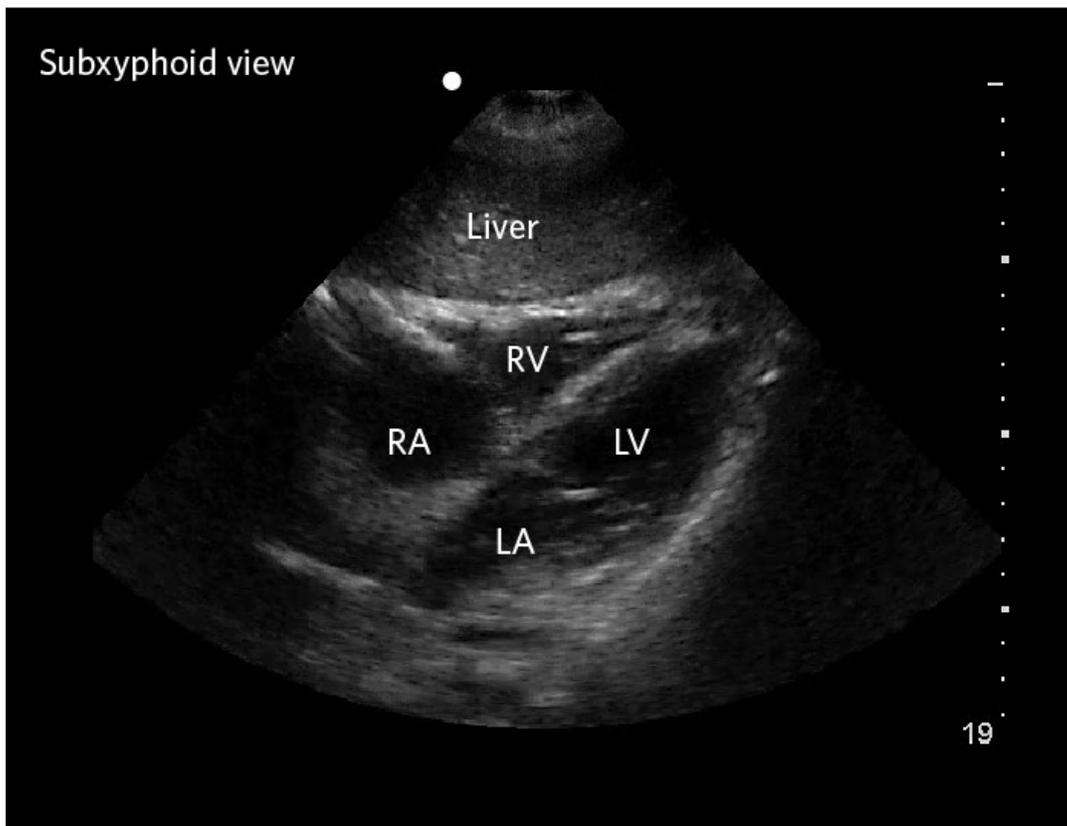




EXTENDED FAST ULTRASOUND: The How-To Guide

How to do it:

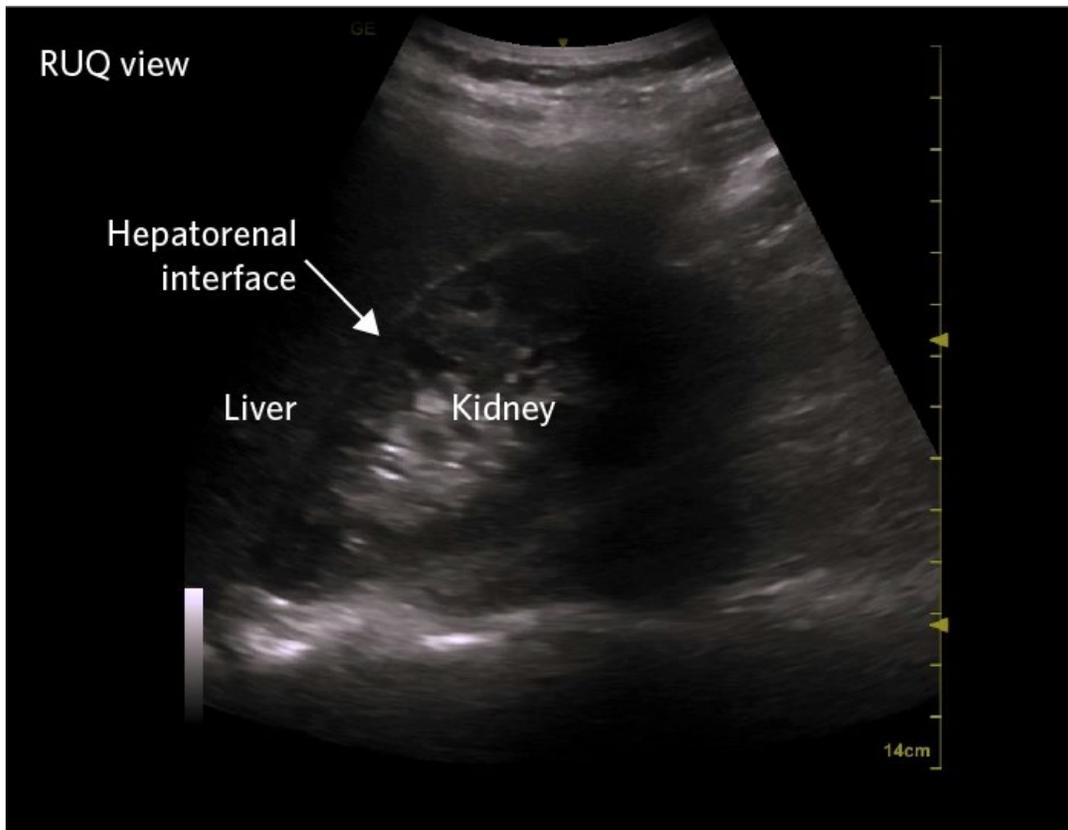
Start with the subxyphoid view, the best view to detect pericardial effusion.



Subxyphoid View of the Heart:

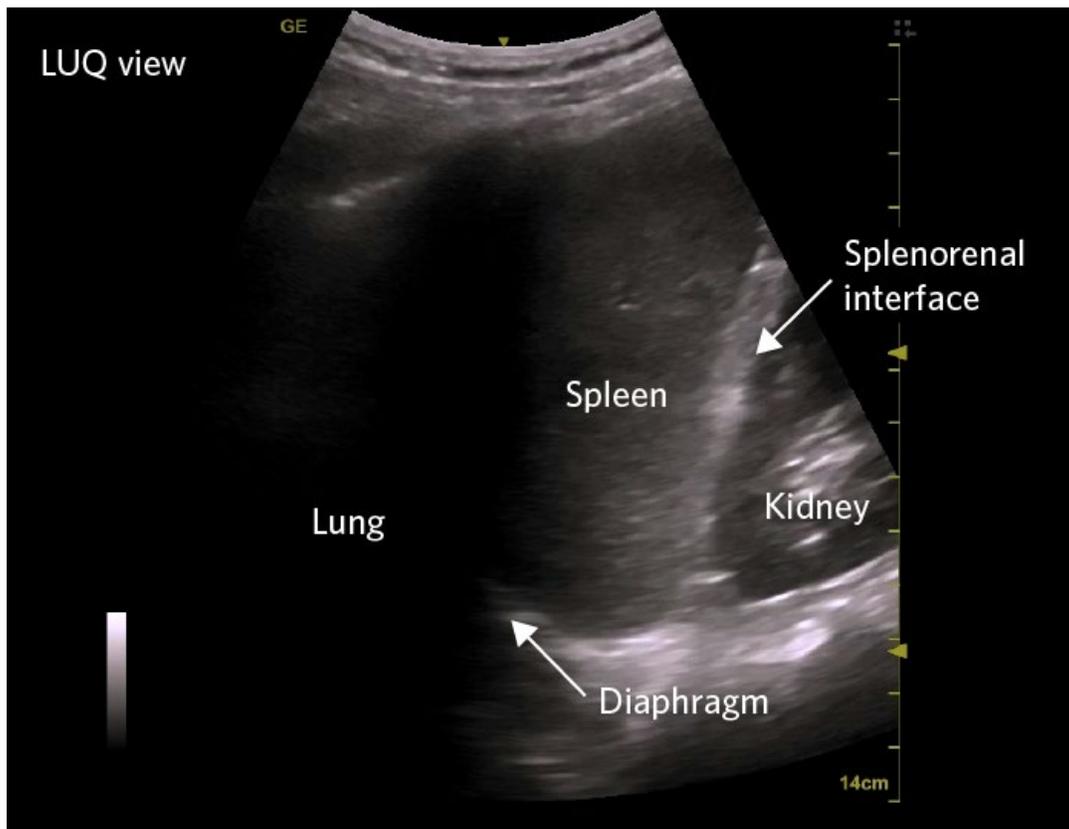
1. Select your probe. Most POCUS operators perform FAST exams using the 'abdominal' or curved array probe. Alternatively, you can also perform this exam with the 'cardiac' or phased array probe.
2. Hold the abdominal probe like a computer mouse, and have the indicator pointing toward the patient's right side.
3. Start with your depth setting on high.
4. Think 'LUMPS'. Start with your probe low on the abdomen, and slide it caudally, until it touches the xyphoid process. At this point you will need to magnify the image by adjusting the depth setting. Once you identify the heart, change your probe angle (often pointing it slightly to the patient's left) so that you can see the intra-ventricular septum right up to the cardiac apex. Be sure to do a full sweep through the heart. So Low, Upward, Magnify, Sweep.

Once you've completed the subxyphoid scan, move on to the abdominal portion of the FAST. The next step is to scan the RUQ. We start here first as this is the area we are most likely to find free fluid collecting. We also want to check the right hemithorax for blood (or fluid).



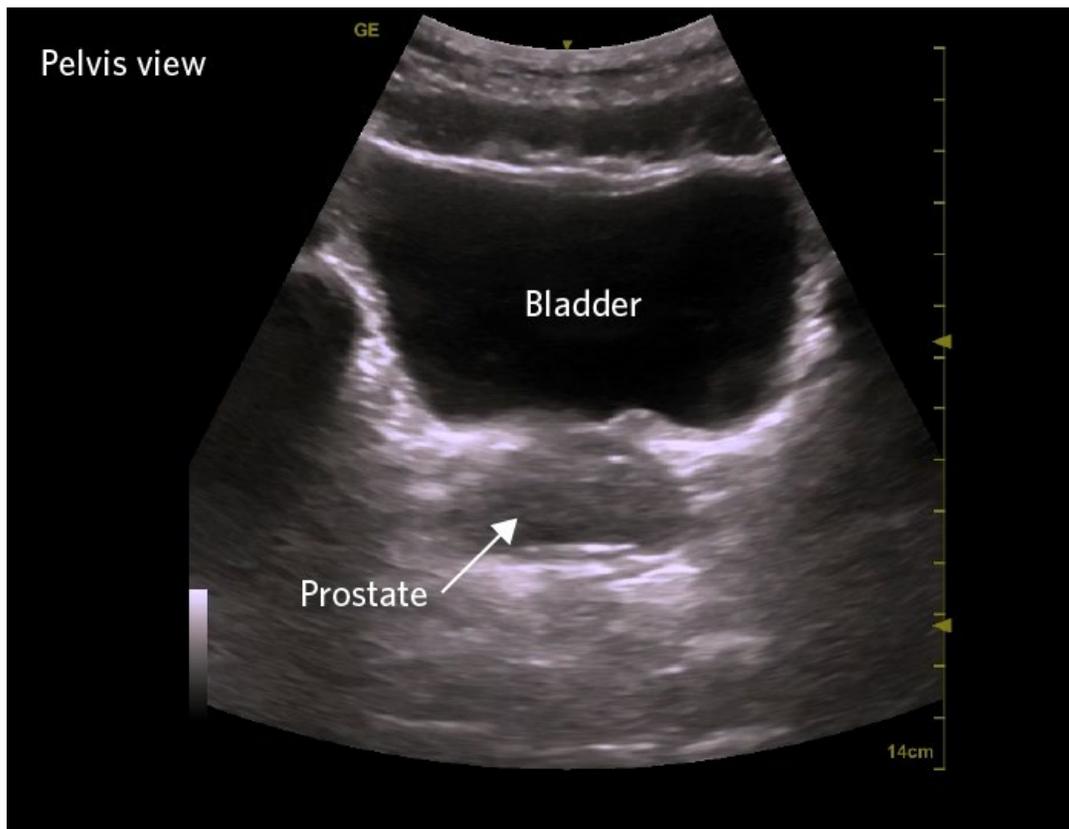
RUQ scan:

1. Lay the probe in your open palm, and place your thumb on top of the probe. The probe indicator should point towards the patient's head.
2. Start with your probe hand near the bed, in the area of the right flank.
3. Locate the area of interest, the hepatorenal interface, usually by moving the probe towards the ceiling.
4. Visualize the entire kidney and hepatorenal interface by performing a thorough sweep. It may not be possible to visualize this area in one view, due to rib shadows. You may need to sweep through the upper kidney and interface, and then slide the probe down caudally and repeat the sweep through the lower kidney and interface. You can also rotate the probe between the ribs to eliminate the rib shadow. The important thing is to ensure you have visualized the entire area of interest with your sweep. Take special care to view the area between the kidney and the caudal tip of the liver, as this is potentially the only area where small amounts of fluid will be seen.
5. Confirm presence of free fluid - YES or NO.
6. Next, slide your probe cephalad to visualize the diaphragm. Inspect the area above the diaphragm for signs of fluid. Fluid in the thorax will appear black, while ordinary lung has a scattered appearance similar to the liver (when viewed from the abdomen).



LUQ scan:

1. Perform the same steps as above to locate the area of interest, the splenorenal interface. Remember that this area is slightly more cephalad and often more posterior than on the right side.
2. Sweep the entire kidney and interface.
3. It's also important on the LUQ scan to visualize and sweep the area between the spleen and diaphragm, another location that free fluid commonly collects. This may be the only place you will find free fluid, so do not miss it.
4. Confirm the presence of free fluid, YES or NO.
5. Next slide your probe cephalad to visualize the diaphragm, and look above the diaphragm for signs of fluid in the thorax.



Pelvis Scan:

1. Holding the probe in a transverse orientation, place it in the supra-pubic area and angle it towards the coccyx.
2. Locate the bladder, which will look like contained black fluid.
3. Sweep through the bladder, looking for free fluid in the pelvis. Free fluid here tends to collect behind the bladder, and will have an irregular shape.

How to do it better:

- Keep the patient supine to ensure any free fluid collects in the gutters.
- Trendelenberg may improve your ability to detect free fluid.
- If you are having difficulty localizing the entire kidney, having your patient take a breath in and hold it may make it easier to visualize.
- Be aware of the 'spine sign' when looking for thoracic fluid. Normally, air in the lung prevents visualization of the thoracic spine. However, the presence of a large amount of pleural fluid (either an effusion or blood) will permit visualization of the thoracic spine.

How to do it safely:

Be aware of the limitations of this exam:

FAST is not 100% sensitive for free fluid in the abdomen. You are unlikely to detect amounts of fluid less than 300 to 500 cc. You can greatly improve your sensitivity to detect fluid by repeating the FAST scan.

Finding fluid on the scan does not tell you what that source is. Fluid from intra-abdominal hemorrhage, ascites, dialysate fluid, and a ruptured ovarian cyst will all look the same.

FAST is unable to assess the retroperitoneum, and as a result, you will not see bleeding in this area. For example, you will be unable to detect the retroperitoneal bleed of an AAA, a ruptured kidney, or that secondary to an unstable pelvic fracture.

Don't forget your clinical judgement: An unstable trauma patient is still an unstable trauma patient, even if their FAST is negative. Injuries to bowel for instance, often do not present with a positive FAST but can lead to life threatening peritonitis.

False positive exams

- False positive exams can arise from perinephric fat, or fluid within the bowel lumen.

False negative exams

- Bowel adhesions may prevent the normal flow of intra-abdominal fluid into the right and left sided gutters. Never be overly confident about calling a negative FAST in a patient with previous abdominal surgery.
- Clotted blood is echogenic and will be difficult to see. FAST is less helpful in delayed presentations.
- LUQ variability can lead fluid can first accumulate between the spleen and diaphragm, before accumulating in the splenorenal interface. You must always visualize the diaphragm above the spleen to rule this out.

How to use this in practice:

A FAST exam can often identify critically ill trauma patients more quickly, and especially if access to CT scan is limited. This exam should be automatically included as part of your primary survey (ABC, eFAST, D, secondary survey). Normal FAST findings mandate repeated scans when there is clinical concern.

The abdominal portions of the FAST scan also have some utility outside of the trauma setting:

In pregnant patients with abdominal pain, a positive FAST scan can quickly identify a ruptured ectopic pregnancy.

You can also use this exam in more stable patients, for instance to confirm or rule out suspected ascites.

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