

# Ultrasound Quick Guide



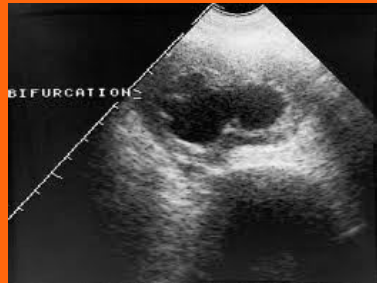
**USA HEALTH**

Department of Emergency  
Medicine

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I=IVC A=aorta V=vert body



Long



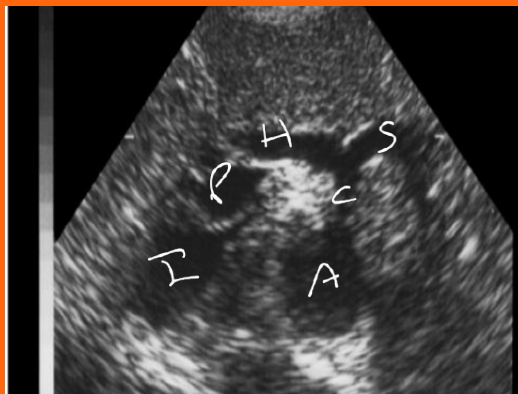
Normal Diameter

## AORTA

**Obtain:** Proximal, mid, distal, bifurcation, distal longitudinal.  
Measure wall

**Questions:** Is there an aneurysm? Is there a dissection?

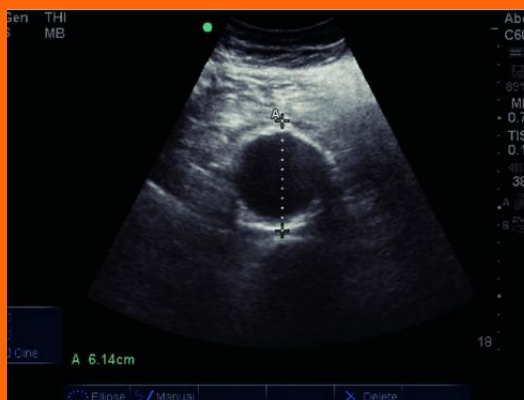
**Rescue View:** If gas is obstructing view, apply constant deep pressure or move to a more lateral angle



I=IVC P=portal v H=hepatic a  
S=splenic a C=celiac a A=aorta



I=IVC P=portal v SP=splenic v  
SM=SMA R=renal v A=aorta



Aneurysm



Dissection

## Pitfalls

Don't forget to image all segments of the aorta.  
Aneurysms can be isolated to a single segment

Ultrasound does not completely rule out dissection or rupture

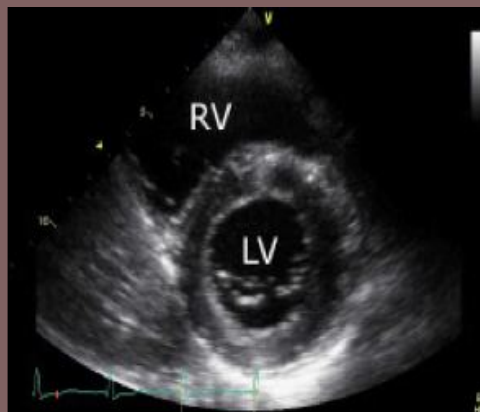
Ruptures can be in the retroperitoneum, which you can't reliably see

Remember the sad cookie monster so you don't misidentify the aorta

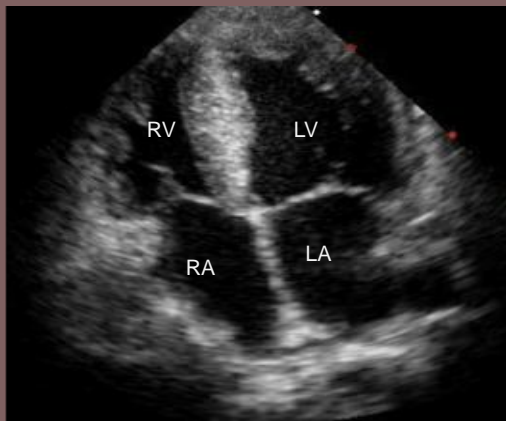
Always measure outside wall to outside wall. Normal < 3 cm



PARASTERNAL  
LONG



PARASTERNAL SHORT



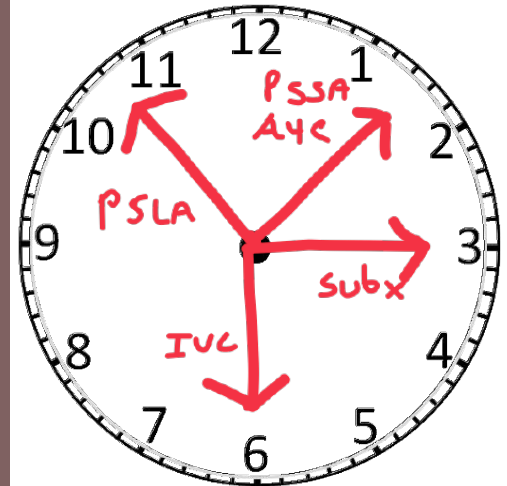
APICAL (A4)



SUBXIPHOID

# CARDIAC

Obtain: **PSLA, PSSA, A4C, Subxiphoid**



## Questions:

Effusion?

EF?

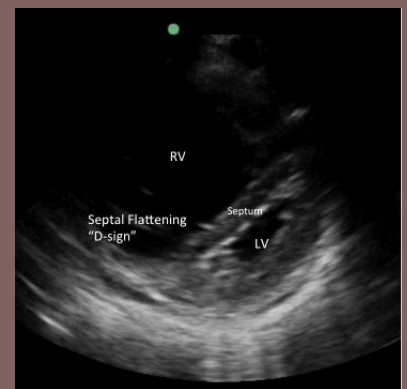
Who owns the  
septum?

## Rescue Position:

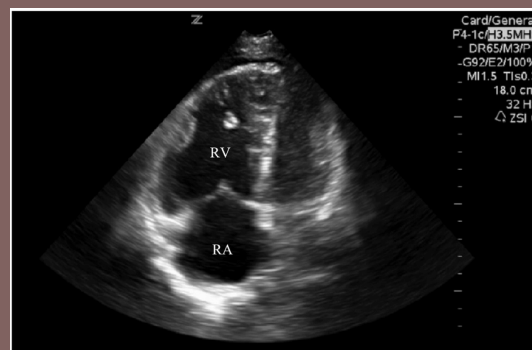
Left lateral  
decubitus



Effusion



D-Sign



RHS: RV > 2/3 LV



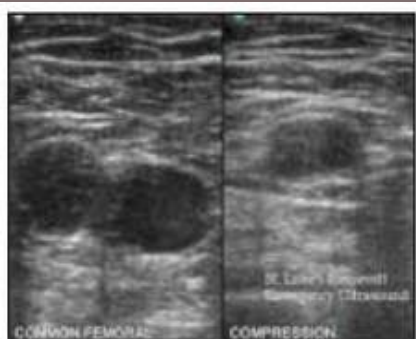
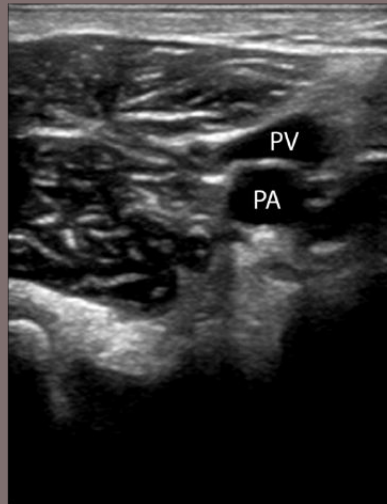
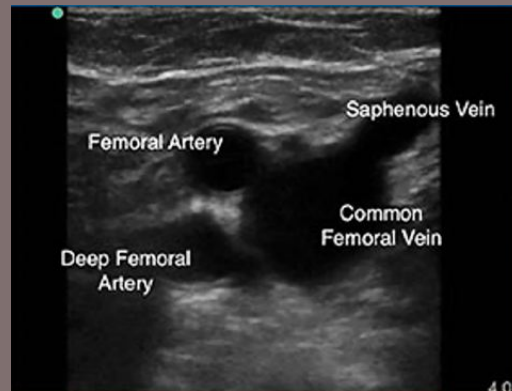
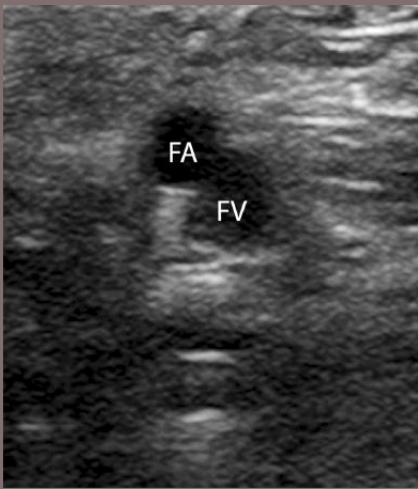
Low EF - mitral valve  
distant from septum



## Deep Vein Thrombosis

**Obtain: CFV at GS, DFV takeoff, follow FV as far as you can, popliteal vein and trifurcation**

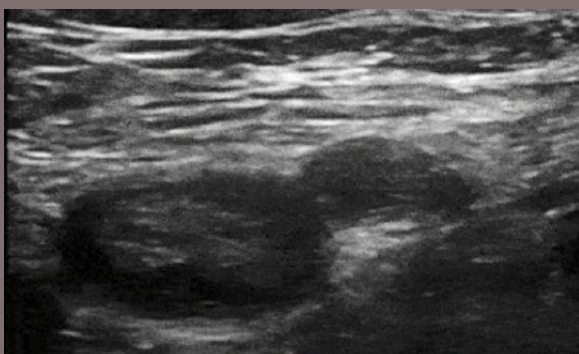
**Questions: Is each area completely compressible?**



3) Normal compressibility of the common femoral vein.



Lymph node



DVT

## Pitfalls

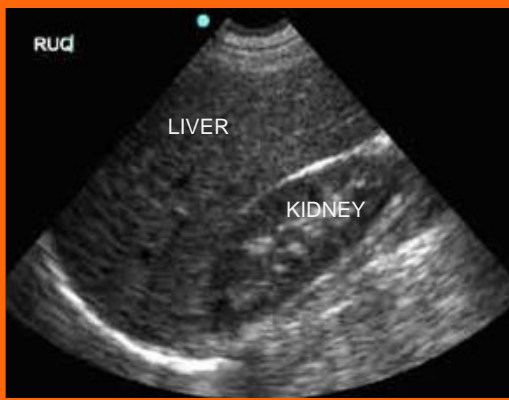
Vessel needs to completely compress to be a negative study. Attempt to compress the vein until you see the artery deform.

Many times we don't actually visualize the clot. A non compressible vein is suggestive of a clot.

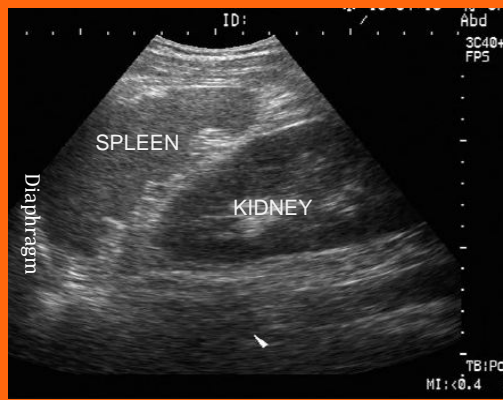
We don't assess clots distal to the popliteal fossa. If there is concern for a distal DVT order a radiology based study.

Don't mistake a lymph node for a clot. Obtain a longitudinal view if unsure.

Make sure you are deep enough. Don't mistake superficial vessels. Do you see a paired artery?



RUQ



LUQ



SUBXIPHOID



PELVIC

## FAST

Obtain: **RUQ, LUQ, subxiphoid, and both transverse and longitudinal bladder**

Questions: **Pericardial effusion? Free fluid?**



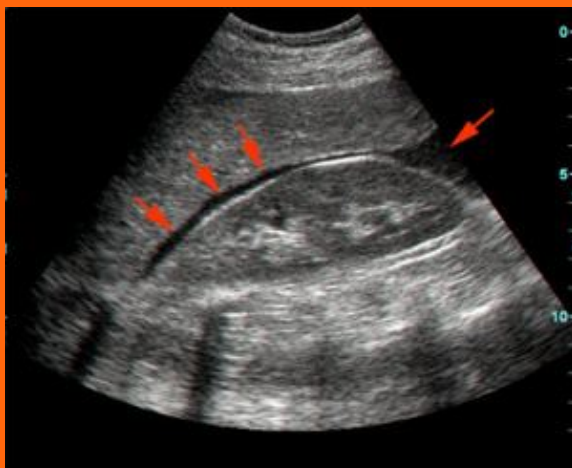
## PITFALLS

Remember to also look both above and at the tip of the liver/spleen for free fluid

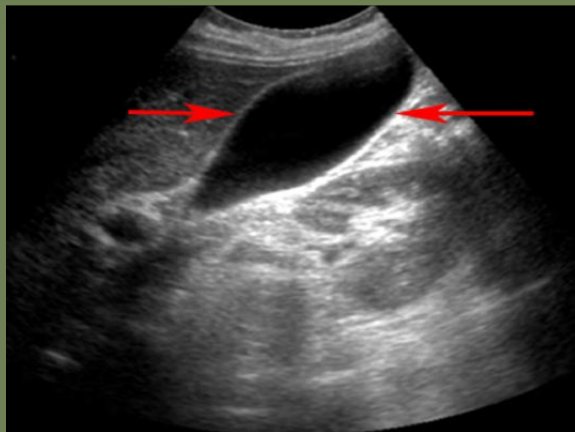
For LUQ put knuckles to the bed as kidneys are very posterior

Cannot find bladder? Fan or tilt caudally

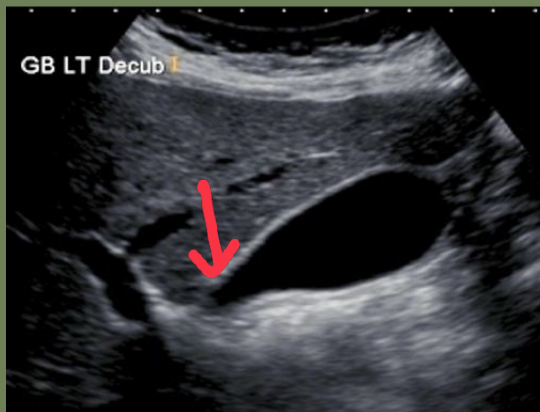
Place patient flat for subxiphoid and flatten probe angle as much as possible







Normal long



Neck



Normal short



Normal AP wall measurement

## Gallbladder

**Obtain:** GB long, GB short, GB neck, wall measurement

**Questions:** Stones? GB wall thickening (>0.4cm)? Pericholecystic fluid? Sonographic Murphy's sign?

**Rescue Views:** Take a deep breath and hold it, left lateral decubitus, lawnmower technique



Stone



Thick GB wall



Pericholecystic fluid



Stone in neck

## PITFALLS

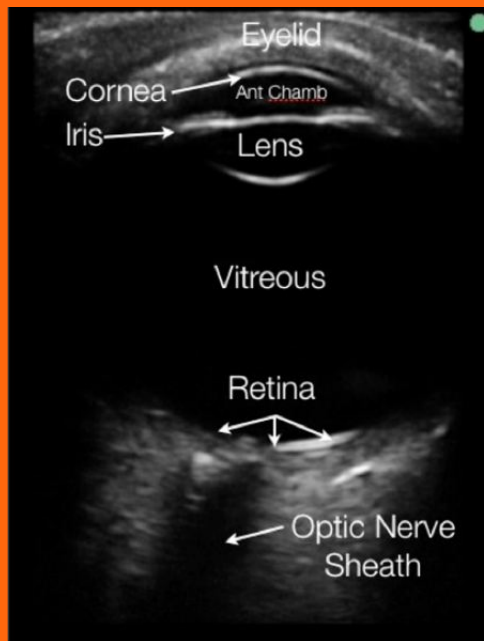
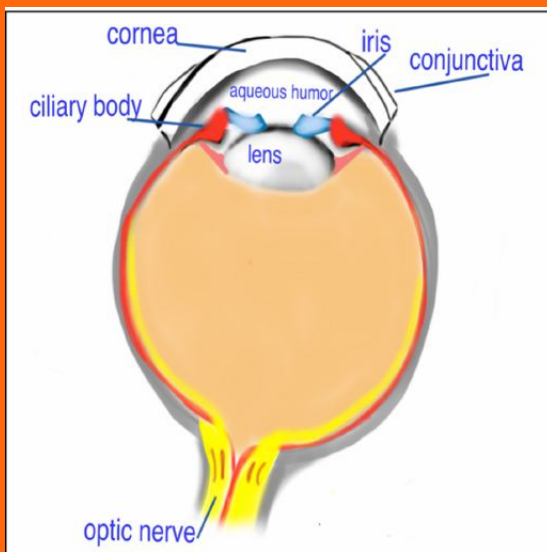
Don't forget to image the neck - stones hide in the neck

GB should be a blind ended pouch. Get multiple views so you don't confuse vasculature with the GB

Stones shadow, polyps don't

For GB wall, measure AP as much as possible. Don't measure posterior wall

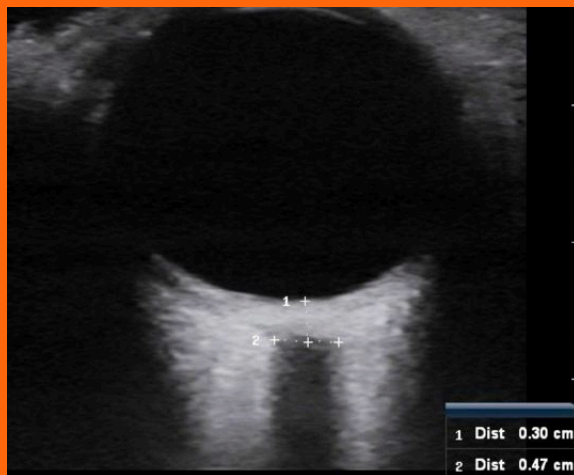
If concerned about CBD, order a radiology based study as accurate identification and measurement is time consuming



## Ocular

**Obtain:** **Bilateral eyes,**  
**transverse and long,**  
**ONSD**

**Questions:** **Retinal**  
**detachment? PVD?**  
**ONSD > 5 mm? FB?**  
**Lens dislocation?**  
**Vitreous hemorrhage?**



Normal optic nerve



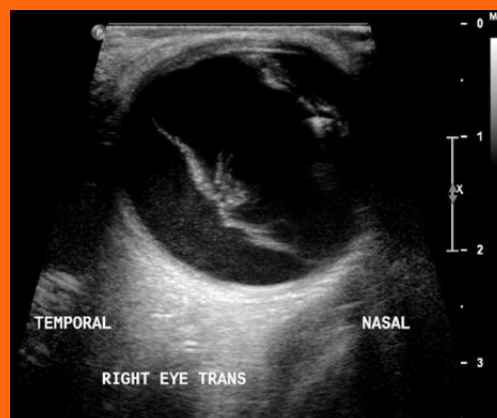
Foreign body



Vitreous hemorrhage



Retinal detachment



PVD

## Pitfalls

Always use ocular setting to  
prevent injury to patient

Use a pile of gel on the eye.  
Offer a tegaderm

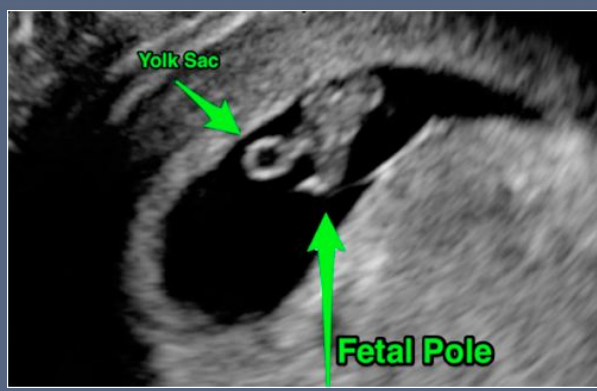
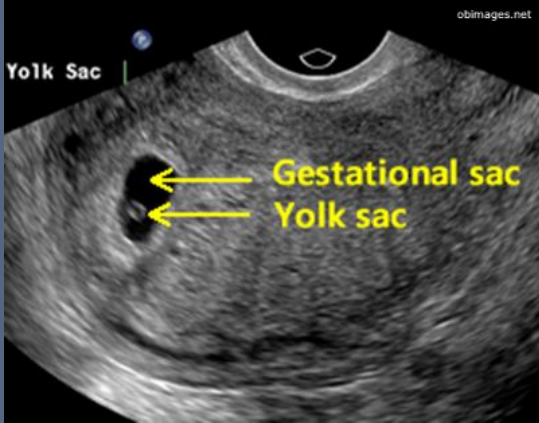
PVD vs detachment can be hard  
to distinguish especially for mac  
off. Consult ophth when either  
one is seen

In general retinal detachment  
attaches at macula and PVD  
goes all the way across

Do not perform US if any  
concern for open globe

ONSD needs to be measured  
3mm behind the retina

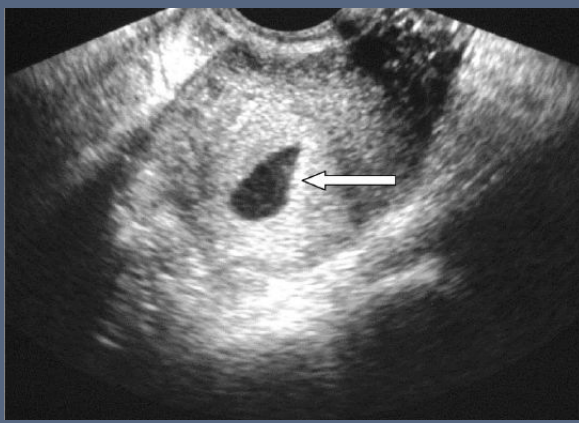




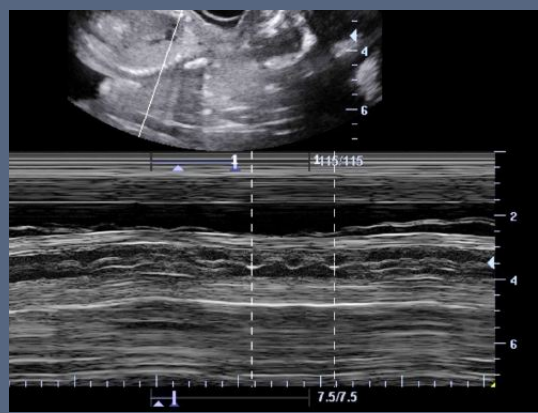
## Pregnancy

Obtain: **Uterus, fetus**

Questions: **IUP? FHR?**  
**Free fluid?**

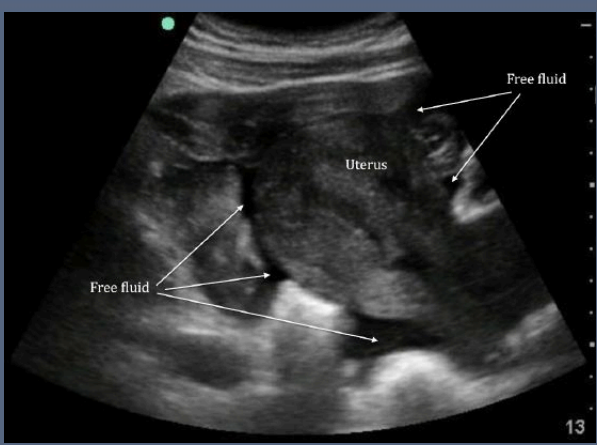


Pseudogestational sac



FHR measurement

Free fluid, no IUP seen



## Pitfalls

B and m mode only. No doppler

You need to see a yolk sac at least to confirm an IUP. Double decidual sign should be reserved for TV US.

A gestational sac without a yolk sac does not confirm IUP. It may be a pseudogestational sac.

No definitive IUP + free fluid or abd pain is ectopic until proven otherwise

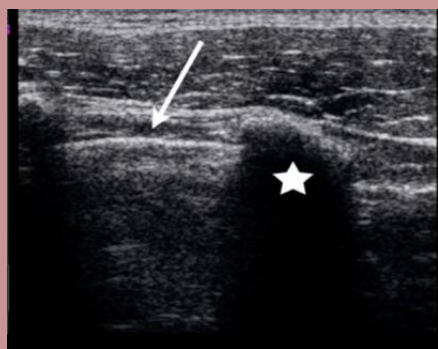
Normal FHR 120 - 180

Extremely small chance of ectopic even with IUP (be careful with fertility patients)



Molar pregnancy





Arrow=pleura  
Star=rib



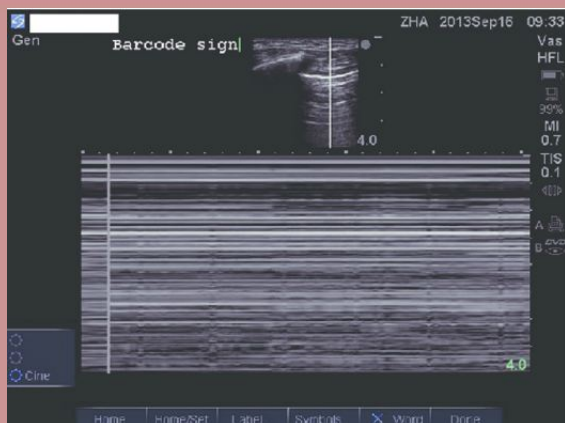
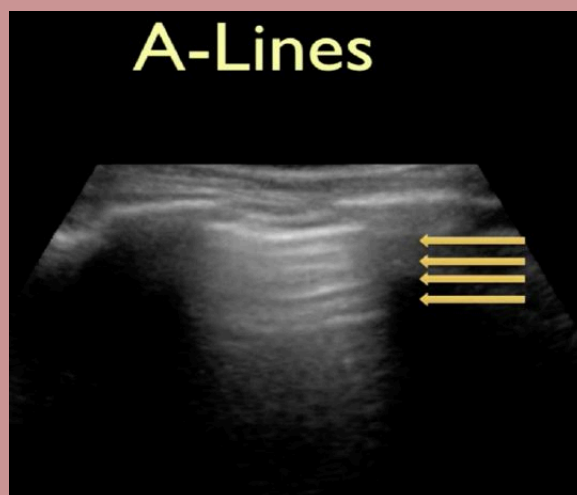
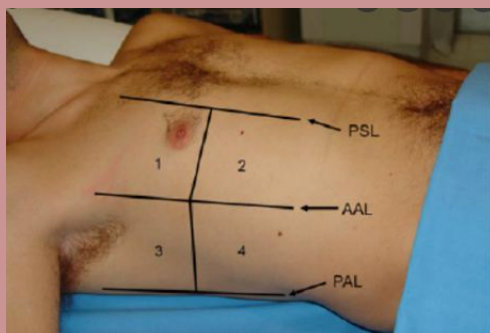
## Pulmonary

**Obtain: Linear probe:**  
bilateral apical lung  
fields in both b and m  
modes.

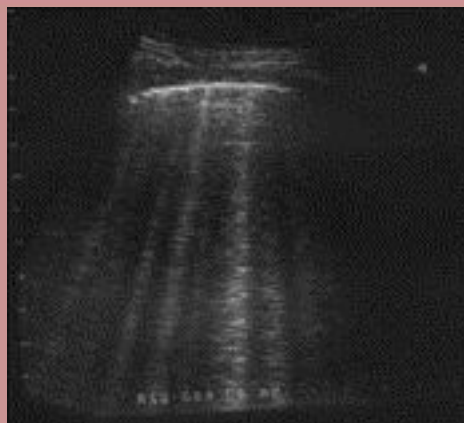
**Curvilinear probe: 4 lung  
fields per side**

### **Questions:**

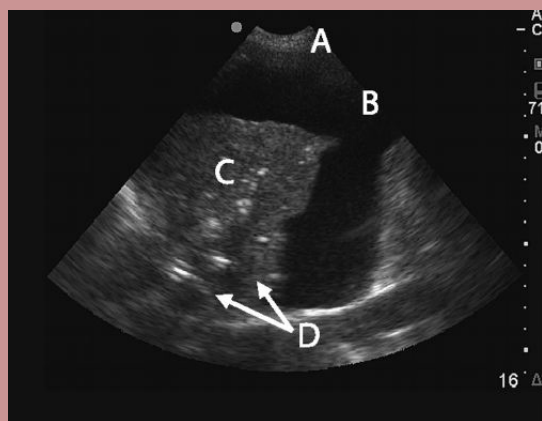
**Pneumothorax? B lines?  
Pleural effusion?**



Barcode Sign



B lines



A=chest wall  
B=pleural effusion  
C=hepatization  
D=air bronchograms

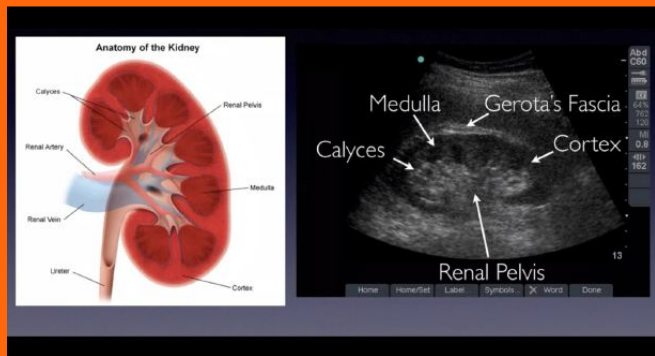
## Pitfalls

Do not mistake a superficial  
tissue layer for a pleural layer in  
obese patients. Look between  
rib shadows.

Make sure you are  
perpendicular with your probe.

With the curvilinear probe,  
make sure depth is set to 18cm

Remember b lines mean "not  
air." Remember pattern of  
distribution matters.



Anatomy



Bladder

## Renal

**Obtain: L and R kidney in both long and transverse, bladder**

**Questions: Hydro (mild, moderate, severe)?  
Perinephric abscess?  
Stone at UVJ? Debris in bladder? PVR?**



Long



Transverse



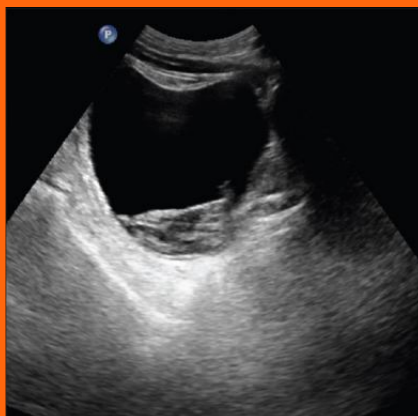
Mild Hydronephrosis



Moderate Hydronephrosis



Severe Hydronephrosis



Bladder with debris

## Pitfalls

Don't confuse hydro with vascular kidneys - use color

Hydro is in pelvis. Isolated anechoic areas in medulla are not hydro

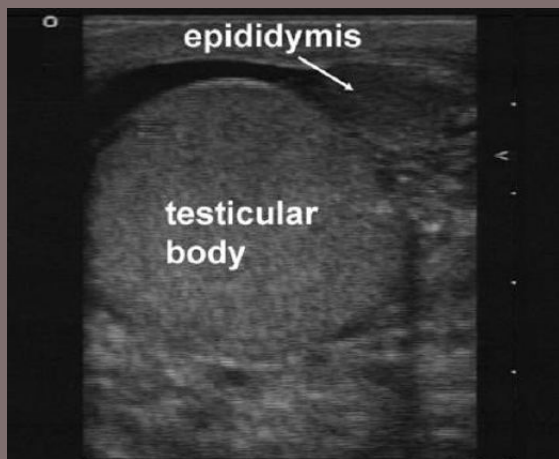
Compare both sides

A well circumscribed anechoic structure is likely a cyst

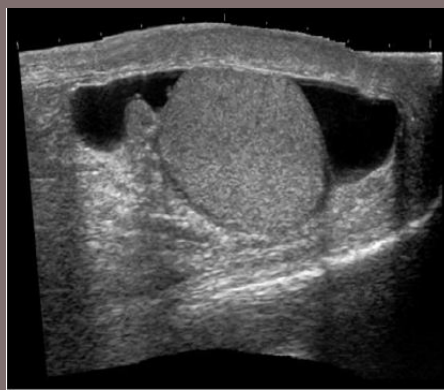
Mixed echogenic material in bladder could be sediment or blood

PVR - 3 measurements: AP, right to left, diagonal

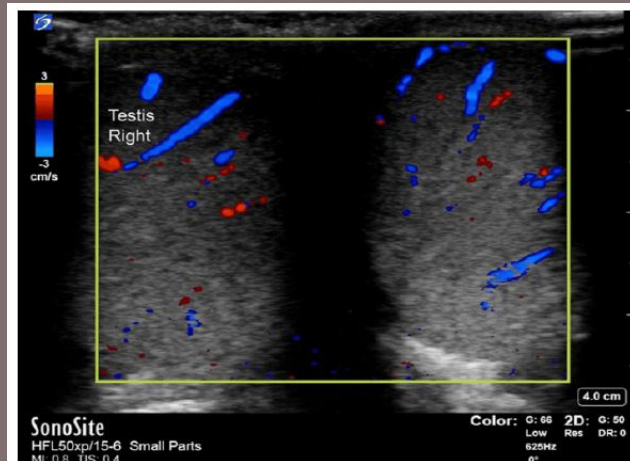




Normal



Normal with hydrocele



Buddy view with flow

## Testicular

Obtain: **Buddy view, each individual testicle, epididymis**

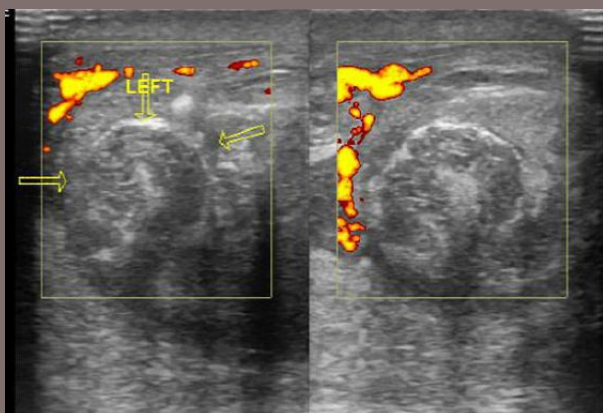
Questions: **Flow?**  
**Enlargement? Echogenicity?**  
**Fluid?**



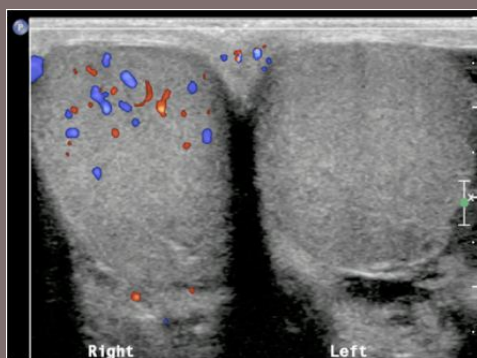
Abnormal Echogenicity



No Flow



Whirlpool



Left Torsion

## Pitfalls

Testicular US is high risk.  
Always order radiology based study to confirm

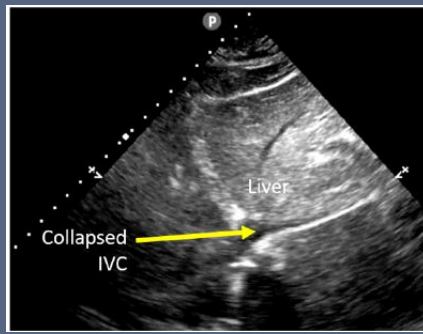
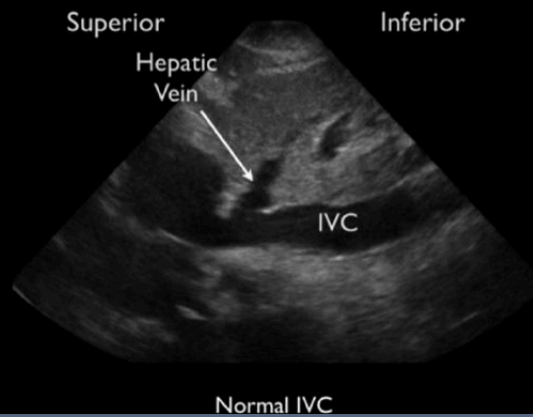
Draping patient: only expose testicles.

Keep hand steady - movement will create false color flow

Use power doppler - more sensitive for flow

Look for whirlpool sign - twisting of spermatic cord





## IVC

Obtain: **IVC as it enters RA**

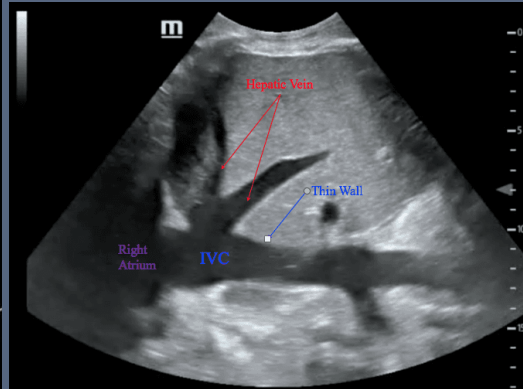
**Questions: Distended?  
Collapsed? Abnormal variability?**

## Pitfalls

Get a subxiphoid cardiac view first, then rotate the probe 90 degrees towards the patients feet keeping it rocked into the chest

Make sure you see the hepatic vein entering the IVC. The aorta can look exactly like the IVC. The IVC can look pulsatile

Don't worry about measuring the IVC. Look for the extremes.



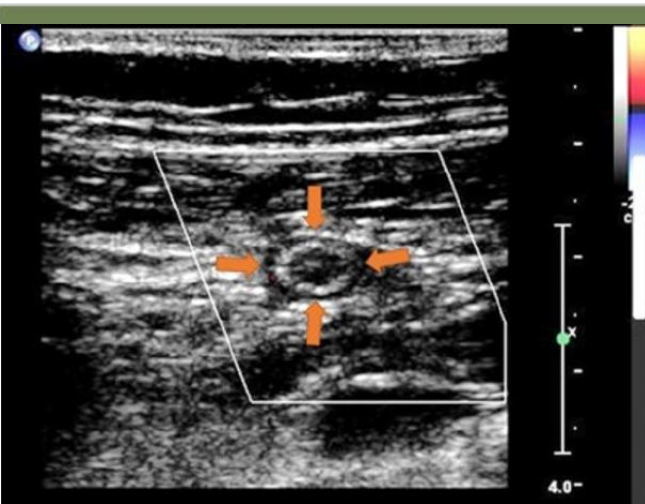
# Pediatric POCUS



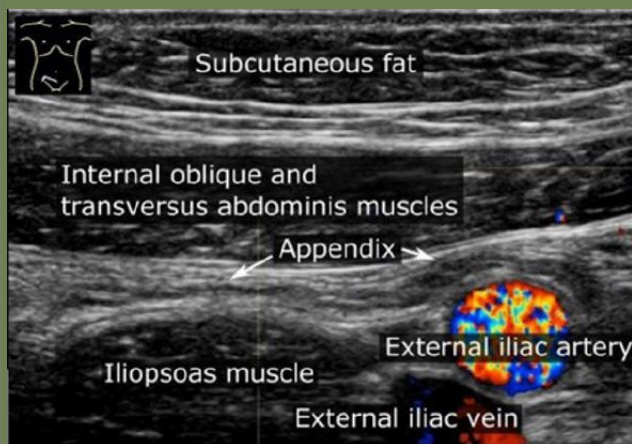
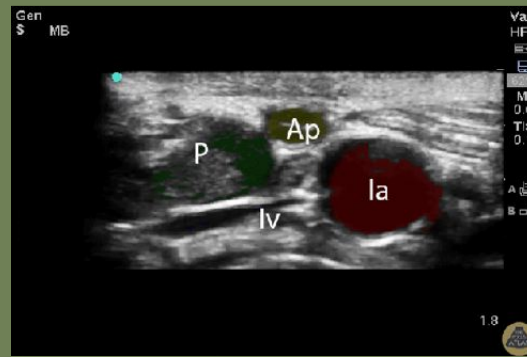
## Appendix

**Look For: Right iliac vessels, iliopsoas in sagittal and transverse**

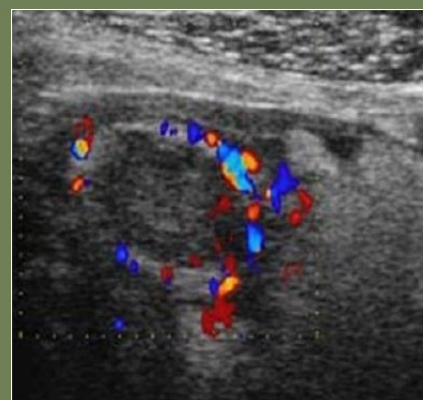
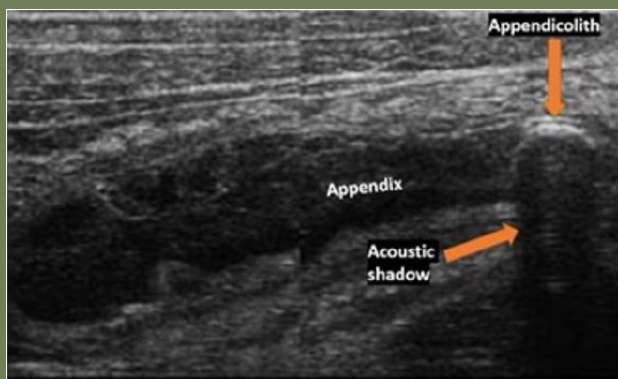
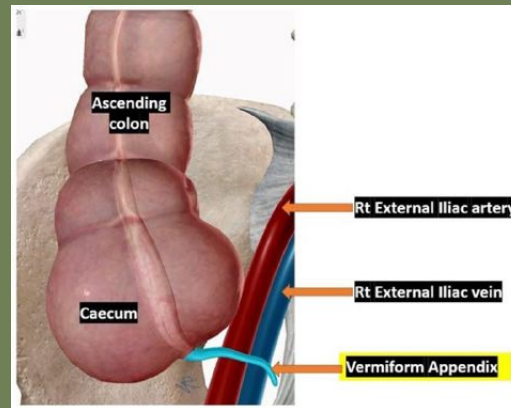
**Questions: Is it enlarged (>6mm)? Is it compressible (<2mm)? Is there free fluid? Is there an appendicolith?**



Normal Transverse



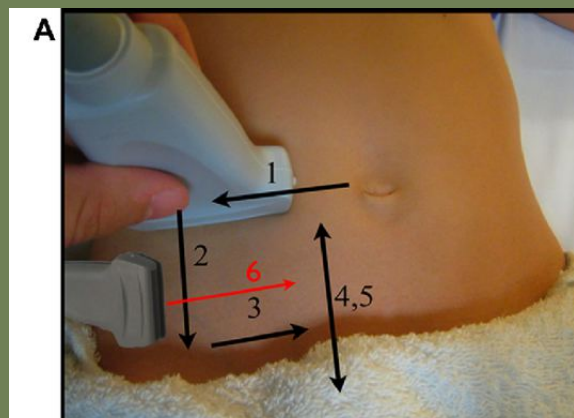
Normal Transverse



Ring of Fire



Dilated Appendix



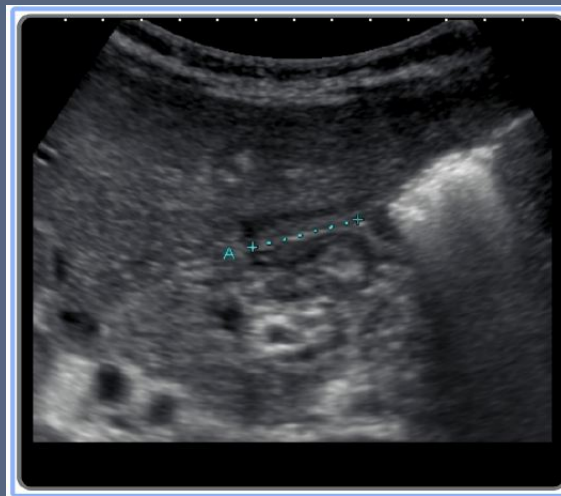
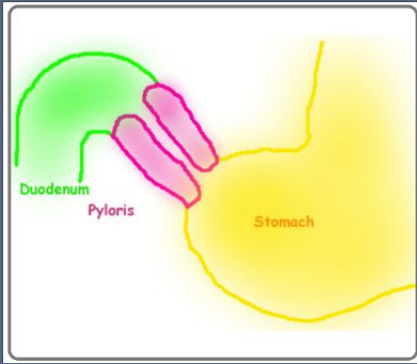
## PITFALLS

Don't mistake for bowel. Find a blind ended pouch.

Put on color - look for "ring of fire."

Look for shadowing - appendicoliths shadow



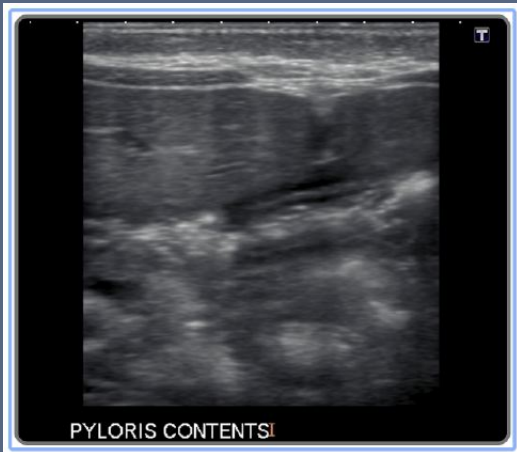


Normal Pylorus

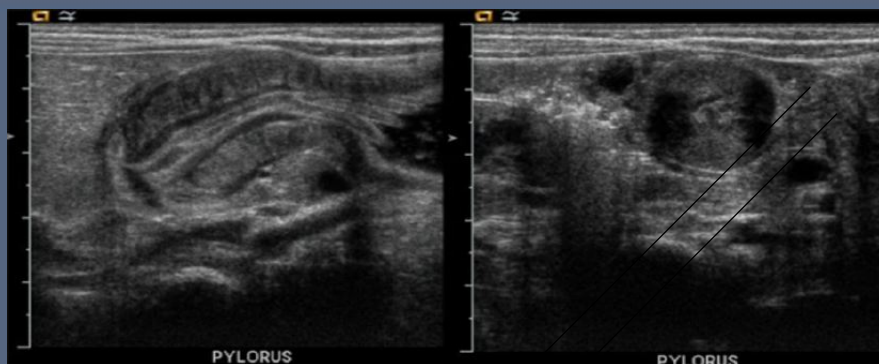
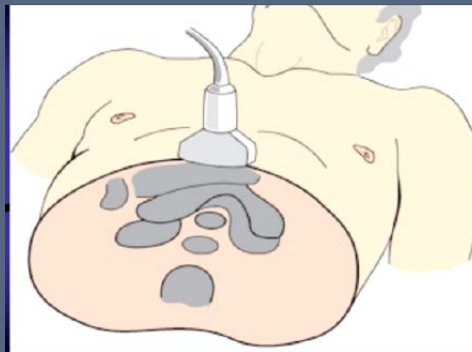
## Pyloric

**Obtain: Pyloric view, measure length and thickness**

**Questions: Is it thick (>3mm)? Is it long (>14mm)? Is there an antral nipple sign? Are there contents passing through?**



Contents Passing



Enlarged

## Pitfalls

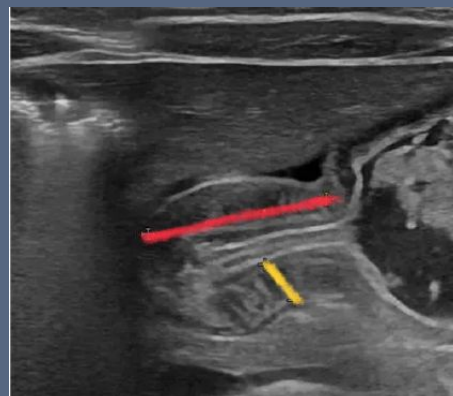
Gas in stomach can obstruct view - give sweet-ease

Scan in parent's arms so child stays calm

Lack of contents passing through highly suspicious for pyloric stenosis



Target Sign



Thick (yellow) Long (red)

