EM CASES SUMMARY

Episode 53 – Pediatric POCUS
Ch.2 Lung Ultrasound

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Lung ultrasound:

Lung ultrasound has several advantages over CXR for the assessment of infectious respiratory illnesses in pediatric ED patients. First, it can help differentiate between a viral URTI, pneumonia or an empyema. Second, in the child with an early bacterial pneumonia which may not be present on chest x-ray, POCUS can help make the correct diagnosis and allow the physician to initiate early antibiotic therapy. Finally, POCUS can more reliably pick up retrocardiac infiltrates that are difficult to visualize on CXR.

Accuracy of lung POCUS for pneumonia:

Studies have shown that with appropriate training POCUS has a sensitivity and specificity 90% for the diagnosis of pneumonia.

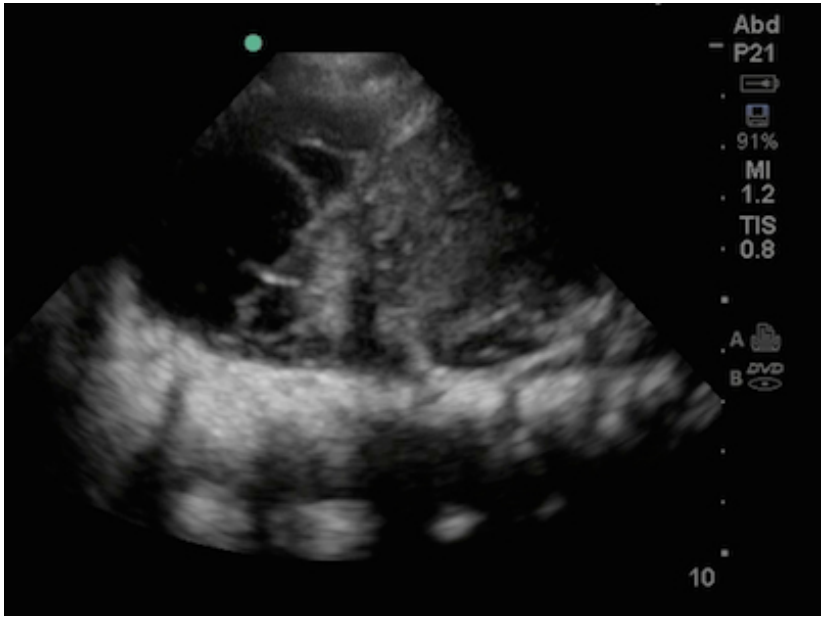
Diagnosing pneumonia using lung ultrasound:

Several approaches to identifying pneumonia with bedside ultrasonography have been described in the literature. One approach advocates for dividing the lung into 32 different regions and scanning each separately. The diagonal approach involves starting high along the chest, towards the sternum and proceeding diagonally towards the flank. The third approach divides the chest into “anterior”, “axillary” and “posterior” sections. The ultrasound is then used to look both superiorly and inferiorly in each of the three sections.

When looking at the lung ultrasound one muse first identify the ribs which create hypoechoic shadows. Looking between two ribs you then idenitify the pleural line and position the probe to visualize A lines (horizontal artifacts).

Once the landmarks have been identified, scan each section of the lung carefully, looking for signs of consolidation (see image below). Several distinctive features of consolidation include:

1. ***Hepatization*** - the lung looks like liver tissue
2. ***Shred sign*** - plural edge looks uneven
3. ***Tissue sign*** - looks like tissue instead of normal lung appearance



Tissue Sign for lung consolidation

To screen for retro-cardiac pneumonias, begin by generating a *parasternal long view* of the heart. In the setting of a retrocardiac pneumonia there will be a lack of mirror heart image and visible B lines.

Differentiating between consolidation and atelectasis:

Differentiating between atelectasis and consolidation can be very difficult. Although there is no definitive way to tell the two apart on POCUS, several characteristics can help distinguish the two.

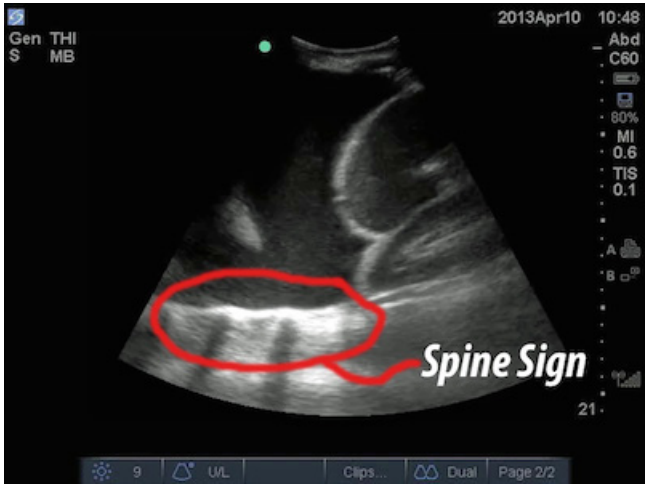
Although controversial, our experts recommend looking for air bronchograms (air in the bronchus much like it is seen on a chest x-ray). If the air bronchograms are *static* during the respiratory cycle, the area may represent either atelectasis or consolidation. However, if they are *dynamic* during the respiratory cycle, this should prompt a higher suspicion for consolidation.

These views are difficult to generate and interpret correctly and there will be subjectivity in interpreting these images just like any other test. It is important to interpret your findings in the clinical context and not solely rely on images.

Pearls and pitfalls:

- *Pearl* - on FAST exam, seeing the spine above the level of the diaphragm (*spine sign – see image*) can indicate presence of lung pathology.

- *Pitfall* - not looking at all of the lung and missing pathology



Video of POUCS lung scan by Dr. Mike Stone here: http://vimeo.com/51212231

For detailed International evidence based recommendations for point of care lung ultrasound visit: http://link.springer.com/article/10.1007/s00134-012-2513-4

References:

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