UTHealth
McGovern Medical School
The University of Texas Health Science Center at Houston

CT and MRI in Aortic Diseases

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Nothing to Disclose

CT/CTA

- Faster acquisition (emergency situation)
- Isotropic spatial resolution. Evaluation of extravascular structures.
- Better for evaluation of calcium
- Multiple planes. 3D volume rendering
- Radiation

Contraindications:

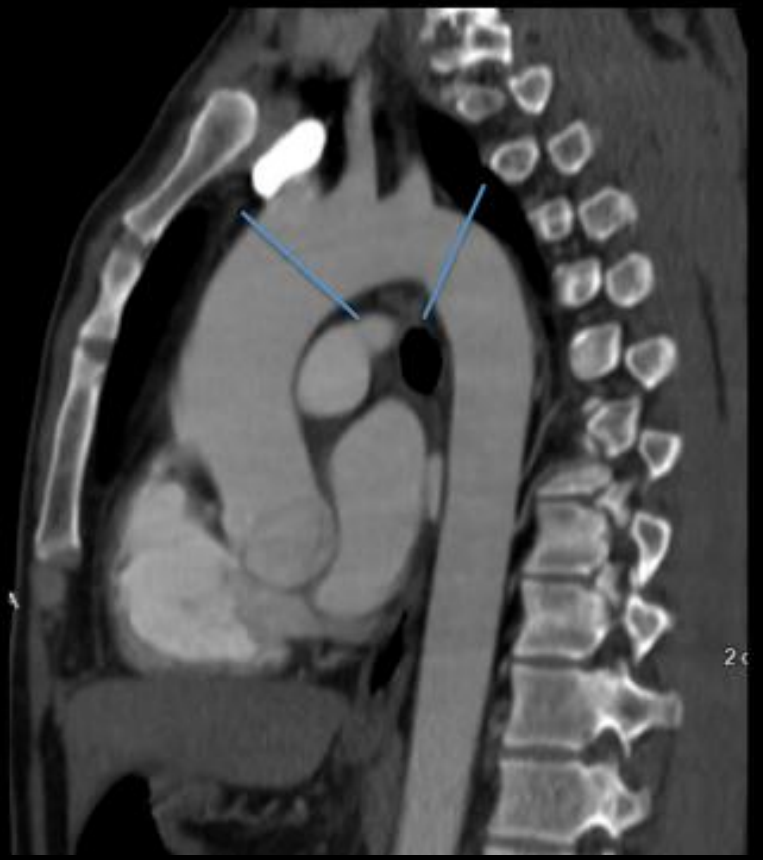
- Iodine allergies
- Renal failure

MR/MRA

- No radiation
- EKG gated multiplanar imaging.
- Can be performed with and without intravenous contrast.
- Flow analysis
- Longer scanning times and technical expertise.
- Non emergent setting
- Contraindications:
  - Claustrophobia
  - MR unsafe devices
  - GFR less than 30 (Risk of Nephrogenic Systemic Fibrosis with IV gadolinium)

Anatomy

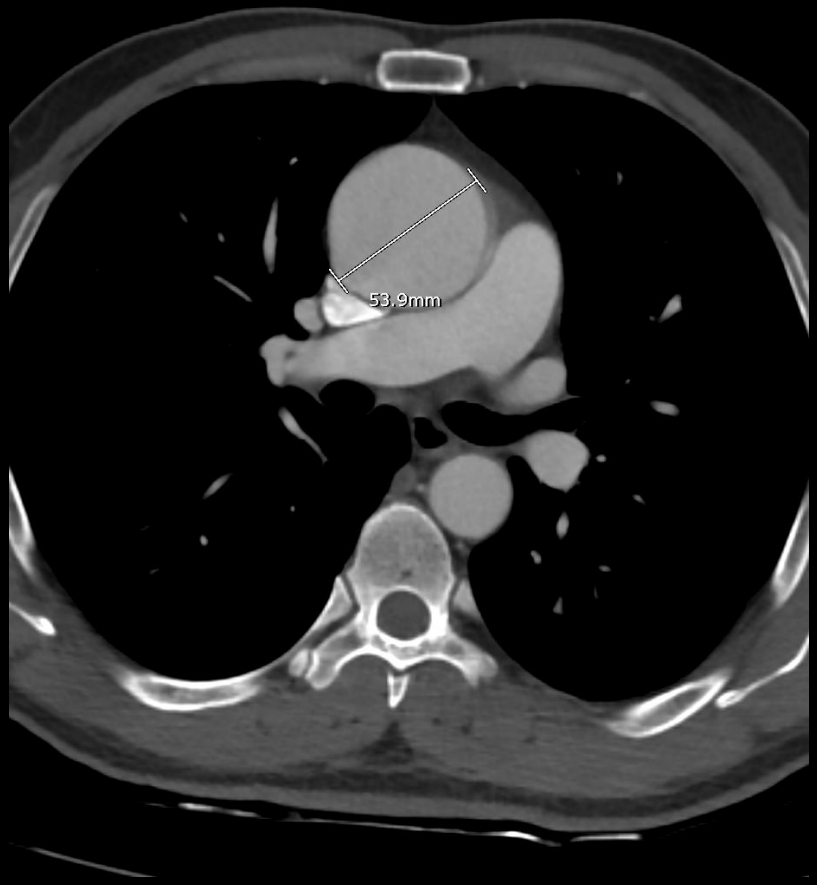
- Ascending aorta: Aortic valve to the origin of innominate artery.
- Aortic Arch: Innominate artery to ligamentum arteriosum.
- Descending thoracic aorta: Ligamentum arteriosum to diaphragmatic hiatus.
- Abdominal aorta



Aortic Aneurysm

- Maximal aortic diameter:
  - Ascending thoracic aorta: >4 cm
  - Descending thoracic aorta: >3 cm
  - Abdominal aorta: >2-3 cm
- Aortic Aneurysm Size Criteria:
  - Ascending: >5 cm
  - Descending: >4 cm
  - Abdominal: >3 cm

Ascending Aortic Aneurysm (5.4 cm)



Aortic Aneurysm

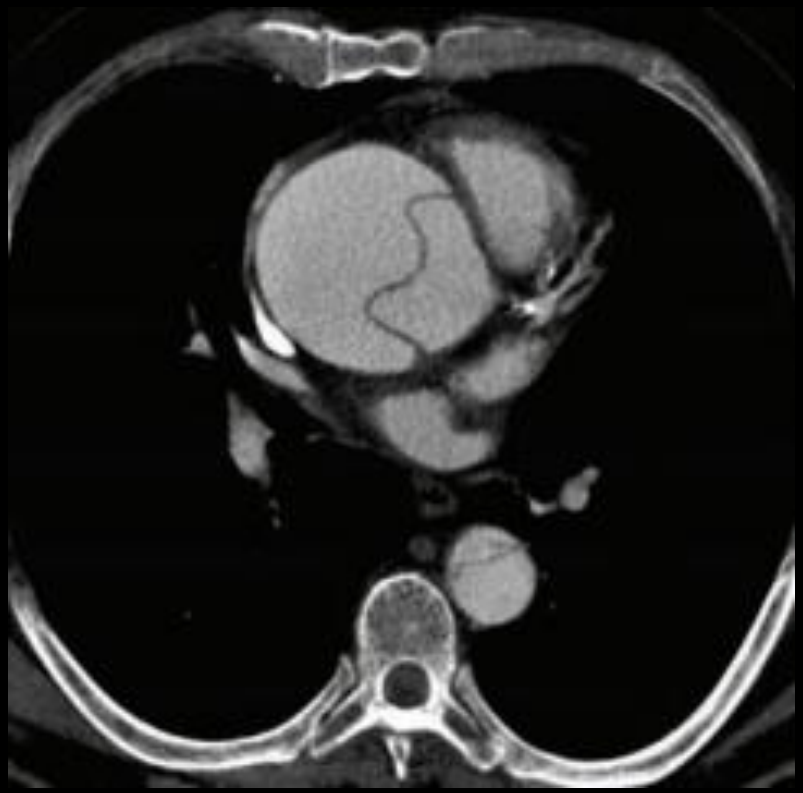
- Etiologies:
  - Atherosclerosis
  - Cystic medial necrosis with predilection of the aortic root (Anuloaortic Ectasia):
    - Marfan
    - Ehlers- Danlos
    - Bicuspid aortic valve
    - Osteogenesis Imperfecta
    - Syphilis

Marfan Syndrome

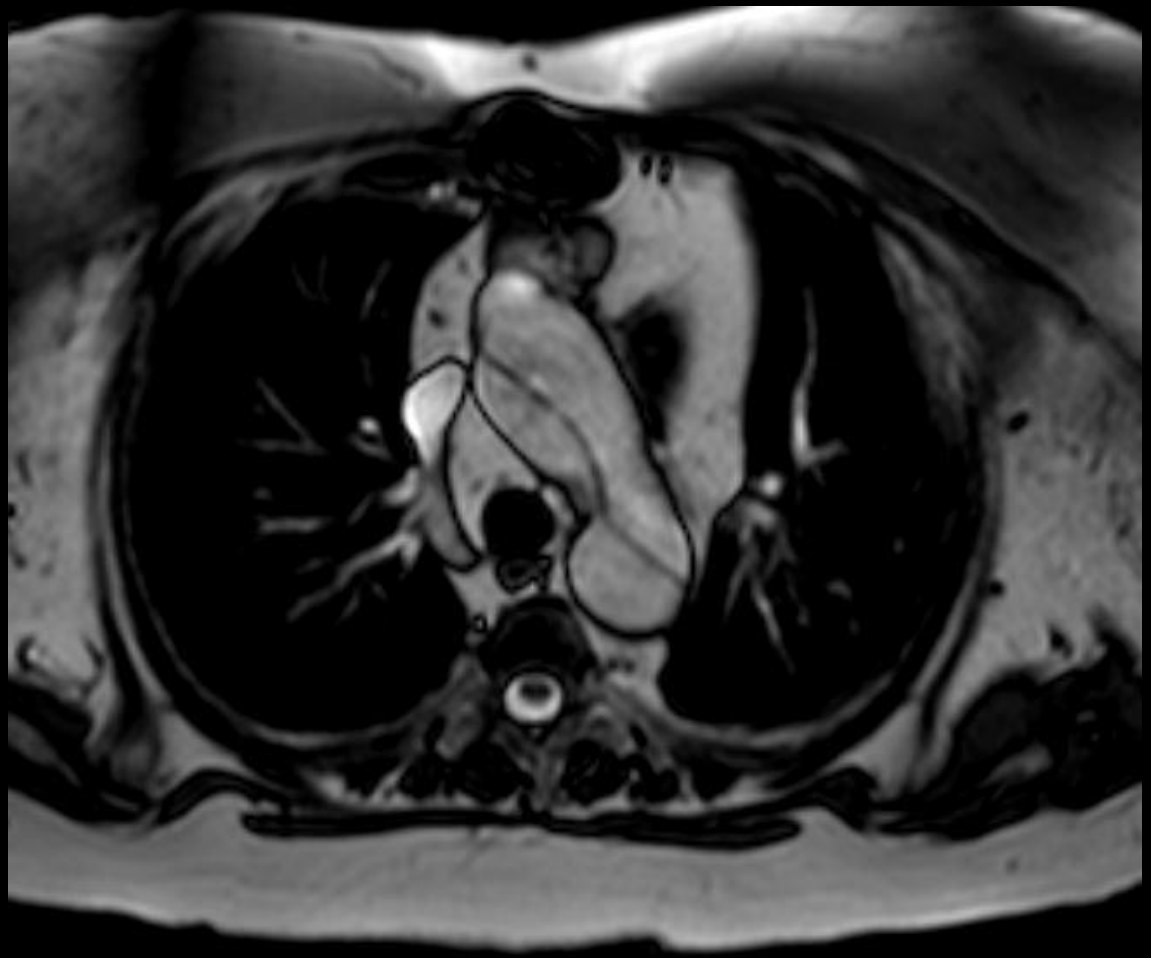
Acute Aortic Syndromes

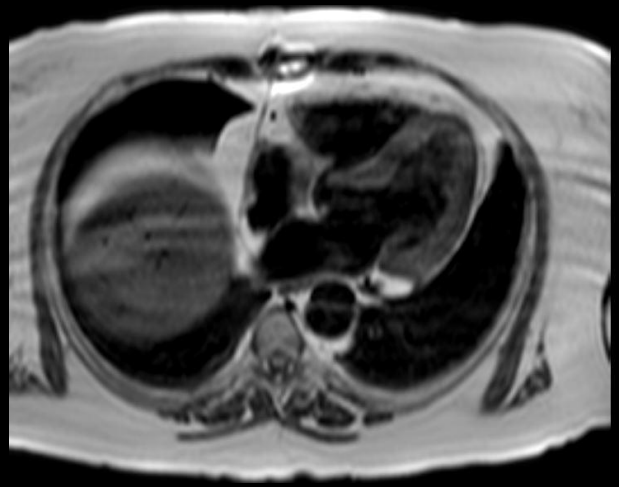
- Aortic Dissection:
  - Intimal flap separating true and false lumen.
- Intramural Hematoma:
  - High attenuation crescentic thickening of the aortic wall.
- Penetrating atherosclerotic ulcer:
  - Localized ulceration penetrating through aortic intima into aortic wall.

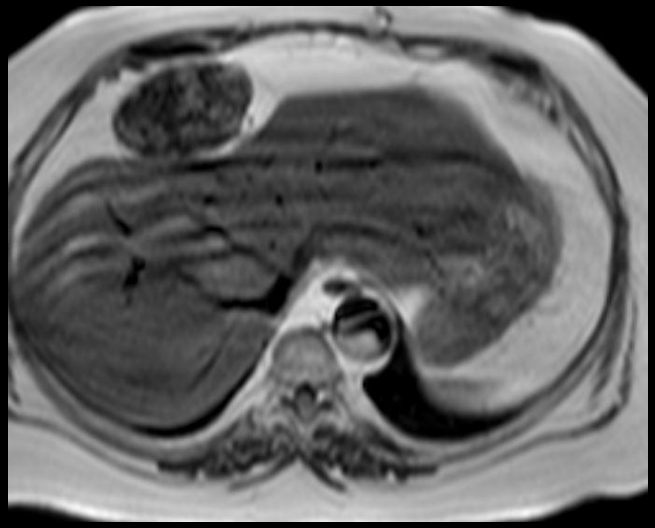
Type A Aortic Dissection CTA



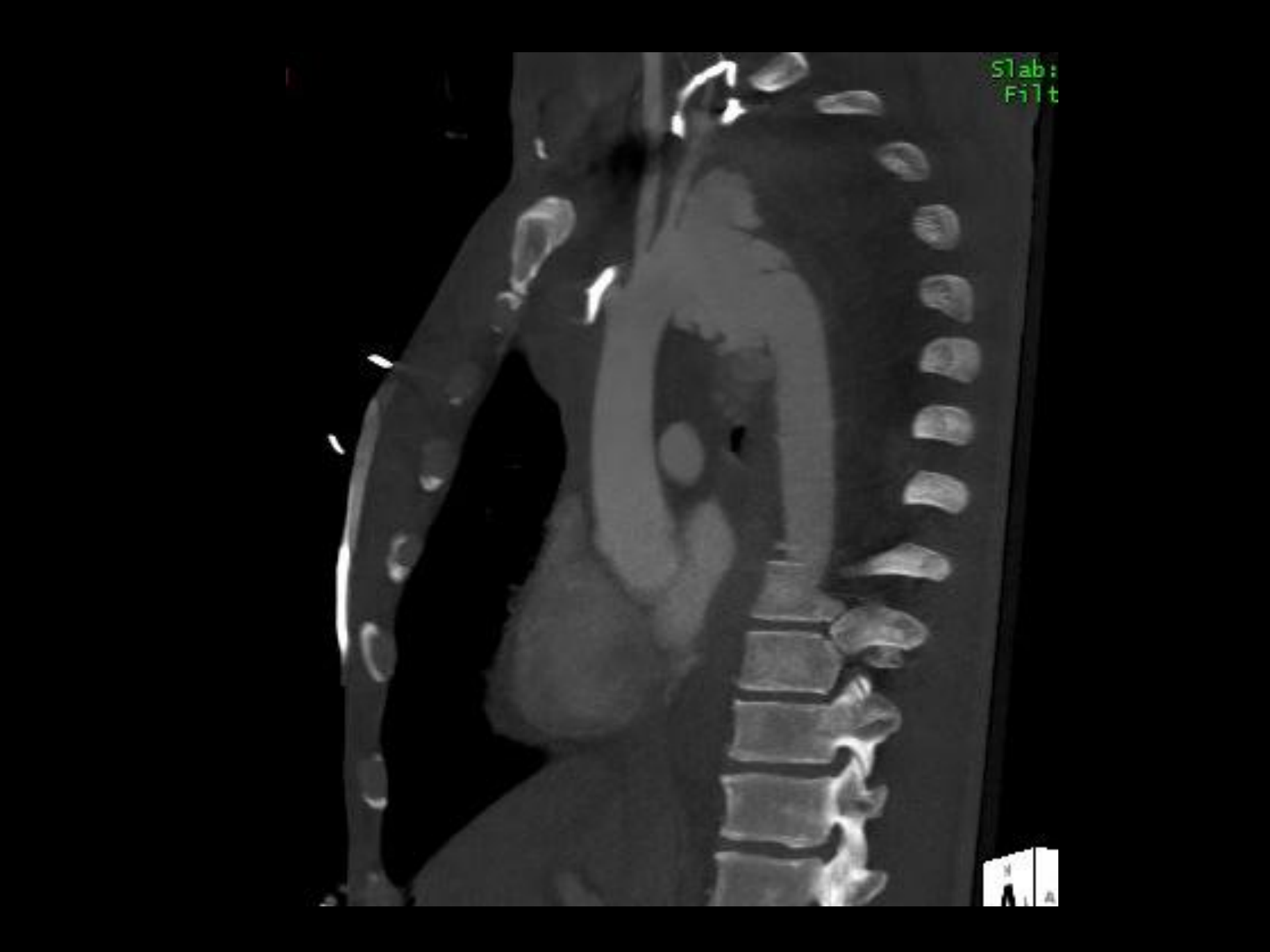
Type B Aortic Dissection MR

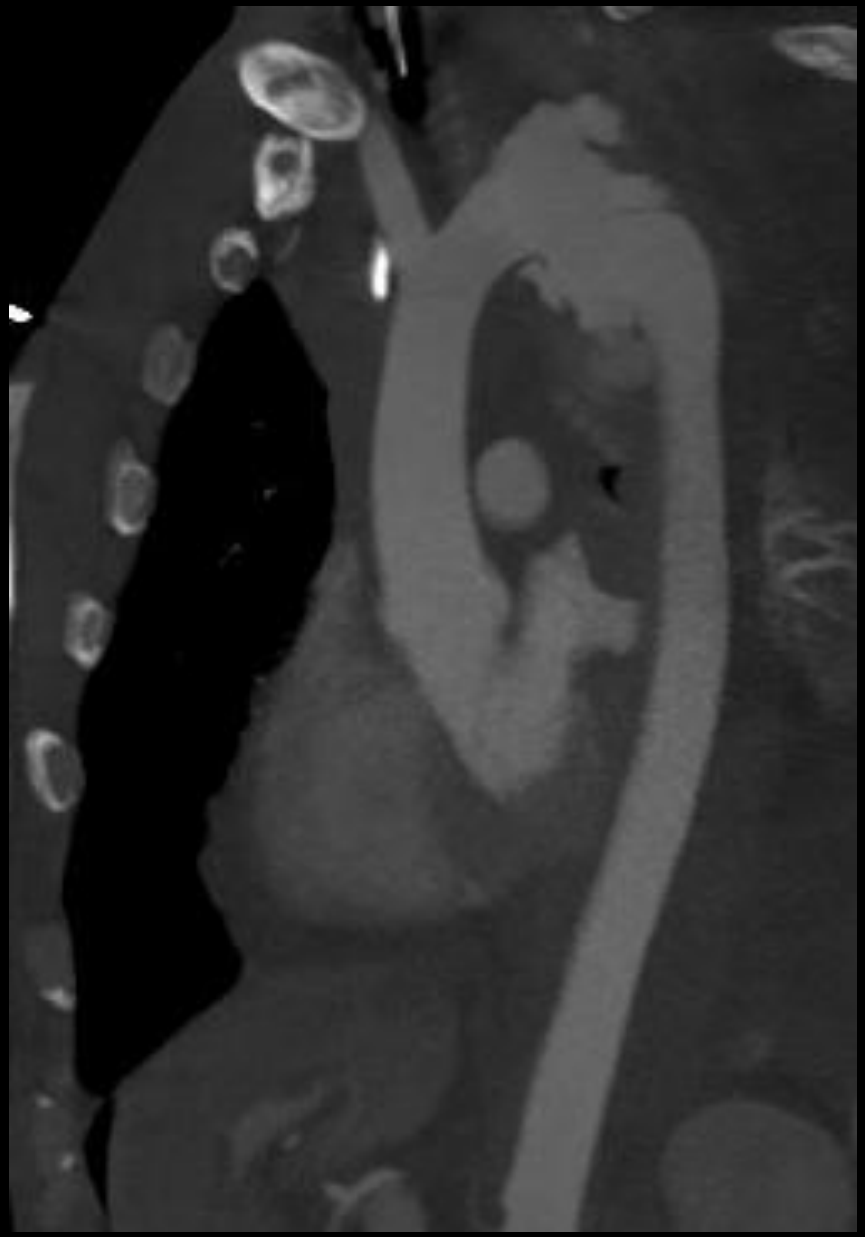






Traumatic Aortic Rupture


Slab:
Filt

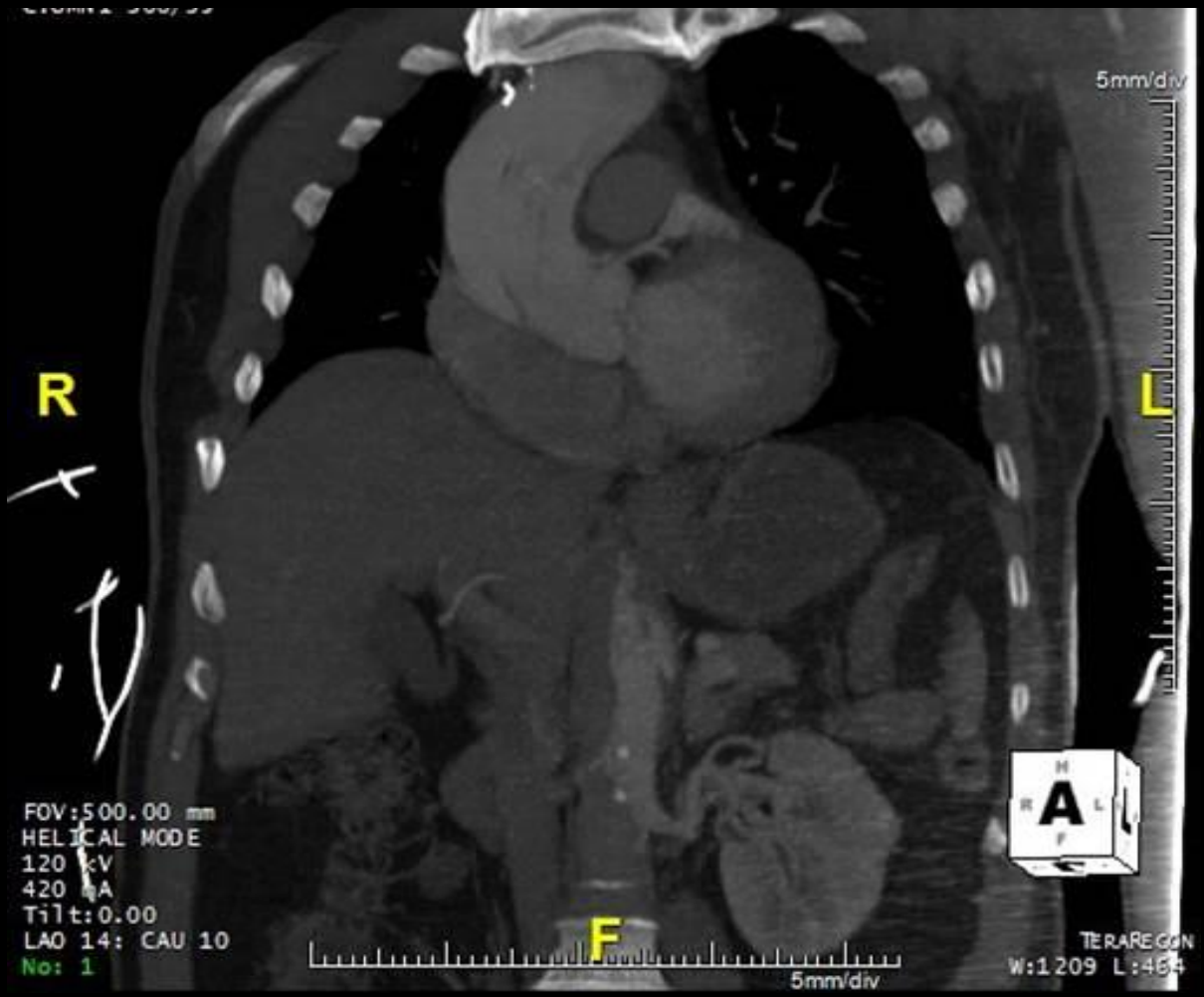


A
P
F
120 kV
455 mA

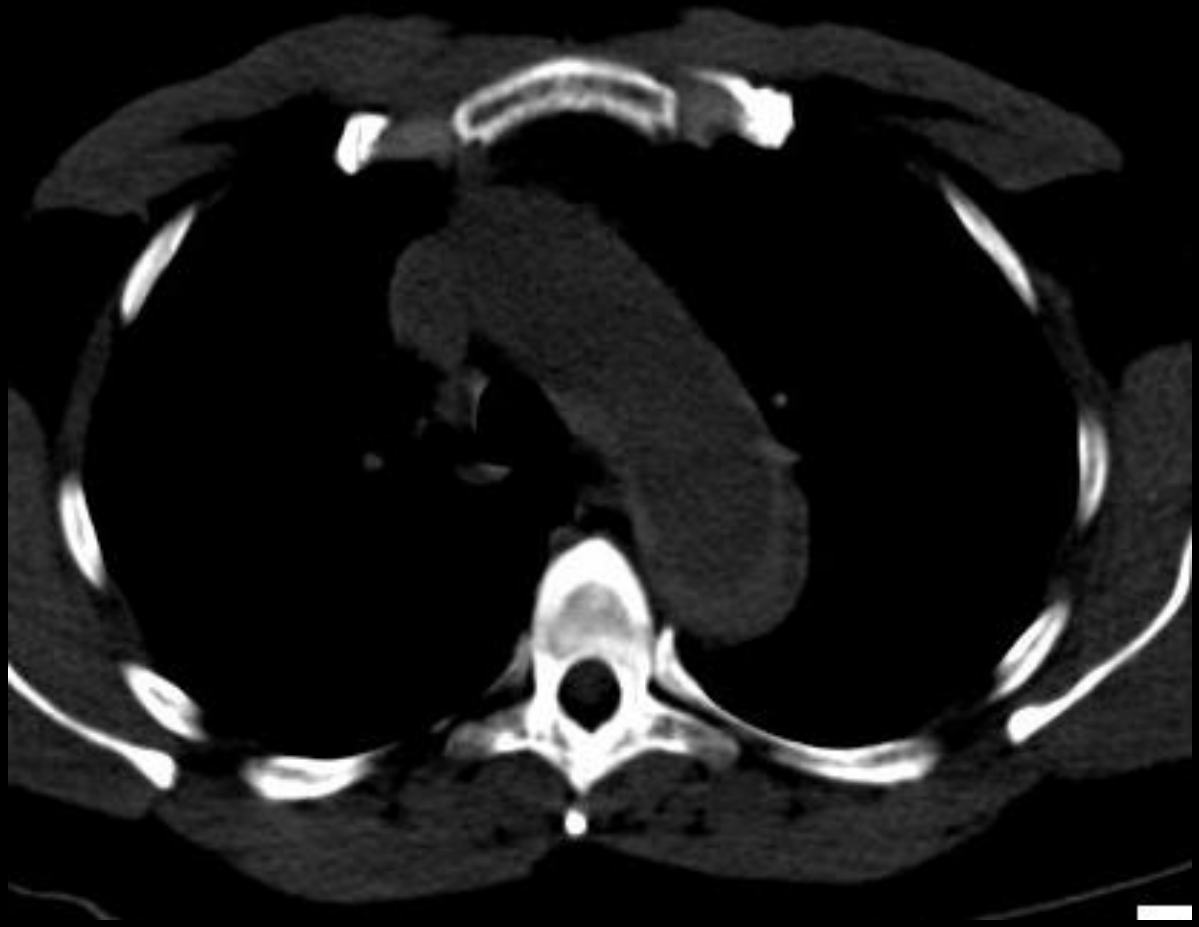
Feared Complications of type A dissection

- Extension to coronary arteries: Acute MI
- Extension to carotids: Stroke
- Pericardial rupture: Tamponade
- Aortic valve rupture with acute insufficiency.

Type A dissection extending into the LAD



Intramural Hematoma



Clinical Scenario 1

- 56 year old man presents to the ED with acute onset ripping chest and abdominal pain. On physical exam BP of 80/50.
- What is the appropriate imaging modality?
  1. CT chest without IV contrast
  2. CTA chest with IV contrast
  3. MRA without contrast
  4. MRA with contrast

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Clinical Scenario 2

- 29 year old woman with history of Marfan syndrome, here for follow-up of thoracic aortic aneurysm .
- What is the appropriate initial imaging modality?
  1. CT chest without IV contrast
  2. CTA chest with IV contrast
  3. MRI/MRA

Clinical Scenario 2

- 29 year old woman with history of Marfan syndrome, here for follow-up of thoracic aortic aneurysm .
- What is the appropriate initial imaging modality?
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  3. MRI/MRA

Clinical Scenario 3

- 49 year old man with history of bicuspid aortic valve and ESRD who presents with subacute chest pain.
- What is the appropriate initial imaging modality?
  1. CT chest without IV contrast
  2. CTA chest with IV contrast
  3. MRA with gadolinium
  4. MRA without contrast

Clinical Scenario 3

- 49 year old man with history of bicuspid aortic valve and ESRD who presents with subacute chest pain.
- What is the appropriate initial imaging modality?
  1. CT chest without IV contrast
  2. CTA chest with IV contrast
  3. MRA with gadolinium
  4. MRA without contrast

Thank You