

Aorta and IVC Ultrasound

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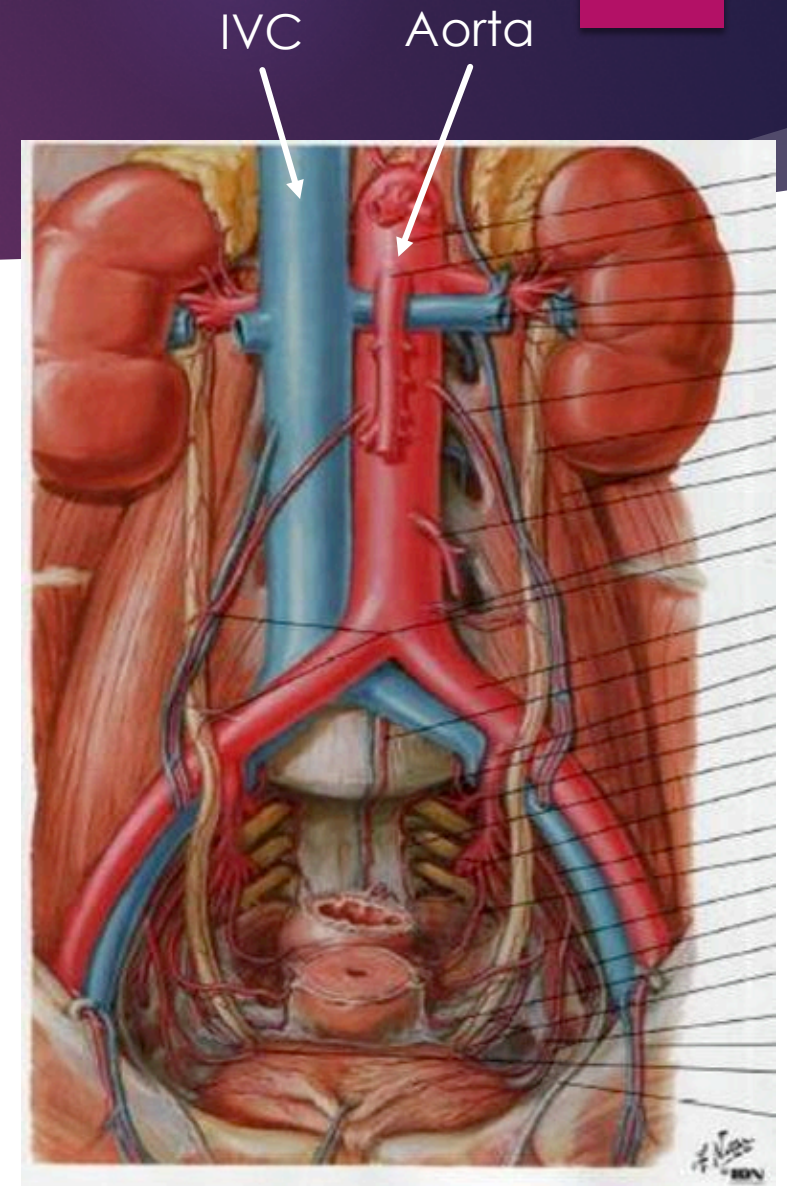
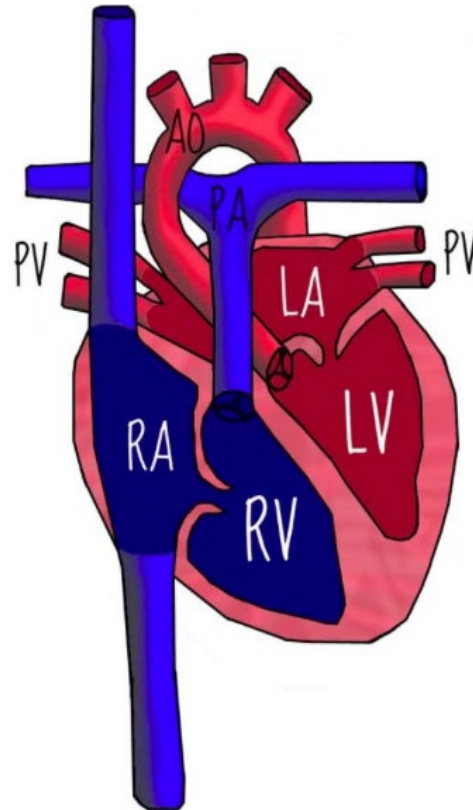
DEPARTMENT OF EMERGENCY MEDICINE

Getting Started

- ▶ What anatomic structure is being scanned?
- ▶ Which probe should be used?
- ▶ Where should the probe be placed?
- ▶ Does depth need to be adjusted?
- ▶ Does gain need to be adjusted?

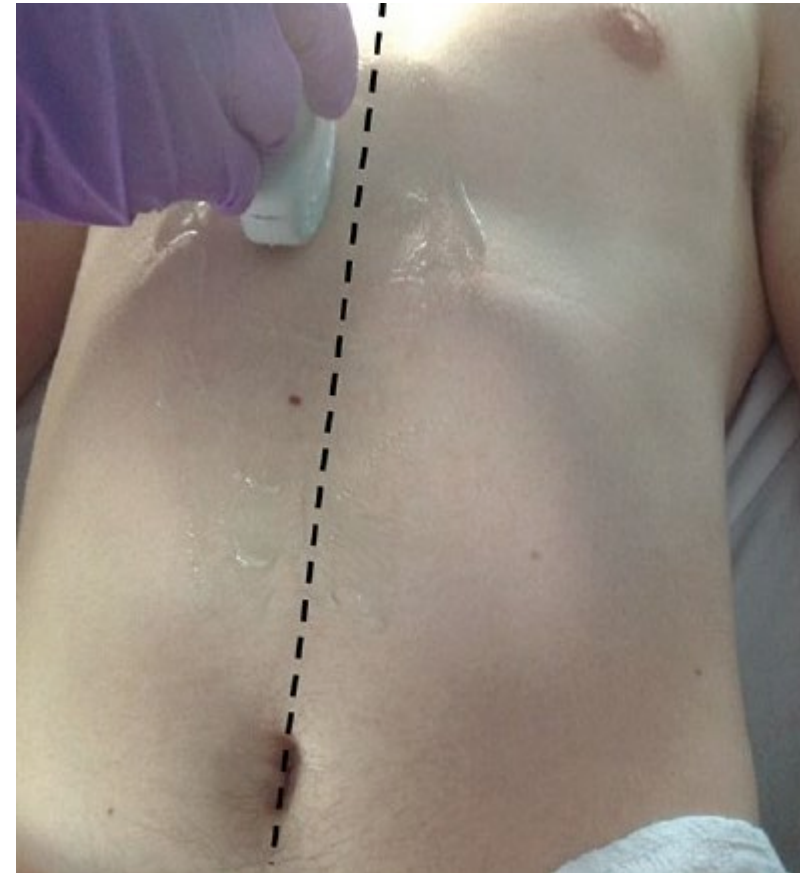
IVC Anatomy

- ▶ Runs in long axis to the body
- ▶ Sits to the right of the aorta
- ▶ Drains into the inferior aspect of the right atrium (RA)



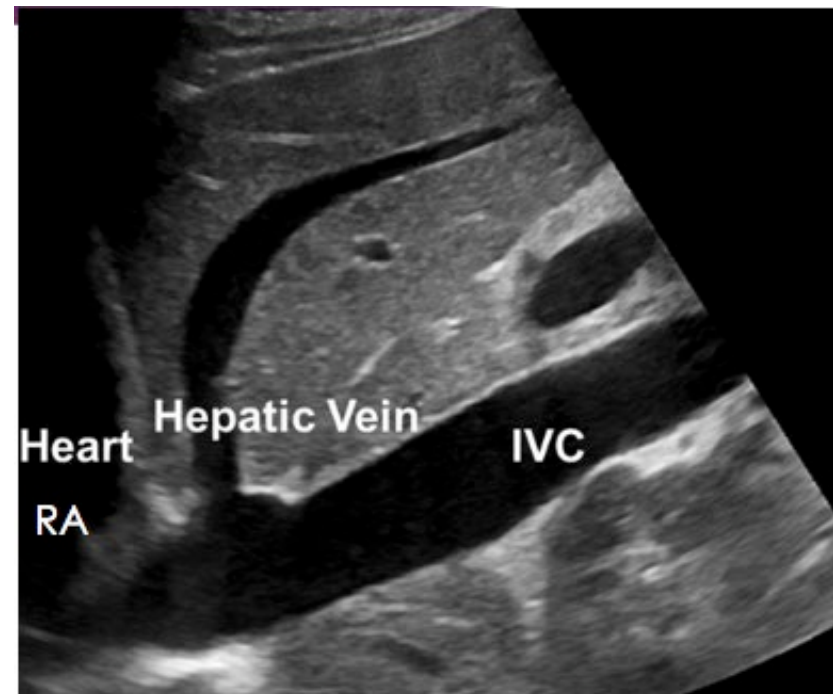
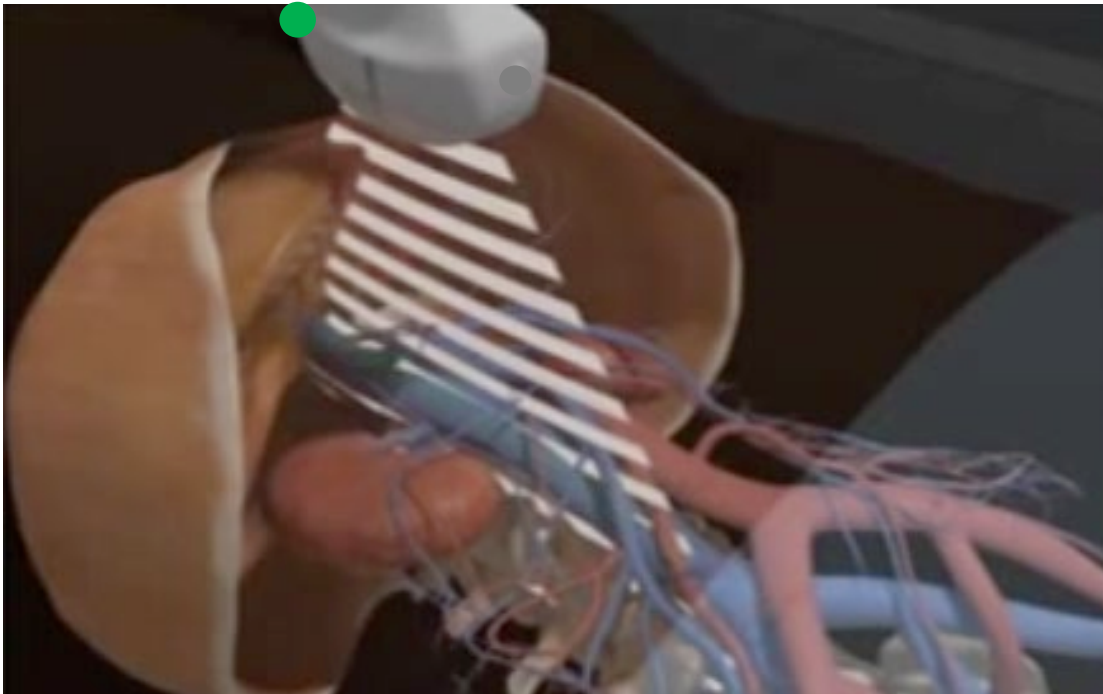
IVC Scanning Technique

- ▶ Probe selection: Curvilinear > Phased array
- ▶ Transducer in longitudinal plane
- ▶ Probe placed right of midline



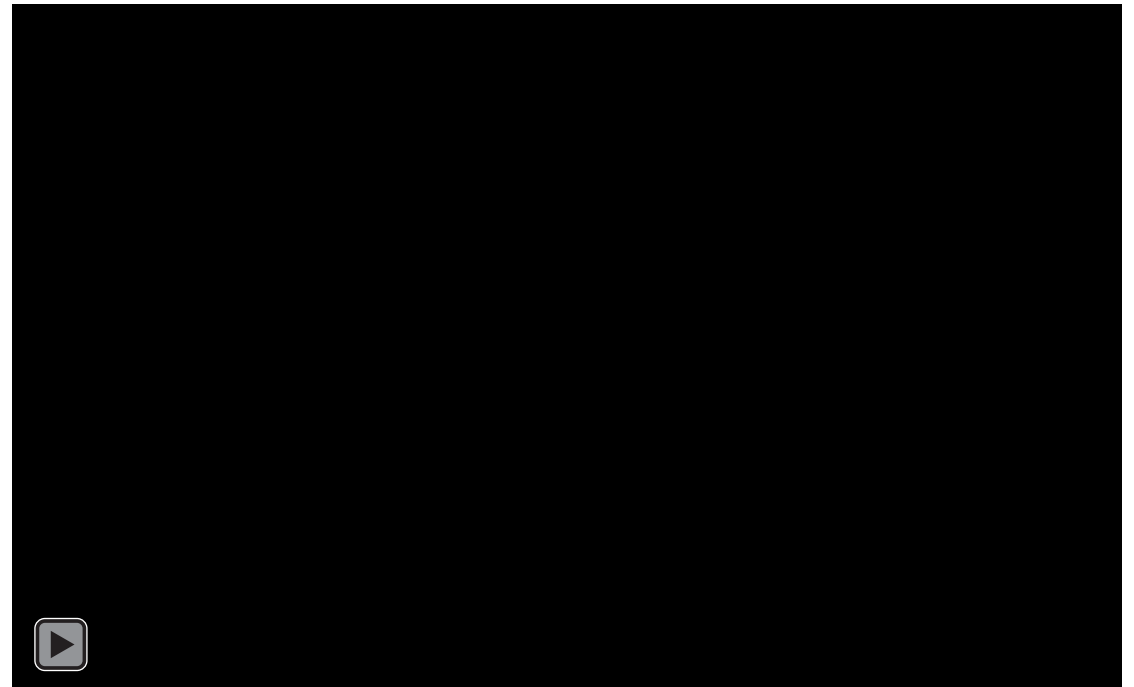
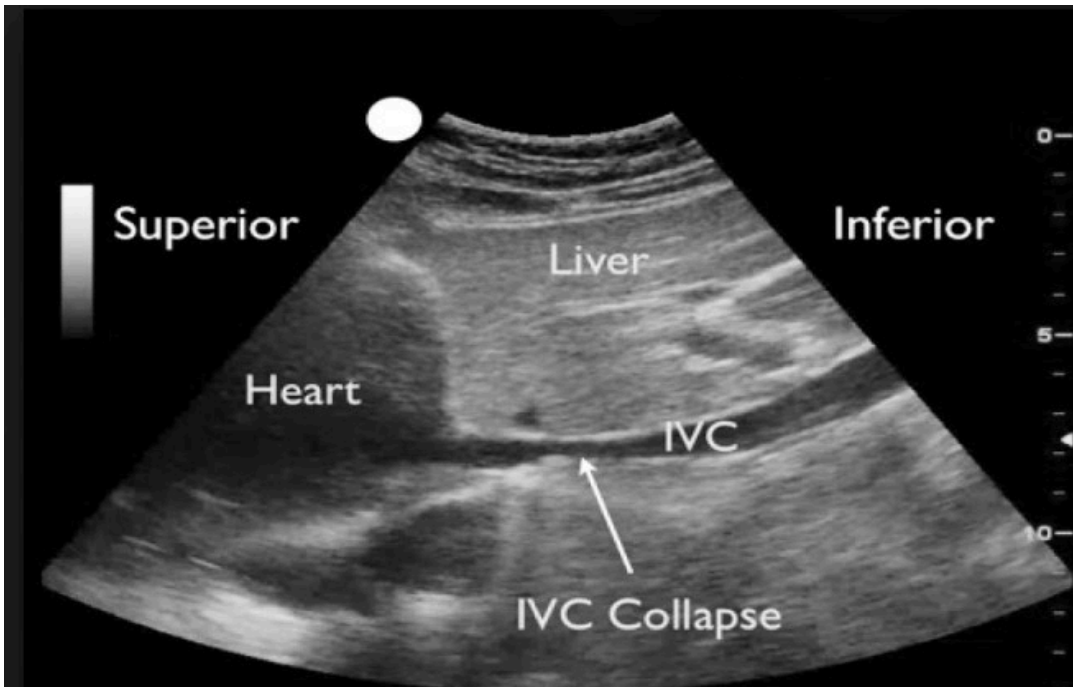
IVC Scanning Technique

- ▶ Slightly rock the probe up towards the head to capture a view of the IVC entering the right atrium



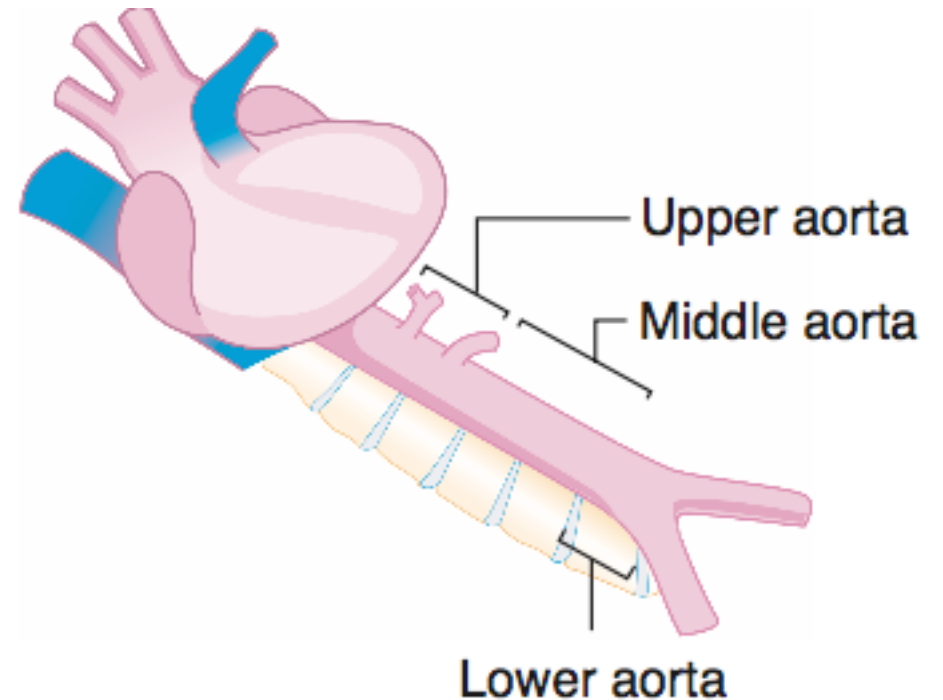
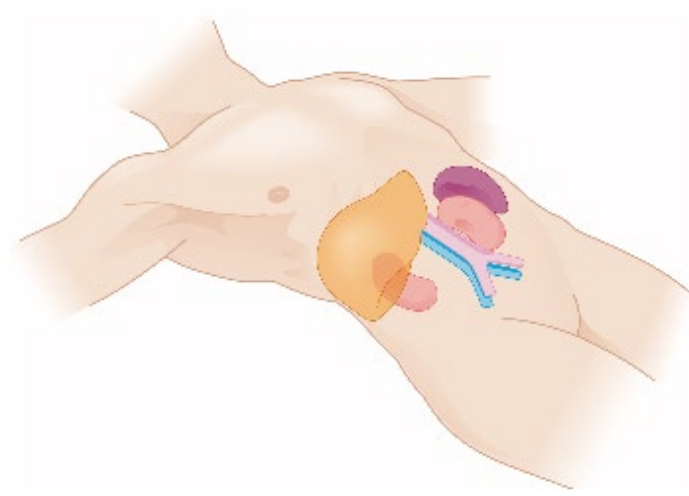
IVC US Findings

- ▶ Appears as anechoic tubular structure
- ▶ IVC will exhibit normal size variation during respiration
- ▶ This change in diameter can be exaggerated by having the patient “sniff”



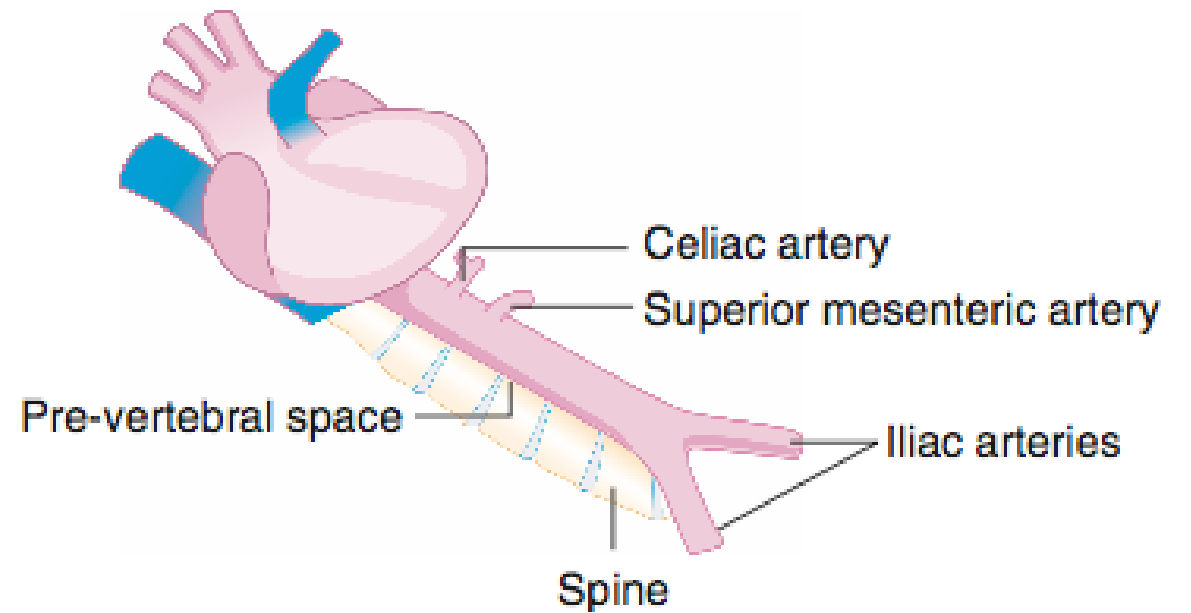
Aorta Anatomy

- ▶ Passes through the diaphragm at 12th thoracic vertebral body
- ▶ Bifurcates at 4th lumbar vertebral body
 - ▶ Anatomically at umbilicus
- ▶ Total length of abdominal aorta ~ 13 cm
- ▶ Normal diameter < 3 cm



Abdominal Aorta Branches

- ▶ Celiac Trunk (CT)
- ▶ Superior Mesenteric Artery (SMA)
- ▶ Bifurcates into common iliac arteries

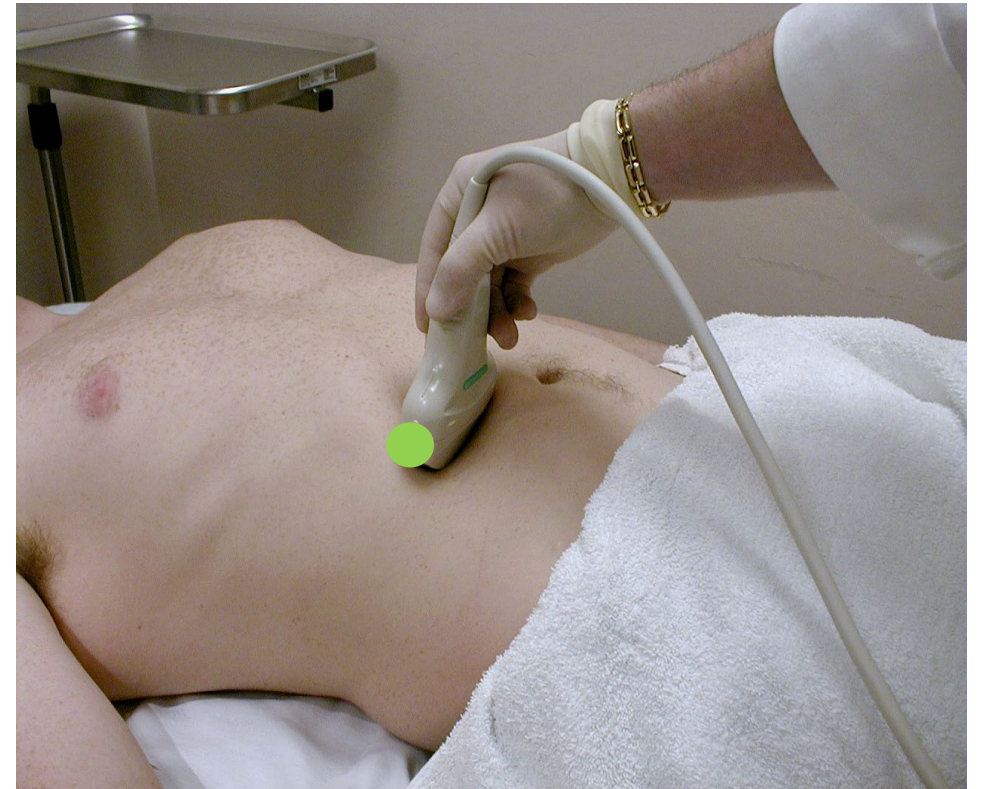


IVC vs Aorta

IVC	Aorta
On patient's right	On patient's left
Compressible	Non-compressible
Thinner walls	Thicker walls
Usually respiratory variation	No respiratory variation
Usually larger (may depend on hydration status)	Usually smaller (when normal)
Not pulsatile	Pulsatile

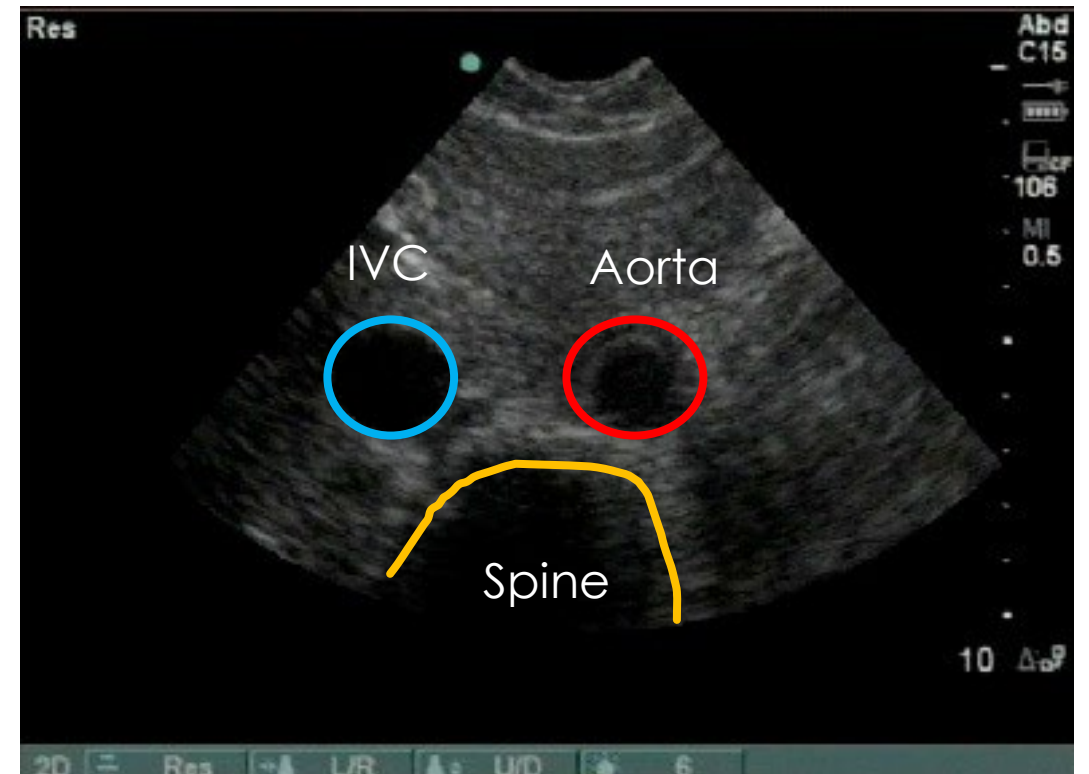
Scanning Technique

- ▶ Probe selection: Curvilinear > Phased array
- ▶ Probe marker towards patient's right: transverse orientation
- ▶ Place transducer below the xiphoid process
- ▶ Hold probe perpendicular to the skin
- ▶ Sweep the probe towards the umbilicus



Landmarks

- ▶ Identify vertebral body
 - ▶ Hyperechoic rim with posterior shadowing
- ▶ IVC and aorta will sit above the vertebrae
 - ▶ IVC to patient's right
 - ▶ Aorta to patient's left



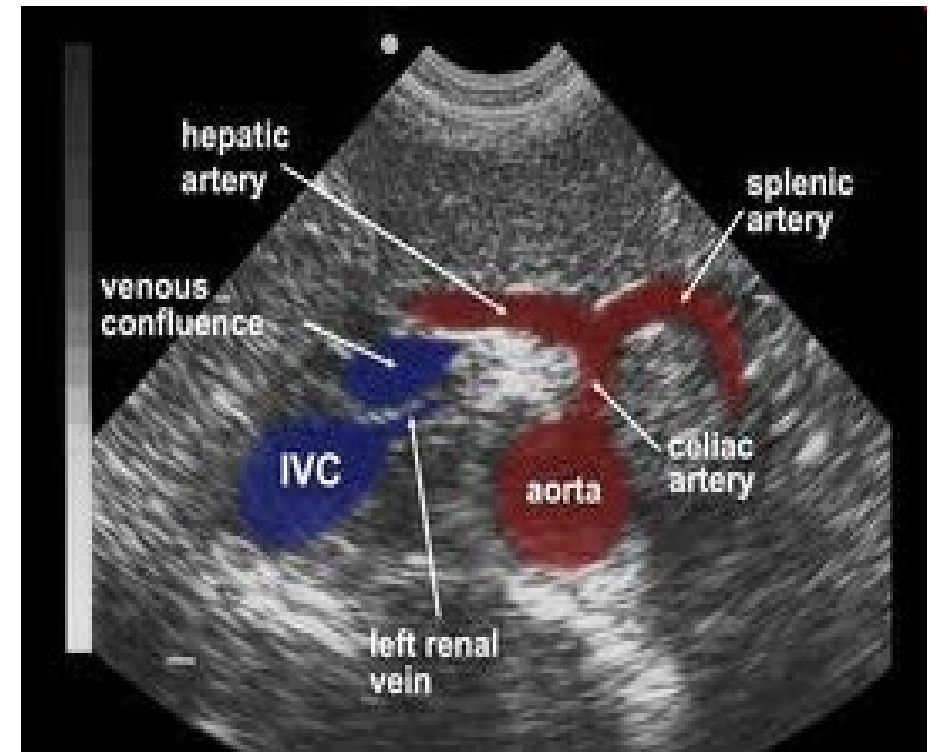
Proximal Aorta – Celiac Trunk

- ▶ “Seagull” sign



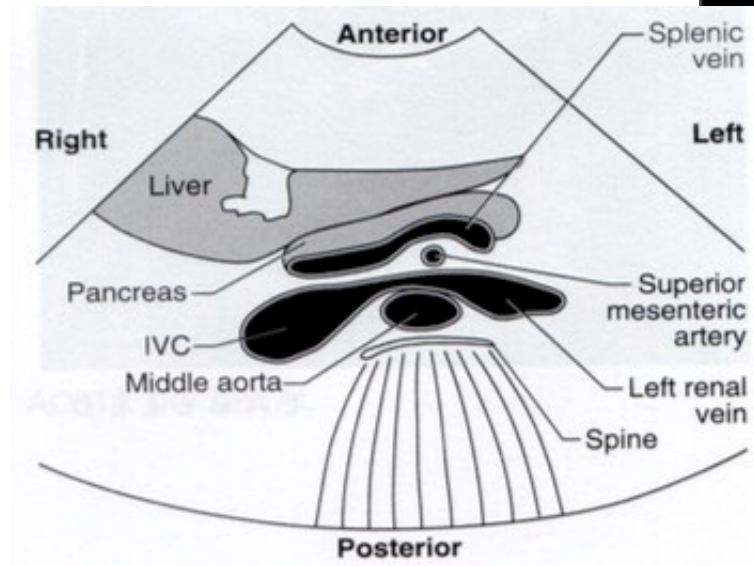
- ▶ Wings =

- ▶ Common hepatic artery
- ▶ Splenic artery
- ▶ Left gastric artery (usually not visible on US)

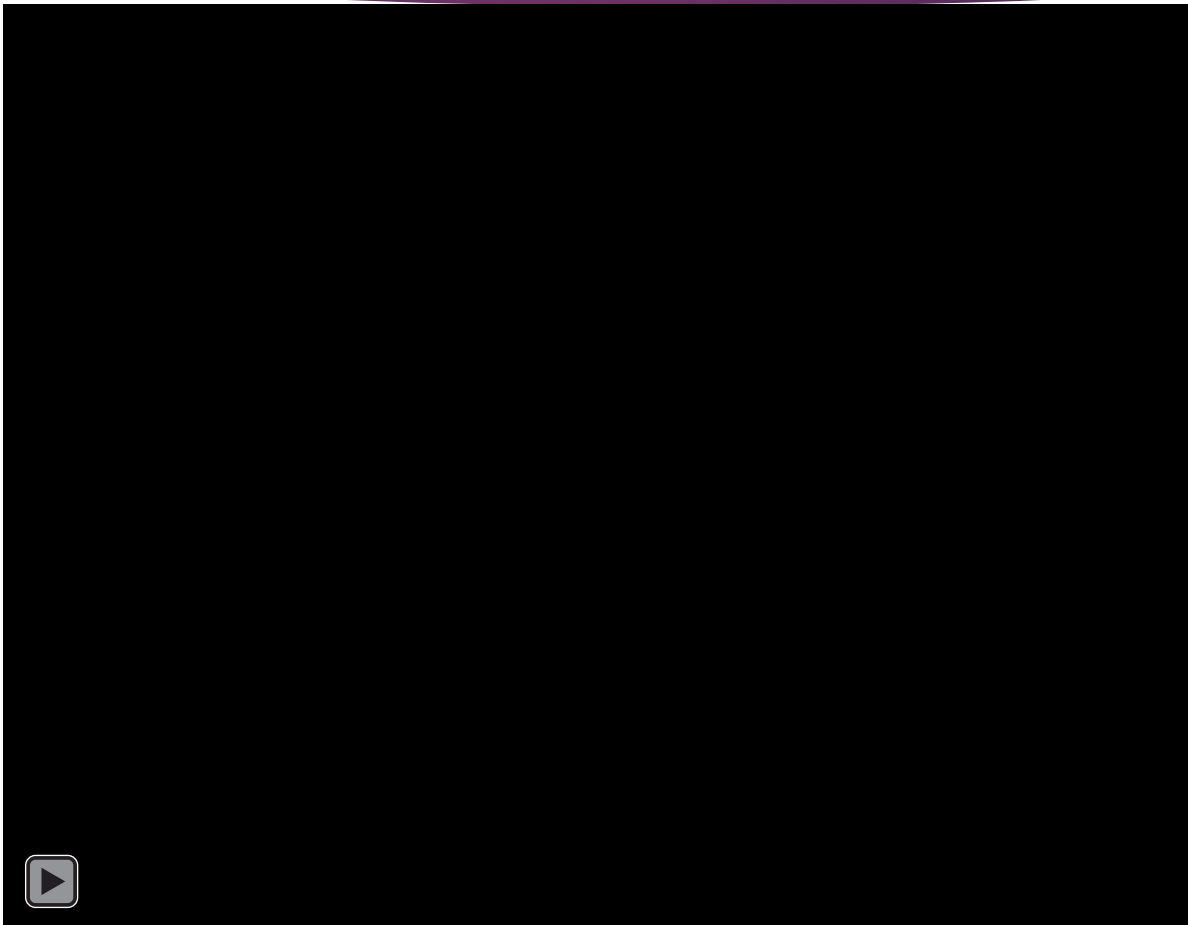


Mid Aorta – Superior Mesenteric Artery

- ▶ Superior Mesenteric Artery
- ▶ IVC
- ▶ Splenic vein
- ▶ Left renal vein

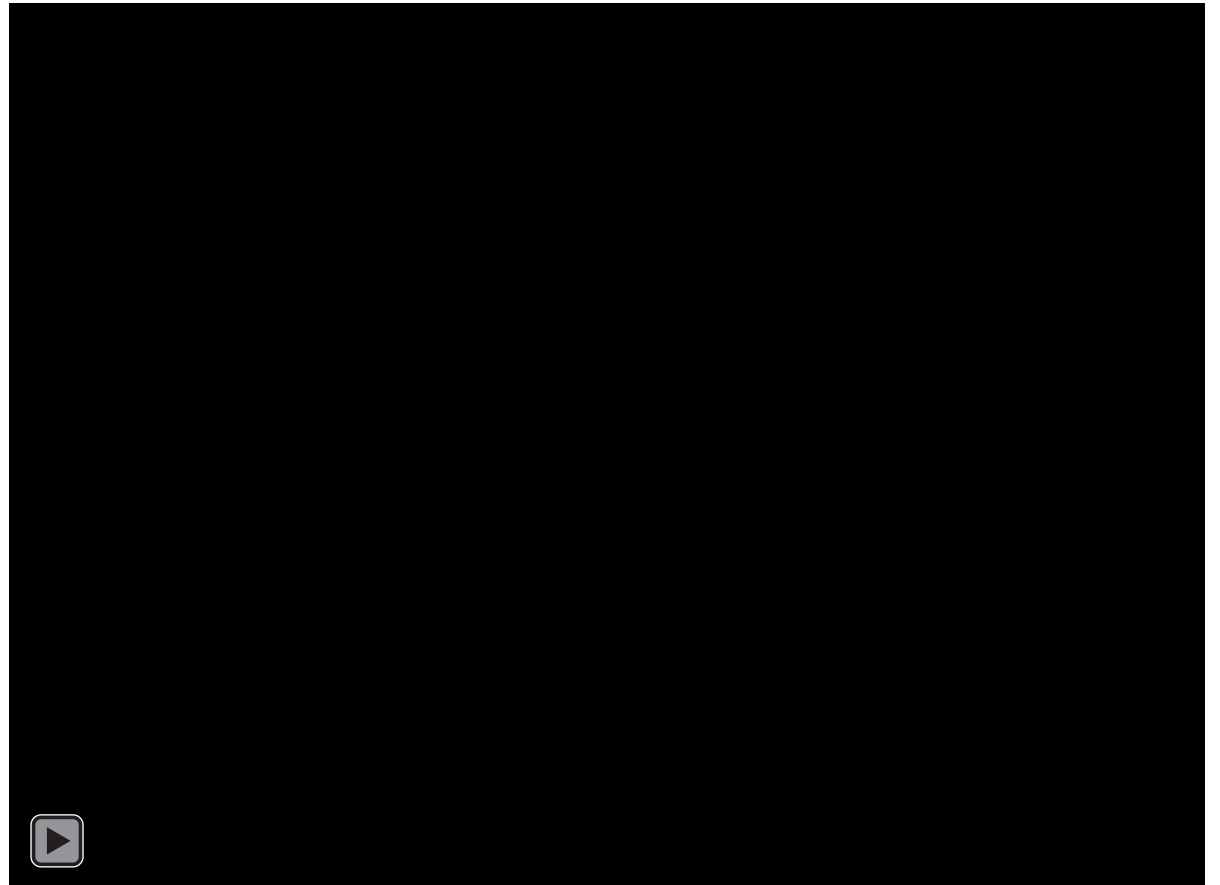


Proximal and Mid Aorta Video



Distal Aorta - Bifurcation

- ▶ Usually above or at the umbilicus



Pitfalls

- ▶ Excessive bowel gas
 - ▶ Provide constant gentle pressure
 - ▶ Scan in left lateral decubitus position
 - ▶ Use the liver as an acoustic window
- ▶ Mistaken identity
 - ▶ IVC will drain into right atrium
 - ▶ IVC may appear pulsatile, but will collapse when "sniffing"

Quiz



Questions?

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References

- ▶ EUS Consultants – Aorta/IVC Lecture
- ▶ Dr. Monika Lusiak Abdominal Aorta Lecture