

Thoracostomy Tube Insertion

BACKGROUND

- All physicians involved with the insertion of thoracostomy tubes should be adequately trained and supervised prior to performing the procedure independently.²
- Routine prophylactic use of antibiotics in trauma patients requiring tube thoracostomy remains controversial; however, prophylactic antibiotics have been shown in several randomized controlled trials to reduce the risk of infectious complications, including pneumonia, and are therefore recommended at our institution.^{1,3}

CLINICAL PRACTICE GUIDELINES

I. Preparation

- a. All equipment required for the insertion of the thoracostomy tube must be readily available prior to starting the procedure. This includes full barrier precautions (gowns, gloves, mask, hat sterile blue towels, full length drape), a chest tube insertion tray, gauze, syringes, 18 and 23 gauge needles, 1% lidocaine, scalpel, suture material, tape, Pleurovac, and an appropriately sized chest tube.
- b. The patient is positioned supine with the arm extended or raised behind their head to expose the axillary region.
- c. A single dose of antibiotics is administered *prior* to placing the chest tube (Cefazolin 1g IV vs. 2g IV if the patient weighs >80kg; for Penicillin allergic patients, either Vancomycin 1g IV or clindamycin 600mg IV). If urgency of the procedure precludes prior or simultaneous administration of antibiotics they should be given in as close proximity to the procedure as possible.

II. Insertion

- a. All chest tubes are placed using strict sterile precautions (i.e., gown, mask, gloves, hat, sterile blue towels, full length drape).
- b. The patient's chest is prepped widely with chlorhexidine and draped with sterile towels.
- c. The optimal site of insertion is the 4th-5th intercostal space in the anterior to mid-axillary line, at or above the level of the nipple (or infra-mammary crease in females), to avoid injuring the diaphragm.
- d. The dermis, intercostal muscles and pleural surface are infiltrated generously with 1% lidocaine prior to placing the chest tube.
- e. A 1.5cm incision is made in the skin with a #10 scalpel on the inferior border of the rib.
- f. A Kelly clamp is used to bluntly tunnel up and on top of at least one rib until a thin layer of muscle remains; at this point, steady pressure is applied in order to enter the pleural cavity.
- g. The pleural space is then digitally explored to check for intrapleural adhesions.
- h. A 32 - 36Fr chest tube is inserted and directed apically and posteriorly for 8-10cm, ensuring that all holes, including the sentinel hole, are within the pleural cavity.
- i. The chest tube is connected to the Pleurovac and secured at the skin with a 0-silk suture (U-stitch or simple closure).
- j. The Pleurovac should initially be set at -20cm H2O suction.

III. Management

- a. The patient should receive an immediate CXR following placement and a daily CXR until the chest tube is removed.

- b. The chest tube should be removed with the patient lying supine, at the point of end expiration or Valsalva.
- c. A CXR should be obtained after chest tube removal to evaluate for pneumothorax.

*Note: The following guidelines must be followed during the placement of all non-emergent chest tubes. For emergent chest tubes (i.e. in the setting of hemodynamic instability, severe respiratory distress), they should be followed as closely as possible without delaying a potentially life-saving procedure.

REFERENCES

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2. Laws D, Neville E, Duffy J. BTS guidelines for the insertion of a chest drain. *Thorax*. 2003;58:ii53-59.
3. Sanabria A, Valdivieso E, Gomez G, Echeverry G. Prophylactic antibiotics in chest trauma: a meta-analysis of high-quality studies. *World J Surg*. 2006;30:1843-1847.
4. ATLS ® for Doctors Student Manual with DVD, 8th Edition.