Abdominal aorta

**Anatomy of Aorta**

- Largest artery in the human body
- Originates at the LV
- Includes:
  - Aortic arch
  - Thoracic aorta
  - Abdominal aorta

**Anatomy (continued...)**

Normal abdominal aorta and key branches of the abdominal aorta identified with bedside US:

- Celiac trunk
  - Splenic artery
  - Left gastric artery (not seen)
- Common hepatic artery
- Superior mesenteric artery (SMA)
- Renal arteries

**Function of the aorta**

- Function:
  - Important role in hemodynamic homeostasis
  - Receives large volumes of blood following each ventricular contraction during systole
  - The walls expand in response and energy is stored in the vessel wall

**Image acquisition**

Visualization of abdominal aorta: transabdominal approach

- 3 segments:
  - Proximal abdominal aorta
  - Middle segment
  - Distal abdominal aorta

**Image acquisition (continue...)**

- Transducer: 3.5-5 MHz
- Phased array
- Curvilinear
- Plans:
  - Short axis
  - Long axis
- Scan below the costal margin, moving from the xiphoid process to the umbilicus

**Marker points to patient's R**
Image acquisition
Should be able to see:
- Spine shadow
- Aorta (on patient’s left)
- IVC (on patient’s right)

Image acquisition: bowel gas

Proximal Aorta
- Circular structure • short axis
- Anechoic lumen
- Posterior to the left lobe of the liver

Between diaphragm and celiac axis
Bowel gas artifact often complicates imaging.
Proximal Aorta (short axis)
- Celiac axis + bifurcation into 2 anterior branches
- Splenic a. and common hepatic a.
- Left gastric a. not seen
- Splenic a and common hepatic a resemble the wings of a seagull → Seagull sign

Middle Aorta (short axis)
- Between celiac axis and SMA
- SMA
- Anterior to and above aorta
- Distinct hyperechoic circumscribed ring → Mantle clock sign
- As we go distally, left renal vein (going into IVC) becomes visible between aorta and SMA

Distal Aorta (long axis)
Between SMA and common iliac bifurcation
Often difficult part to see due to bowel gas again

US Task Force Recommendations for Screening for AAA
- One-time screening for AAA with US in men age 65-75 who have ever smoked
- Selectively offer screen to men age 65-75 who never smoked
- USPSTF recommends against screen of women age 65-75 who have never smoked and had no FHx of AAA
- Insufficient evidence to assess benefits and harms of screening of AAA with US in women age 65-75 who had ever smoked or have FHx of AAA

Diagnostic Evaluation Recommendations to R/O Aortic Aneurysm
- 1. Palpable or pulsatile abdominal mass or abdominal bruit
- 2. Unexplained lower back pain, flank pain, or abdominal pain.
- 3. Follow-up of a previously demonstrated abdominal aortic aneurysm.
- 4. Follow-up of patients with an abdominal aortic and/or iliac endoluminal stent graft.

Risk factors for AAA
- Older age
- First-degree relative with an AAA
- CAD or CVA
- Hypertension
- Diabetes mellitus
- Hyperlipidemia
- History of other vascular aneurysms
Risk factors for rupture AAA

- Female gender
- Older age
- HTN
- Smoking

Pathologic conditions of abdominal aorta

- Abdominal aortic aneurysm
- Mural thrombus
- Aneurysmal leakage
- Aortic dissection

Abdominal Aortic Aneurysm

AAA saccular type

Measuring the diameter

- Greater than 3 cm indicates aneurysm
- Incorrect Measurement
- Correct Measurement

Specification of the exam

- Measurements of the proximal, mid, and distal aorta
- Long axis view to measure the AP dimension
- Transverse view to measure the width
- At the greatest diameter of the aorta from outer edge to outer edge \(^{9,10}\)
If an aneurysm is present, the maximal size and location of the aneurysm should be documented and recorded. Color Doppler and spectral Doppler imaging with waveform analysis of the aorta may be helpful to demonstrate patency or the presence of intraluminal thrombus. 9,12,13 Measure from intimal wall to intimal wall.

**Aneurysm dissection**

**Thrombus inside aneurism**

### Pearls and pitfalls

1. **Aorta mistaken for adjacent structures**
   - vertebral bodies
   - lymph nodes
   - IVC
   - aorta is pulsatile

2. **Underestimation of diameter**
   - always measure diameter in axial plane, when cross section appears as a 'pale'.