

Maine Medical Center – Department of Emergency Medicine
Emergency Tube Thoracostomy Checklist

Anesthesia

Tube Thoracostomy can be very painful. Utilize systemic analgesia or procedural sedation when possible. Also use adequate local anesthetic – up to 5 mg/kg of 1% lidocaine with or without epi.

- Use a 25-ga needle to slowly inject 5 cc of local anesthesia into the skin at the anticipated site of incision. Infiltrate deeper. Once the peri-ostium is encountered, inject between 5-10 cc of local anesthetic.
- Use a longer needle (between 23-ga to 27-ga) and advance the needle over the top of the rib while intermittently infiltrating and aspirating until the pleura is breached and air is withdrawn
- Once the pleura is breached, inject liberally to cover the pleural lining as entry into the pleura can be very painful
- Ensure adequate local anesthesia across the entire anticipated track of the chest tube

Patient Preparation

- Oxygenate and Monitor with cardiac monitoring and pulse oximetry
- Elevate the head of the bed 30 – 60 degrees when possible (lowers the diaphragm and decreases the risk of injury to the diaphragm/spleen/liver)
- Abduct the arm on the affected side, placing it over the patient’s head, and restrain in this position when possible
- Clean the skin with standard surgical scrub and drape the skin with sterile towels

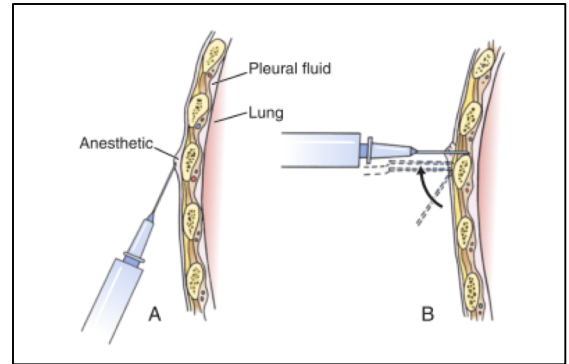
The Procedure

Tube Placement

Most common location for placement in emergency situations is the mid-axillary to anterior axillary line, in the fourth or fifth intercostal space. The fifth intercostal space is approximately at the level of the nipple or the inferior scapular boarder in most patients.

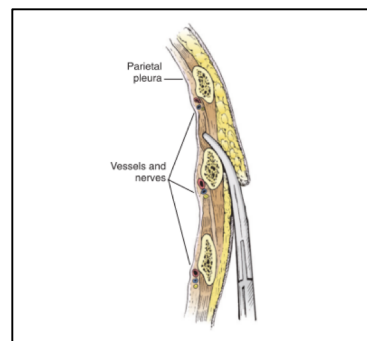
Steps of the Procedure

- Use a No. 11 or 10 blade to make a skin incision approximately 4 cm long overlying the rib that is BELOW the desired intercostal level of entry. The skin incision should be in the same direction as the rib itself.
- Use a hemostat or a medium Kelly clamp to bluntly dissect a tract in the subcutaneous tissue by intermittently advancing the closed instrument and opening it. Blunt dissection should continue down to the intercostal muscle.
- Palpate the tract with a finger and make sure the tract ends at the upper boarder of the rib above the skin incision.
- Consider adding more local anesthetic to the intercostal muscles and pleura
- Use a closed Kelly clamp to pass through the intercostal muscles and parietal pleura and enter into the pleural space. A closed and locked Kelly clamp is used to enter the chest wall



The Basics

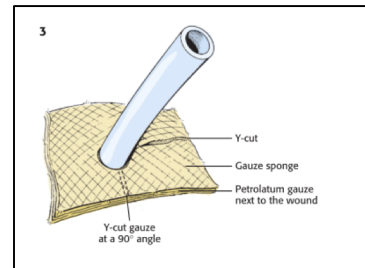
- 1) When Possible – obtain consent
- 2) Identify the patient using two identifiers
- 3) Confirm site of the procedure
- 4) Conduct the procedure as sterilely as possible wearing gown, mask and goggles. Cover hair and apply sterile drapes



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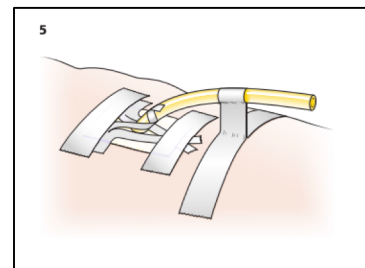
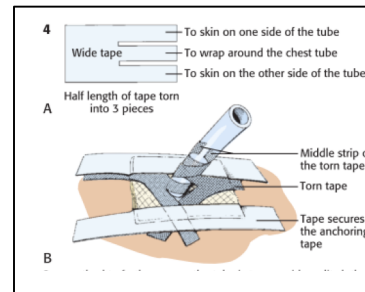
into the pleural cavity. Make sure to guide the clamp over the upper margin of the rib. This maneuver requires some force and twisting motion of the tip of the closed Kelly clamp and should be done in a controlled manner so that the instrument does not enter too far into the chest. Upon entry into the pleural space, a rush of air or fluid should occur.

- The Kelly clamp should be opened (while still inside the pleural space) and then withdrawn so that its jaws enlarge the dissected tract through all layers of the chest wall. This facilitates passage of the chest tube when inserted.
- Use a sterile, gloved finger to appreciate the size of the tract and to feel for lung tissue and possible adhesions. Rotate the finger 360° to appreciate the presence of dense adhesions that cannot be broken and require placement of the chest tube in an alternate site.
- Measure the length of between the skin incision and the apex of the lung to estimate how far the chest tube should be inserted. If desired, place a clamp over the tube to mark the estimated length. Some prefer to clamp the tube at a distal point, memorizing the estimated length.
- With a finger remaining in the tract, the proximal end of the chest tube is held with a Kelly clamp that helps guide the tube through the tract. The distal end of the tube should be clamped until connected to a drainage device.
- Release the Kelly clamp and continue to advance the chest tube posteriorly and superiorly. Make sure all of the fenestrated holes in the chest tube are inside the thoracic cavity.
- Rotate the tube to reduce the likelihood of kinking
- Connect the chest tube to drainage. Release the cross clamp that is on the chest tube only after the chest tube is connected to the drainage device.
- Before securing the tube, look for a respiration-related swing in the fluid level to the water seal device to confirm correct intra-thoracic placement.



Securing the Tube

- Secure the chest tube to the skin using 0 or 1-0 silk or nylon stitches
- Securing sutures: Two separate through and through, simple, interrupted stitches on each side of the chest tube are recommended. Each stitch should be tightly tied to the skin, then wrapped tightly around the chest tube several times to cause slight indentation, and then tied again.
- Sealing suture: Either a central vertical mattress or horizontal mattress stitch with ends left long and knotted together can be placed to allow for sealing of the tract once the chest tube is removed.
- Apply petroleum (eg, Vaseline) gauze over the skin incision
- Bandage the area as depicted in the pictures
- Strap the emerging chest tube on to the lower trunk with a “mesentery” fold of adhesive tape, as this avoids kinking of the tube as it passes through the chest wall. This also helps reduce pain and discomfort. All connections are then taped in their long axis to avoid disconnection.



Completion of the Procedure

- Obtain chest radiography to ensure correct placement of the chest tube.