

# Just-In-Time Learning Series: INTRODUCTION TO CHEST TUBE PLACEMENT AND MANAGEMENT IN THE DISASTER SETTING



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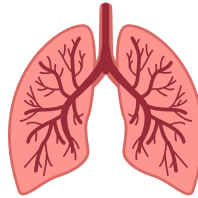
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## ANATOMY

- **Parietal pleura:** lining on inside of chest wall
- **Visceral pleura:** lining that covers the lungs
- **Pleural space:** thin fluid filled space between the pleural layers.
  - Disruptions of this space
    - Air: Pneumothorax
    - Blood: Hemothorax
  - Negative pressure keeps lungs inflated and space small (layers close to each other).

## DIAGNOSIS - Symptoms

- Varies based on cause, size, and speed of onset
- Mild dyspnea and pleuritic pain, shoulder pain, mild cough
- Severe dyspnea, hypotension



## KEY DEFINITIONS

- **Spontaneous pneumothorax:** Rupture of lung bleb with little or no trauma
- **Traumatic closed pneumothorax:** Blunt injury without penetration of the chest wall
  - Rib fracture or traumatic bleb rupture
- **Traumatic open pneumothorax:** Penetrating injury to chest wall with loss of negative pressure
  - Tension Pneumothorax
    - One way valve of air in, but not air out
    - Lung collapse, mediastinal shift, decreased ventricular filling, leading to hypotension and ultimately cardiac arrest
- **Hemothorax:** Blood in pleural space
  - From: heart, great vessels, lung vessels, chest wall
  - Arterial usually requires surgery (intercostal, pulmonary, or internal mammary arteries)

## INSERTION OF A CHEST TUBE

1. Prep and drape the chest
2. Anesthesia
3. Scalpel (No. 10) to make a 3-5 cm Incision in the selected site (over the rib)
4. Bluntly dissect (Large Kelly clamp) over the rib (remember vessels run under the rib)
5. "Pop" through the parietal pleura with closed clamp
6. Spread the clamps to make a hole (tube + Finger)
7. Place your finger inside the tract, then remove clamps. Ensure no abdominal organs and you are within the pleural space
8. Slide tube along finger, and direct superior, medially, and posteriorly (can use clamps to direct). It should pass easily. Resistance should make you consider you are not in parietal space (subcutaneous, fissure, mediastinum)
9. Stop when resistance met/all holes are intrathoracic
10. Attach to drainage system

## DIAGNOSIS - Exam

Unilateral decreased breath sounds, tachypnea, tachycardia, subcutaneous emphysema.

- **Stable:** Symptoms/exam less helpful overall, very subtle
  - E.g. Pneumothorax less than 20% of the hemithorax may have completely normal exam findings
  - Pleural fluid collections less than 500 mL hard to note on exam
- **Unstable:** Pneumothorax should be considered in the unstable trauma patient during primary survey (ABCD).
  - Tachycardic, hypotensive, dyspnea
  - Similar: PE, Tamponade, significant pneumonia
  - Less common but possible: JVD, tracheal deviation

## OTHER CONSIDERATIONS

<b>NEEDLE DECOMPRESSION</b>	Lifesaving intervention <ul style="list-style-type: none"><li>• Apnea, hypotension, cardiac arrest</li><li>• Do not wait for imaging</li><li>• Should see: rapid improvement in vital signs/gush of air</li><li>• Large angiocath (16 ga or bigger)</li><li>• Followed by tube thoracostomy</li></ul>
<b>FINGER THORACOSTOMY</b>	Alternate method <ul style="list-style-type: none"><li>• Scalpel and forceps</li></ul>
<b>PIGTAIL</b>	Many different small bore, catheter options exist <ul style="list-style-type: none"><li>• Typically a Seldinger technique</li><li>• Same site selection as tube thoracostomy</li><li>• Typically for pneumothorax, not hemothorax</li><li>• Many different kits exist</li></ul>

## CONSIDERATIONS FOR A DISASTER SCENARIO

In the disaster setting, equipment and resources will undoubtedly be limited. Become familiar with your department's equipment so when a disaster occurs, the kit you have available isn't "new" to you. The principles of when a patient needs a chest tube, and how to place one, should not change in a disaster setting.

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