

Chest Tube Insertion and Removal

Introduction:

Tube thoracostomy is a procedure in which a tube is placed into the pleural cavity to drain abnormal collections of air or fluid.

Indications:

- Tension pneumothorax
- Simple pneumothorax > 15%
- Hemothorax
- Pleural effusion
- Empyema
- Chylothorax

Contraindications:

- Multiple pulmonary adhesions
- Large pulmonary bulla or blebs
- Need for open thoracostomy
- Massive hemothorax before fluid resuscitation
- Coagulopathy

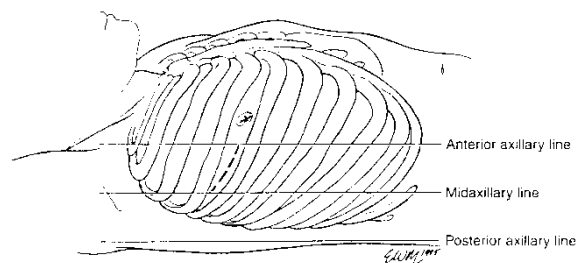
Equipment:

- Sterile gloves
- 1% Lidocaine with syringe and needles
- Betadine
- Sterile drapes
- Scalpel with No . 10 blade
- Large curved mayo scissors
- Large kelly clamps
- Medium kelly clamps
- Chest tube:
 - 16 to 24 Fr in children
 - 28 to 40 Fr in adults
- Water-seal apparatus (pleur-evac) with clear tubing, serrated connector, & suction
- Needle driver
- Large cutting needle with 0 or 1-0 silk

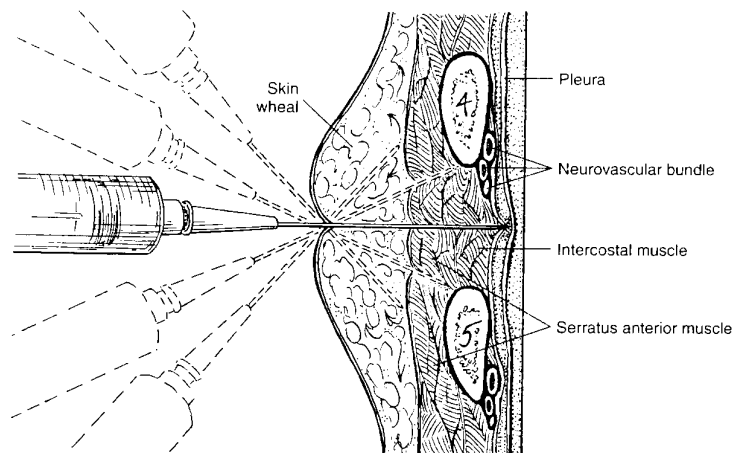
- Vaseline-impregnated gauze
- 4 × 4 gauze pads
- Wide cloth adhesive tape

Technique:

1. Place the patient in a semierect position (or supine if the patient's condition is unstable).
2. Elevate the arm above the head on the ipsilateral side for the procedure.
3. Mark the site for insertion at the 4th or 5th intercostal space at the anterior axillary line.

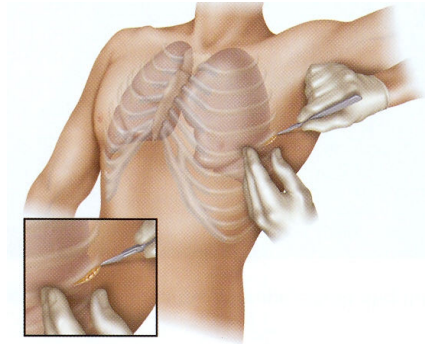


4. Prepare and drape the skin in sterile fashion.
5. Raise a wheal with anesthetic over the insertion site.
6. Infiltrate deeper with the Lidocaine, using the 25-gauge needle to anesthetize the subcutaneous tissue, intercostal muscles, and parietal pleura.

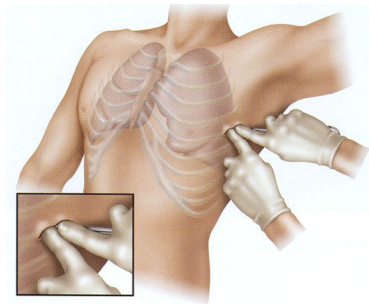


7. An awake patient will require 10 to 20 ml of Lidocaine.
8. Make a 2-to-3-cm incision over the 5th rib, running parallel to

the rib.



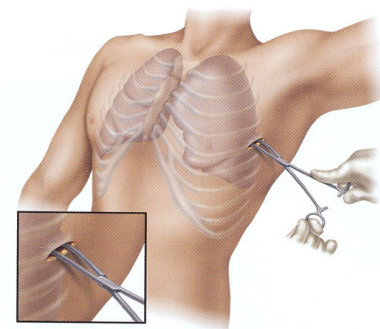
9. Bluntly dissect the subcutaneous tissues, using the kelly clamp or mayo scissors.



10. Dissection should be caudad, over the top of the 4th or 5th rib.

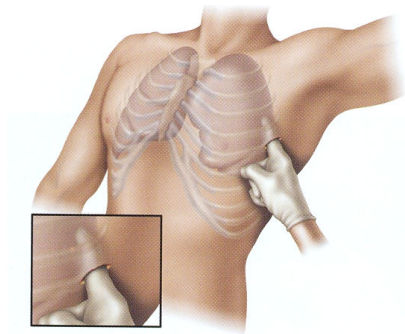
11. Using a closed clamp or scissors, bluntly penetrate the parietal pleura with steady Pressure.

12. Open the instrument wide after penetrating the pleura, and remove with the instrument still open to widen the size of the opening.

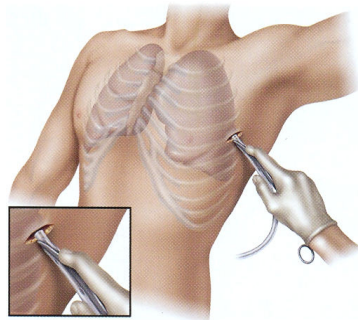


13. Insert a gloved finger through the pleural opening to verify

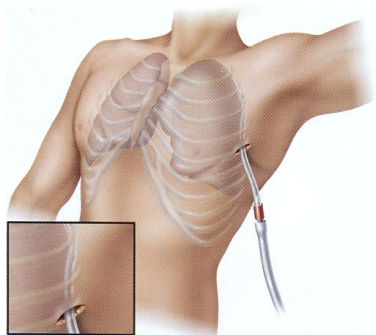
position and absence of adhesions or abdominal organs.



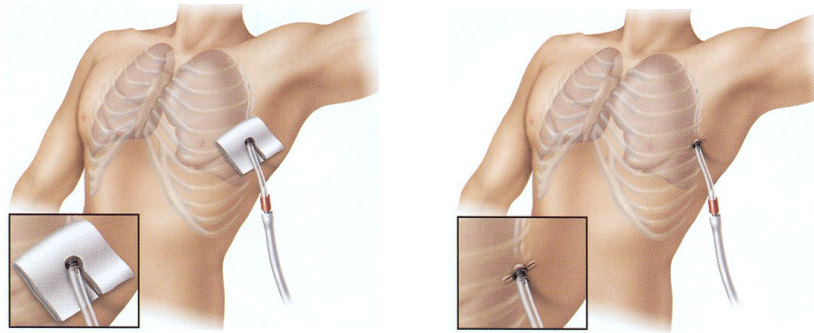
14. Guide an appropriate size chest tube into place, using fingers and a pean clamp on the end.



15. Direct the tube posteriorly and cephalad until all holes are within the thoracic cavity.



16. Connect the tube to a water-seal apparatus. If the system is patent, bubbles should appear when the patient coughs.
17. Secure the tube with suture in purse - string fashion and cover with vaseline - impregnated dressing , 4 × 4 gauze pads, and adhesive tape.



Complications:

- Incorrect placement
- Infection
- Laceration of lung, liver, or other abdominal organs
- Injury to intercostal bundle
- Injury to long thoracic nerve
- Cardiac dysrhythmias
- Persistent pneumothorax

Chest Tube Removal

Technique:

1. Cut portion of the suture anchoring the tube, taking care not to cut the vertical mattress sutures that are reapproximating the skin.
2. Place Xeroform gauze and sterile gauze dressing over the insertion site.
3. While maintaining constant pressure on the skin with the gauze, ask the patient to take a deep breath and perform a Valsalva maneuver to remove the tube during it. This prevents air from entering the pleural cavity and causing a pneumothorax.
4. Have an assistant maintain the pressure seal on the skin while you tie the horizontal mattress suture, thereby closing the skin.
5. Place a dressing on top of the site. The sutures may be removed in 1 week.
6. Obtain a CXR to rule out a pneumothorax.

Checklist for Chest tube Insertion

1. Identifies the patient
2. Assembles correct equipment in the tray
3. Washes hands
4. Wears gloves and mask
5. Removes clothing on site of examination
6. Places the patient in a semierect position (Or supine if the patients conditions is unstable)
7. Elevates the arm above the head on the ipsilateral side for the procedure
8. Marks correctly the site (4 th or 5 th intercostal space at anterior axillary line) for incision
9. Preps and drapes the site of chest tube insertion
10. Numbs the site of incision
11. Makes an incision in correct position with appropriate size
12. Bluntly dissects the subcutaneous tissue with clamp
13. Bluntly penetrates the parietal pleura with closed clamp
14. Opens the instrument wide after penetrates the pleura and removes with the instrument still open to widen the size of opening
15. Inserts a gloved finger through the pleural opening to evaluate pleura
16. Guides an appropriate-size chest tube into place
17. Directs the tube posteriorly and cephalad until all holes are within the thoracic cavity
18. Connects the tube to a water-seal apparatus and requests from patient to coughing
19. Secures the tube with sutures and covers with vaseline-impregnated dressing, 4×4 gauze pads and adhesive tape
20. Considers complications
21. Records finding and operate note on patient's medical record