Pulmonary Embolism with Right Heart Strain

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10/16/2019

RAD 4001 Diagnostic Radiology

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Clinical History

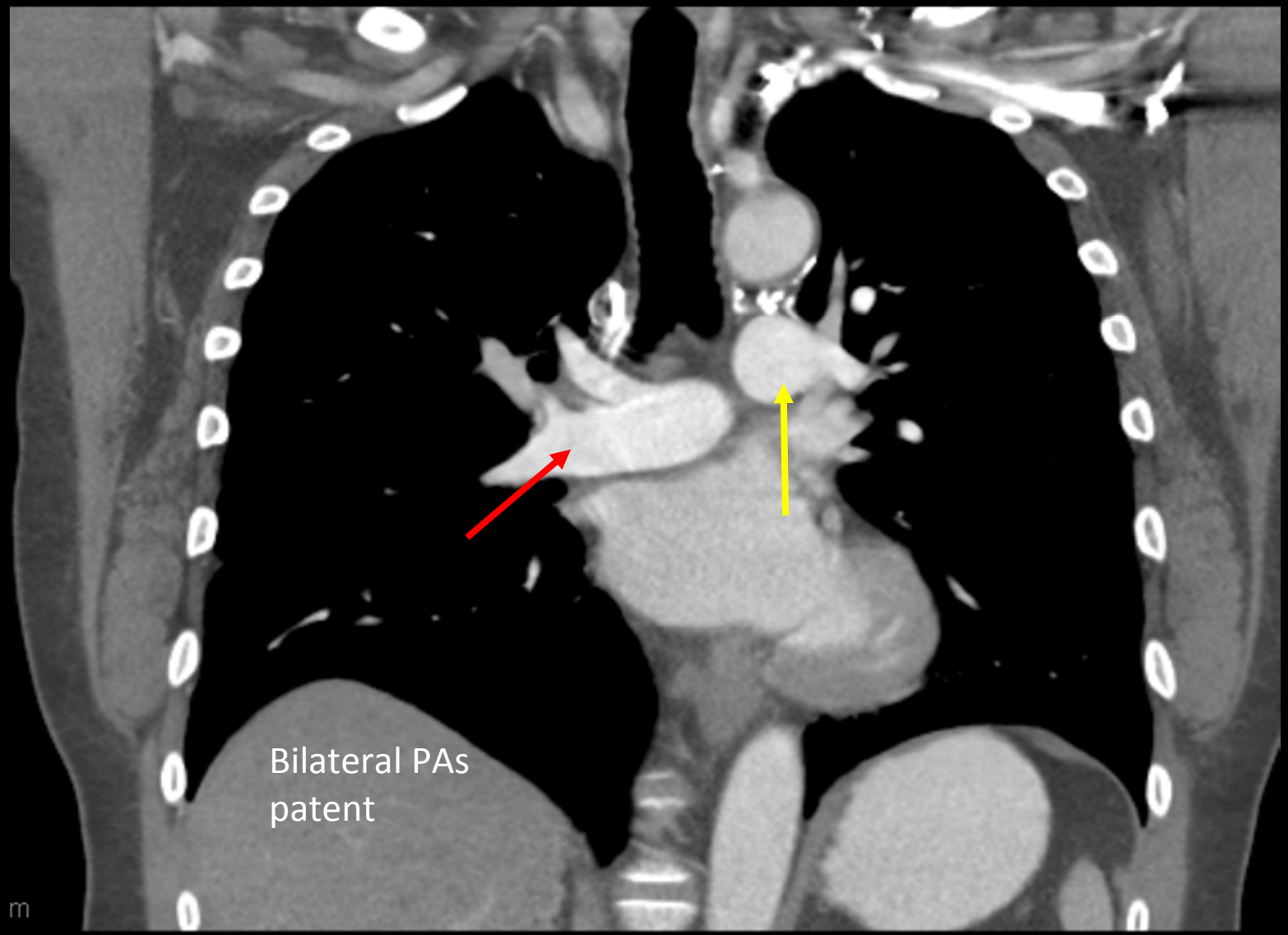
- History
  - 56 y/o M w/ PMHx of metastatic prostate cancer s/p radical prostatectomy and recent diverging ileostomy has worsening O2 sat and SOB on 10/7

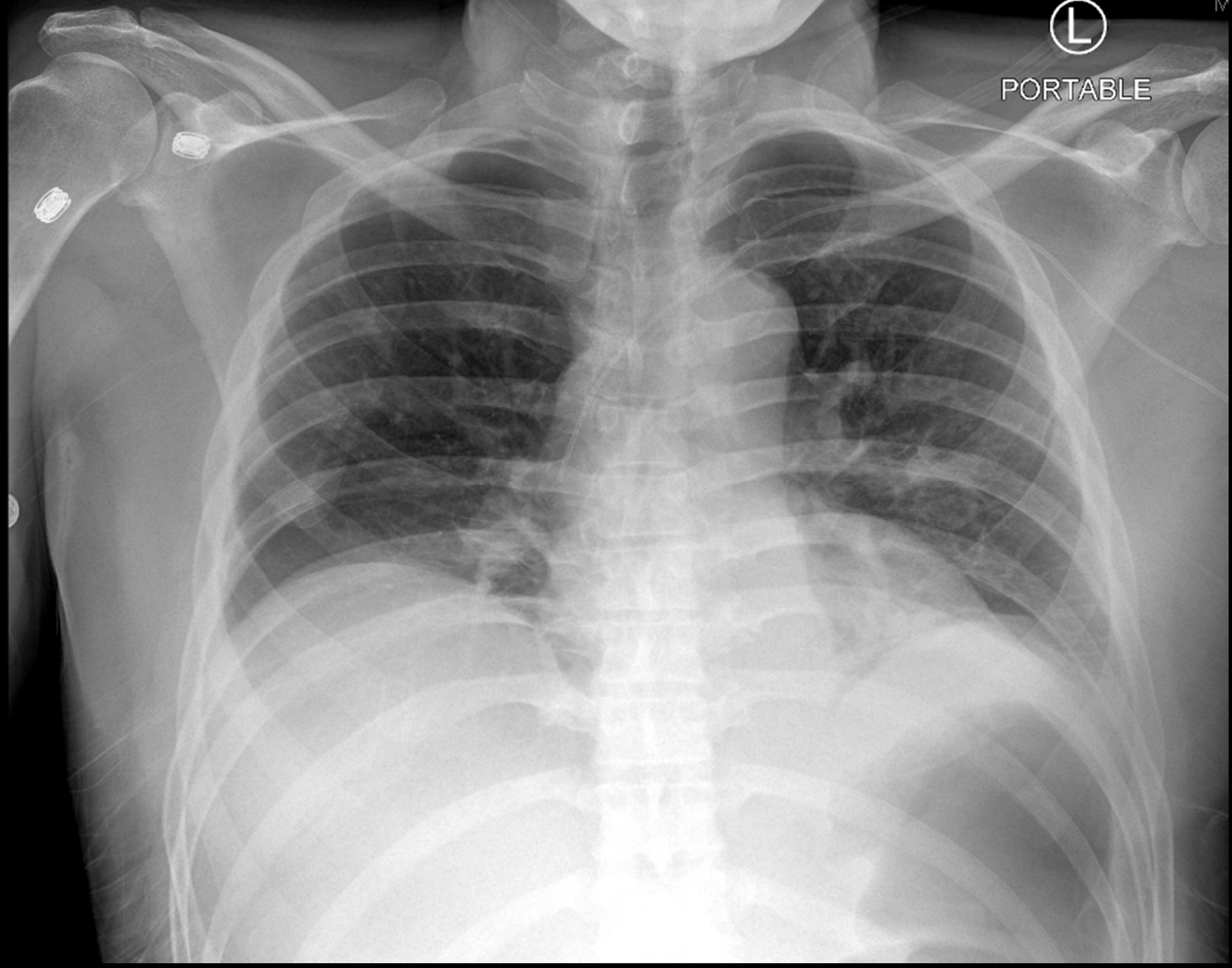
Imaging at MD Anderson

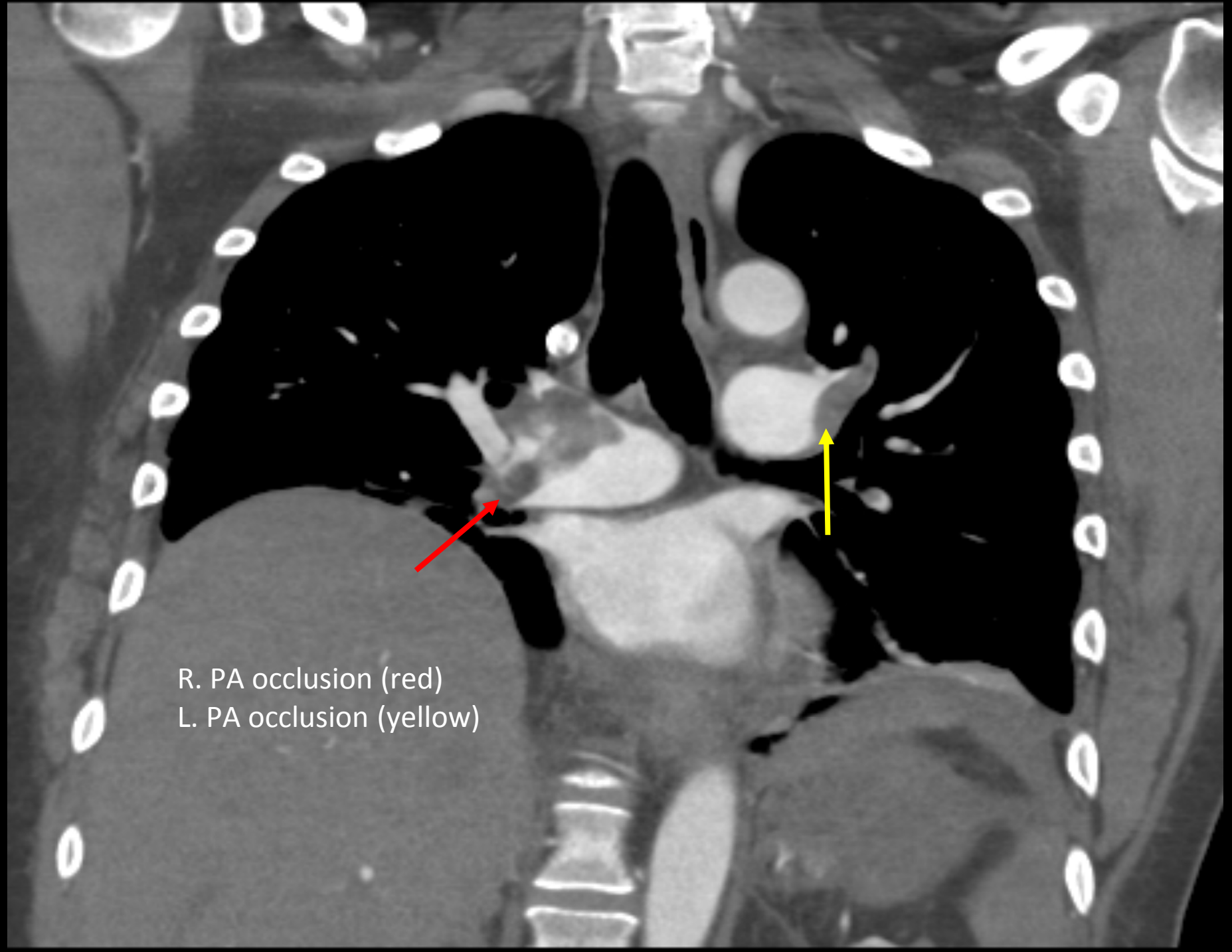
- CXR
- CT Chest
- LE dopplers

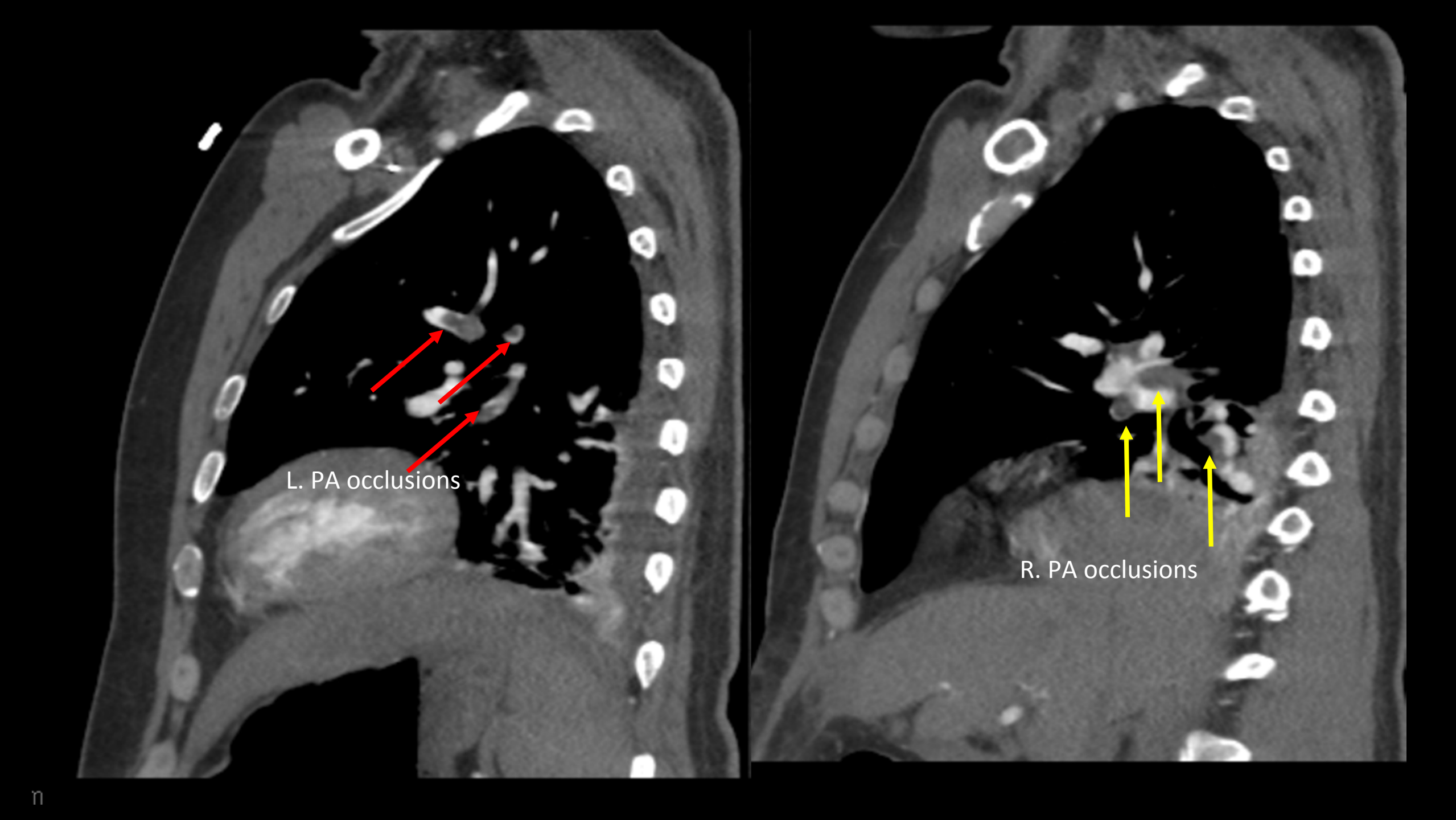
Baseline CT Chest

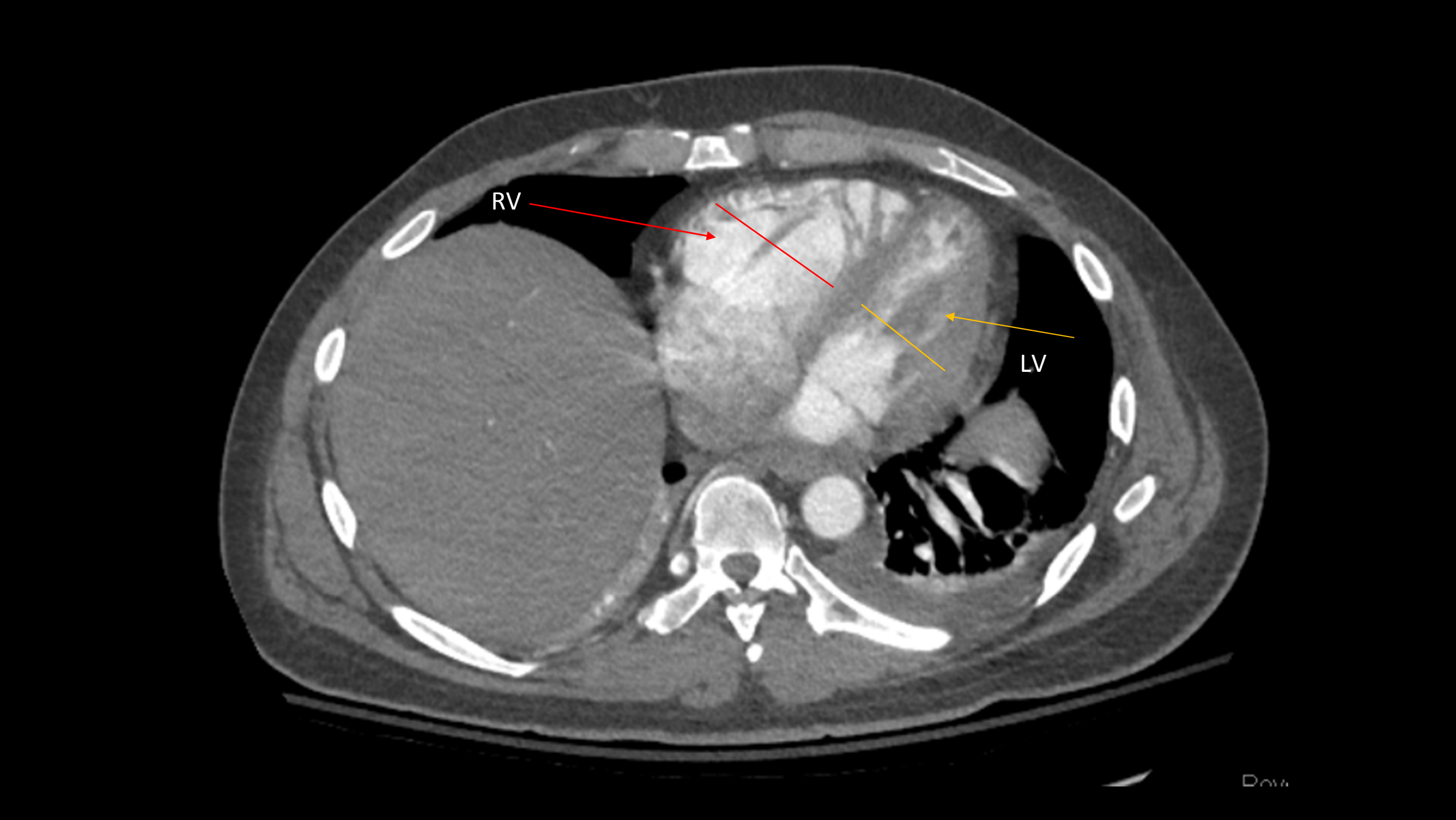
- Two weeks prior to symptom onset

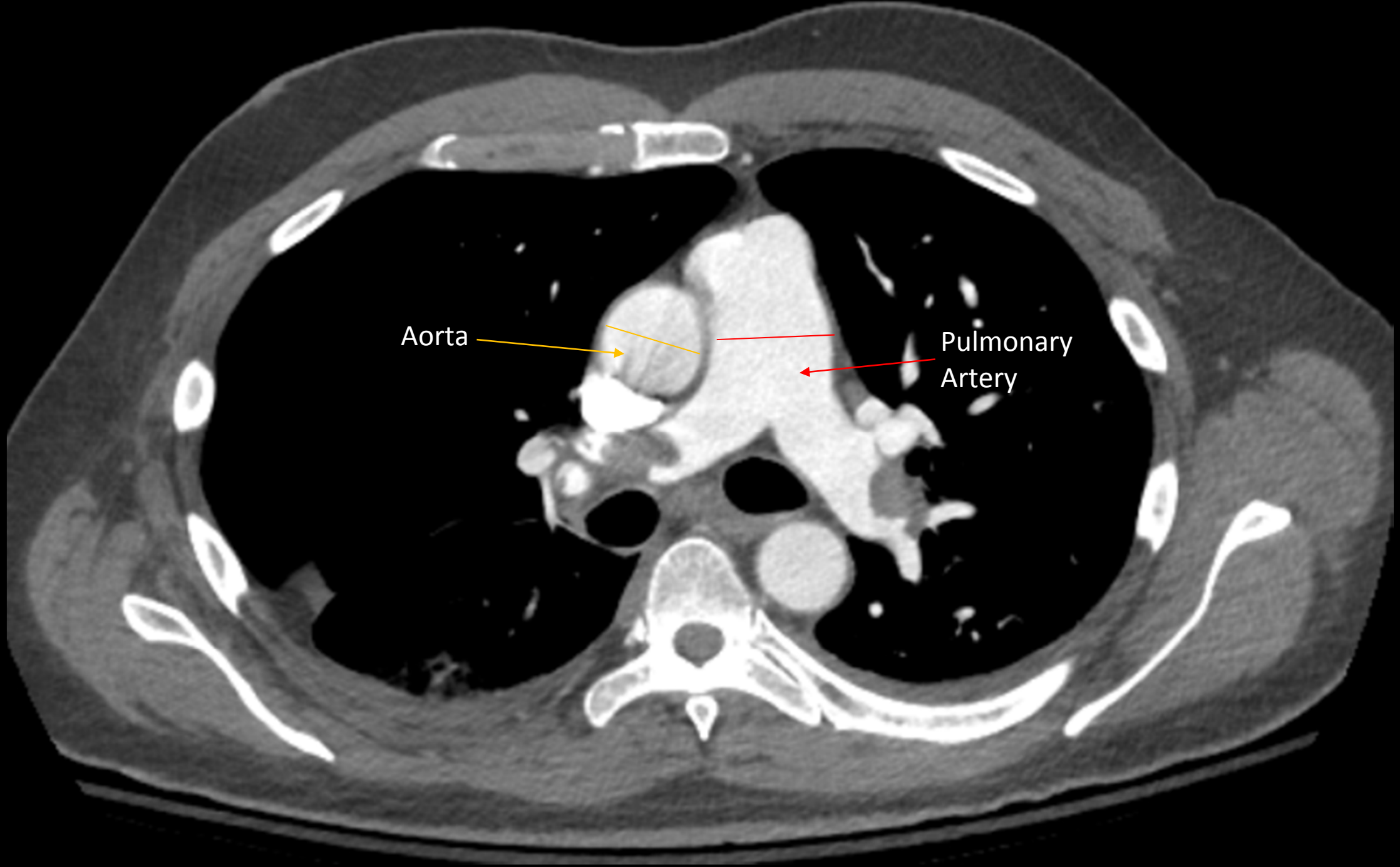

Bilateral PAs
patent

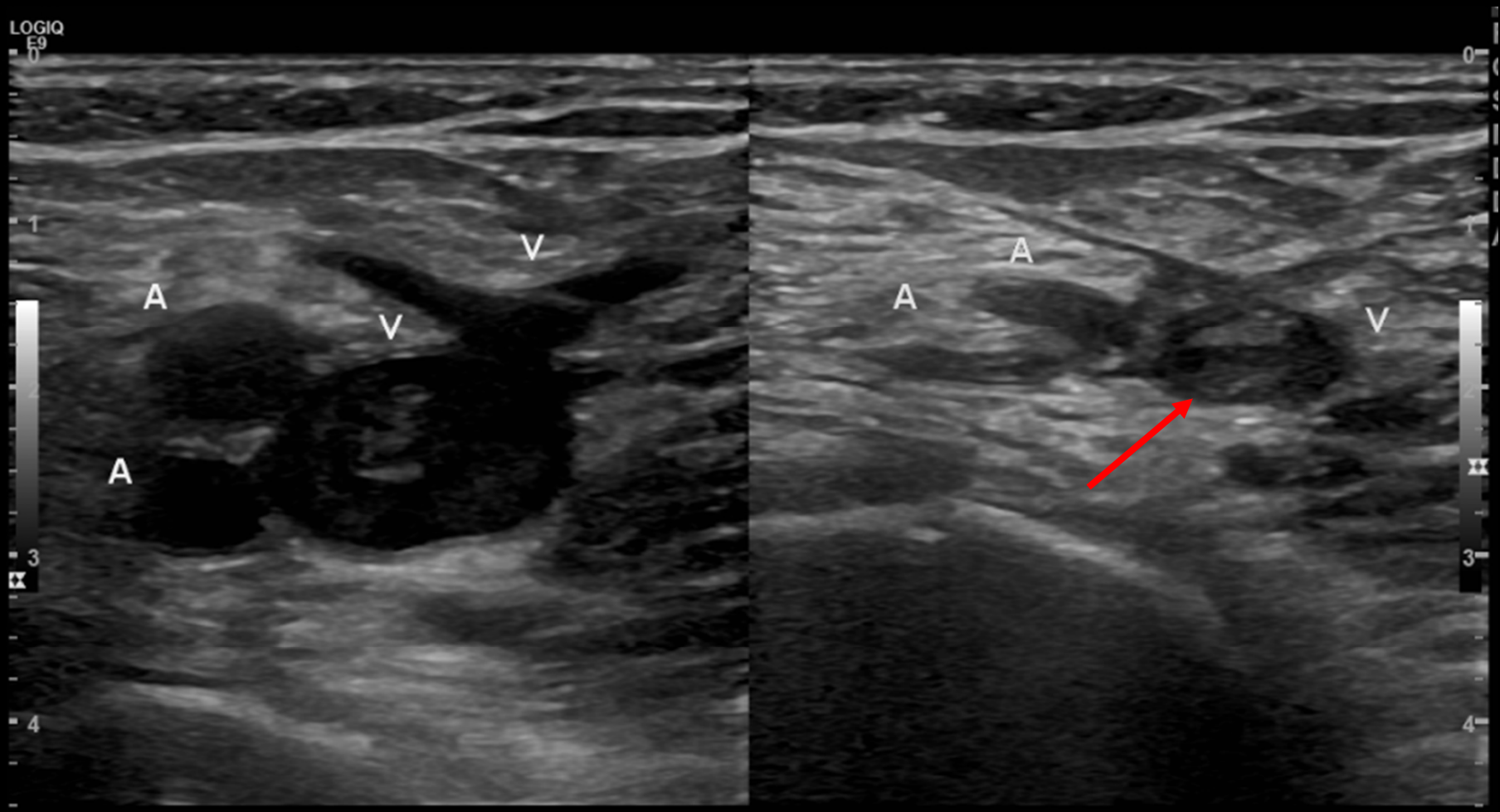

L
PORTABLE


R. PA occlusion (red)
L. PA occlusion (yellow)


L. PA occlusions
R. PA occlusions


RV
LV


Aorta
Pulmonary
Artery



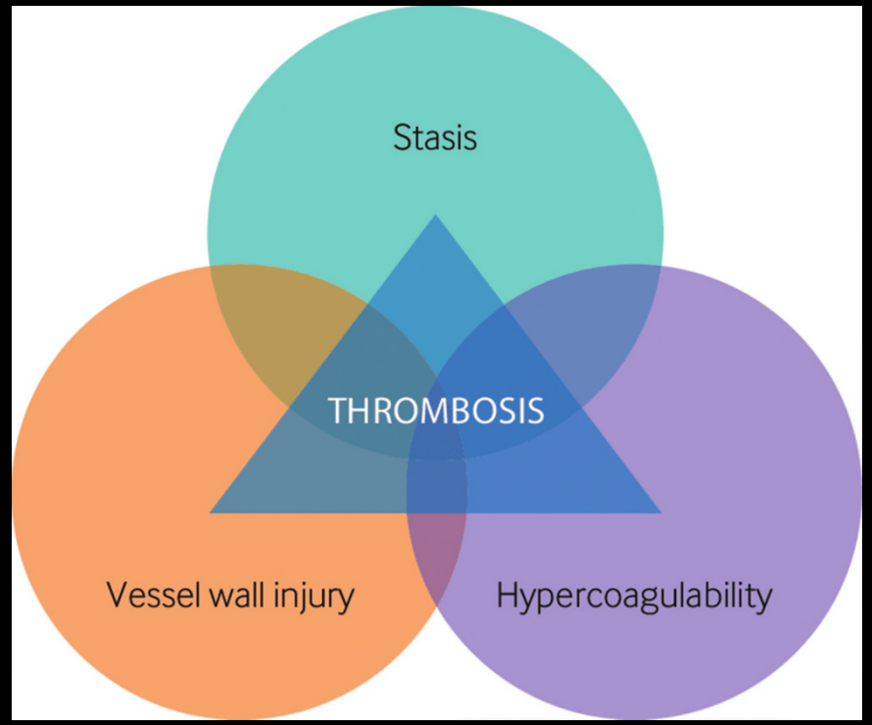
TRANS RT CFV/ GSV W/O COMP W/COMP

Key Findings

- Low lung volumes on CXR
- Notable opacifications of bilateral pulmonary arteries
- Right ventricle measures larger than left ventricle
- Pulmonary artery measures larger than adjacent aorta
- Uncompressible LE veins

Virchow's Triad

- Long term inpatient has low mobility
- Metastatic prostate cancer
- Recent operation



Pulmonary Embolism - Discussion

- Major risk factors in Virchow's Triad
- Mortality rate of up to 30%
- Well's Score:
    1. Clinical Signs/Sx of DVT
    2. PE is #1 diagnosis or equal to #1 diagnosis
    3. Pulse >100 BPM
    4. 3 days of immobilization or surgery within last 4 weeks
    5. Previously diagnosed DVT/PE
    6. Hemoptysis
    7. Malignancy treated within past 6 months or palliative

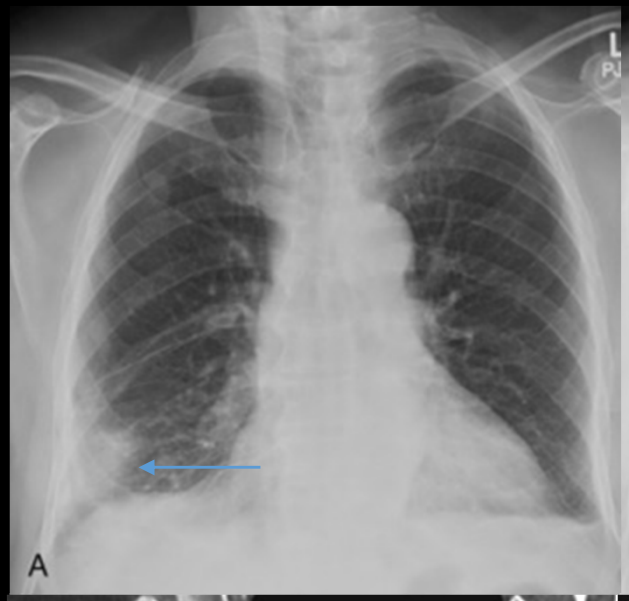
Treatment

- Requires immediate treatment with LMWH unless the patient has contraindication
  - This can be transitioned to DOACs or warfarin
- Anticoagulation should be continued for 3-6 months in first time clot with low suspected risk of recurrence
  - For patients with malignancy this treatment period is extended based on clinical judgment
- Recurrence rate is as high as 21% in cancer patients
- Major bleeding events are also more frequent in cancer patients

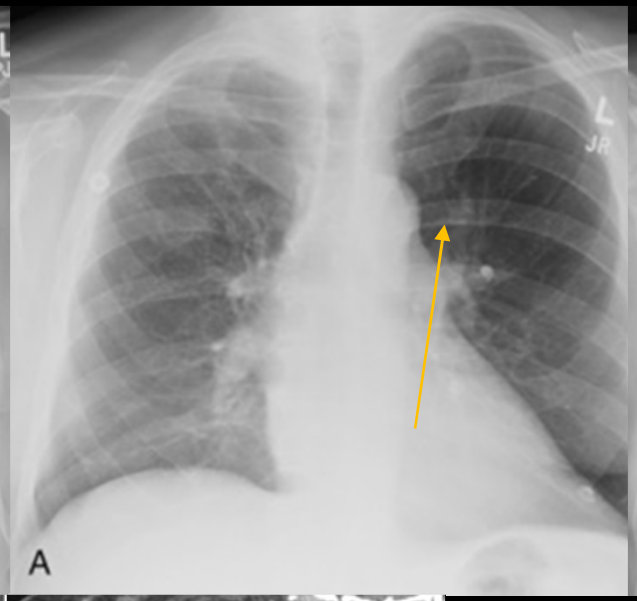
Radiologic Signs of PE

- Hampton's Hump
- Westermark Sign
- Fleischner Sign
- Railway Sign
- Polo Mint Sign

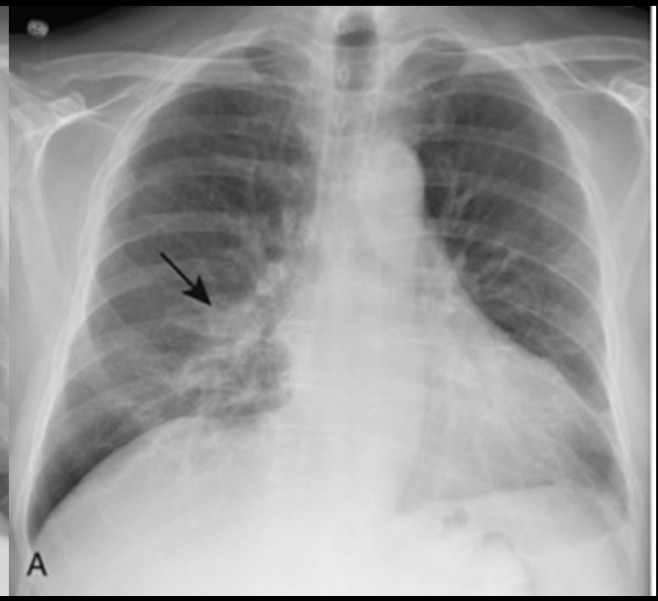
Hampton's Hump: Wedge shaped infarct

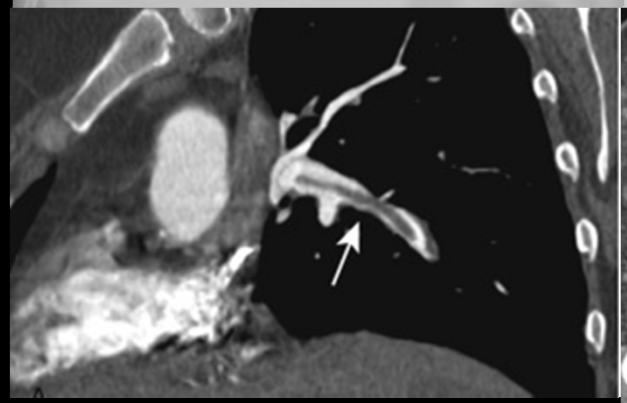


Orange Arrow: Westermark Sign [Increased lucency of lung distal to occlusion.

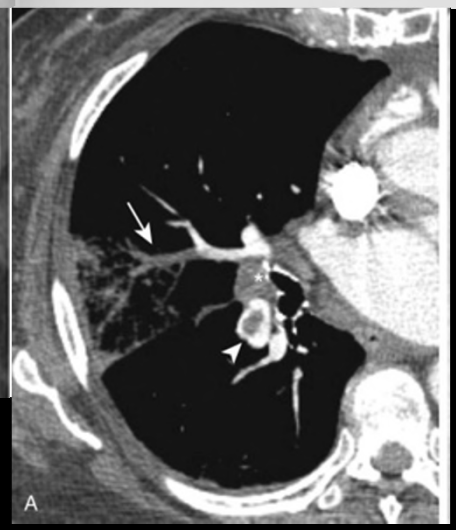


Fleischner Sign: Enlargement of pulmonary artery





Railway Track Sign: Central filling defect



Polo Mint Sign: Central filling defect

ACR Appropriateness Criteria for Suspected Pulmonary Embolism

Radiologic Procedure	Rating	RRL
CXR	9	1
CTA Chest with IV Contrast	5	3
LE Doppler	3	0

https://acsearch.acr.org/docs/69404/Narrative/

Cost of Imaging

Study	Cost (Insured)	Cost (Uninsured)
CXR 1 View	$683	$246
CT Chest with Contrast	$3963	$1417
BLE Doppler	$2164	$779

https://www.memorialhermann.org/patients-caregivers/pricing-estimates-and-information/#accordion-1

Summary

- 56 y/o M w/ PMHx of metastatic prostate cancer s/p radical prostatectomy and recent diverging ileostomy presented with worsening O2 sat and SOB was found to have bilateral PE on CT secondary to bilateral DVTs.

References

1. McDermott S., Gilman M. Thoracic Imaging: The Requisites. Ch 11:238-258. 2010.
2. Goldacre MJ, Roberts S, Yeates D, Griffith M. Hospital admission and mortality rates for venous thromboembolism in Oxford region, UK, 1975-98. Lancet 2000; 355:1968.
3. Kucher N, Goldhaber SZ. Management of massive pulmonary embolism. Circulation 2005; 112:e28.
4. https://www.mdcalc.com/wells-criteria-pulmonary-embolism