

**Pulmonary Embolism -  
Acute, Chronic and Mimics**

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**NORDICFORUM** www.nordictraumamed.com  
**TRAUMA & EMERGENCY RADIOLOGY**

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**Disclosures**

**None**

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**Objectives**

- Better understand imaging characteristics of acute and chronic thromboembolic disease
- Recognize signs of right heart strain
- Become familiar with common mimickers of embolic disease

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# Acute Pulmonary Embolism

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Acute / Chronic / Mimics

Clinical

- clinical signs of deep venous thrombosis (DVT)
  - asymmetric pitting lower extremity edema
  - prominent superficial collateral vessels
  - tenderness to palpation along the deep venous system
- tachycardia
- dyspnea
- pleuritic chest pain
- hemoptysis

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Acute / Chronic / Mimics

Clinical

- Wells score (MC)
- Geneva score
- PERC rule

Criteria	Points
Clinical signs/symptoms of DVT	3
PE is most likely diagnosis	3
Tachycardia (>100 bpm)	1.5
Immobilization/surgery in previous 4 weeks	1.5
Prior DVT/PE	1.5
Hemoptysis	1
Active malignancy (bt w/in 6 months)	1

Low Risk < 2 points    Intermediate risk 2-6 points    High risk >6 points

PE unlikely 0-4 points    PE Likely >4 points

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Acute / Chronic / Mimics

Imaging Classification

- hemodynamic
  - massive PE
  - submassive PE
  - low-risk
- vessel
  - saddle
  - lobar
  - segmental / subsegmental

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Acute / Chronic / Mimics

Imaging - CXR

- Westermark sign
  - focal peripheral hyperlucency secondary to oligemia
  - collapsed appearance of vessels distal to the occlusion



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Acute / Chronic / Mimics

Imaging - CXR

- Fleischner sign
  - prominent central pulmonary artery
  - typically in the setting of massive pulmonary embolism



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Acute / Chronic / Mimics

Imaging - CXR

- Hampton Hump
  - wedge shaped pleural-based opacity
  - due to pulmonary embolism and lung infarction



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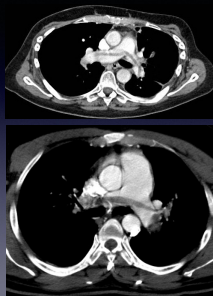
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Acute / Chronic / Mimics

Imaging - CT

- Saddle Thrombus
  - large pulmonary embolism that straddles the bifurcation of the pulmonary trunk
  - extends into the left and right pulmonary arteries



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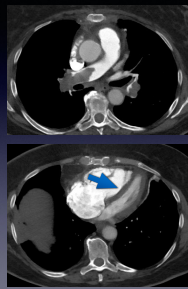
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Acute / Chronic / Mimics

Imaging - CT

- RV Strain
  - dilatation of the right ventricle (RV) (i.e. RV width > left ventricular width)
  - straightening or leftward bulging of the interventricular septum
  - enlargement of the pulmonary trunk



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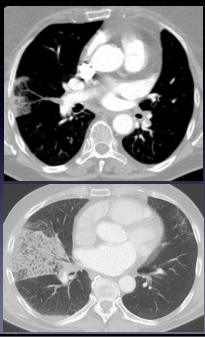
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Acute / Chronic / Mimics

Imaging - CT

- Pulmonary Infarction
  - minority (10-15%) of patients with acute PE
  - peripheral wedge-shaped pulmonary consolidations



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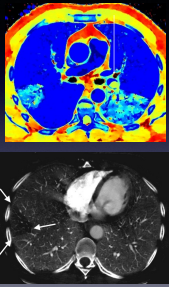
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Acute / Chronic / Mimics

Imaging - CT

- Additional Techniques
  - Spectral CT
  - Dual Energy



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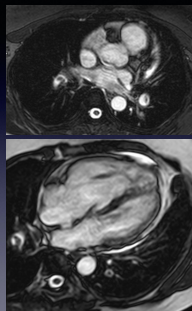
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Acute / Chronic / Mimics

Imaging - MR

- Reserved for patients w/ contraindications
  - sensitivity 78%
  - specificity 99%



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# Chronic Pulmonary Embolism

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Acute / **Chronic** / Mimics

## Clinical

- consequence of incomplete resolution of pulmonary thromboembolism
- increased vascular resistance due to obstruction of the vascular bed
- leads to pulmonary hypertension

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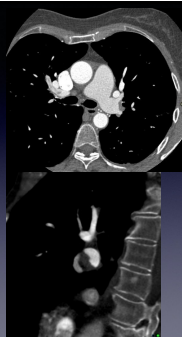
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Acute / **Chronic** / Mimics

## Imaging - CT

- complete/near complete filling defects in the vessel periphery
- form obtuse angles w/ the vessel wall
- thrombus can calcify
- mosaic perfusion
- bronchial or systemic collateralization



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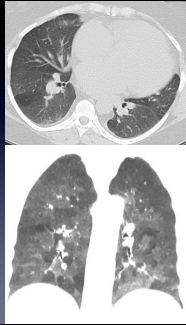
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Acute / **Chronic** / Mimics

Imaging - CT

- complete/near complete filling defects in the vessel periphery
- form obtuse angles w/ the vessel wall
- thrombus can calcify
- **mosaic perfusion**
- bronchial or systemic collateralization



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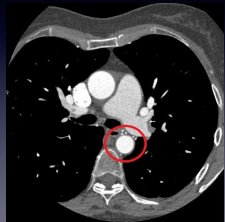
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Acute / **Chronic** / Mimics

Imaging - CT

- complete/near complete filling defects in the vessel periphery
- form obtuse angles w/ the vessel wall
- thrombus can calcify
- mosaic perfusion
- **bronchial or systemic collateralization**



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## Pulmonary Embolism Mimics

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Acute / Chronic / **Mimics**

Differential Diagnosis

- Artifact
  - flow related
  - beam hardening
  - breathing
- Indwelling catheters
- Pulmonary Artery Sarcoma
- Cement Embolism

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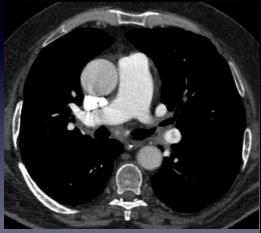
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Acute / Chronic / **Mimics**

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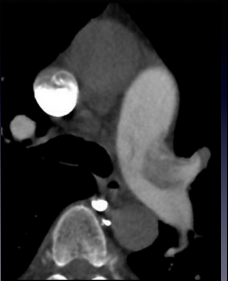
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Acute / Chronic / **Mimics**

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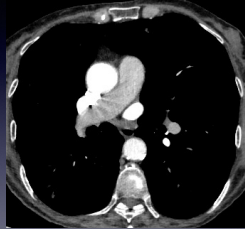
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Acute / Chronic / **Mimics**

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Pre-scan  
Valsalva

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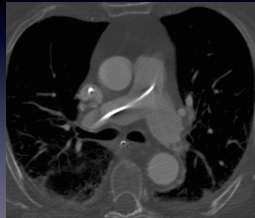
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Acute / Chronic / **Mimics**

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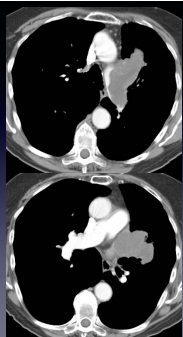
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Acute / Chronic / **Mimics**

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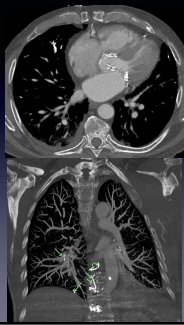
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Acute / Chronic / Mimics

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Questions?

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THANK YOU & BEST WISHES!

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