Chest Tubes – Take Home Points
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Jessie Nelson, MD, FACEP & Gary Setnik, MD, FACEP

Rules for anything going in the chest:
- Insert device immediately OVER a rib, not under to avoid neurovascular bundle
- Infections can and do happen. Use sterile technique whenever feasible.
- Needle thoracostomy for tension pneumothorax doesn’t always work. Consider supplying longer, larger gauge needles for this purpose.
- Be generous with local anesthesia. When properly done, chest tubes can be largely painless. Procedural sedation is likely not needed in small chest tubes for spontaneous PTX but consider doing it for large chest tubes when you don’t have time or patient cooperation for adequate local anesthesia.
- With children, will need to use generous sedation since the maximum dose of lidocaine is a fairly small volume.
- Unless obvious visible trauma, both sides of the chest look the same. Confirm the side with X-ray and/or ultrasound and do site marking.
- Tunnelling up a rib space is not necessary. Causes more soft tissue trauma and more likely to lose the hole in the pleura.

Standard tube thoracostomy (for non-emergent tube placement):
1. Universal Protocol
   a. Informed Consent
   b. Mark site with your initials
   c. Time out
2. Choose tube size and have suction apparatus set up.
3. Give IV analgesics or sedation.
4. Prepare dressings and tape for securing the tube.
5. Position patient with shoulder abducted if possible.
6. Gown, sterile gloves, mask, hat, consider shoe covers
7. Open kit and set out sterile supplies.
8. Prepare the tube
   a. Open tube and lay on sterile field.
   b. Place large Kelly clamp in end of tube with holes in it.
   c. Place another clamp near the other end.
   d. Consider cutting off the beveled end to make it connect better to the suction.
9. Prep and drape widely
10. Instill local anesthesia (plan on using 20-40 mL total in adults)
    a. Large wheal at skin with small needle
    b. Switch to larger needle and instill more in the subcutaneous fat and musculature. Fan out in a few directions (but avoid going just under the upper rib). Make sure to anesthetize the periosteum.

Chest Wall Anatomy

Lidocaine Dosing:
- 1% lidocaine = 10mg/mL
- Lidocaine with epi – max dose is 6-7 mg/kg
- Lidocaine without epi – max dose is 3-5 mg/kg
- 10kg child – max dose of lido without epi is 5mL
c. Using larger needle, puncture the parietal pleura in about the area you will place the chest tube. Draw back a little air or fluid.
d. Back the needle up a few millimeters so that your needle is at the parietal pleura.
e. Instill LOTS of local anesthetic here (5-10 mL)
f. Wait at least a minute for it to work.

11. Make incision over 5\textsuperscript{th} or 6\textsuperscript{th} rib in the safe triangle
   a. Anterior border – lateral edge of pectoralis muscle
   b. Posterior border – lateral edge of latissimus dorsi
   c. Inferior border – nipple line in men, inframammary fold in women
   d. Superior border – axilla

12. Bluntly dissect to pleura
13. Bluntly puncture the pleura with small or large clamp
14. Open clamp and \textit{slowly} stretch the hole (unless emergent life threat)
15. If inserting large enough tube, consider inserting your finger in the hole to feel for adhesions, then keep the finger at the entrance to the hole.
16. Insert chest tube with the Kelly clamp attached to it, aim medially to avoid placing the tube in a false passage in the chest wall
17. Rotate the Kelly 180 degrees to turn the tube superiorly
18. Open the Kelly and gently push tube in until last hole is in the chest
19. Spin the chest tube 360 degrees. If it meets resistance and the white line twists like a candy cane, the tube is likely in a fissure. Back it out until it spins freely and re-insert.
20. Suture tube securing to skin. Multiple methods exist. Pull gently to ensure it is tightly secured. Use at least 2-0 nylon.
21. Hook up tightly to suction. Use cable ties or high-strength cotton tape.
22. Release the distal clamp.
23. Suction incision if needed and secure the tube with suture.
24. Place sterile occlusive dressing.
25. Remove sharps.
26. Obtain chest XR.