Thoracentesis

Introduction:

Thoracentesis may be diagnostic, therapeutic, or life - saving in certain situations.
All house officers should be familiar with the diagnosis and treatment of pleural effusion and pneumothorax.

Indications:

- Diagnosis of pleural effusion
- Therapeutic removal of pleural air or liquid

Contraindications:

There are no absolute contraindications.

Relative:

- Coagulopathy
- Loculated effusion
- Mechanical ventilation
- Ruptured diaphragm
- Pleural adhesions
- Chest wall infection

Equipment:

- Sterile prep solution
- Sterile gloves and towels
- ٢٥-gauge needles for fluid removal
- ٨-gauge needle for air removal
- ١٦-gauge single-lumen central line and dilator for large fluid volume
- IV tubing and Three-way stopcock
- Clamp
- Specimen tubes
- Vacuum collection bottles
- ١٪ Lidocaine

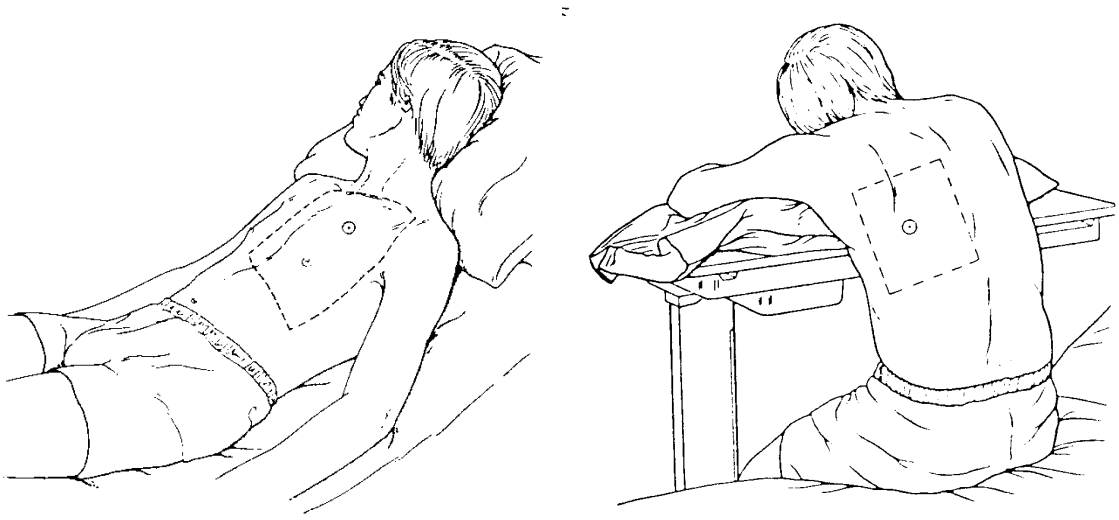
Position:

Air removal:

Liquid removal:

Supine, head of bed elevated ٣٠˚ -٤٥˚.

Sitting, arms supported on bed side table.



Technique:

١. Review current CXR If the lateral recumbent position is used or if the pleural effusion is small and/or loculated, ultrasound guidance should be used.

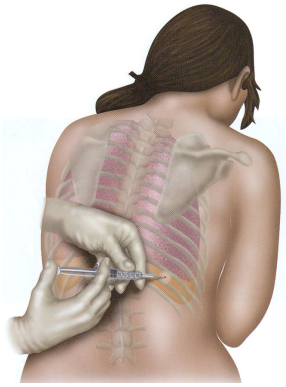
٢. Use mask and gloves. Prep and drape.

٣. Air removal: use second or third intercostal space, midclavicular line, avoid internal mammary artery.

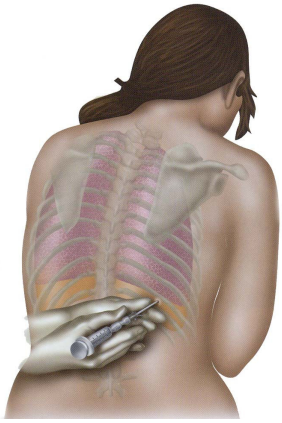
٤. Liquid removal: confirm fluid level by dullness to percussion, use first or second interspace below fluid level in posterior axillary line, but not lower than eight intercostal space.

٥. Infiltrate local anesthesia and confirm presence of air or fluid:

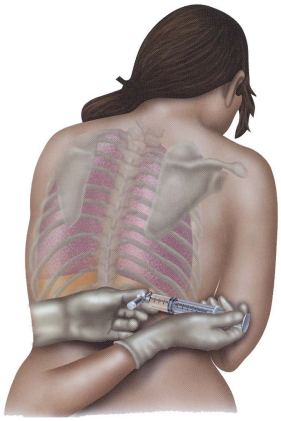
- Carefully walk the needle at superior margin of rib (to avoid intercostal bundle). A " give " or " pop " is often felt.
- Aspirate to confirm presence of air or fluid.
- Infiltrate through pleura an additional ١-٢ ml of Lidocaine.



٦. Attach the catheter to a syringe. Insert the catheter at the indicated rib interspace at the midscapular or posterior axillary line.

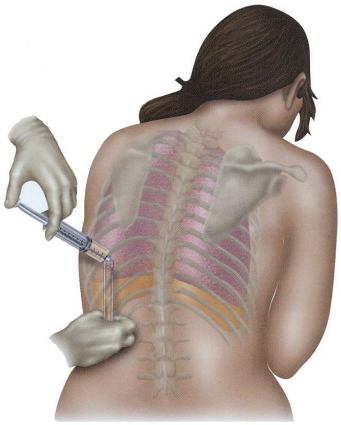


٧. Advance the catheter into the pleural space and aspirate for fluid.

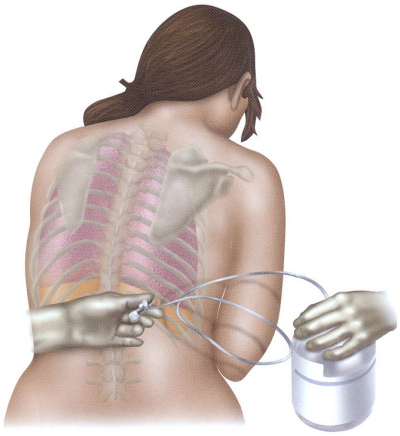


٨. Aspirate specimen: Use side arm of ٣ - way stopcock for effluent specimen.

٩. For a diagnostic tap send specimen for studies as appropriate. (Cell count, Gram stain, Culture, Cytology, Protein, Sugar, Amylase and PH).



١٠. For a therapeutic tap, attach one end of the tubing to the catheter and the other by needle to a vacuum collection bottle.



١١. Remove needle and place a finger over the needle to prevent air from entering the pleural cavity.

١٢. Obtain CXR to confirm amount evacuated and check for pneumothorax.

Alternative Technique for Large Volume Fluid:

١-٥. Identical to standard procedure.

٦. Insert ١٤ gauge intracath needle on syringe.

٧. Insert cannula through needle:

Remove syringe, occlude needle with finger to avoid major pneumothorax, and insert cannula in needle.

Advance cannula into pleural space and slide needle back over cannula.

Never slide cannula back out of needle.

(Cannula previously placed on clamped intravenous tubing attached to plasma vacuum bottle).

٨. Open tubing clamp to initiate drainage.

٩. At completion, remove cannula and needle, then apply sterile dressing.

١٠. Send speciment for studies.

١١. Obtain CXR to confirm amount evacuated.

Emergency Technique for Tension Pneumothorax:

Immediately insert ١٥-gauge needle in ٢nd intercostal space, midclavicular line to allow egress. Place chest tube immediately therefore**.**

Complications and Prevention:

- **Bleeding:**
  Insert needle at superior margin of rib. If a laceration occurs, monitor hemodynamic closely and obtain serial CXR. If the hemothorax is significant, tube thoracostomy may be necessary.

- **Pneumothorax:**
  Be familiar with stopcock before performing thoracentesis, use short beveled needle. Insert needle no further than necessary.

- **Hepatic or splenic puncture:**
  Avoid puncture lower than eight intercostal space posteriorly, mark proper needle depth with clamp.

- **Poor flow:**
  Rotate the patient in all direction, occasionally manual aspiration of the fluid with a ٣٠-٦٠ ml syringe placed on a three-way stopcock may be useful, consider tube thoracostomy if effusion is viscous.

Checklist for Thoracentesis

١. Checks patient's name and hospital number
٢. Assembles correct equipment in the tray
٣. Greets and introduces oneself to the patient
٤. Explains procedure and gets verbal consent
٥. Washes hands and wears gloves
٦. Use sterile technique Positions the patient as follows : • Liquid removal : asks the patient to sit upright and lean forward with his/her arms supported on bed side table • Air removal : asks the patient to lie down , then elevates head of bed ٣٠-٤٥ °
٧. Ensures that the patient is relatively comfortable and maintains a dialogue with them throughout the procedure
٨. Marks site of inserting needle : • Liquid removal : percusses lower thorax posteriorly . Delineates ١-٢ intercostal space below the top of the effusion in posterior axillary line • Air removal : Delineates second or third intercostal space in midclavicular line
٩. Cleans the skin with antiseptic solution
١٠. Infiltrates local anesthesia • Numbs the skin . Walks carefully to feel a « give » or « pop » • Aspirates to confirm presence of air or fluid • Infiltrates Lidocaine through pleura • Clamps needle to mark depth and withdraw needle
١١. Attachs a needle to syringe and introduces it inferiorly to same depth , just above the rib
١٢. Aspirates with two - handed technique then withdraws the needle
١٣. Places a finger over the needle & covers the entry site with a dry gauze dressing
١٤. Thanks and listens to patient's questions
١٥. Sends the aspirated fluid in appropriately labelled sterile containers to the laboratory
١٦. Obtains C.X.R
١٧. Follows through patient and knows how the result of thoracentesis are used in management
١٨. Discards gloves