**Introduction**

Hello, my name is Cody Couperus and today we’ll be going over an introduction to point of care ultrasound of the appendix.

Appendicitis is the most common abdominal surgical emergency and ultrasound is a useful diagnostic tool for it’s identification. The use of point of care ultrasound can decrease the time to diagnosis of appendicitis and at the same time reduce patient exposure to radiation. It is especially useful in the pediatric population where the adverse outcomes of radiation exposure are more likely.

POCUS for identification of appendicitis is very specific but can have low sensitivity due to inadequate visualization of anatomy. In general, if you scan a bunch of patients for which you are concerned about appendicitis, about 1/3 will have clear diagnostic views, 1/3 will have equivocal views, and 1/3 will not be visualized. When signs of appendicitis are present, the positive predictive value of ultrasound is excellent.

**Indications/Contraindications**

Choosing the right patients to scan will improve the likelihood of achieving a diagnostic test. You will want a patient with signs and symptoms of appendicitis \*\*\*.

It is important to provide adequate analgesia prior to performing the ultrasound scan, as it could markedly exacerbate the patient’s pain.

Lastly, if a patient is peritonitic and toxic appearing, the OR may be the best place for the patient and timely involvement of the surgical team is of utmost importance.

**Probe selection**

For appendix ultrasound you will want to choose between the high frequency linear probe and the low frequency curvilinear probe. Many practitioners prefer the linear probe as it offers greater image quality, but in patient’s with a large body habitus, the curvilinear probe will offer better tissue penetration.

**Positioning**

After providing patient analgesia, you should place the patient in the supine position.

Crossing the patient’s right leg over the left can sometimes help to bring the appendix more anterior.

**Scanning Technique**

There are multiple approaches to identifying the appendix, and identification of relevant anatomy what ultimately counts.

The most common and useful approach is to have the patient point to the location of most intense pain and place the probe there in transverse orientation with the indicator facing the patient’s right side. In the case of appendicitis, this will often allow you to find the appendix with minimal difficulty.

The appendix itself is a non-peristalsing tubular structure that can be followed to a blind end. The structure is most difficult to see in the absence of appendicitis, and dilation/obstruction actually make it much easier to visualize.

If this strategy fails, you should begin to scan systematically in the right lower quadrant between the umbilicus and the iliac crest. Look for the useful landmarks of the iliac crest (lateral to the appendix), the psoas muscle (posterior to the appendix), and the iliac artery/vein (directly behind the appendix). Once identified scan up and down these structures and look for the appendix. About 75% of the time you will find the appendix within the bounds of these structures.

During the scan you will likely see small bowel and the beginning of the large bowel (the cecum). Indeed, the proximal aspect of the appendix originates from the cecum and this is another landmark that can be used for it’s identification. Small bowel is most commonly visualized as a peristalsing structure containing moving luminal content. In contrast, the large bowel often visualized as a lumpy bumpy gas pattern.

Once you have successfully identified the appendix you should attempt to visualize it’s entire length from the tip to it’s entrance into the cecum. Attempt to compress the appendix, as failure to compress indicates increased luminal pressure and potential obstruction. You will then measure the widest portion of the tubular structure from the outer edge of each wall. Lastly, you will place color dopler over the appendix, and look for hyperemia (just a lot of color).

**Diagrammatic Anatomy vs US anatomy**

**- Talk through examples with CT comparison**

**Specific findings**

The two findings most suggest of appendicitis are:

* Diameter >6 mm
* Non-compressibility

Additional findings include visible lumenal fecolith, hyperemia (ring of fire), periappendicalar fluid, and edematous, hyperintense, surrounding fat (equivalent to fat stranding).

**How to report and document findings**

**Integration into global clinical picture**

**Summary and Conclusion**