaly.

What Imaging Should We Order?

Select the applicable ACR Appropriateness Criteria

Variant 7: Suspected iliocaaval or lower extremity disease with severe post-thrombotic changes. Initial diagnosis.

Procedure	Appropriateness Category
US duplex Doppler lower extremity	Usually Appropriate
CTV abdomen and pelvis with IV contrast	Usually Appropriate
MRV abdomen and pelvis without and with IV contrast	Usually Appropriate
US duplex Doppler IVC and iliac veins	Usually Appropriate
Catheter venography iliac veins	May Be Appropriate
Catheter venography lower extremity	May Be Appropriate
CTV lower extremity with IV contrast	May Be Appropriate (Disagreement)
MRV lower extremity without and with IV contrast	May Be Appropriate (Disagreement)
US intravascular iliac veins	May Be Appropriate (Disagreement)

This imaging modality was ordered by the physician

Findings: (unlabeled)



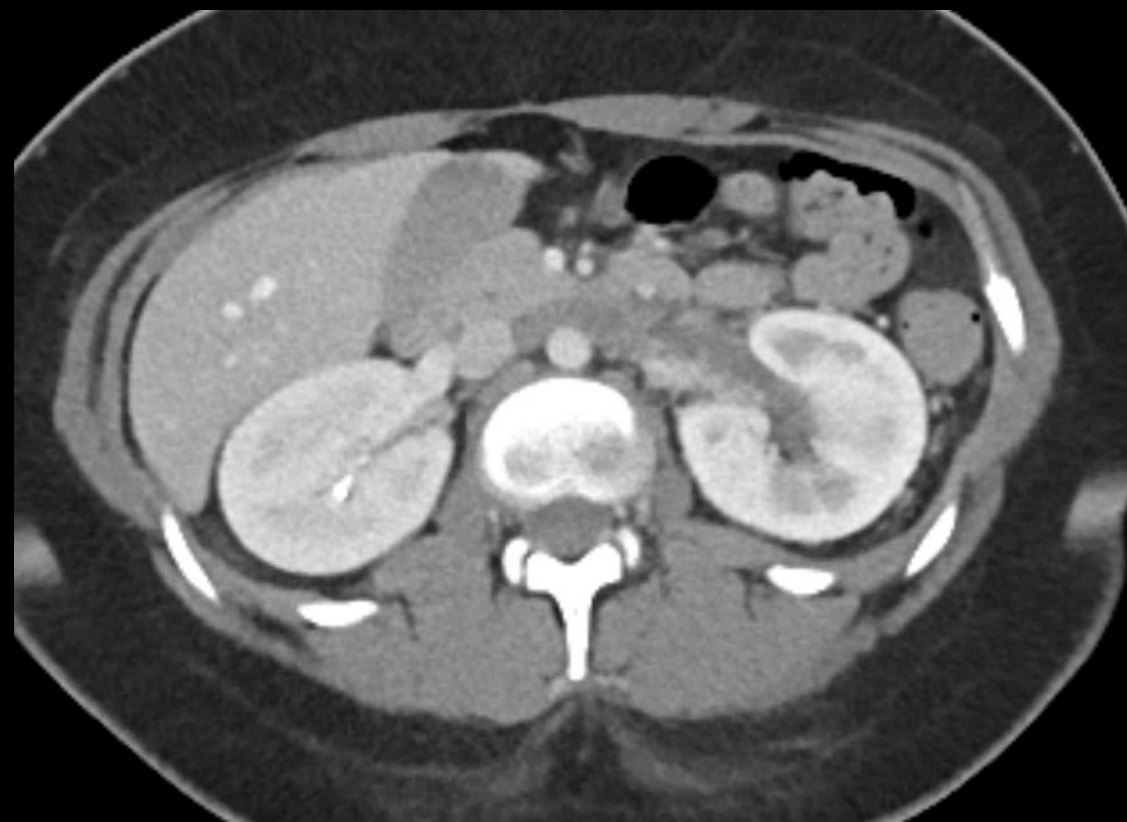
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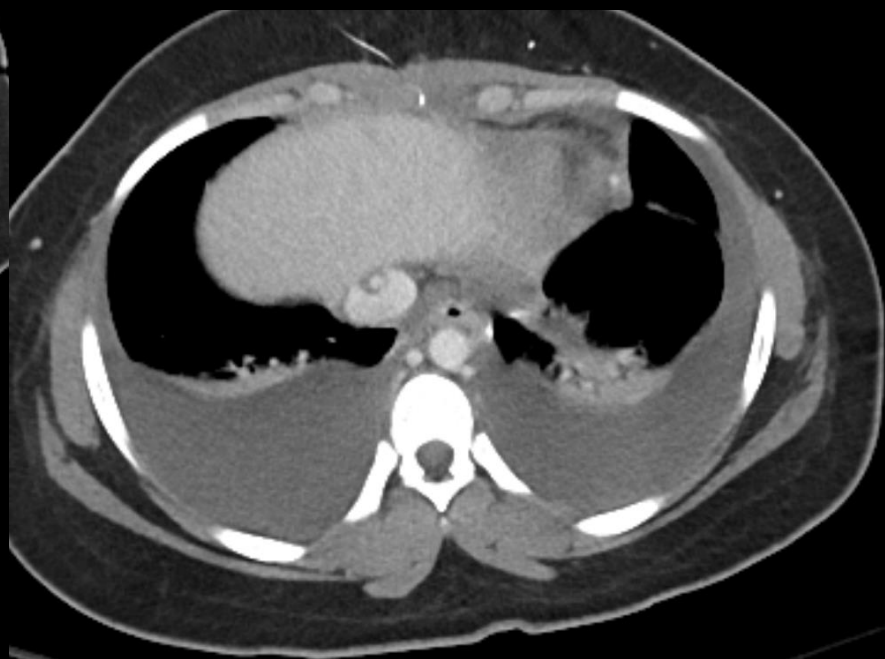
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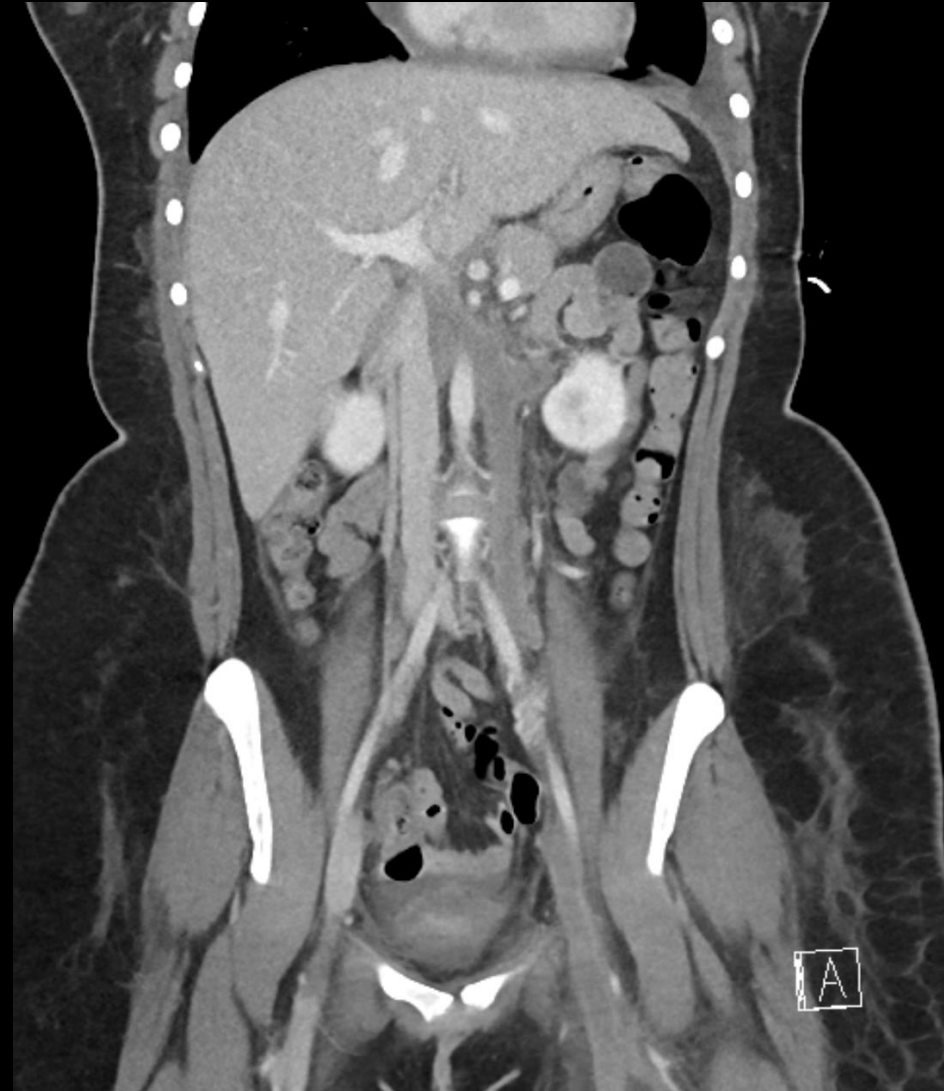
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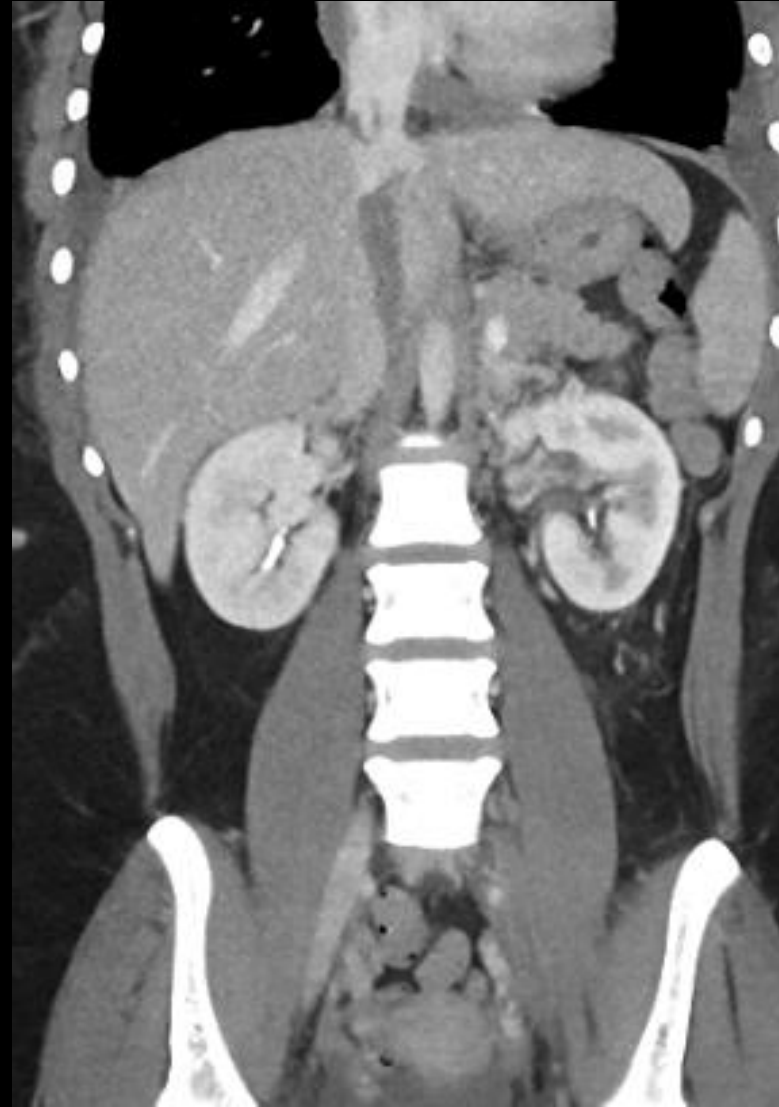
Findings (unlabeled)



Findings (unlabeled)



Findings (unlabeled)



Coronal Localizer (axial slice)

Findings: (labeled)

Filling defects in the left and right femoral veins



Coronal Localizer (axial slice)



Findings: (labeled)

Extension of clot superiorly into the left iliac vein

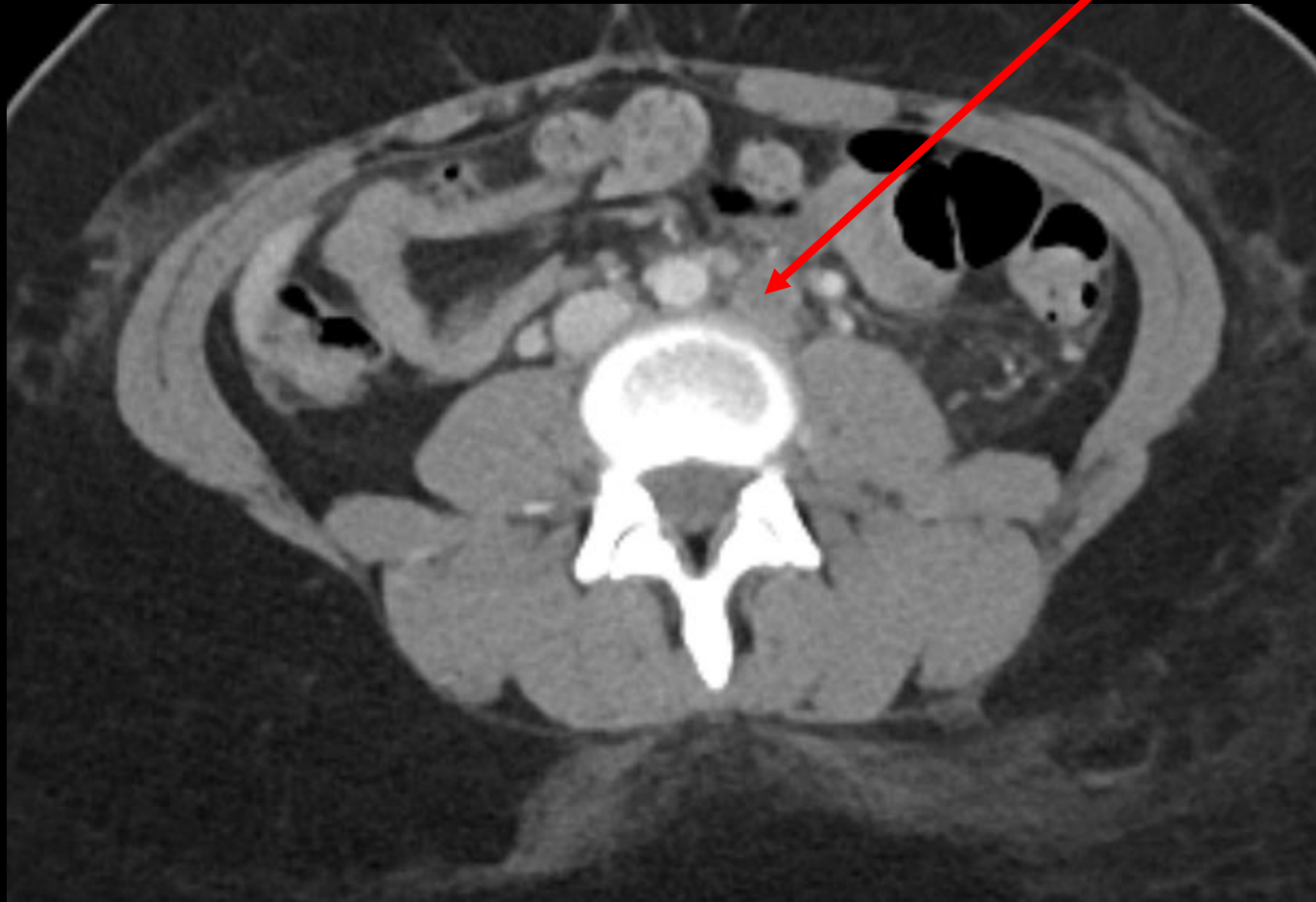


Coronal Localizer (axial slice)



Findings (labeled)

Superior extension into left duplicated inferior vena cava

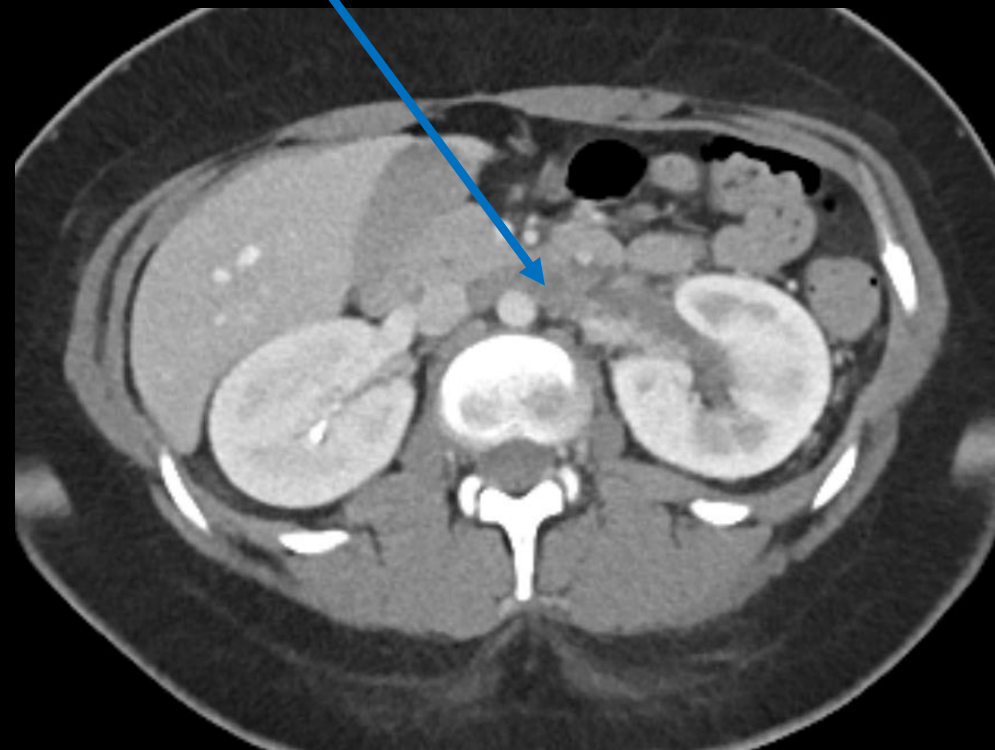
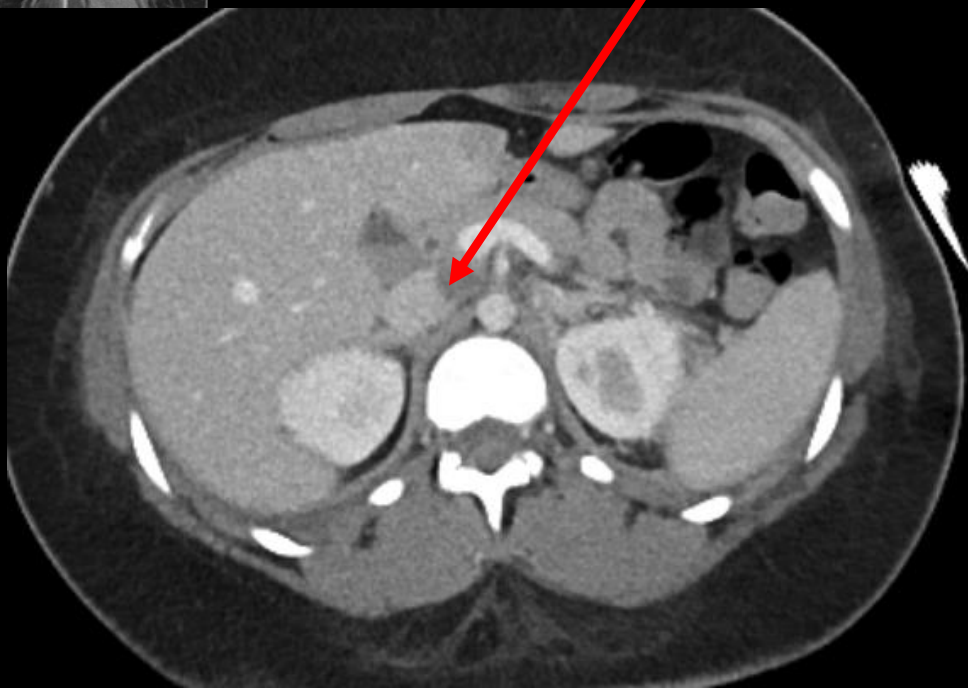


Coronal Localizer (axial slice)



Findings (labeled)

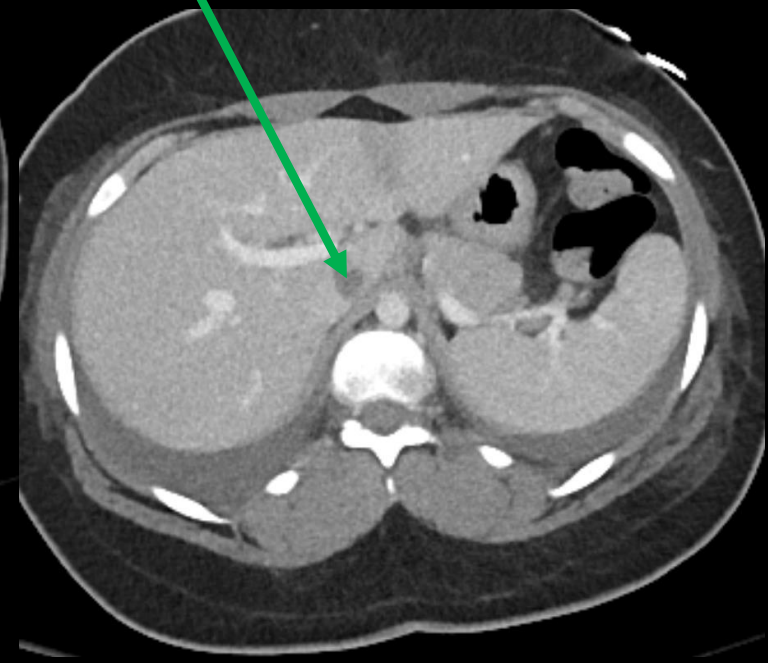
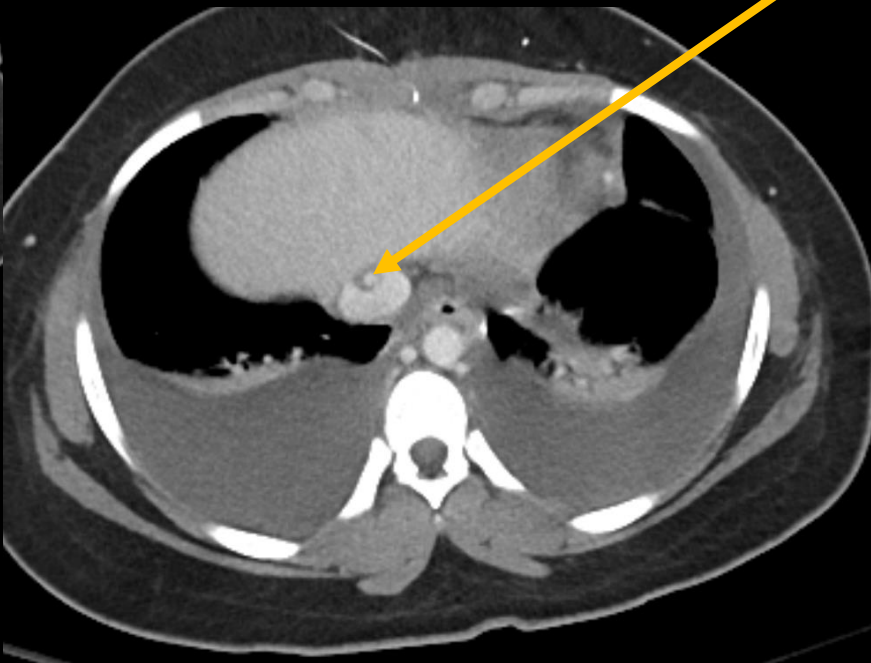
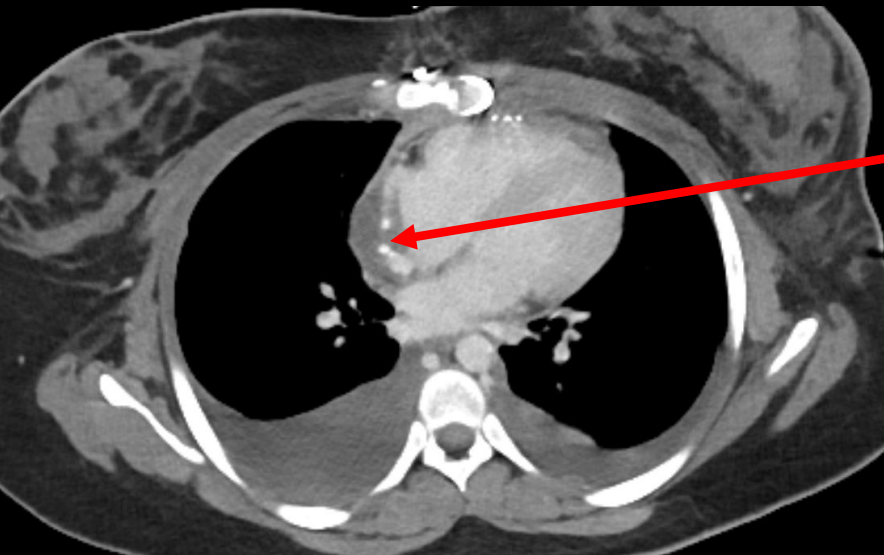
Extension of thromboses superiorly into:
Infra-hepatic inferior vena cava and left renal vein



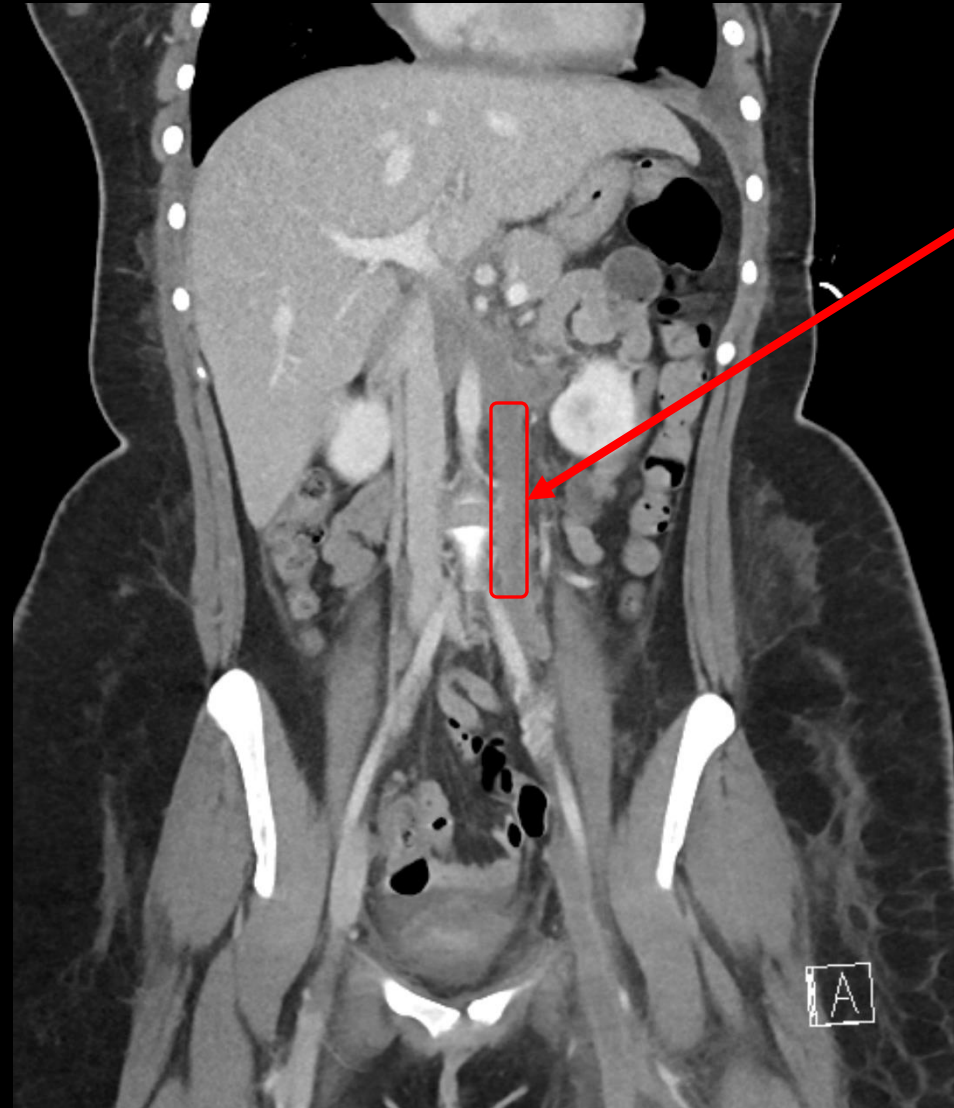
Findings (unlabeled)

Extension of thromboses superiorly into:

- right atrium
- Inferior vena cava
- intra-hepatic IVC



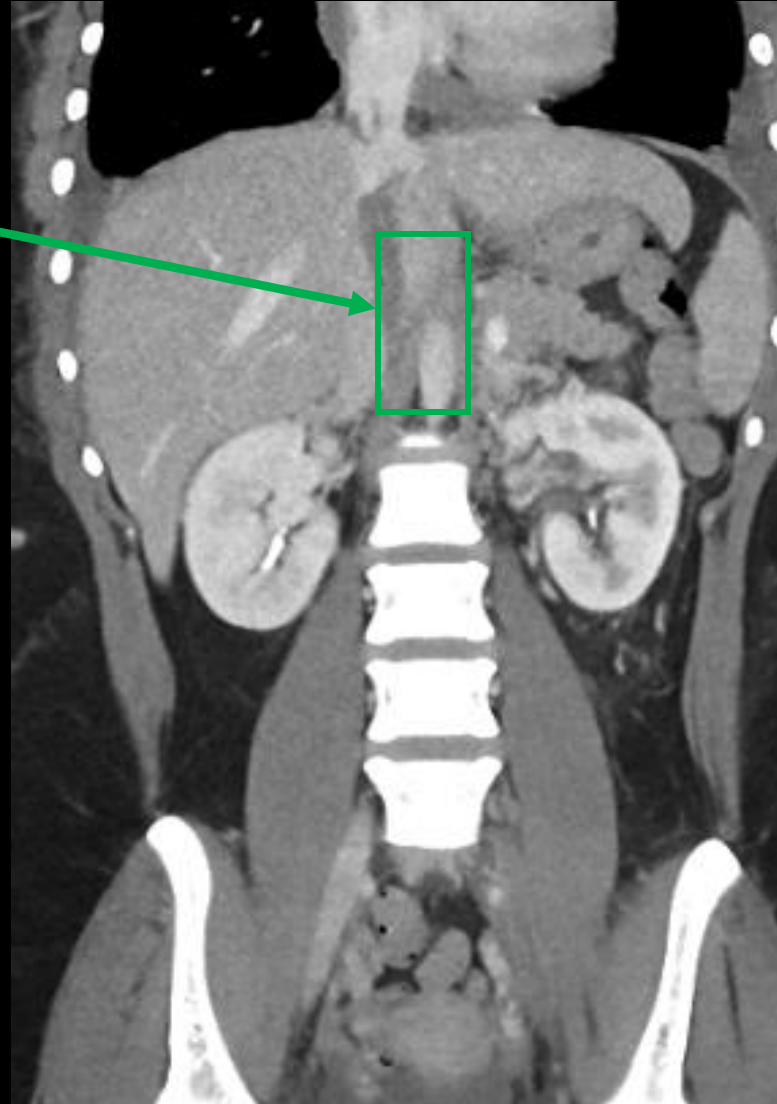
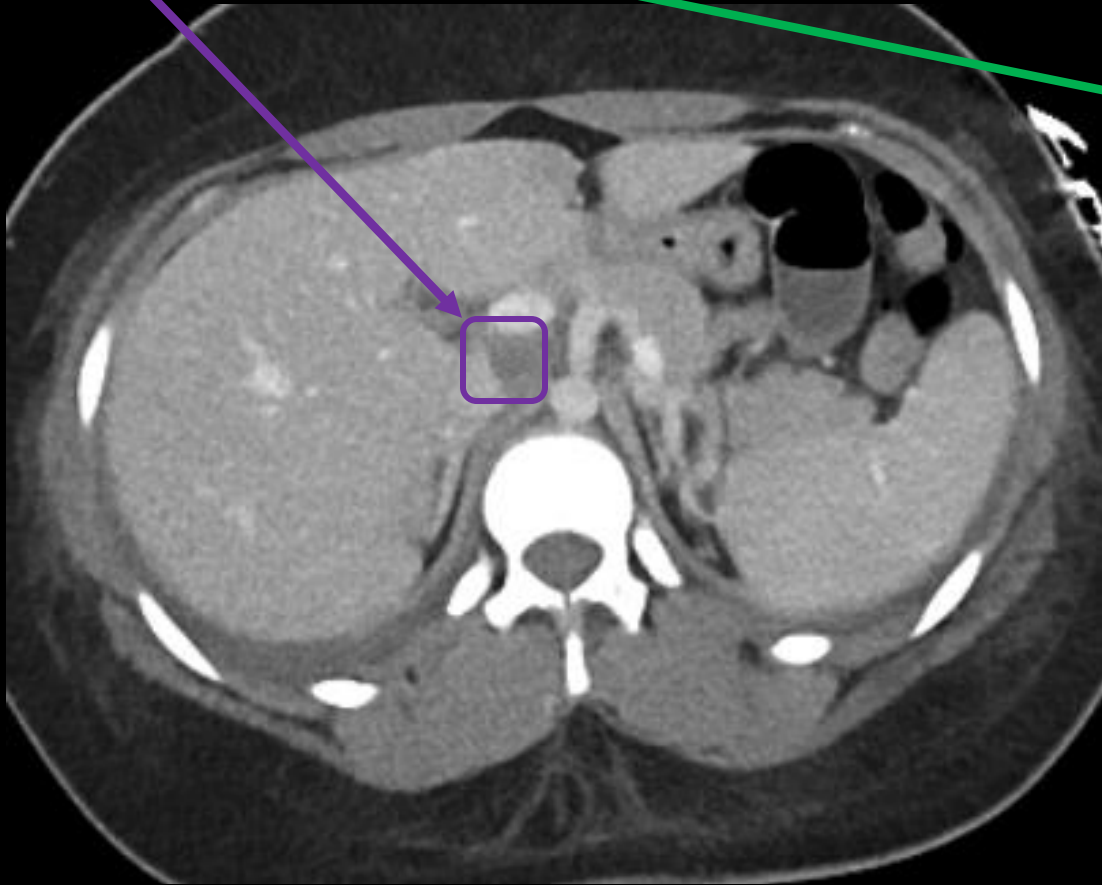
Findings (labeled)



Coronal view of thrombosed duplicated IVC

Findings (labeled)

Axial and Coronal views of partial thromboses of IVC



Final Dx:

Anatomical Variant: Duplicated Inferior Vena Cava
(DIVC)

Case Discussion

- The patient was taken to the OR for pulmonary embolectomy, total cardiopulmonary bypass, and resection of the RA mass/clot in transit. Failure of IVC filter placement due to “small IVC caliber”, arousing initial suspicion of an anatomic anomaly.
- Failed IVC placement due to small IVC caliber, (-) pregnancy test, and (-) hematological work-up that would explain her heavy clot burden aroused suspicion of variant anatomy.
 - Suprarenal IVC filter placements are known to be a safe and effective option in patients with duplicated IVC's.¹ Recognition of the entity is important because infrarenal placement can lead to recurrent pulmonary embolisms.²
- CT showed a clot in the left femoral and iliac vein extending into left duplicated IVC and left renal vein, as well as a filling defect in the left lateral margin of the suprarenal IVC. Right common femoral vein DVT's were also present.
- IR performed mechanical thrombectomies of the common intrahepatic inferior vena cava, left renal vein, duplicated IVC, and left lower extremity vessels.

Case Discussion

- At around 4-8 weeks of life, the anomalous DIVC can arise from embryological abnormalities with the regression, merging, or anastomosing of the posterior cardinal, subcardinal, and supracardinal veins.³
- An important differential diagnostic consideration includes transposition of the IVC, where the IVC continues on the left side of the aorta. Whereas a duplicated IVC continues on both sides of the aorta.
- Deep vein thromboses associated with DIVCs are known to be caused by stasis, well-known through Virchow's triad.⁴
- Patients with DIVC are usually asymptomatic, often discovered incidentally during imaging studies.⁵

Case Discussion

- Various types of duplicated IVCs.^{5,6} This is an example of Type 2a, a double IVC without any interiliac communication.
- Duplicated IVCs are known to be closely associated with renal anomalies such as crossed fused ectopia, horseshoe kidney, or circumaortic renal collar.^{7,8}
- IVC abnormalities reduce the safety of cardiovascular interventions, including but not limited to right heart catheterizations, catheter-directed thrombolysis, and caval filter placement.³
- Further research is needed for the necessity of lifelong anticoagulation for patients with DIVC.

Management

- Patient underwent mechanical thrombectomy of the left lower extremity, given the extensive clot burden and DVT.
- Discharged on Eliquis
- Now follows closely with Hematology/Oncology with the necessity for lifelong anticoagulation due to the risk of thromboses originating from variant anatomy, regardless of further work-up

References:

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3. Balawender, Krzysztof, et al. "Duplication of the Inferior Vena Cava - an Anatomical Case Report with Comments on Embryological Background and Clinical Implications." *Translational Research in Anatomy*, vol. 29, 28 Aug. 2022, p. 100221, www.sciencedirect.com/science/article/pii/S2214854X2200067X, <https://doi.org/10.1016/j.tria.2022.100221.4>.
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8. Smith, Theodore R., and Andrei Frost. "Anomalous Inferior Vena Cava Associated with Horseshoe Kidneys." *Clinical Imaging*, vol. 20, no. 4, Oct. 1996, pp. 276–278, [https://doi.org/10.1016/0899-7071\(95\)00040-2](https://doi.org/10.1016/0899-7071(95)00040-2). Accessed 21 May 2020.