Chest Tube Insertion

SICU & TICU

January 2013
GOALS:

• Describe indications and contraindications for chest tube placement in SICU & TICU

• Describe equipment necessary for procedure.

• Describe pre-procedure steps.

• Describe steps of the procedure.

• Describe post-procedure steps.

• Describe possible complications of procedure.
INDICATIONS

- Pneumothorax
- Hemothorax
- Pleural Effusions
- Empyema
CONTRAINDICATIONS

- No absolute contraindications
- Coagulopathy (consider correcting if non-emergent)
- Prior chest surgery (consider adjusting site)
- Rib fractures
- Loculations
NECESSARY EQUIPMENT:

- Chest Tube insertion tray plus ancillaries
  - or
- Chest Tube insertion kit (pre-packaged)
- Chest tube (36 French or larger)*
- PleuraVac
- Drapes & sterile PPE

* - Occasionally, smaller chest tubes may be used, but this is not typical.
# TOOLS

What you need for each setup

## TRAY

- Instrument tray
- Local anesthetic
- Scalpel
- Syringe
- Needles
- Suture
- Gauze

## KIT

The Kit
CT INSERTION TRAY

PRO
More instruments
Better instruments
Reusable

CON
No ancillary supplies
CT INSERTION KIT

PRO
All supplies included

CON
Single use instruments

More expensive
ANATOMY OF A CHEST TUBE

• Tip, with drainage holes and "sentinel eye".

• Body, with distance markings.

• Tail, with taper.
PRE-PROCEDURE STEPS

• If possible, obtain Informed Consent (a conversation, not a signature)

• Administer antibiotics (1-2 gram Ancef, 30 minutes prior to incision)

• If patient is awake, discuss use of additional sedation with supervising physician

• Set up drainage system, verify functional suction

• Patient position and prep
DRAINAGE SYSTEM

- VUH uses Atrium Oasis Dry Suction Chest Drain system
- Included ampule of water must be poured into system prior to use
- Pre set at -20 cmH2O suction (adjustable from -10 to -40)
- Suction indicator visually confirms suction is working
DRAINAGE SYSTEM

In-Line Connector with needleless access sampling port

Convenient Fingertip Suction Adjustment

Innovative Knock-Over Nozzles allow fluid levels to be recovered in the event of an accidental knock-over

New Graduated Air Leak Monitor for assessing patient air leak trends

New Larger Easy-to-Grab Handle and Flexi-Hangers allow the drain to be hung bedside from a single point

Pre-Packaged Water offers the ultimate in fast, convenient setup

Large, Easy-to-Read Graphics provide fast, accurate drainage assessment
PATIENT POSITIONING

• Place AND SECURE arm over head (patients seem to like "helping out" a lot during this procedure).

• Place chucks under patient at insertion site (the bedside nurse will love you).

• Raise bed to comfortable height.

• Consider supplemental Oxygen.

• Clear insertion site of EKG leads, dressings, etc.

• Consider marking insertion site (prior to prep/drape)
PATIENT POSITIONING
LOCATION

- Insertion site should be no lower than 5th intercostal space. This avoids intra-abdominal placement
- Place between anterior and midaxillary lines
- Direct anteriorly or posteriorly for pneumothorax
- Direct posteriorly for effusions
- Avoid inserting into fissure by directing the tube
STEPS OF THE PROCEDURE

- Sterile prep and drape
- Local anesthetic
- Prepare the tube
- Incision and dissection
- Insertion of tube
- Secure tube
- Connect to pleuravac
- Apply dressing
STERILE PREP & DRAPE

- Full sterile technique
- Mask & cap for everyone in room
- Chlorhexidine skin prep
- Square off with towels
- Include nipple in field
- Full body drape
STERILE PREP & DRAPE
LOCAL ANESTHETIC

- Skin
- Subcutaneous tissue
- Periosteum
- Parietal pleura
- Insertion tract
LOCAL ANESTHETIC

- Skin
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PREPARE THE TUBE

• Place clamp on tip for insertion.

• Do not let instrument tip pass the end of the tube.
PREPARE THE TUBE

- Cut tube at widest portion of the tail
- Place a clamp 5 cm from end, to keep your shoes dry.
INCISION AND DISSECTION

- Make incision big enough to accommodate index finger and chest tube, about 3 cm.
INCISION AND DISSECTION

- Use large clamp to dissect cephalad, tunneling up at least one rib space

- Once at the rib, place the tips of the clamp at the superior edge of the rib and apply firm pressure to pass through the parietal pleura.
INCISION AND DISSECTION

- Spread instrument parallel to rib, wide and using two hands, to make adequate space.
- Insert finger into thoracic space to confirm thoracostomy, and free any local adhesions.
INSERTION OF TUBE

- Use clamp on tip to insert tube along tract, and into thoracic space
ALTERNATE METHOD

- Use Insertion Guide in Kit instead of clamp at tip of tube.
INSERTION OF TUBE

- Direct tube cephalad.
- Direct tube along chest wall to avoid placement in fissure.
- Rotate tube while inserting to assist with guiding.
- Insert until meeting resistance.
- Ensure last hole is within pleural space.
- Take note of distance marker at skin level. Should be 10-14 cm in normal person.
CONFIRMATION OF TUBE IN PLEURAL SPACE

- Palpation
- Return of blood or effusion
- Fogging of chest tube
SECURING THE TUBE

• Secure before attaching to drainage system.

• Use heavy gauge permanent suture (#0 silk, #1 ethibond).

• Large cutting needle.

• Primary purpose of suture is to secure tube, not to close incision.
SECURING THE TUBE

- Place across incision so as to partially close the incision
- Verify unchanged position of distance marker
- Wrap suture around chest tube twice and tie knot. Repeat.
SECURING THE TUBE

• Consider placing a second stitch to close the incision and prevent further drainage around the tube.
CONNECT TO PLEURAVAC

- The tip of the pleuravac tubing is covered and sterile.
- Have assistant remove the cover and connect the tubing to the chest tube.
- Remove Kelley clamp.
CONNECT TO PLEURAVAC

- Assess volume output from thorax
- If >1500 ml, then consider taking off suction to prevent flash pulmonary edema
APPLY DRESSING

- Vaseline gauze or Xeroform are not typically used.
- Apply 4x4's to insertion site, and secure with tape.
- Apply tape to junction of chest tube and drainage system tubing
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POST-PROCEDURE

- Verify functional pleuravac.
- Quantify initial output and size of air-leak.
- Order chest x-ray.
- Complete procedure note.
- Log procedure in log book.
- Follow chest tube management guidelines found at www.traumaburn.com
COMPLICATIONS

• Malpositioned Tube

• Persistent pneumothorax or Hemothorax

• Hemorrhage

• Parenchymal Lung injury

• Empyema
CREDITS

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