69 year-old male presents with right posterolateral pleuritic chest pain.

Sophia Walker, MS4

Ryan Joyce, MD

Douglas Gibson, MD

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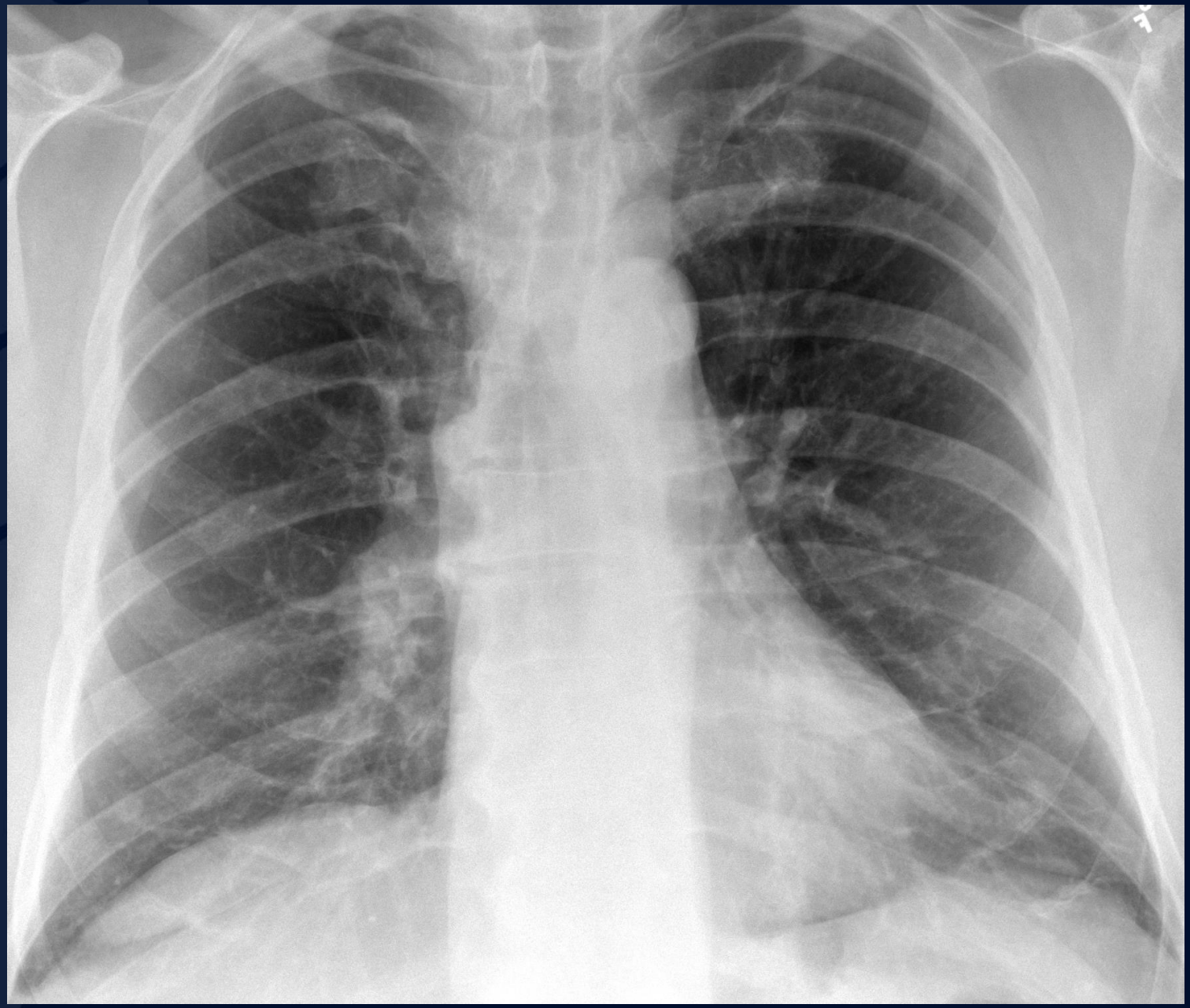

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Pulmonary embolus (Westermark and Palla Signs)

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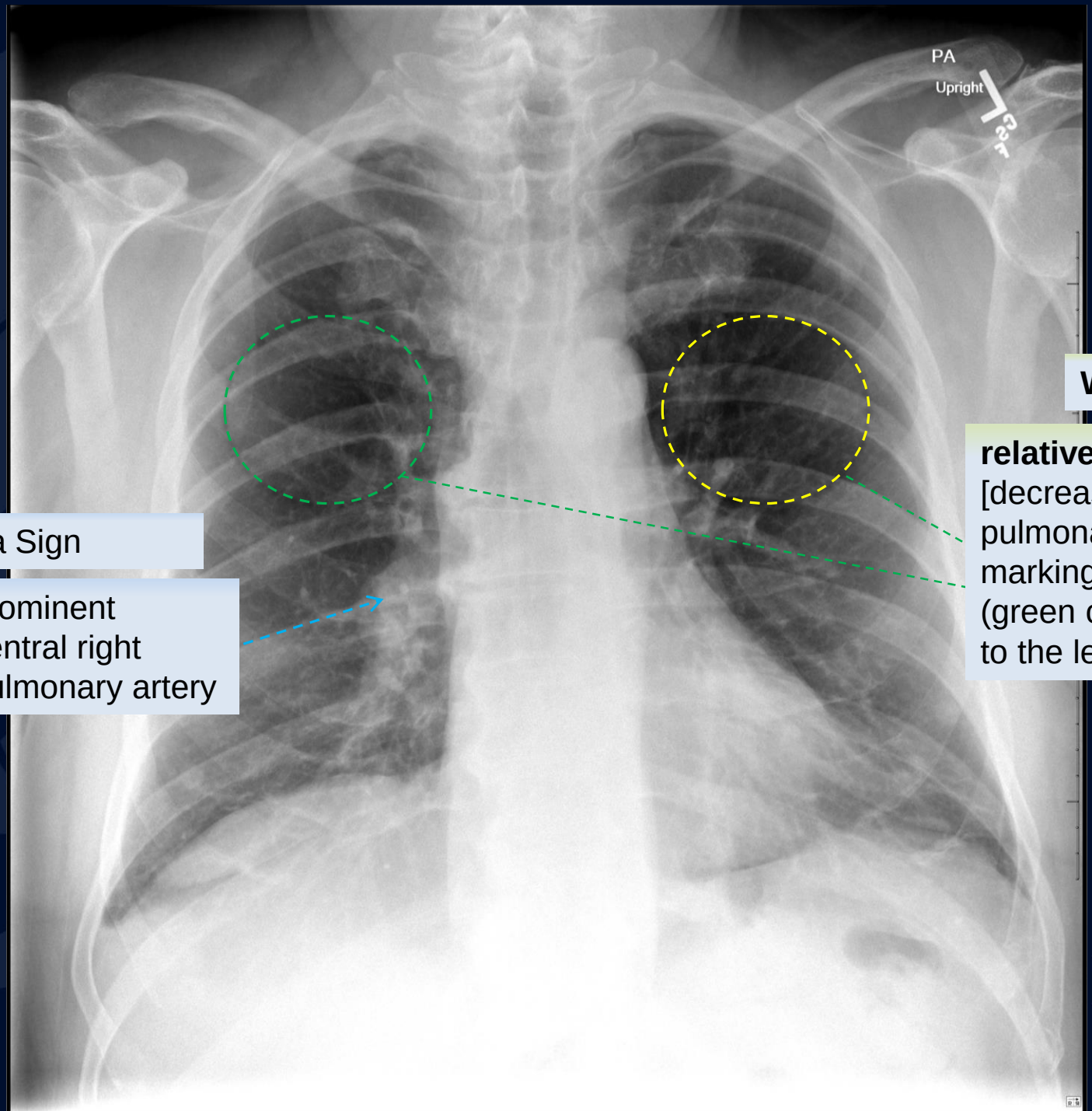

Westermark Sign

relative oligemia [decreased caliber of pulmonary arterial markings on the right (green circle) compared to the left (yellow circle)].

Palla Sign

prominent central right pulmonary artery

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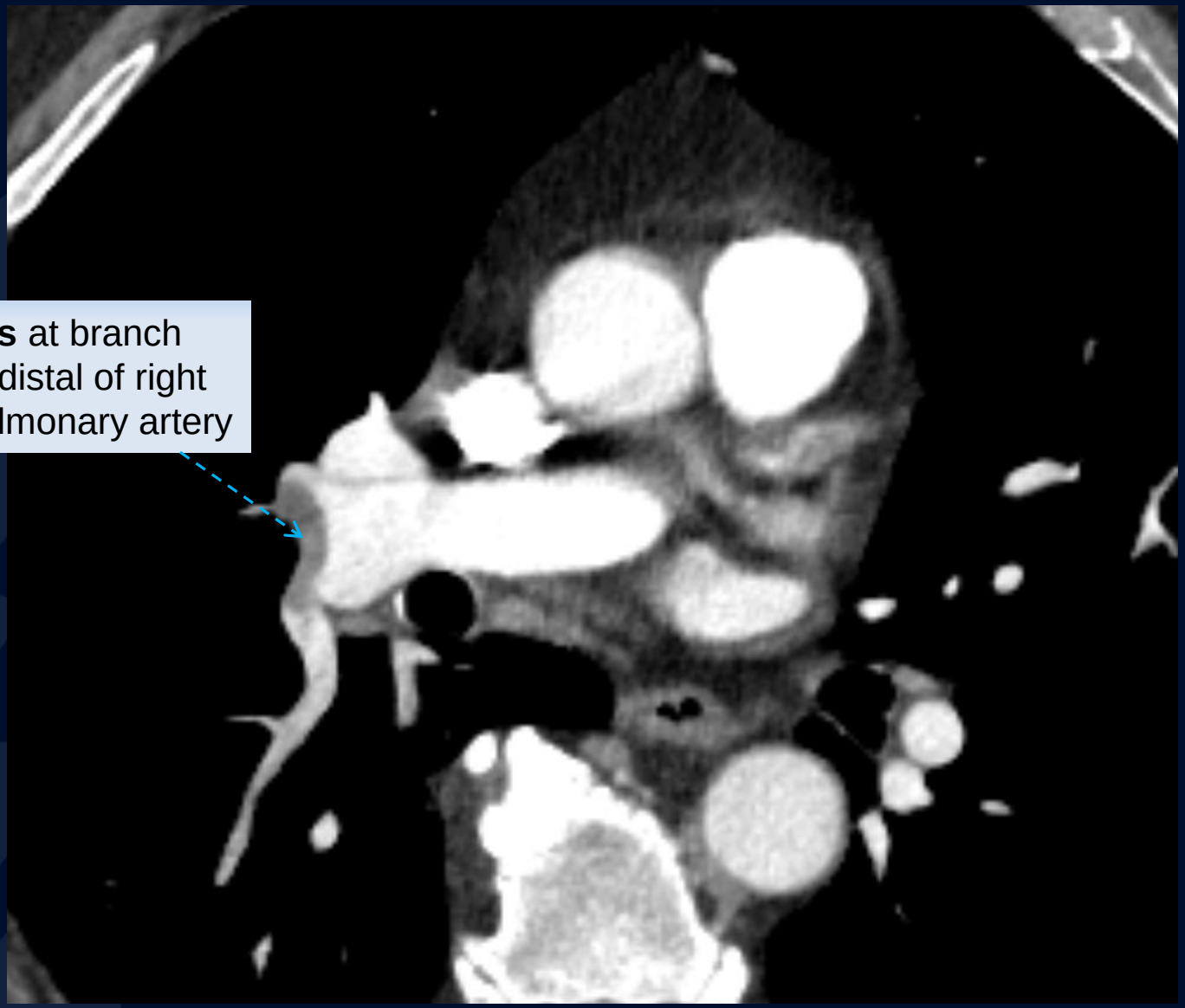

embolus at branch point of distal of right main pulmonary artery

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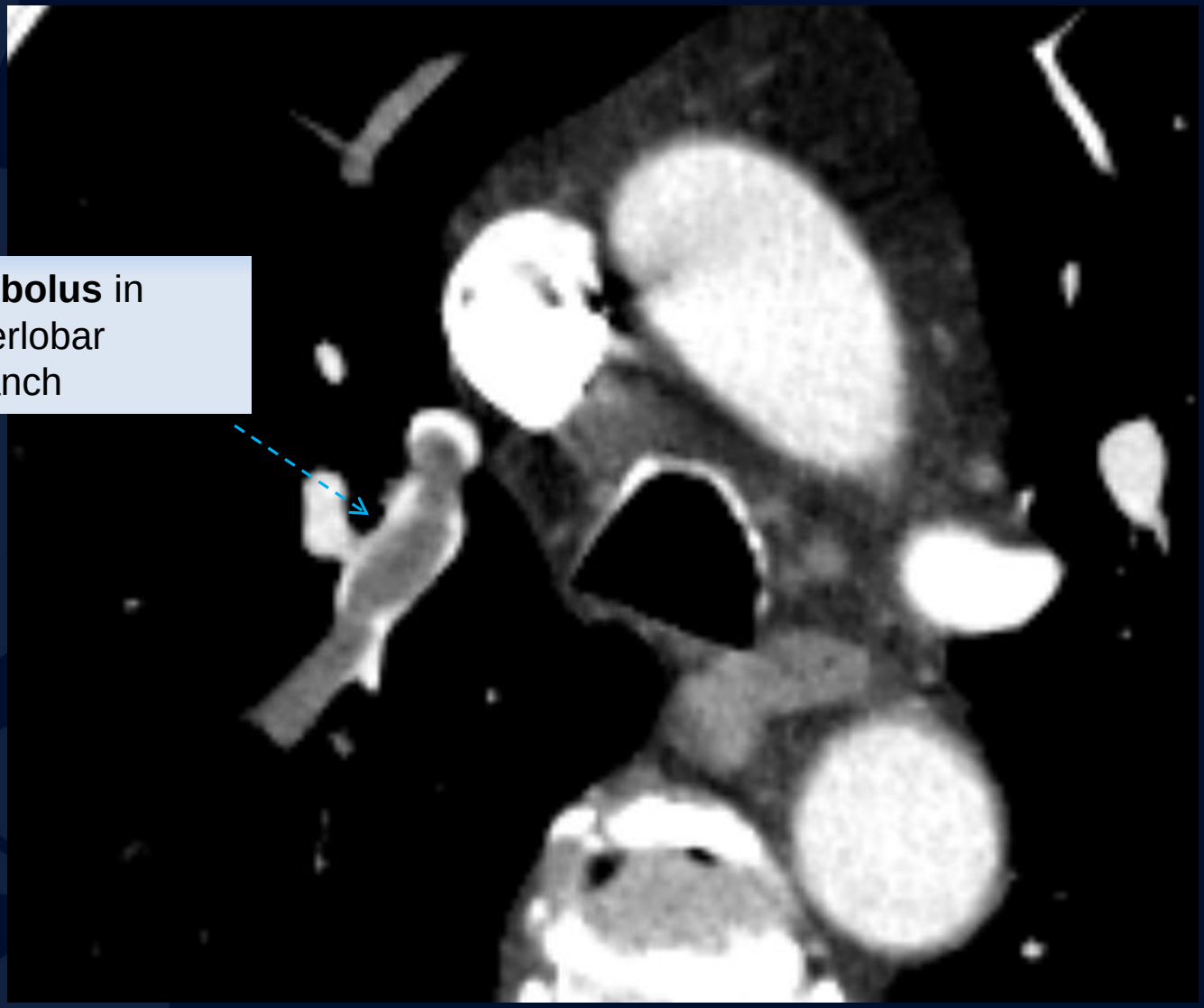

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embolus in segmental branch to RML

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embolus in sub-segmental branch of right pulmonary artery

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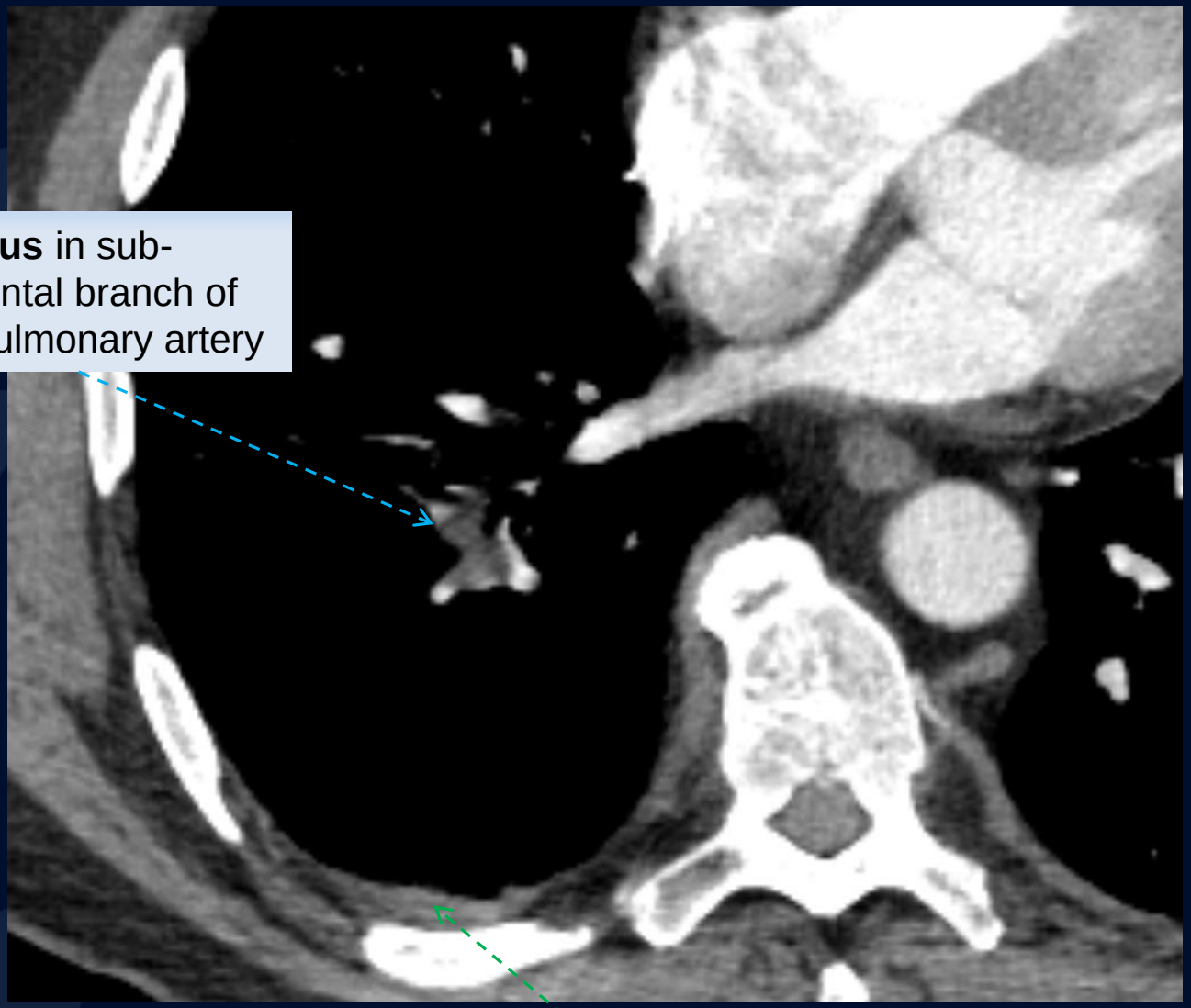

embolus in sub-segmental branch of right pulmonary artery

pleural thickening, likely representing reactive or ischemic pleuritis

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Pulmonary Embolus (Westermark and Palla signs)

- Westermark Sign – areas of relative oligemia secondary to decreased caliber of regional pulmonary arteries.
  - The relative oligemia occurs as a result of proximal occlusion of the involved pulmonary arteries.
- As seen in this case, the more central pulmonary artery may be dilated (Palla sign).
- Westermark sign has the highest positive predictive value (~38%) and specificity (~92%) for pulmonary embolism relative to other plain radiographic findings.
- Note that generally, plain radiographs are used to exclude alternative diagnoses on the differential, i.e. pneumonia, CHF, or pneumothorax.
- Most plain chest radiographs in the setting of PE are NORMAL.

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Pulmonary Embolus (other signs)

- Fleischner sign – enlarged main pulmonary artery.
- Hampton hump – peripheral wedge-shaped region of opacity suggesting lung infarction distal to embolus.
- Palla sign – enlarged right pulmonary artery.
  - When seen with Westermark sign suggests emboli in segmental or smaller sub-segmental pulmonary arteries
- Chang & Knuckle signs – dilated and abruptly cut off right pulmonary artery
- Note that the absence of any of these signs does not exclude a pulmonary embolism

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