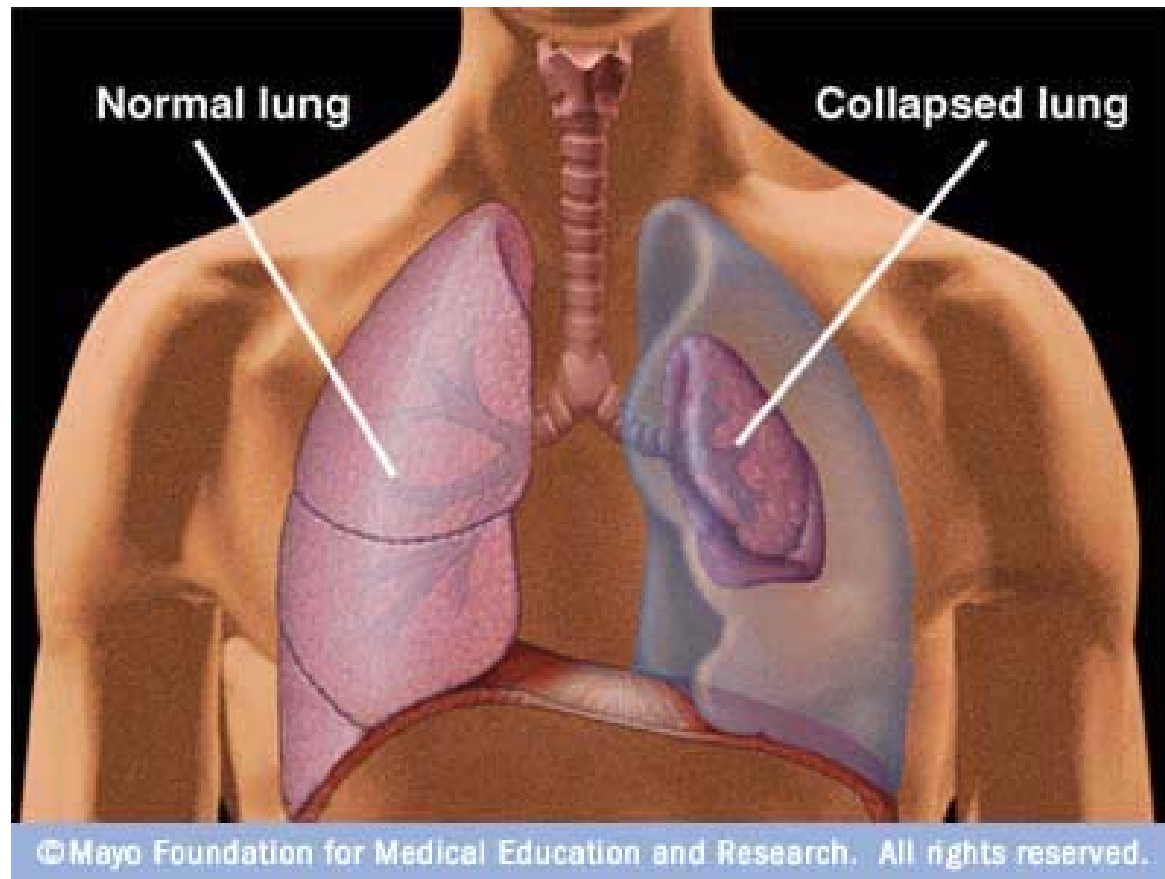


# Emergent Needle Decompression Chest

# Indication for emergent needle decompression

- Tension pneumothorax
  - Accumulation of air under pressure in the pleural space.
  - Develops when injured tissue forms a 1-way valve, allowing air to enter the pleural space and preventing the air from escaping naturally.
  - Rapidly progresses to respiratory insufficiency, cardiovascular collapse, and, ultimately, death if unrecognized and untreated.
  - Requires urgent diagnosis and immediate management.

# Collapsed lung



# Etiology

- Trauma (blunt or penetrating)
  - Involves disruption of either the visceral or parietal pleura
  - Associated with rib fractures (but not necessary for tension pneumothorax to occur)
- Barotrauma
  - secondary to positive-pressure ventilation, especially when using high amounts of positive end-expiratory pressure (PEEP)
- Central venous catheter placement
- Conversion of idiopathic, spontaneous, simple pneumothorax to tension pneumothorax

# Etiology

- Unsuccessful attempts to convert an open pneumothorax to a simple pneumothorax in which the occlusive dressing functions as a 1-way valve
- Chest compressions during cardiopulmonary resuscitation (CPR)
- Pneumoperitoneum
- Fiberoptic bronchoscopy with closed-lung biopsy
- Markedly displaced thoracic spine fractures

# Signs and Symptoms

## Early findings

- Chest pain
- Dyspnea
- Anxiety
- Tachypnea
- Tachycardia
- Hyperresonance of the chest wall on the affected side
- Diminished breath sounds on the affected side

# Signs and Symptoms

## Late findings

- Decreased level of consciousness
- Tracheal deviation toward the contralateral side
- Hypotension
- Distension of neck veins (may not be present if hypotension is severe)
- Cyanosis

# Signs and Symptoms

In nonventilated patients, diagnosis requires

- a high level of suspicion
- presence of decreased or absent breath sounds on the affected side.



# Basic Principle

The basic principle is to introduce a catheter into the pleural space, thus producing a pathway for the air to escape and relieving the built-up pressure.

Although this procedure is not the definitive treatment for tension pneumothorax, emergent needle decompression does arrest its progression and serves to restore cardiopulmonary function slightly.

# Needle decompression

1. Needle decompression can be associated with complications.
2. It should not be used lightly.
3. It should never be used just because you don't hear breath sounds on one side.

## **BUT**

4. In clear cut cases: shock with distended neck veins, reduced breath sounds, deviated trachea, it could be life saving.

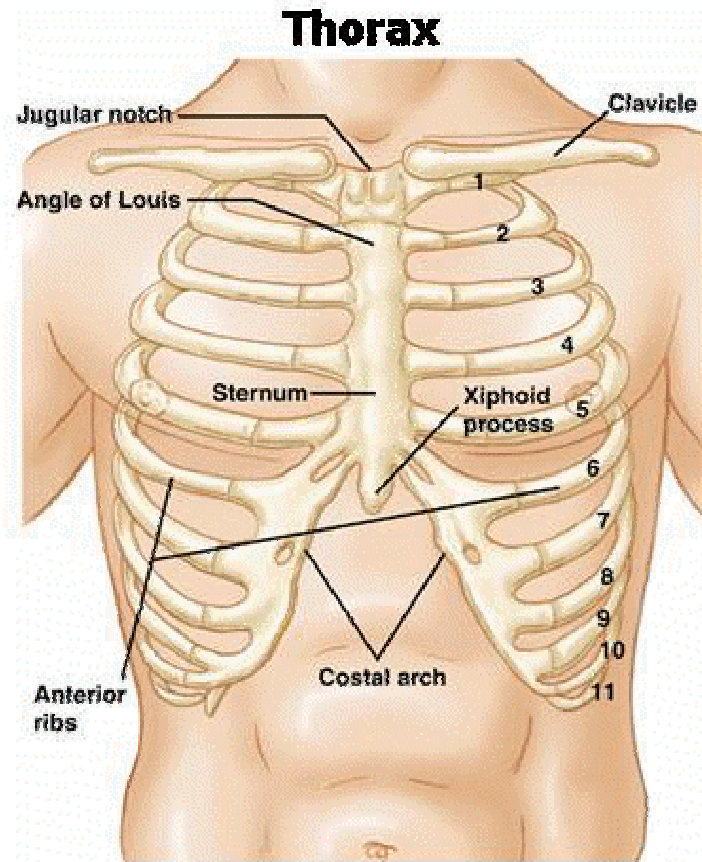
# Prepare patient

- Administer 100% oxygen, and ventilate the patient if necessary.
- Explain to the patient and/or family member the reason for the procedure
- Explain to the patient and/or family member the steps in the procedure
- Explain to the patient that he must keep very still during the procedure.

# Procedure

- Locate anatomic landmarks. The decompression needle should be placed in the second intercostal space at the midclavicular line. This will puncture through the skin and, possibly, through the pectoralis major muscle, external intercostals, internal intercostals, and parietal pleura.
- Quickly cleanse the area to be punctured with an iodine-based solution (Betadine).

# Anatomical site



# Procedure

- Insert a large-bore (ie, 14-gauge or 16-gauge) needle with a catheter into the second intercostal space, just superior to the third rib at the midclavicular line, 1-2 cm from the sternal edge (ie, to avoid injury to the internal thoracic artery).
- Use a 3-6 cm long needle, and hold it perpendicular to the chest wall when inserting; however, note that some patients may have a chest wall thickness greater than 3 cm and failure for the symptoms to resolve may be attributed to inadequate needle length.

# Placement



# Placement

- Placement in the middle third of the clavicle minimizes the risk of injury to the internal mammary during the emergency procedure. Place the catheter just above the cephalad border of the rib because the intercostal vessels are largest on the lower edge of the rib.



# Procedure

- Once the needle is in the pleural space, listen for the hissing sound of air escaping,
- Remove the needle leaving the catheter in place
- The cannula is left open to air
- Secure the catheter in place
- Prepare the patient for tube thoracostomy.

# Contraindications

- Previous thoracotomy,
- Previous pneumonectomy,
- Presence of a coagulation disorder.
- These are relative contraindications, however, because tension pneumothorax is a life-threatening condition, and failure to treat expectantly can result in patient death.

# COMPLICATIONS

## Major Complications

Pneumothorax	11%
Splenic laceration	0.8%
Hemothorax	0.8%

## Minor Complications

Pain	22%
Cough	11%
Dry tap	13%
Subcutaneous hematoma	2%
Infection: cellulitis, empyema	
Subcutaneous seratoma	0.8%