

Just-In-Time Learning Series: LUNG POCUS IN THE DIAGNOSIS AND TREATMENT OF TENSION PNEUMOTHORAX



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TENSION PNEUMOTHORAX

Pneumothorax associated with hypotension, secondary to the mediastinal shift leading to obstructive shock.

Early diagnosis and treatment of tension pneumothorax can lead to rapid reversal of obstructive shock physiology

Lung ultrasound relies heavily on image interpretation and is very sensitive and specific for the diagnosis of pneumothorax.

EMERGENT NEEDLE DECOMPRESSION

Identifying tension pneumothorax is one of the indicators for emergent needle decompression. Needle decompression shouldn't be taken lightly and is associated with certain complications including an iatrogenic pneumothorax and bleeding resulting from laceration of an intercostal artery.

A large bore angiocath is inserted inside of the pleural space where air is trapped. The needle is advanced until there is a sound indicating the exiting of air from the cavity into the angiocath.

CHEST WALL THICKNESS

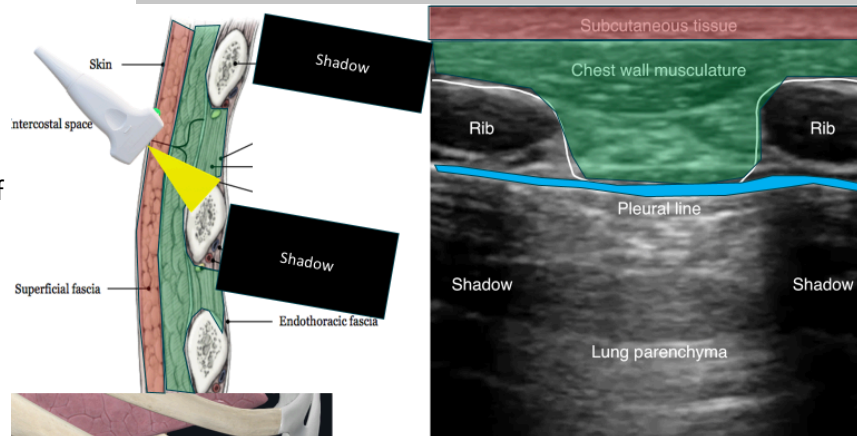
Chest Wall Thickness (CWT) is the distance between the skin and the pleural line. CWT can contribute to treatment failure of needle decompression.

- CWT varies by location and BMI
- CWT > 3.5cm 50% of the time

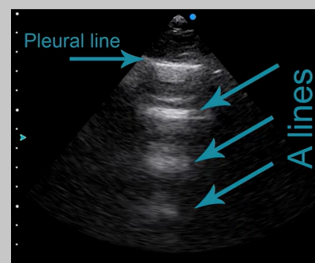
Measuring CWT with Point-of-Care Ultrasound (POCUS):

- Ultrasound allows us to visualize the space between the subcutaneous tissue and pleural line.
- This can assist in identifying the correct insertion site and selecting the correct angiocath with the correct length. The length of the catheter should extend beyond the pleural line.

LUNG ULTRASOUND BASICS



1. Place the probe in a cranial caudal access to view a cross-sectional area of the chest wall.
2. Identify lung sliding using a high frequency probe or vascular probe/setting
 - a. Back and forth sliding of the pleura (parietal pleural and visceral pleural layers) as the patient breathes. **The presence of lung sliding rules out the presence of pneumothorax.**
 - b. In pneumothorax, air dissects the contact between the parietal pleural layer and visceral pleural layer and lung sliding is not observed on ultrasound. **The absence of lung sliding alone is not specific enough to diagnose a pneumothorax.**
3. If lung sliding is not observed, identify A lines in the lung parenchyma to confirm pneumothorax.



- A Lines are reverberation artifacts from the pleural line and occur because of the presence of air in the lung parenchyma.
- These lines appear horizontal, static, and spaced symmetrically.

The associated training video to this document was published on 07/16/2024. The training can be viewed on Youtube at Mountain Plains RDHRS. The MPRDHRs JIT Learning Series is funded by Award Number 6 HITEP200043-01-03 from the Administration for Strategic Preparedness and Response (ASPR). This information is not meant to be a substitute for medical professional advice, diagnosis, or treatment.

