

Aorta Point-of-Care Ultrasound

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Learning Objectives

- Discuss indications for abdominal aorta imaging
- Demonstrate scanning technique in transverse and longitudinal axis
- Estimate the size of aorta
- Recognize normal vs. abnormal findings

Abdominal Aortic Aneurysm

- Normal abdominal aorta diameter: <2 cm
- AAA: Segmental, full thickness dilation of abdominal aorta **>3 cm**
- Most common location: Infrarenal
- Fusiform >> Saccular



Ozawa et al. JAHA 2024

Abdominal Aortic Aneurysm Rupture Risks

- Modifiable: Smoking, CHD, HTN, obesity
- Non-modifiable: Older age, male
- Difficult to diagnose
- High mortality with rupture
- Rupture risk increases with size

Table 1. Annual Risk of Rupture of Abdominal Aortic Aneurysms.*

Aneurysm Size	1-yr Incidence of Rupture %
<5.5 cm	≤1.0
5.5–5.9 cm	9.4
6.0–6.9 cm	10.2
≥7.0 cm	32.5

* Data are from Powell et al.,³³ Lederle et al.,³⁴ and Lederle et al.³⁵ The overwhelming majority of study participants were men.

N Engl J Med. 2014 Nov 27; 371(22) 2101-2108

Who Should Be Screened for AAA (USPSTF)?

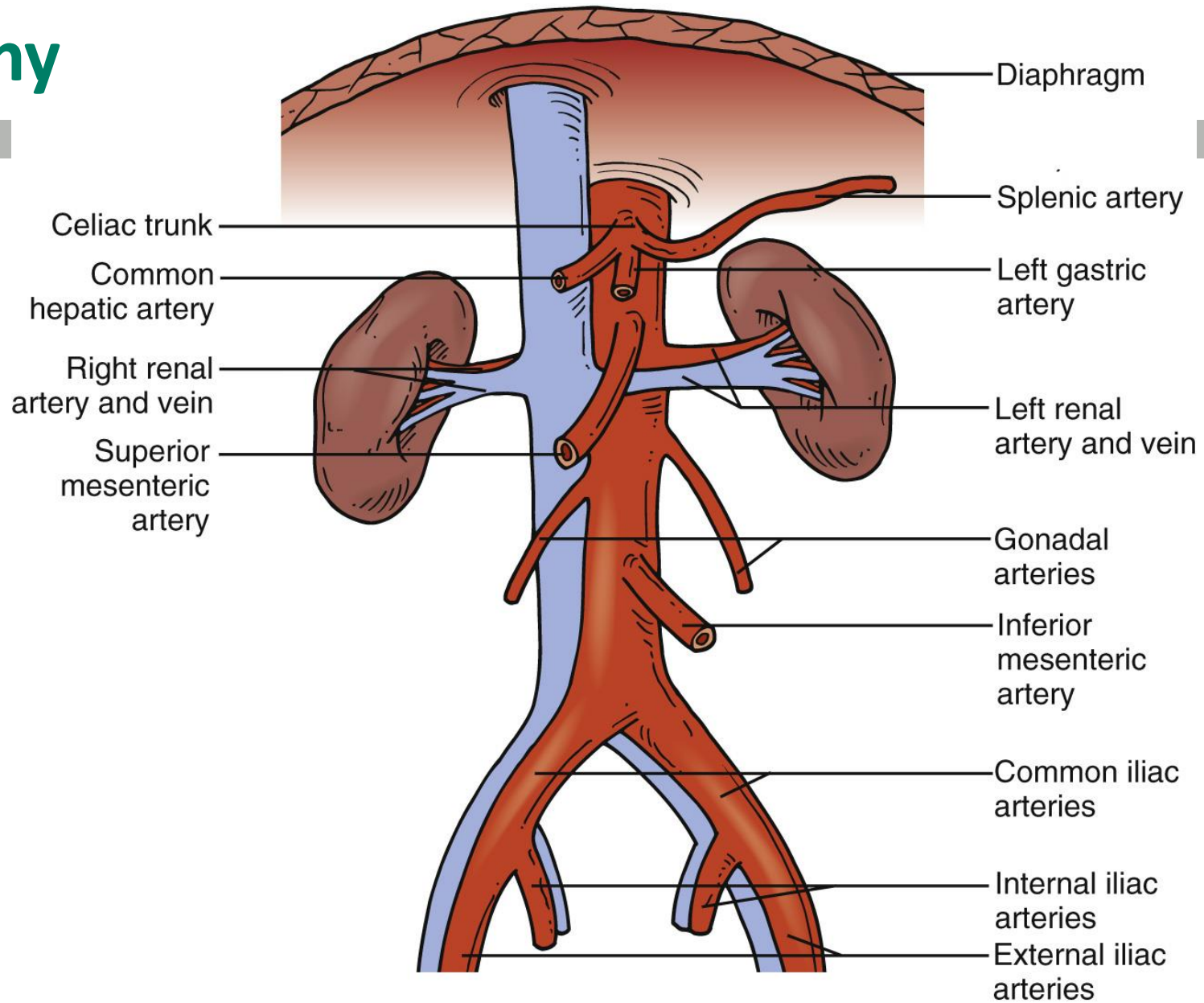
<p>The USPSTF recommends 1-time screening for abdominal aortic aneurysm (AAA) with ultrasonography in men aged 65 to 75 years who have ever smoked.</p>	<p>B recommendation</p>
<p>The USPSTF recommends that clinicians selectively offer screening for AAA with ultrasonography in men aged 65 to 75 years who have never smoked rather than routinely screening all men in this group. Evidence indicates that the net benefit of screening all men in this group is small. In determining whether this service is appropriate in individual cases, patients and clinicians should consider the balance of benefits and harms on the basis of evidence relevant to the patient's medical history, family history, other risk factors, and personal values.</p>	<p>C recommendation</p>
<p>The USPSTF recommends against routine screening for AAA with ultrasonography in women who have never smoked and have no family history of AAA.</p>	<p>D recommendation</p>
<p>The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for AAA with ultrasonography in women aged 65 to 75 years who have ever smoked or have a family history of AAA.</p>	<p>I statement</p>

JAMA. 2019 Dec 10; 322(22):2211-2218

Abdominal Aorta POCUS Evaluation

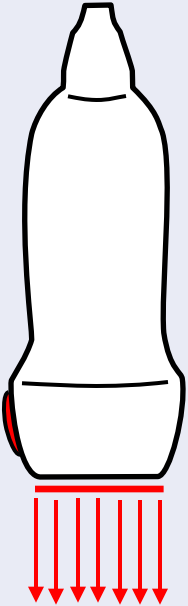
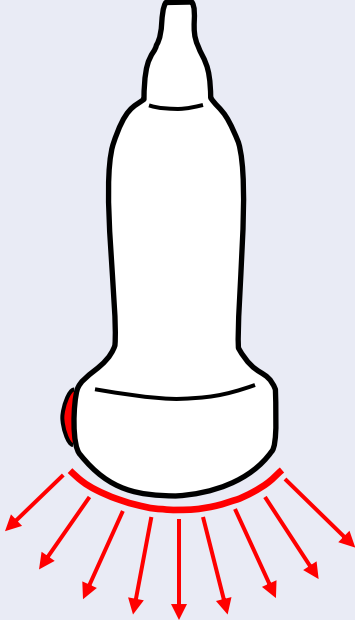
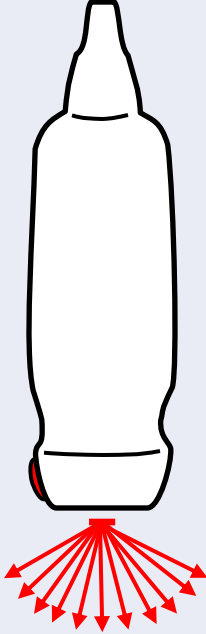
- Ultrasound is the preferred modality for abdominal aorta
- Image the aorta in both transverse and longitudinal planes
- Off-axis imaging can overestimate (transverse) or underestimate (longitudinal) the aortic diameter
- Ultrasound may underestimate the aortic diameter by ~2 mm vs CT

Anatomy

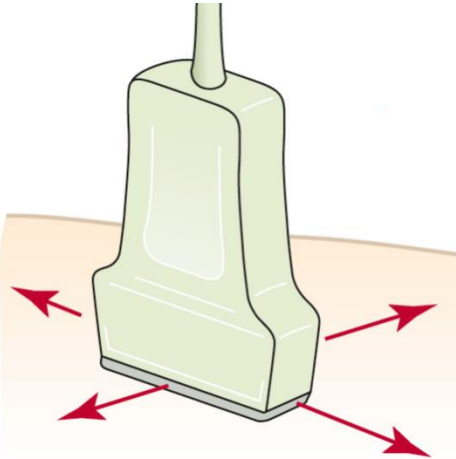


Point of Care Ultrasound 2nd edition. N. Soni

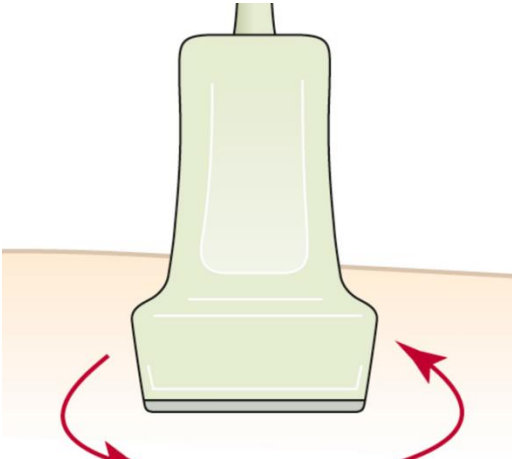
Transducer Selection

Higher Frequency	Lower Frequency	
Linear	Curvilinear (Convex)	Phased-Array
		
Up to 6 cm	Greater than 6 cm	

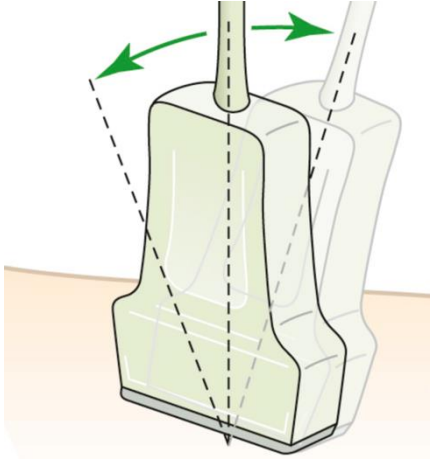
Transducer Manipulation



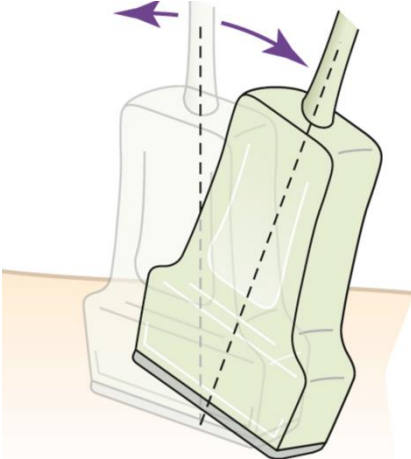
Sliding



Rotating



Fanning/Tilting



Rocking

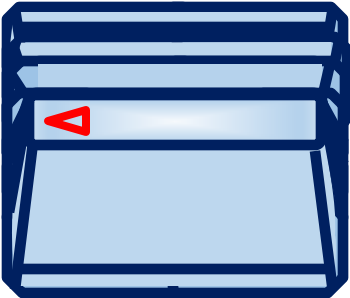
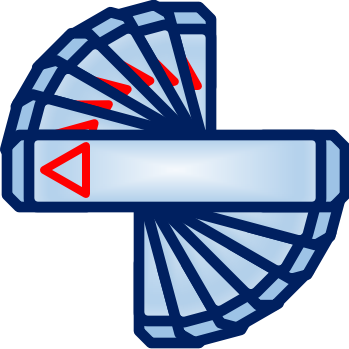
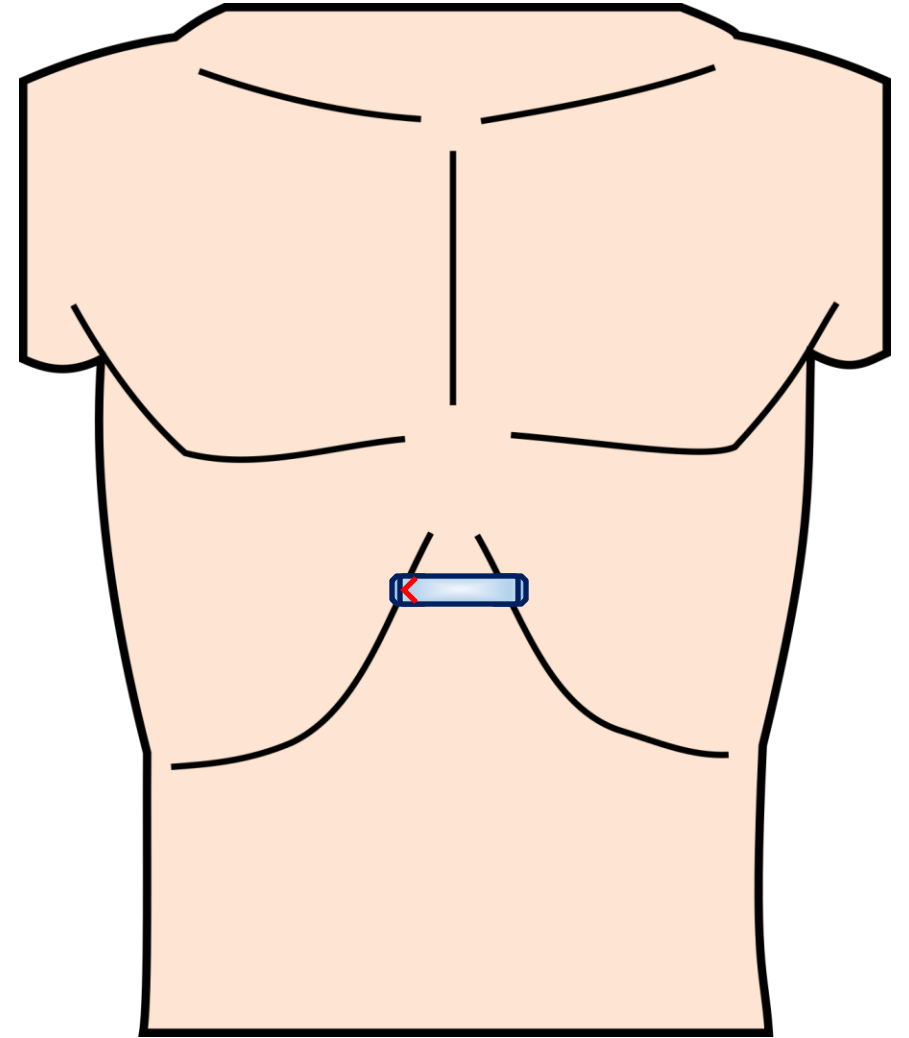
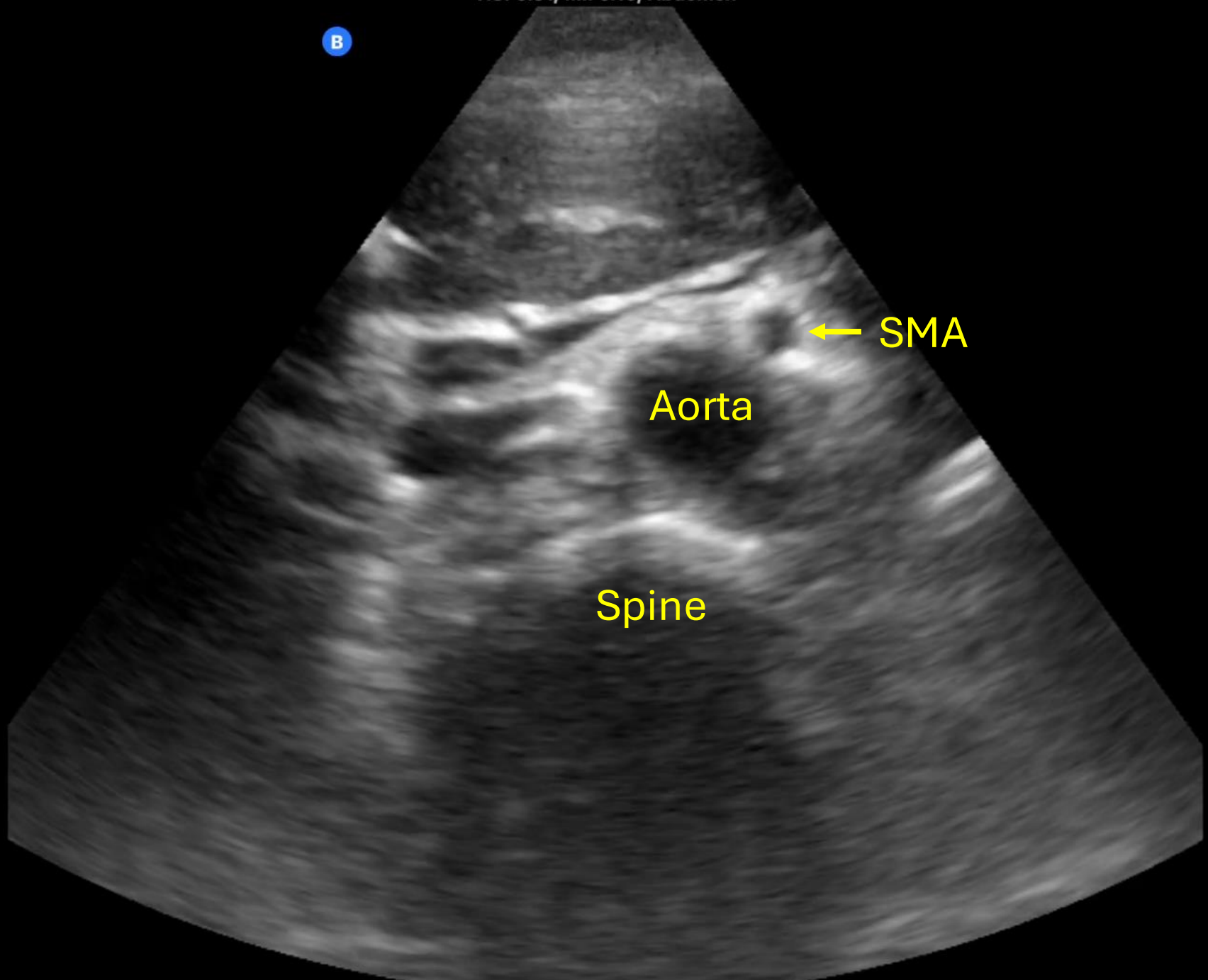


Image Acquisition: Transverse

- Place the transducer just below the xiphoid
- Marker to the patient's right
- Slide inferiorly in transverse view until the aorta bifurcates into the common iliac arteries
- Measure the diameter from outer wall to outer wall



B



1
2
3
4
5
6
7
8
9
10
11
12

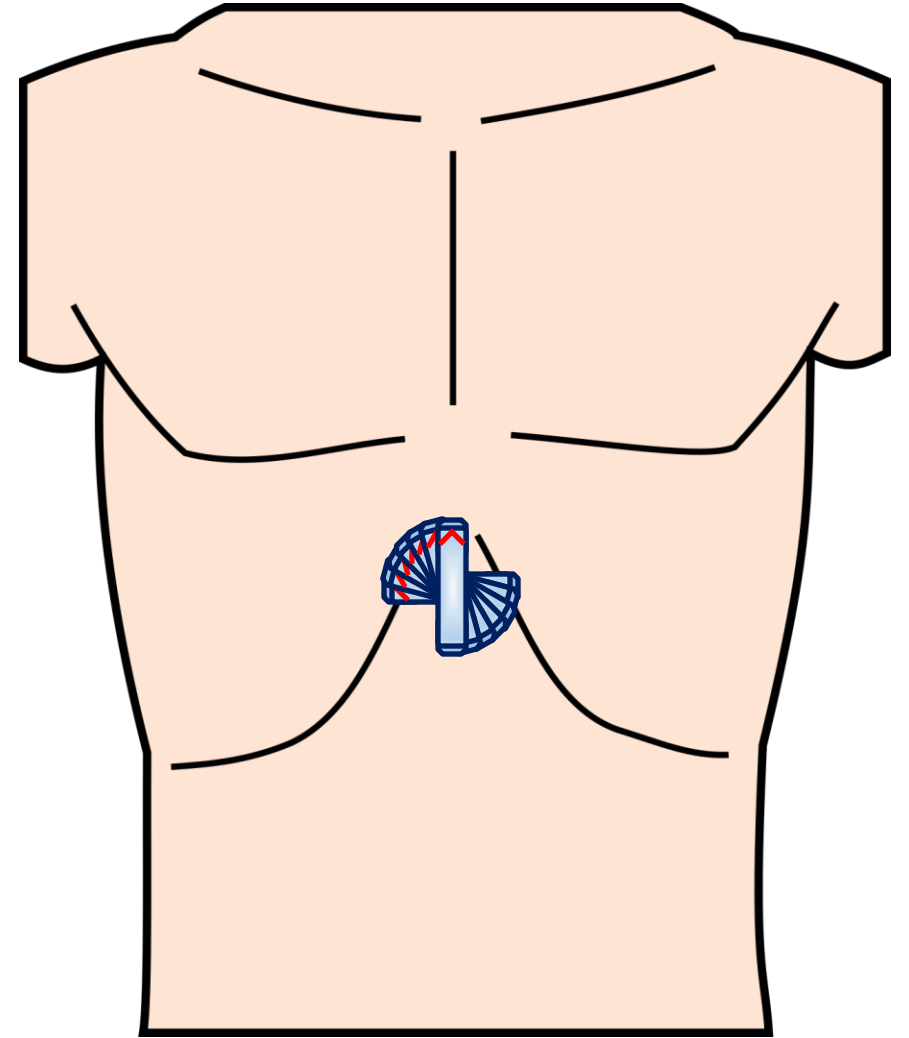
← SMA

Aorta

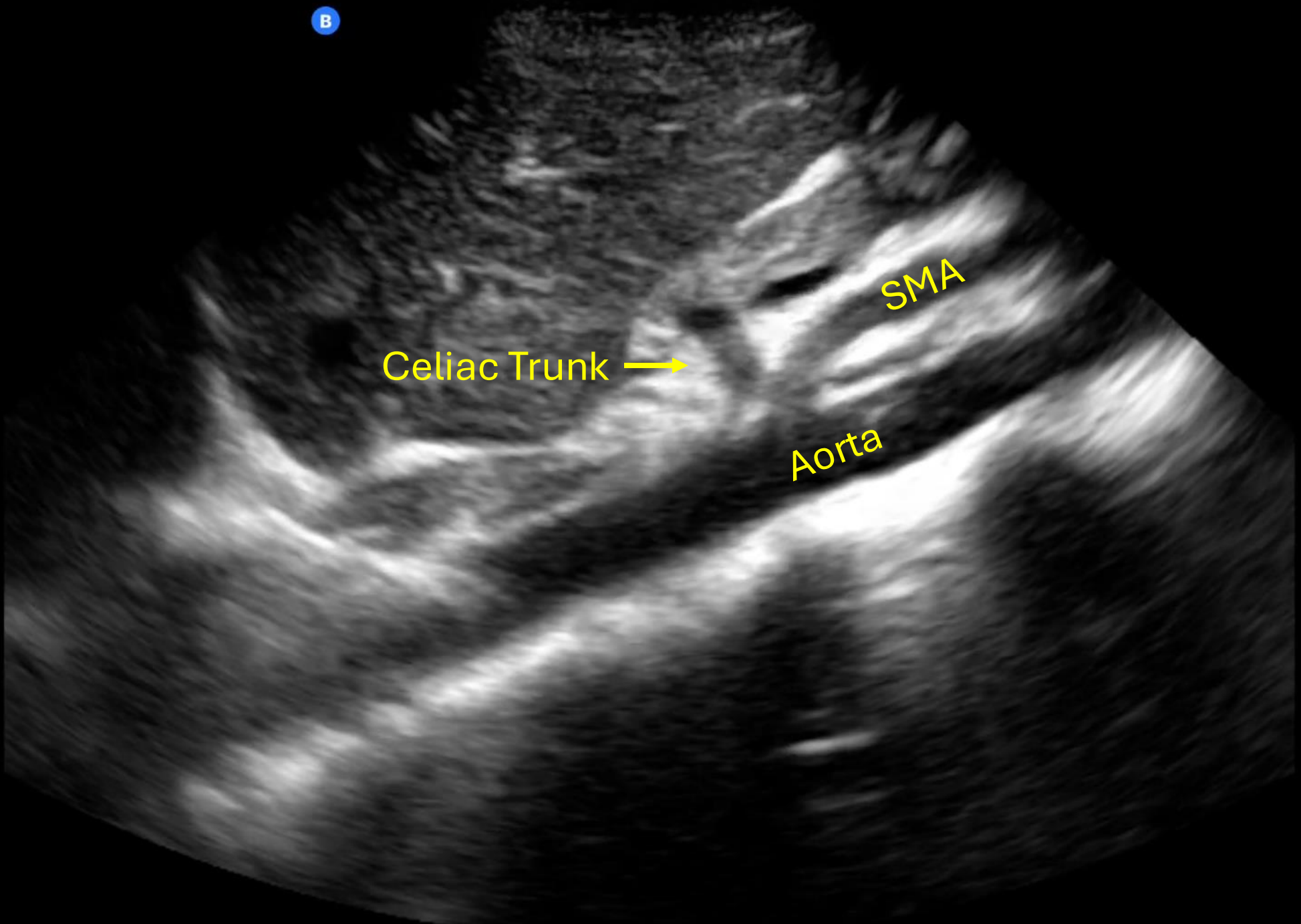
Spine

Image Acquisition: Longitudinal

- Return the transducer just below the xiphoid
- Rotate 90° clockwise (marker to the patient's head)
- Evaluate the aorta longitudinally



B



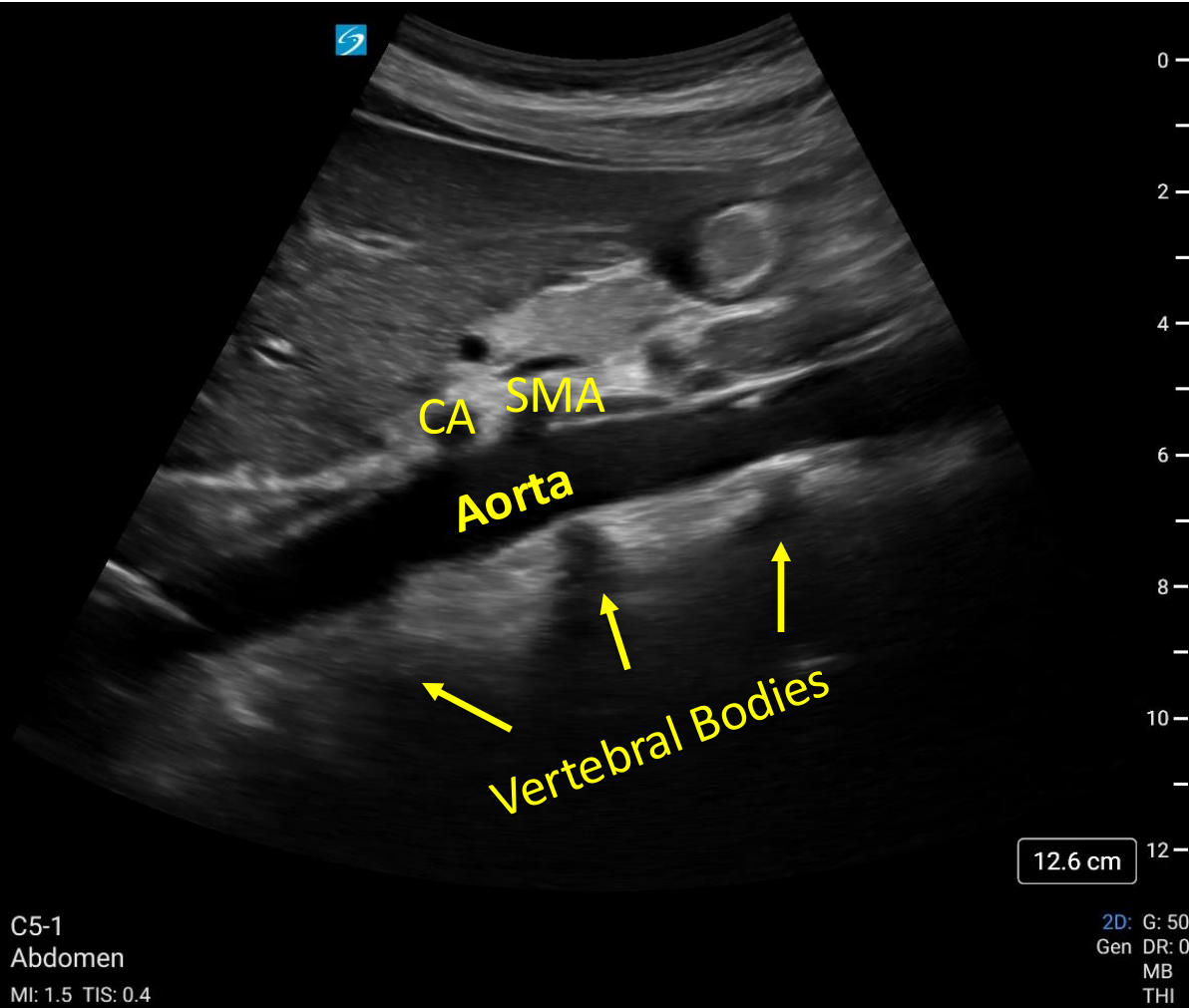
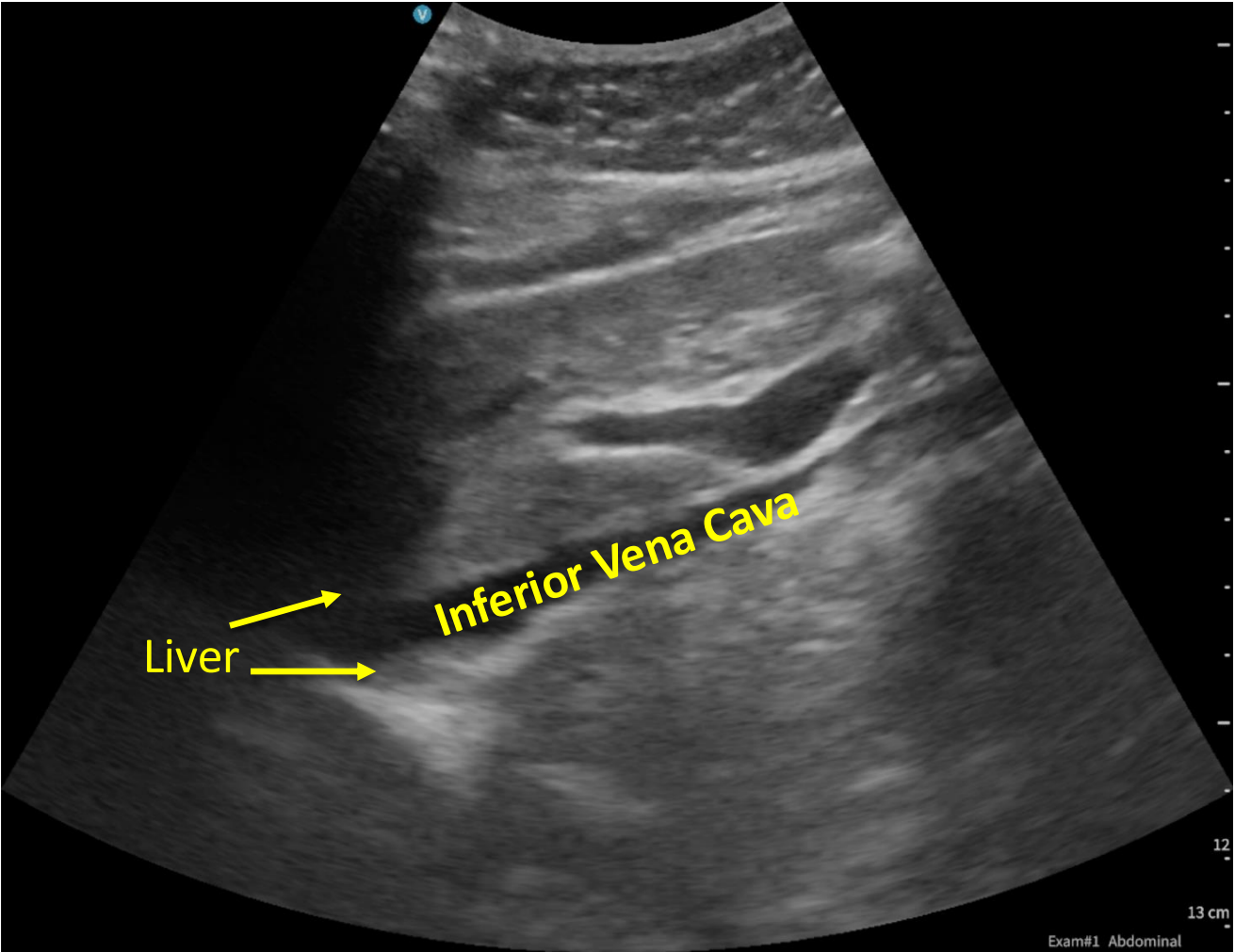
Celiac Trunk →

SMA

Aorta



Aorta vs. Inferior Vena Cava

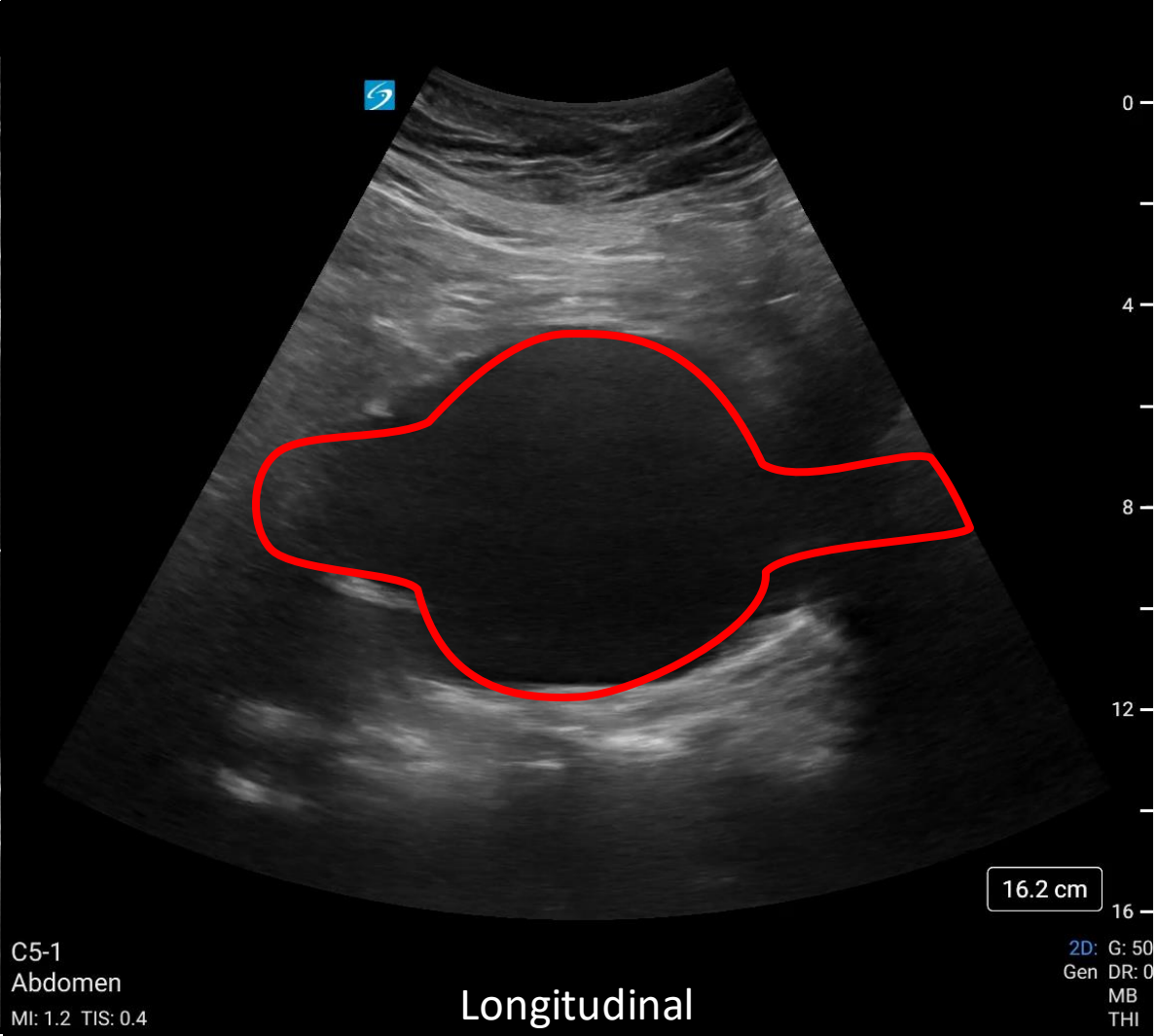
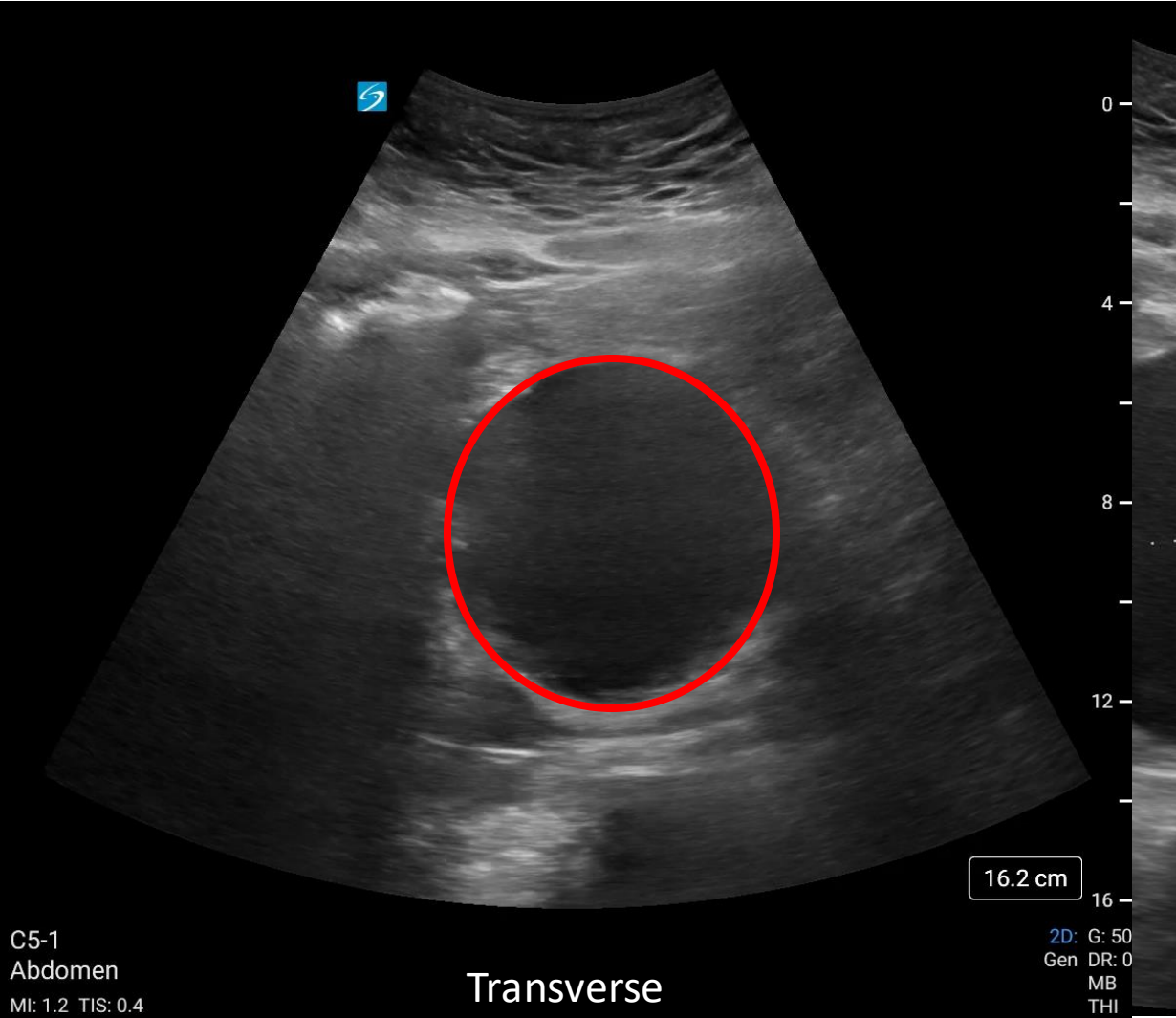




12

13 cm

Abdominal Aortic Aneurysm



Take Home Points

- Scan the abdominal aorta in both transverse and longitudinal planes
- Measure the aorta in transverse view, outer wall to outer wall
- An abdominal aorta diameter >3 cm defines AAA
- Differentiate aorta from inferior vena cava