



# Abdomen Ultrasound

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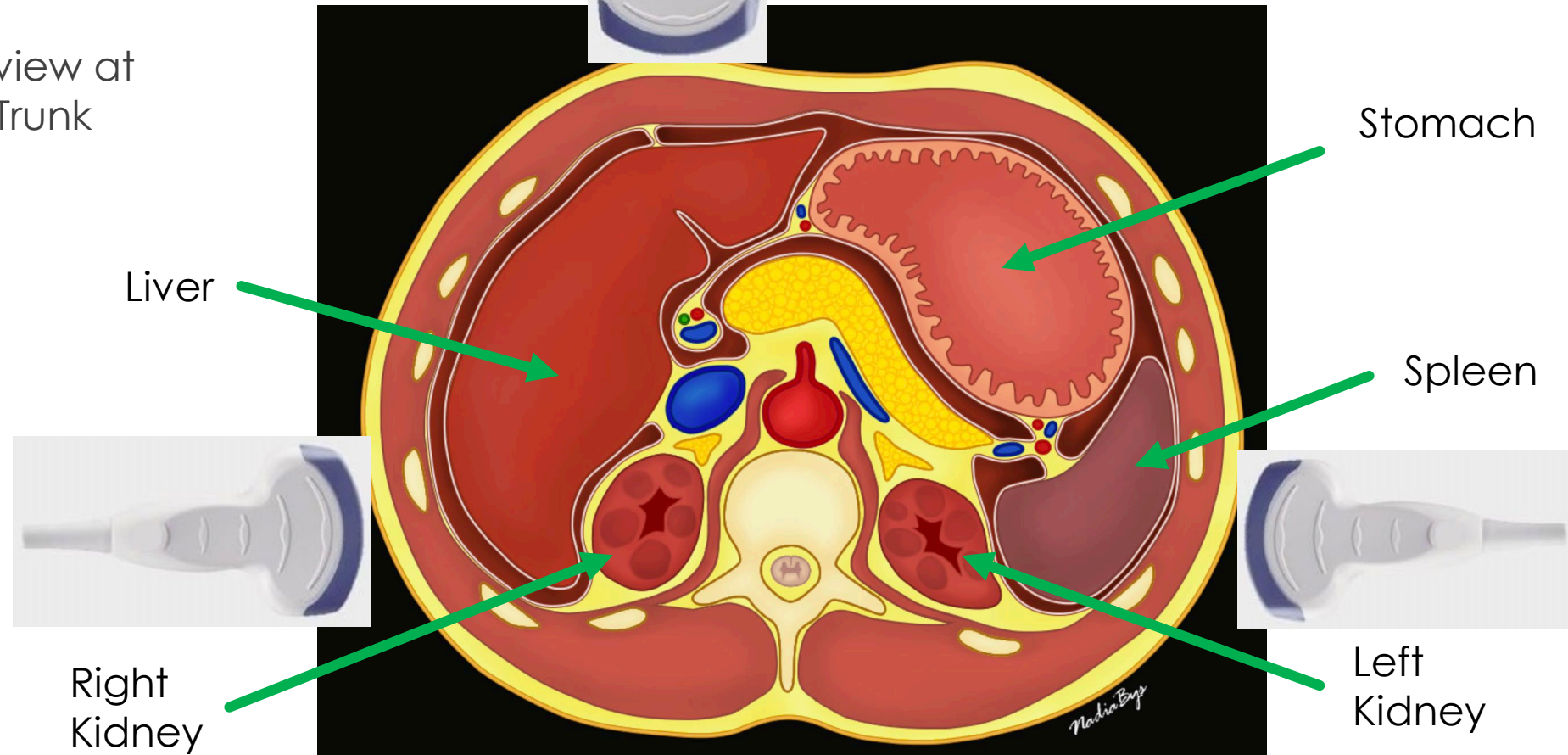
DEPARTMENT OF EMERGENCY MEDICINE

# 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?

# Abdomen Anatomy Rev

- ▶ Cross sectional view at Level of Celiac Trunk



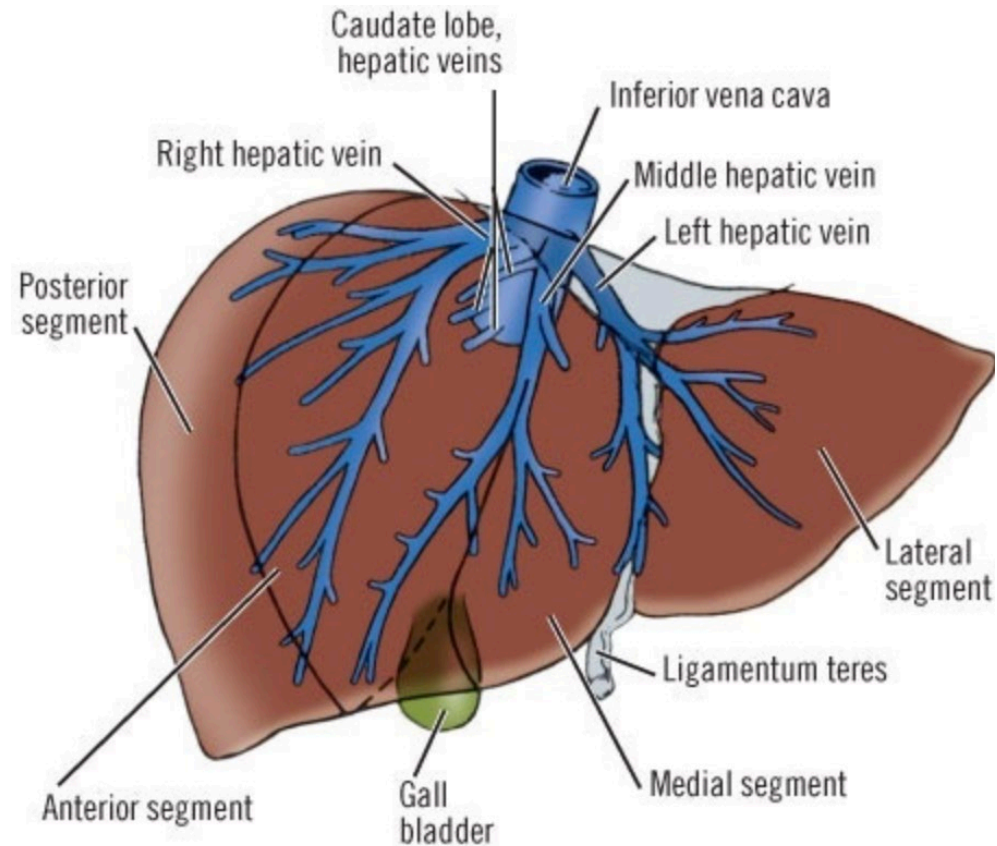
# Basic Scanning Technique

- ▶ Patient Preparation:
  - ▶ Fasting, to avoid bowel gas
- ▶ Patient Positioning:
  - ▶ Supine
  - ▶ Left lateral decubitus (may improve image when scanning the right organs)
  - ▶ Right lateral decubitus (may improve image when scanning the left organs)
- ▶ Probe selection:
  - ▶ Curvilinear
  - ▶ Phased array

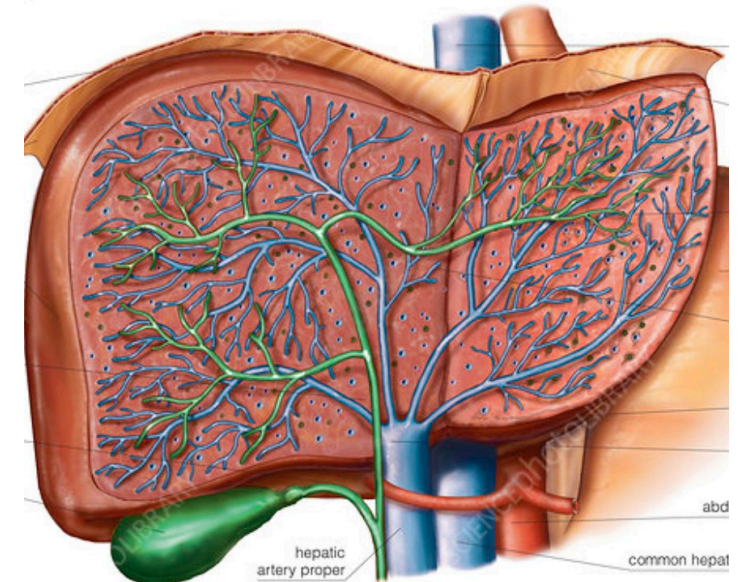


# Liver Anatomy Review

- ▶ Hepatic veins
  - ▶ Right
  - ▶ Middle
  - ▶ Left
- ▶ Intrahepatic
  - ▶ Portal veins
  - ▶ Hepatic arteries
  - ▶ Biliary ducts



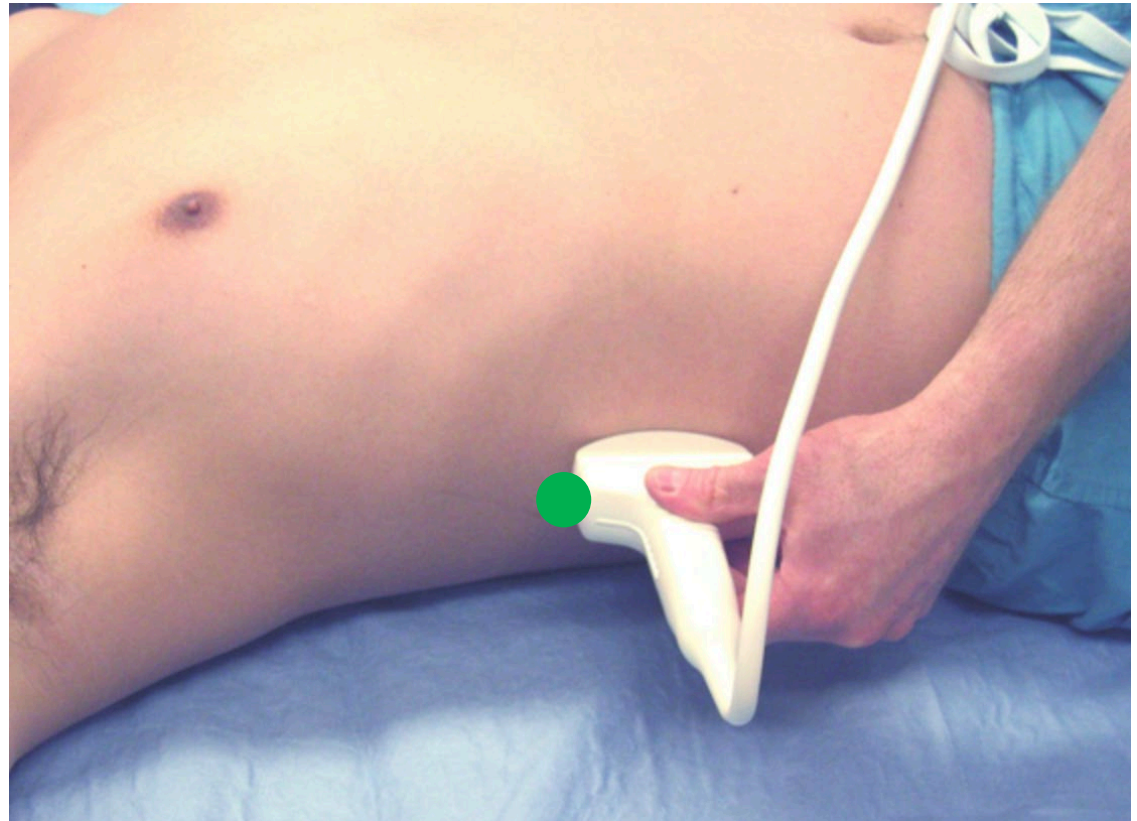
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# Liver Scanning Technique

## View #1 – Coronal Plane

- ▶ Probe placement:
  - ▶ Right coronal plane, mid-axillary line
  - ▶ 9<sup>th</sup> or 10<sup>th</sup> intercostal space
  - ▶ Level of the xiphoid process
  - ▶ Fan anterior and posterior



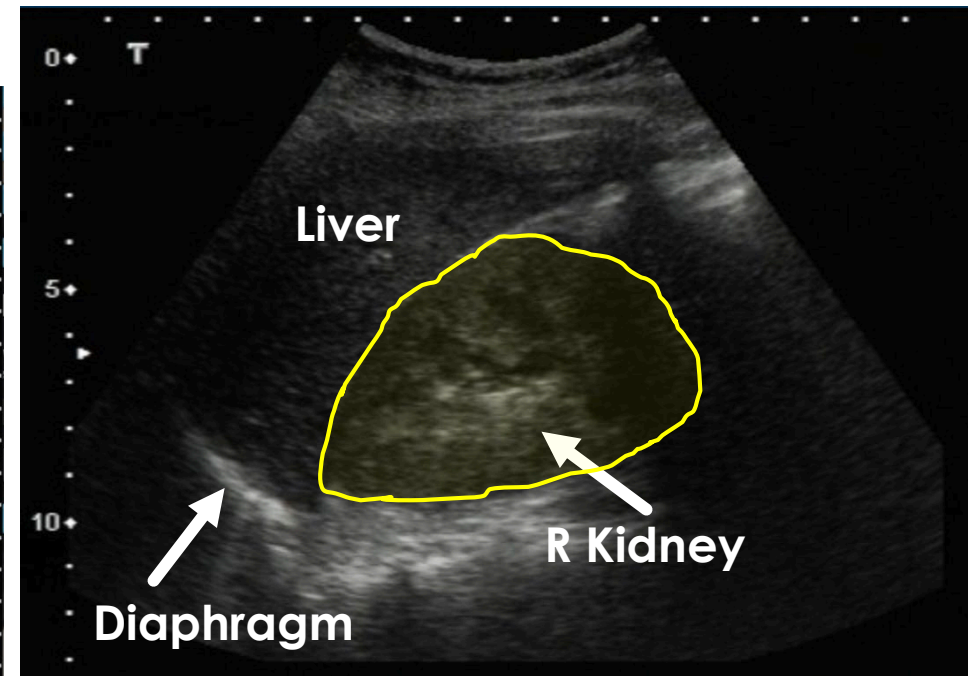


# Liver US Findings

## View #1 – Coronal Plane

### ► Identify:

- Liver
- Diaphragm
- +/- Right kidney
- +/- IVC



# Liver Scanning Technique

## View #2 – Mid-Clavicular Longitudinal Plane

- ▶ Probe placement:
  - ▶ Longitudinal Plane
  - ▶ Right mid-clavicle
  - ▶ Below rib margin or intercostal



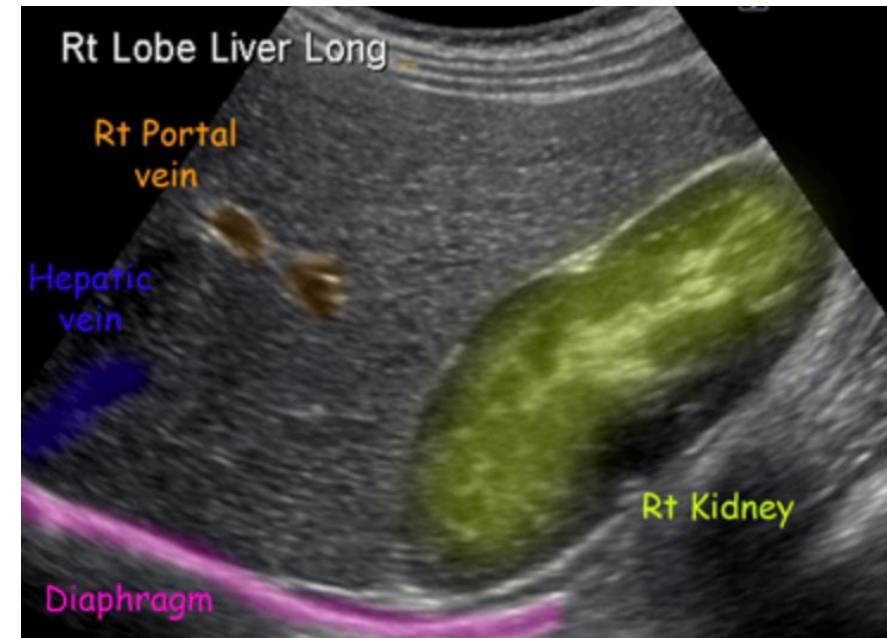
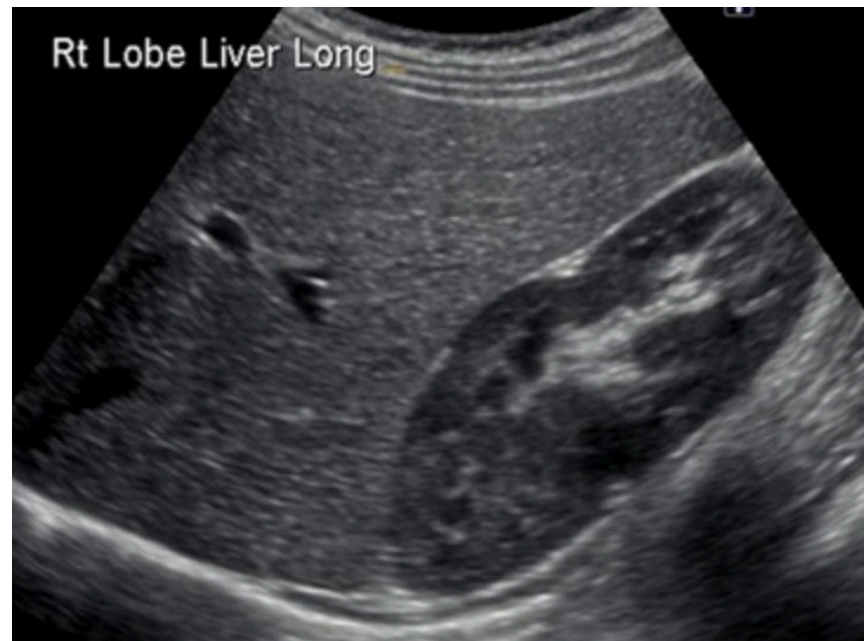


# Liver US Findings

## View #2 – Mid-Clavicular Longitudinal Plane

► Structures viewed:

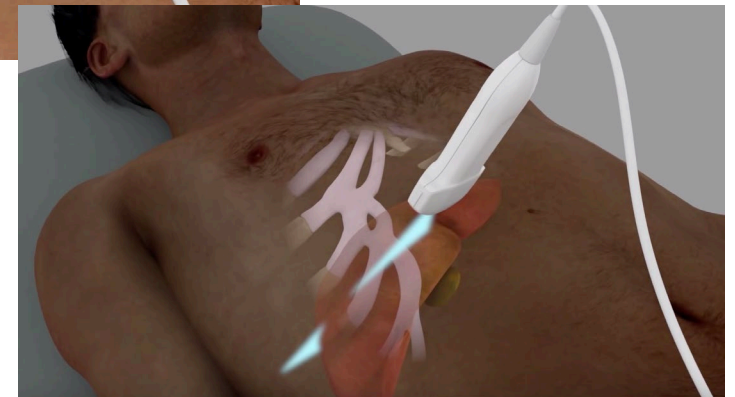
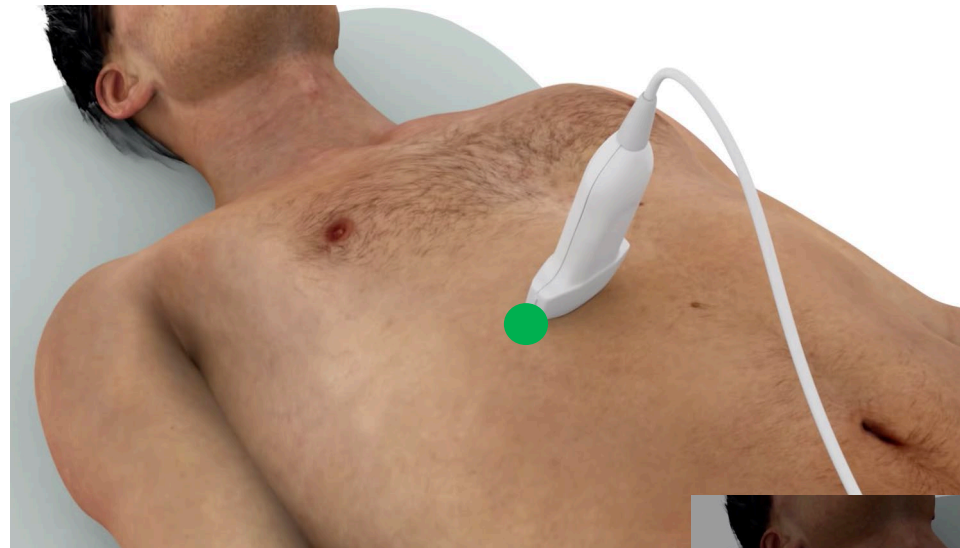
- Liver
- Diaphragm
- Right kidney



# Liver Scanning Technique

## View #3 – Transverse Plane

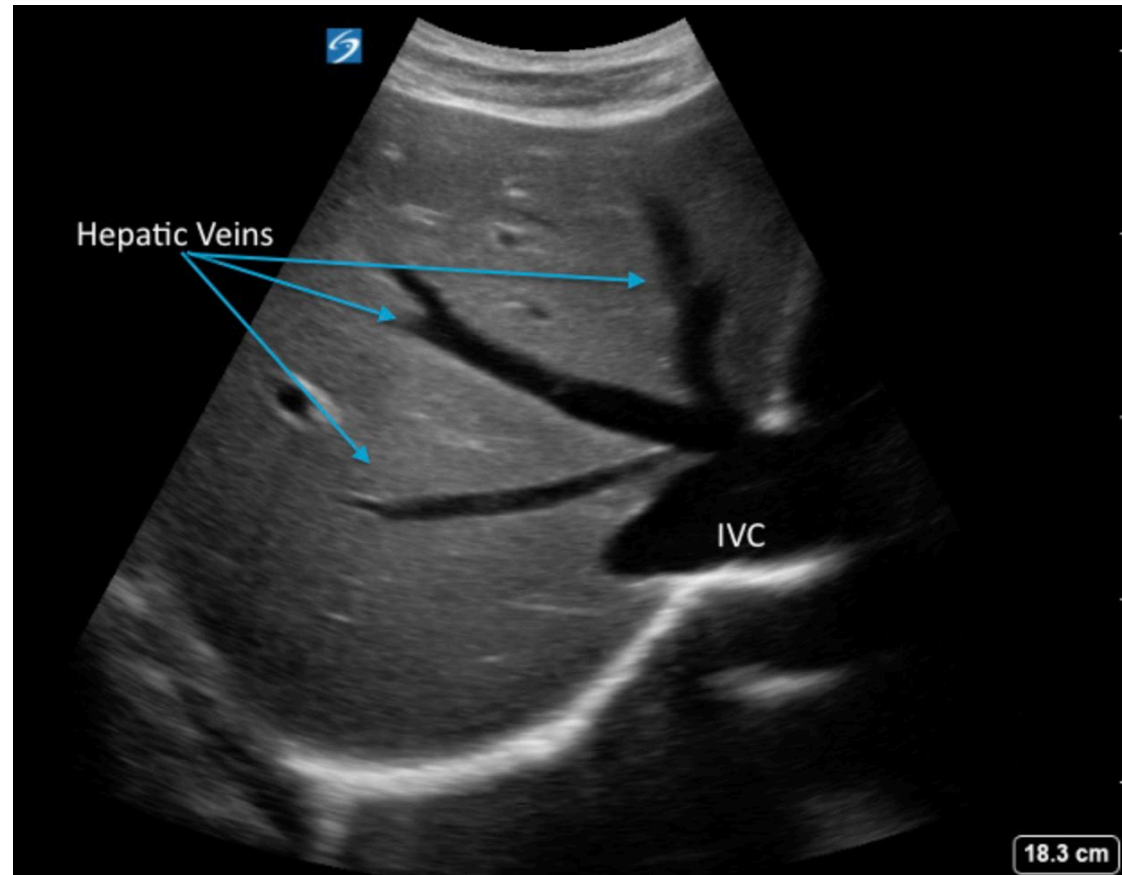
- ▶ Probe placement:
  - ▶ Transverse Plane
  - ▶ Below and slightly right of the xiphoid process
  - ▶ Fan slightly towards the head
  - ▶ Can rotate probe slightly counter-clockwise to obtain views of all hepatic veins



# Liver US Findings

## View #3 – Transverse Plane

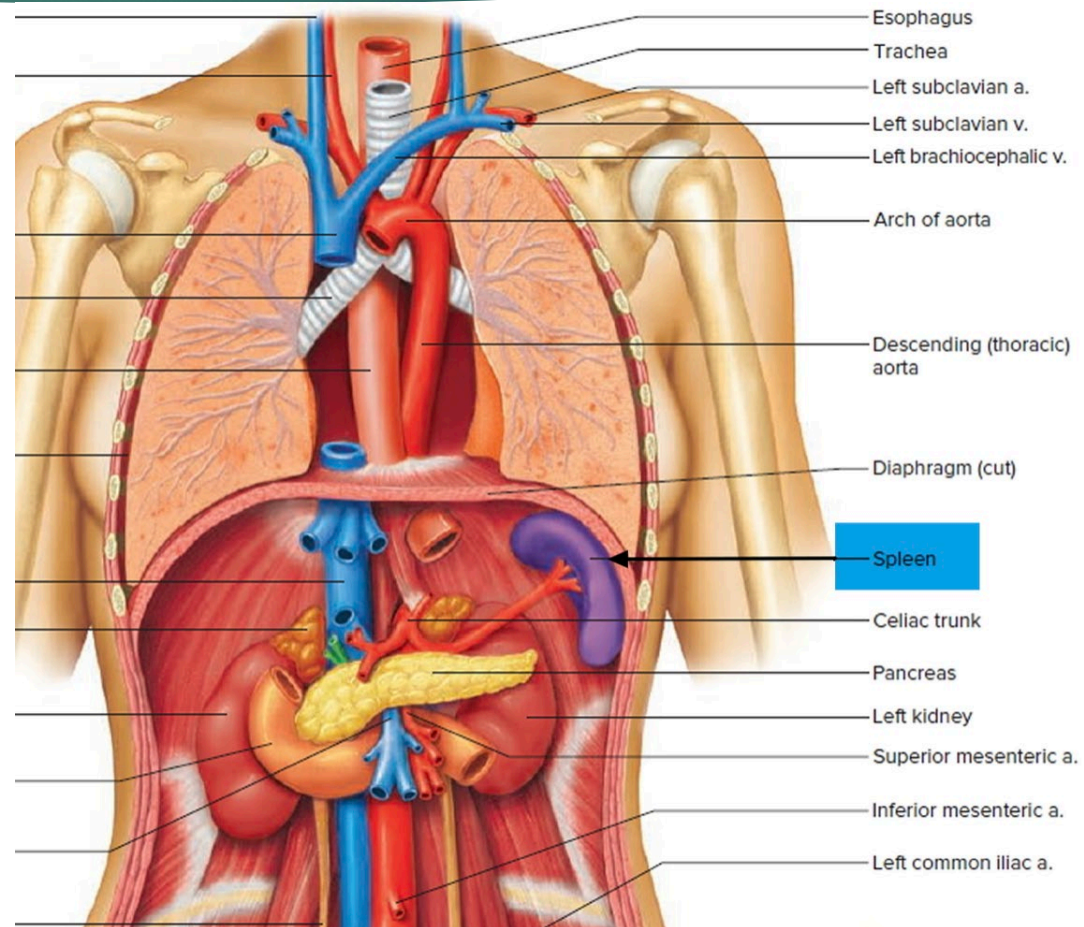
- ▶ Structures viewed:
  - ▶ Liver
  - ▶ Hepatic veins
  - ▶ IVC
  - ▶ Diaphragm





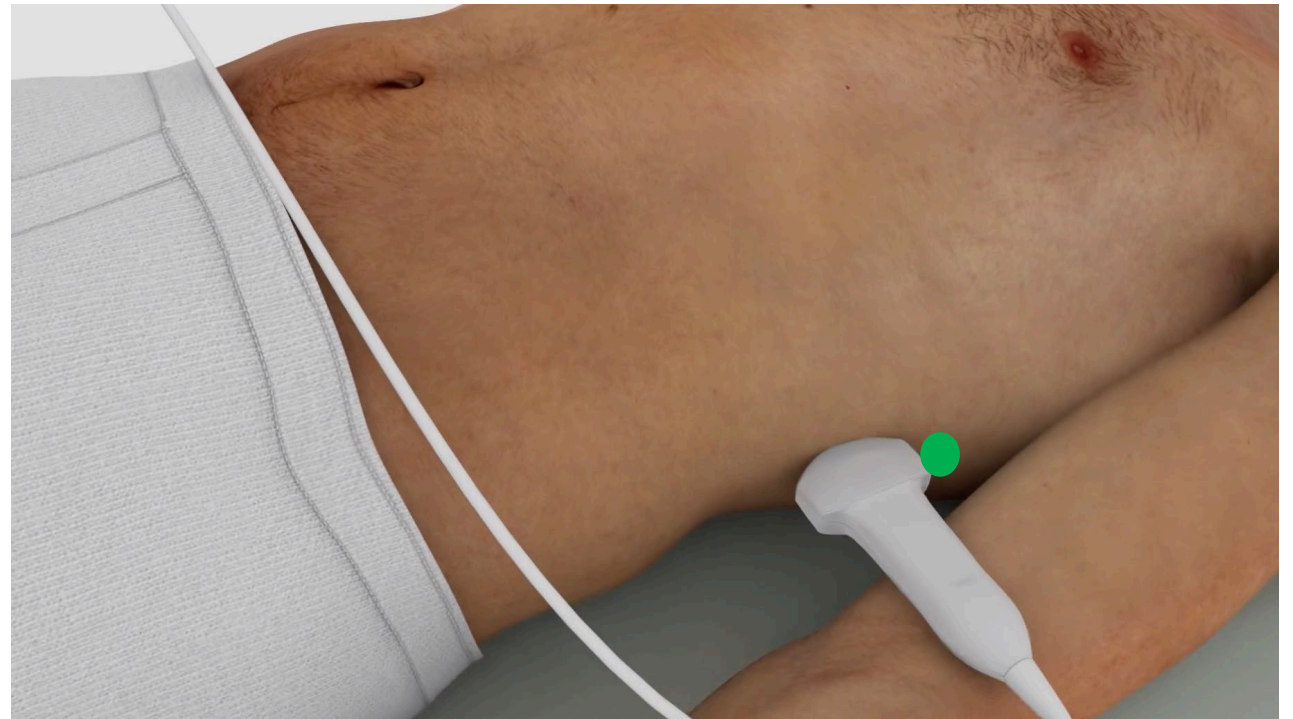
# Spleen Anatomy Review

- ▶ Located left upper quadrant
- ▶ Posterior to stomach (which may hinder view of spleen)



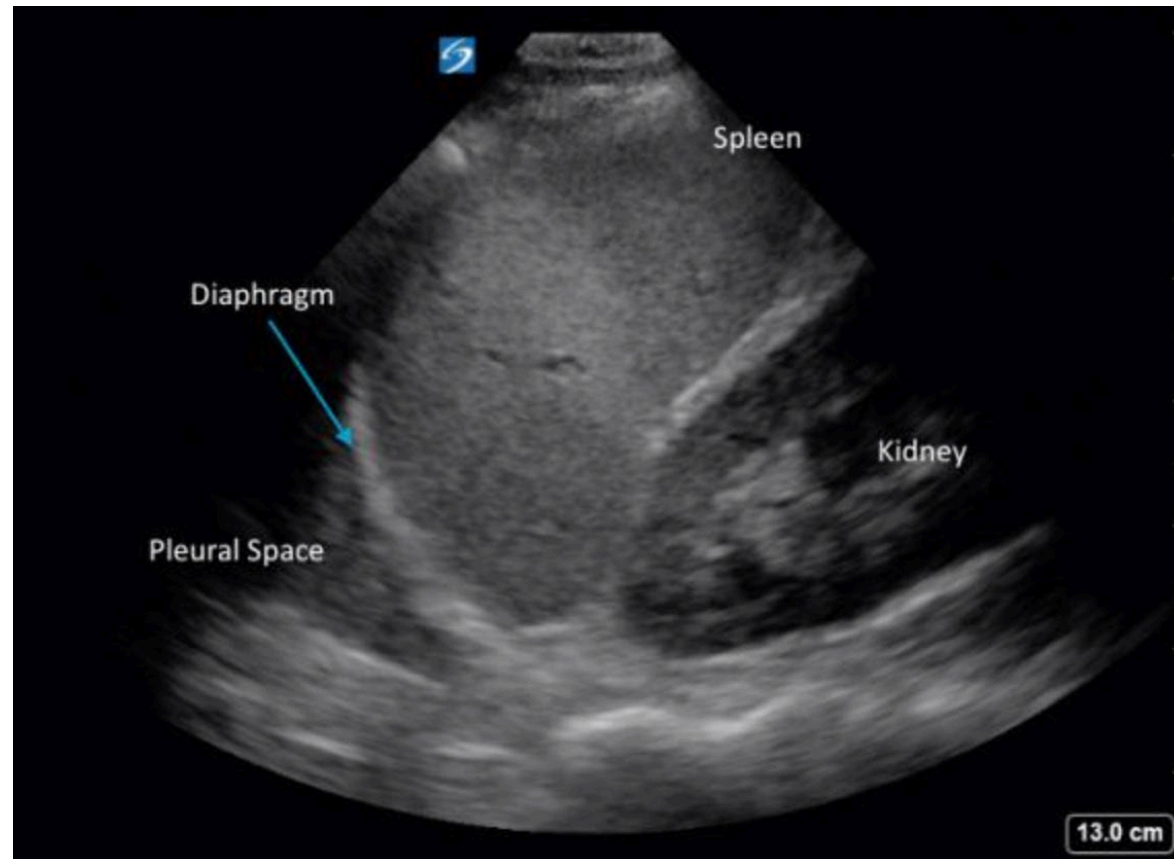
# Spleen Scanning Technique

- ▶ Probe placement:
  - ▶ Coronal Plane, left posterior-axillary line
  - ▶ 8<sup>th</sup> intercostal space
  - ▶ Level of the xiphoid process
- ▶ Tip:
  - ▶ “Knuckles to the bed” (routine to scan from the right side)



# Spleen US Findings

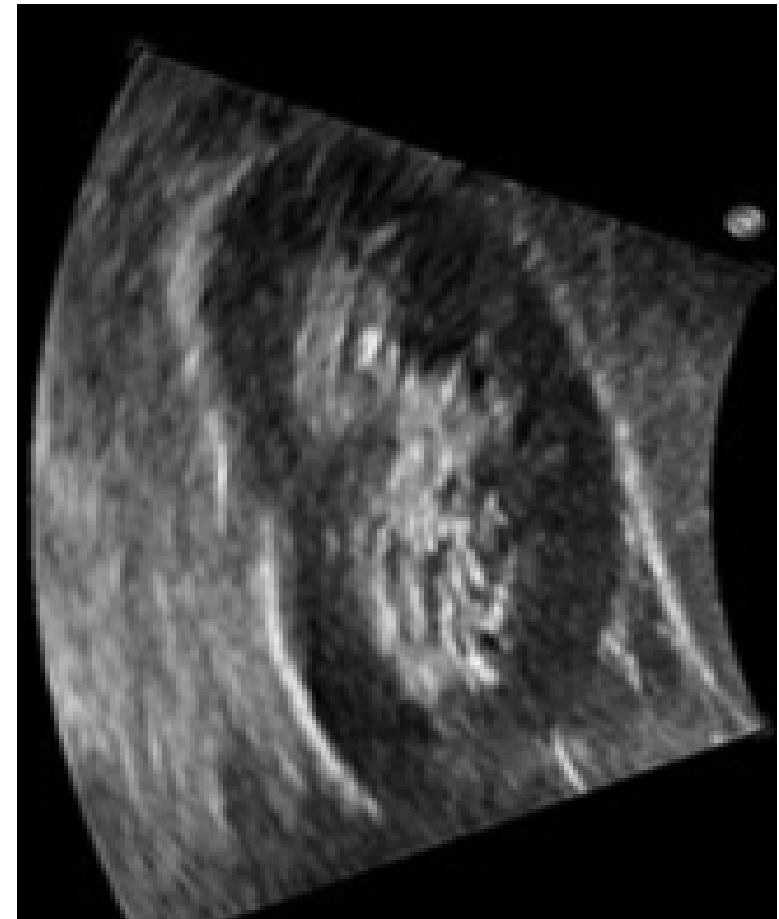
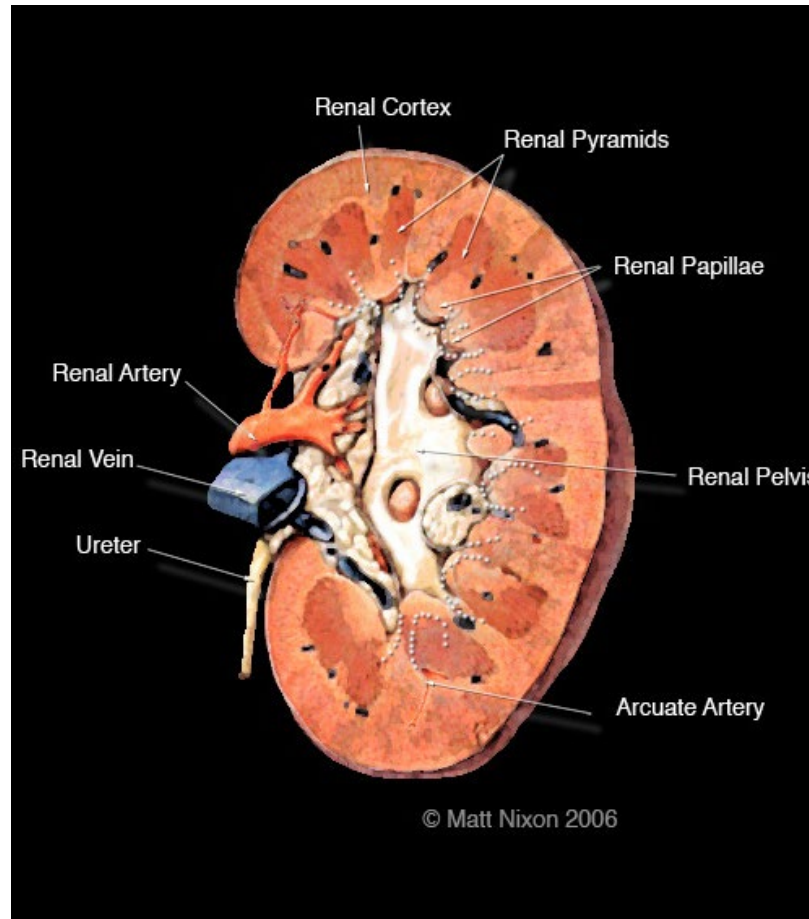
- ▶ Identify
  - ▶ Spleen
  - ▶ Diaphragm
  - ▶ +/- left kidney





# Kidney Anatomy Review

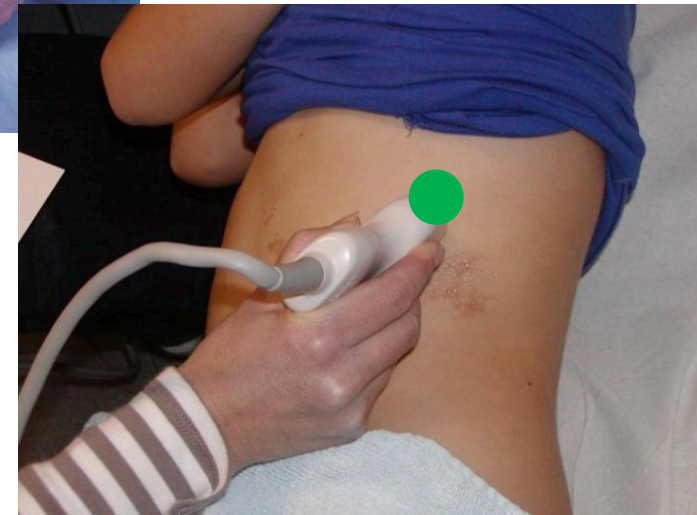
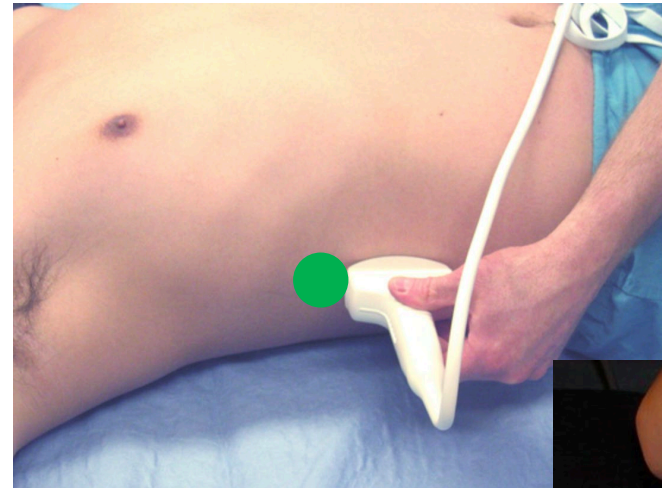
- ▶ Note key aspects of renal anatomy
  - ▶ Capsule
  - ▶ Cortex
  - ▶ Pyramids
  - ▶ Pelvis
  - ▶ Ureter



# Kidney Scanning Technique

## Coronal Plane – Long Axis

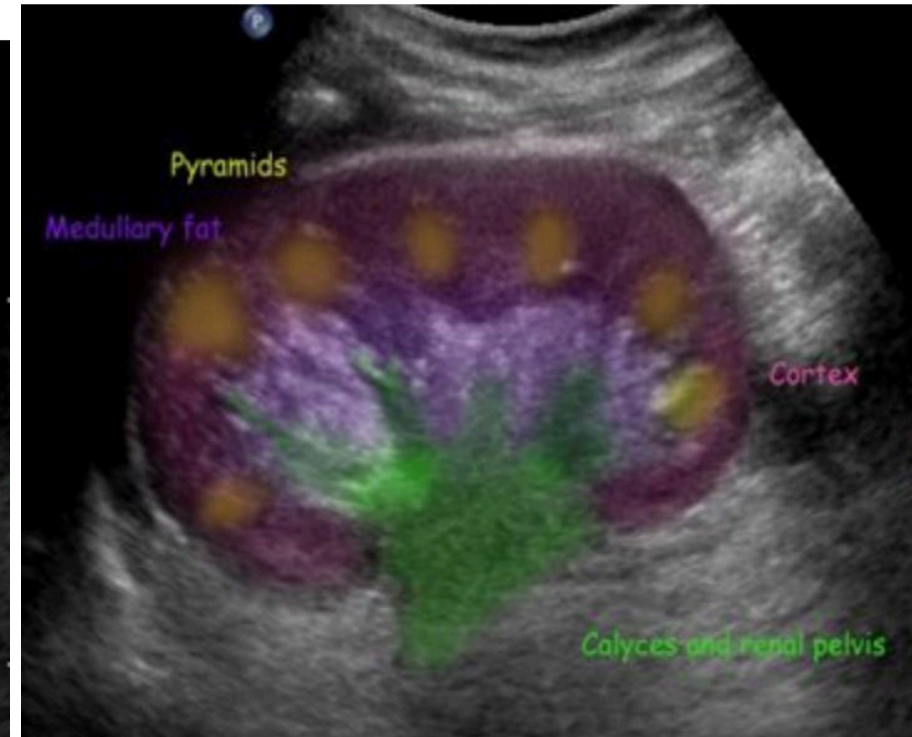
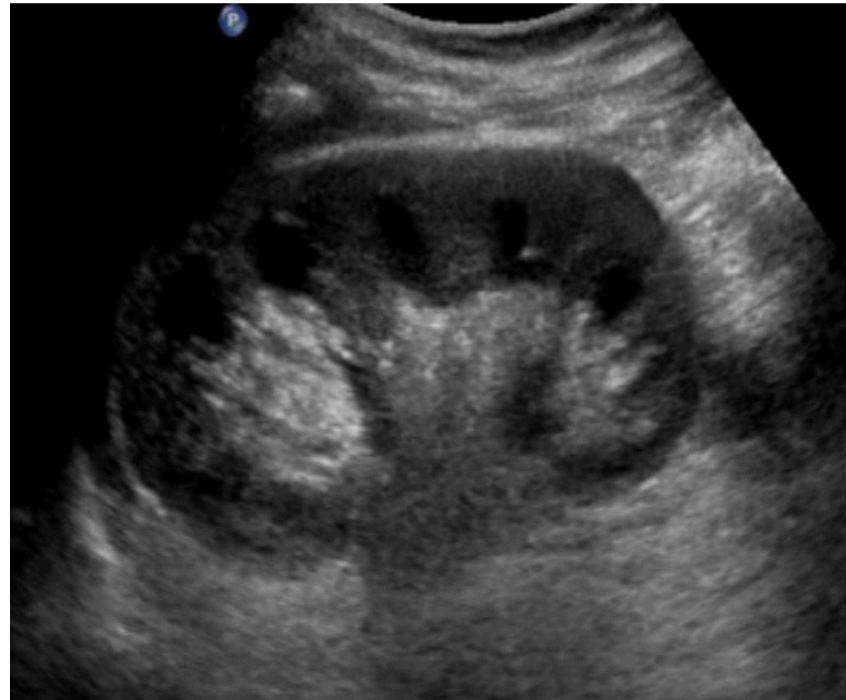
- ▶ Same technique as coronal view of liver and spleen
- ▶ Probe placement:
  - ▶ Coronal Plane, mid-axillary line
  - ▶ Level of the xiphoid process
  - ▶ Fan posteriorly (as kidney sits posterior in body)
- ▶ Tips:
  - ▶ Use the liver or spleen as acoustic windows
  - ▶ Rotate the probe slightly to run intercostally avoiding the ribs (if using curvilinear probe)
  - ▶ “Knuckles to the bed” on left



# Kidney US Findings – Long Axis

## ► Identify:

- Capsule (hyperechoic)
- Cortex (hypoechoic)
- Pyramids (anechoic)
- Pelvis (Hyperechoic)





# Right Kidney Scanning Technique

## Transverse Plane – Short Axis

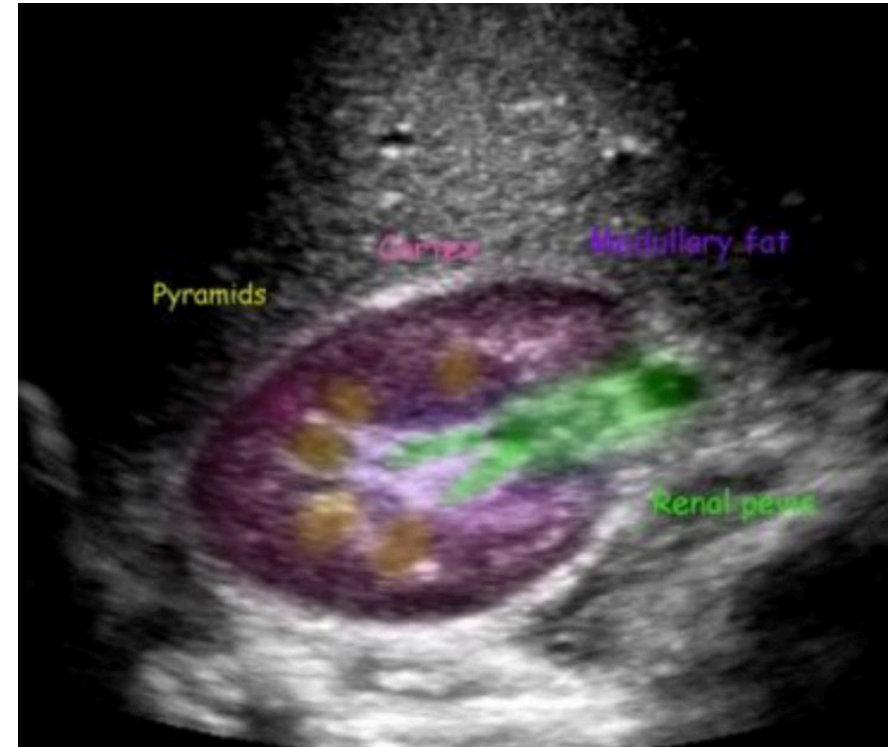
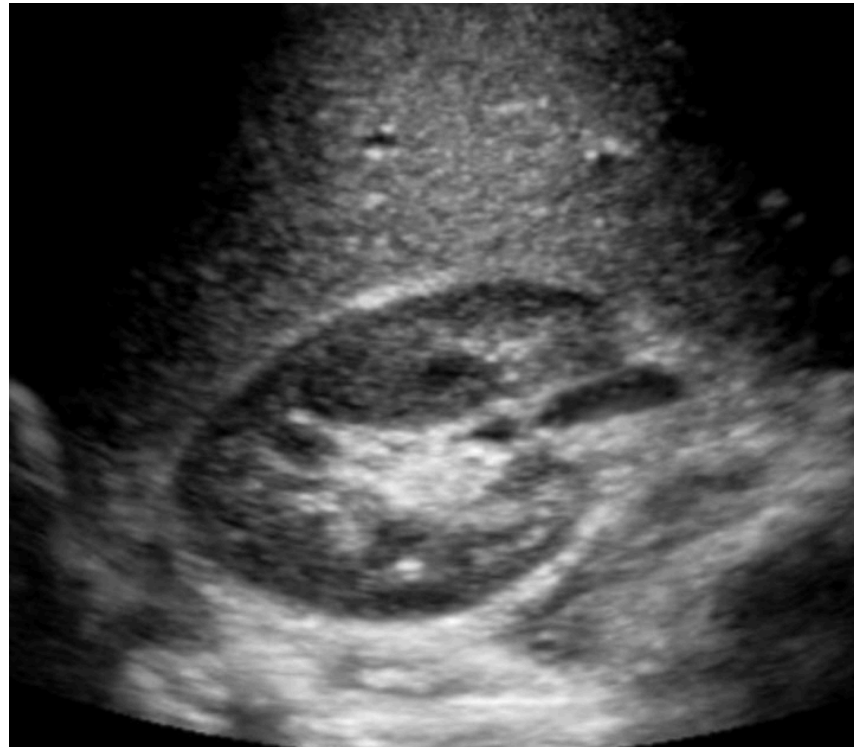
- ▶ Probe placement:
  - ▶ From coronal, rotate the probe 90 degrees
  - ▶ Direction of probe marker doesn't matter (although remain consistent with your practice)
- ▶ Tips:
  - ▶ Have the patient take and hold a deep breath in (may bring kidney into view)



# Kidney US Findings – Short Axis

- ▶ Identify:

- ▶ Capsule
- ▶ Cortex
- ▶ Pyramids
- ▶ Pelvis



# Quiz





# Questions?

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# References and Credits

- ▶ <https://www.ultrasoundpaedia.com>
- ▶ <https://www.acep.org/sonoguide>
- ▶ <https://www.sonosite.com/>
- ▶ Dr. Monika Lusiak Renal Lecture