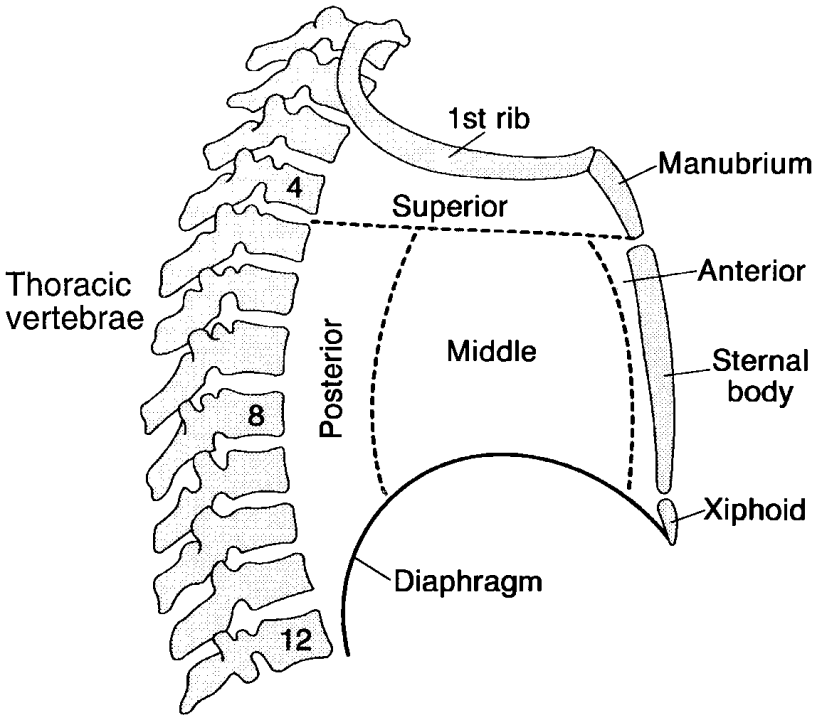
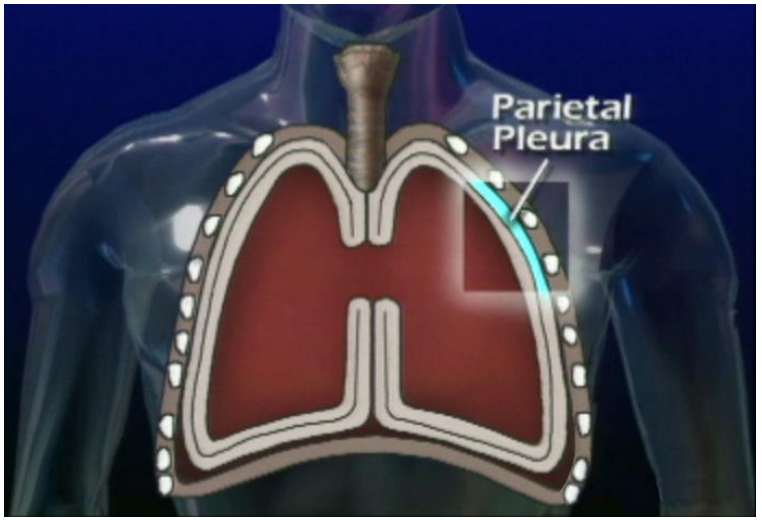
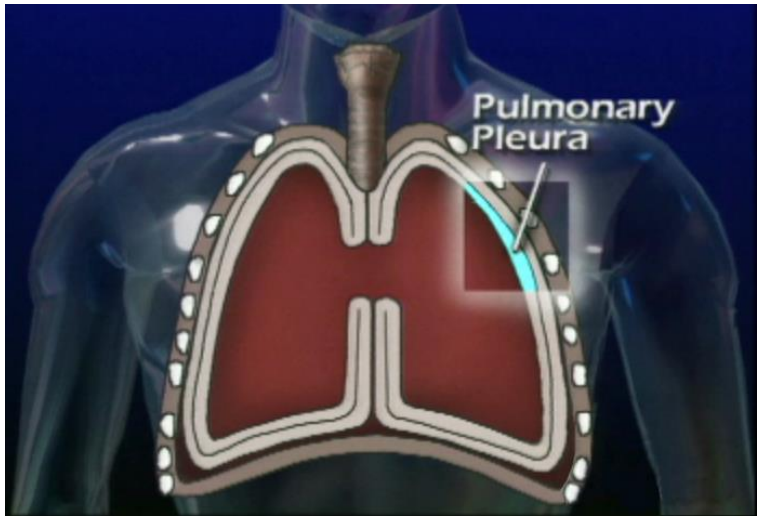
CHEST TUBES

LUCENT NCLEX REVIEWS

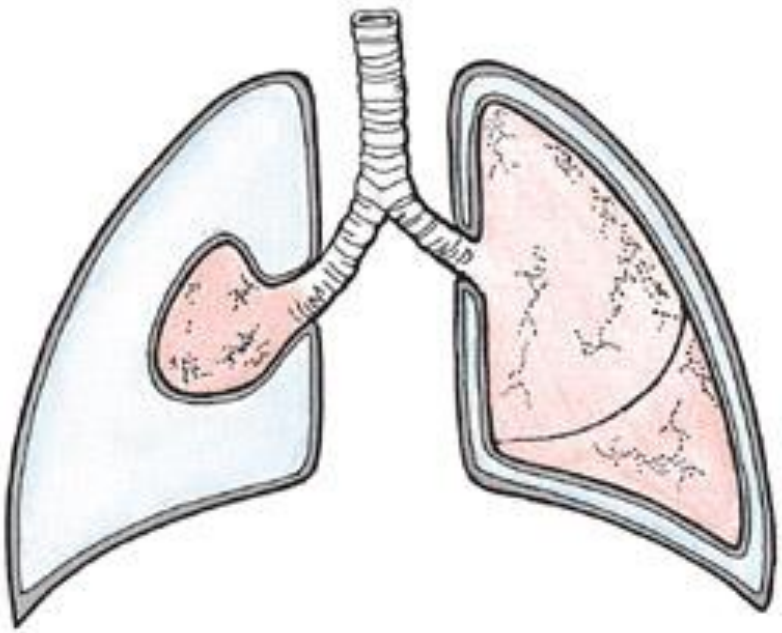
Thoracic cavity, pleural space







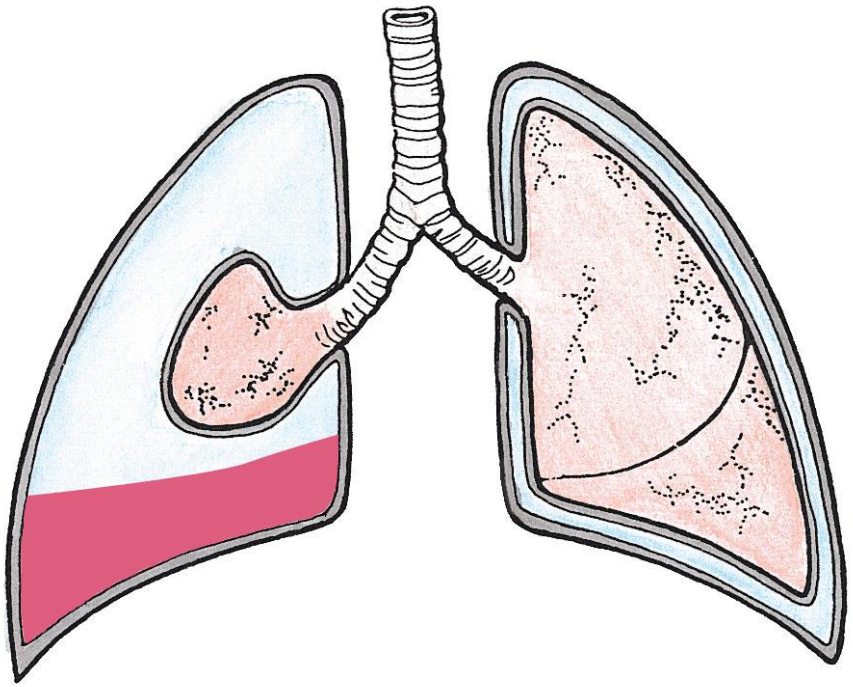
Conditions requiring chest drainage_1



Air between the pleurae is a **pneumothorax**

- Occurs when there is an opening on the surface of the lung or in the airways, in the chest wall — or both
- The opening allows air to enter the pleural space between the pleurae, creating an actual space

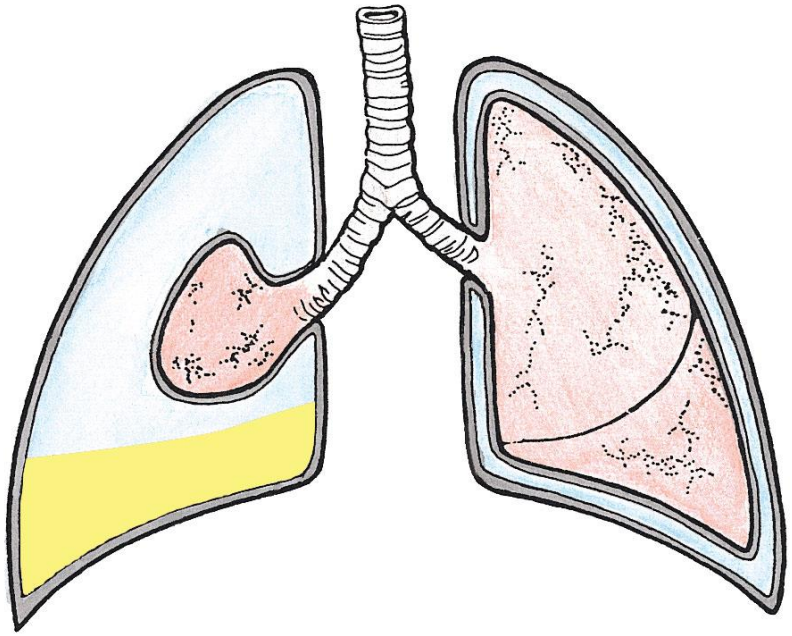
Conditions requiring chest drainage_2



Blood in the pleural space is a **hemothorax**

Lateral decubitus X-Ray

Conditions requiring chest drainage_3



- **pleural effusion**
  - –Transudate
  - –Exudate
  - –Empyema:

Open vs Closed pneumothorax

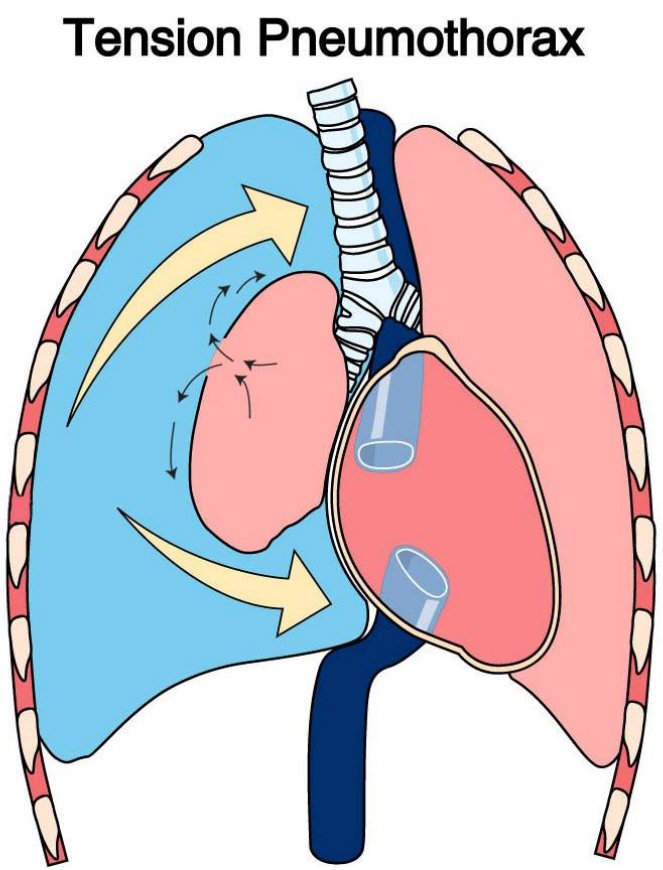
Open pneumo

- Opening in the chest wall (with or without lung puncture)

Closed Pneumo

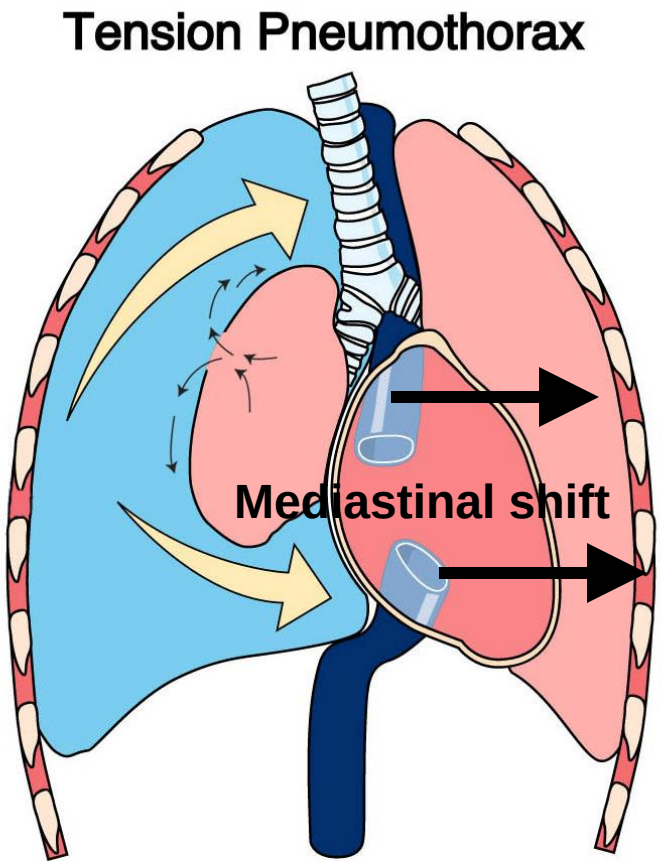
- Chest wall is intact
- Rupture of the lung and visceral pleura (or airway) allows air into the pleural space

tension pneumothorax



- Tension pneumothorax occurs when a closed pneumothorax creates positive pressure in the pleural space that continues to build
- That pressure is then transmitted to the mediastinum (heart and great vessels)

mediastinal shift from a tension pneumothorax



- Mediastinal shift occurs when the pressure gets so high that it pushes the heart and great vessels into the unaffected side of the chest
- These structures are compressed from external pressure and cannot expand to accept blood flow

Clinical Manifestations of a collapsed lung

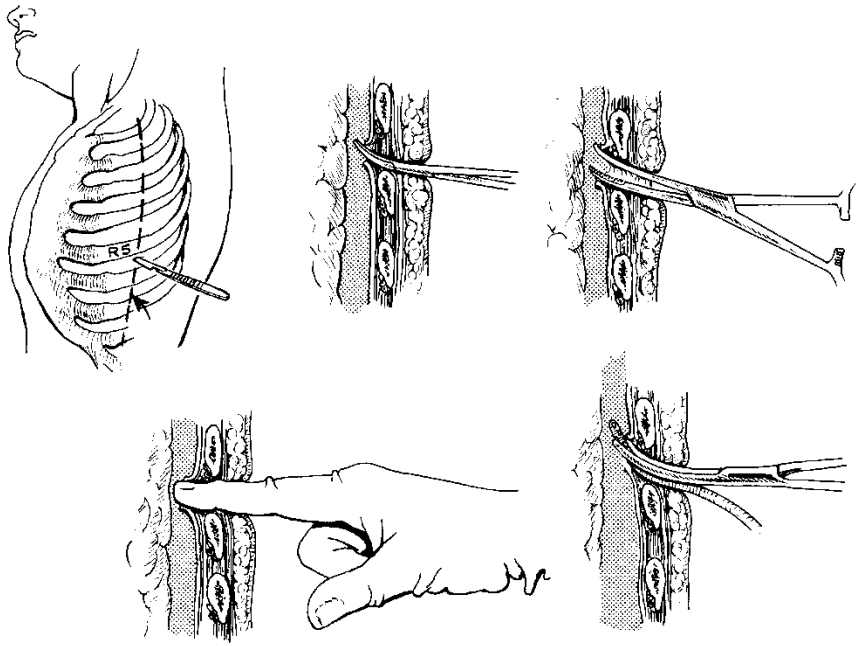
- SOB
- Chest Pain
- Cough
- Absent or decreased breath sounds on affected side
- Shallow Respirations
- Asymmetrical chest movement
- Decreased O_2 saturation

Treatment for pleural conditions

1. *Remove* fluid & air as promptly as possible
2. *Prevent* drained air & fluid from returning to the pleural space
3. *Restore* negative pressure in the pleural space to re-expand the lung

Remove Fluid &/or Air: chest tube insertion

- Chest tube tray with an appropriate size tube
- Surgical prep, sutures, sterile gloves
- Lidocaine, needles, syringes, alcohol preps
- Vaseline gauze, 4x4s & tape
- CDU = Chest drainage unit
- Suction and sterile water



RN Role

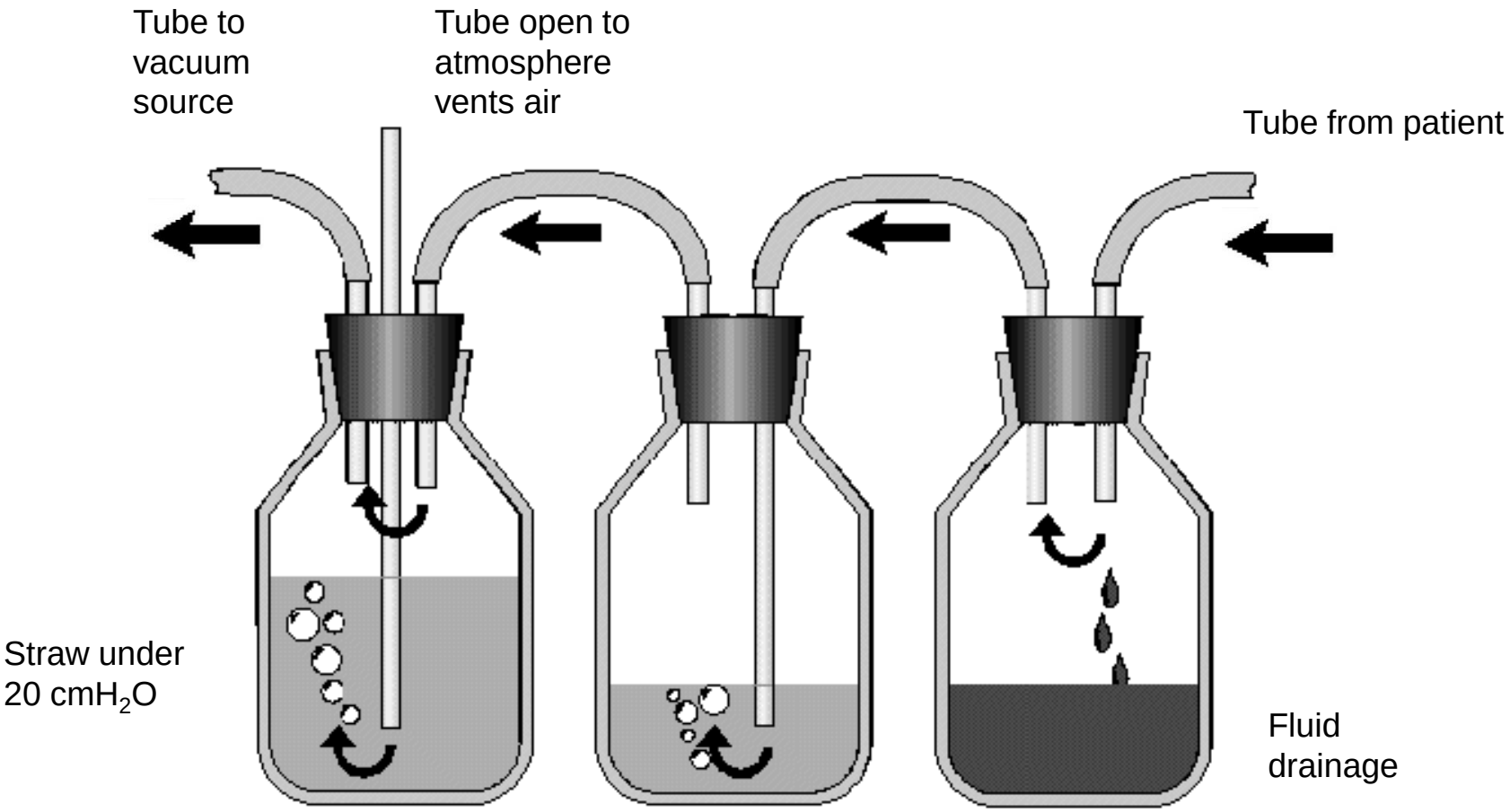
- Educate patient and family
- Administer pain meds
- Set up chest drainage unit
- Obtain consent
- Assists with insertion PRN
- Verify occlusive dressing is intact
- Tape all connections from CT to drainage system to prevent air leaks
- Assess the patient and document appropriately

2. Prevent air & fluid from returning to the pleural space

Chest tube is attached to a drainage device

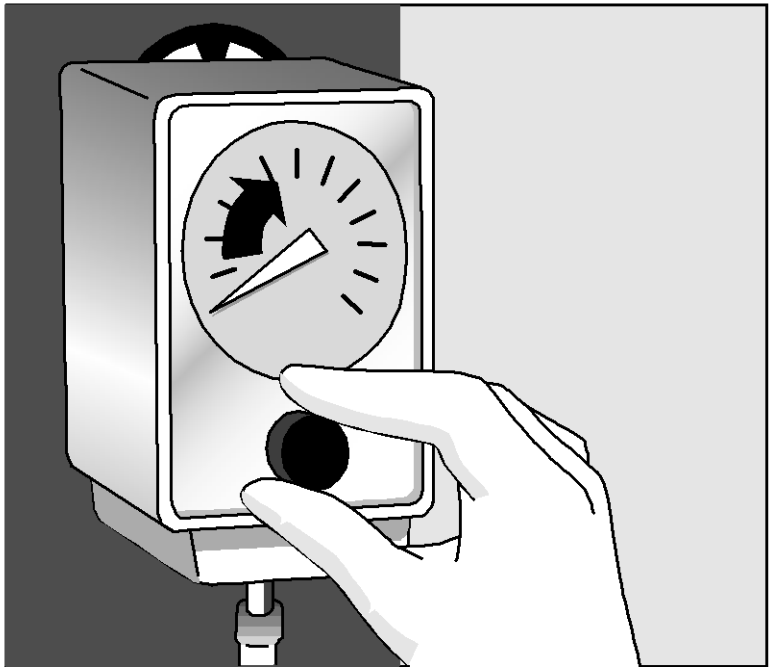
- Allows air and fluid to leave the chest
- Contains a one-way valve to prevent air & fluid returning to the chest
- Designed so that the device is below the level of the chest tube for gravity drainage

3. Restore negative pressure in the pleural space



Restore negative pressure in the pleural space

The ***depth of the water*** in the suction bottle determines the amount of negative pressure that can be transmitted to the chest, ***NOT the reading on the vacuum regulator***

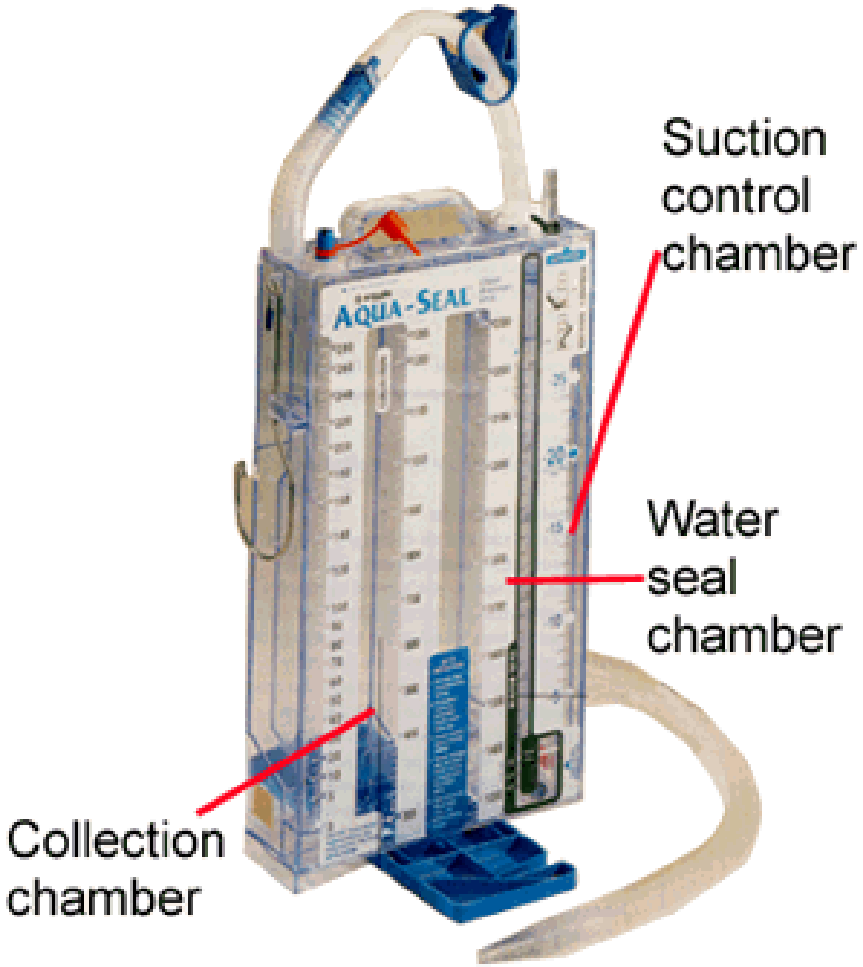


How a chest drainage system works: summary

- Expiratory positive pressure from the patient helps push air and fluid out of the chest (cough, Valsalva)
- Gravity helps fluid drainage as long as the chest drainage system is below the level of the chest
- Suction can improve the speed at which air and fluid are pulled from the chest

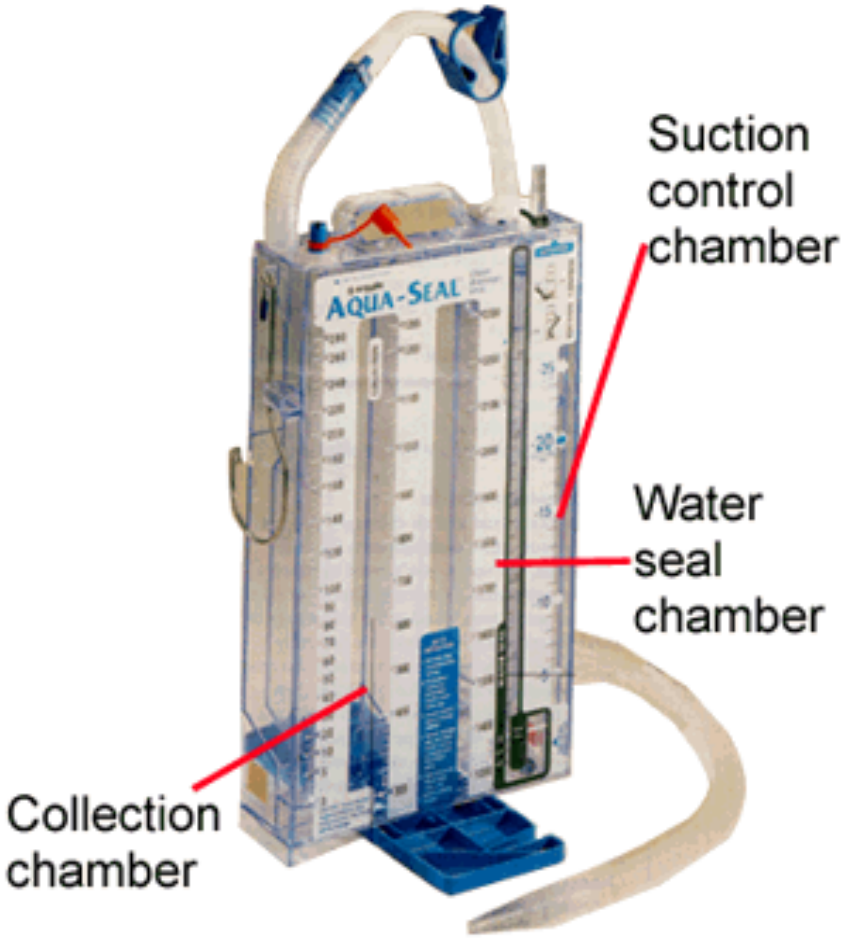
Collection Chamber

- This chamber allows monitoring of volume, rate and nature of the drainage
- Measure output per hospital policy
- Most systems are considered “full” at 2500ccs



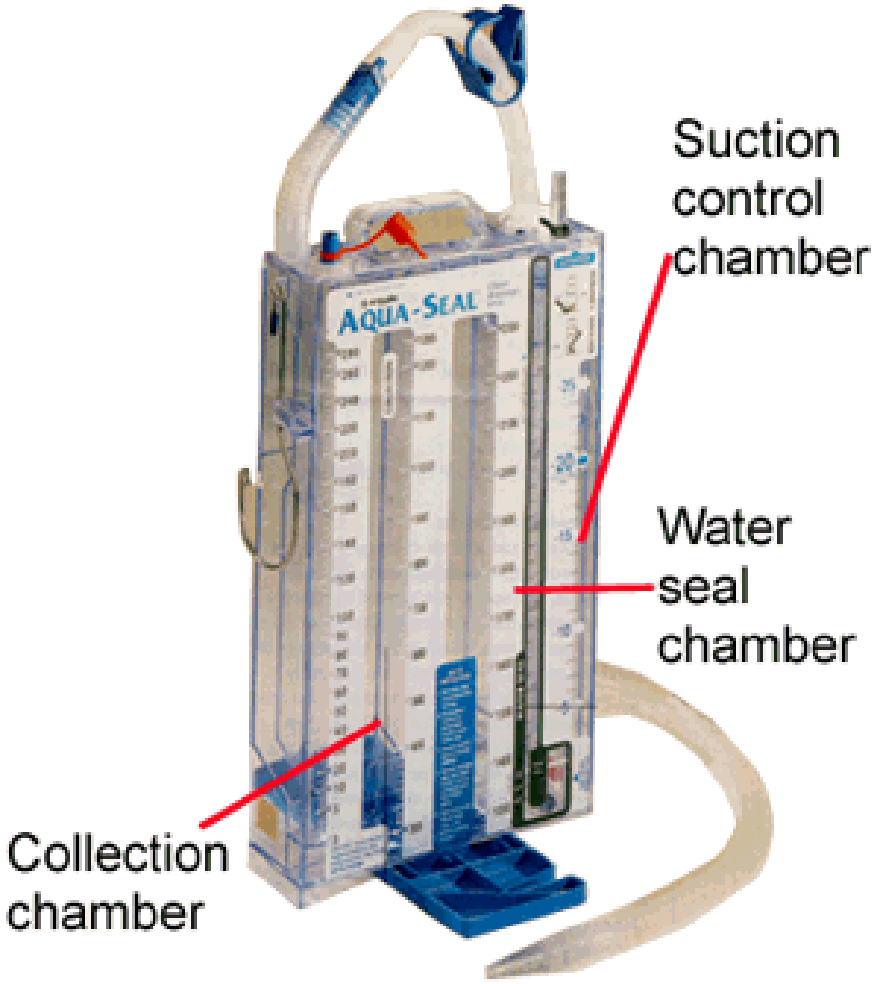
Water Seal Chamber

- Water creates a one-way valve that prevents air or fluid from returning to the patient's chest
- Monitor this chamber for:
  - air leaks (bubbling)
  - tidaling (fluctuations in fluid level)
  - increased negative pressure



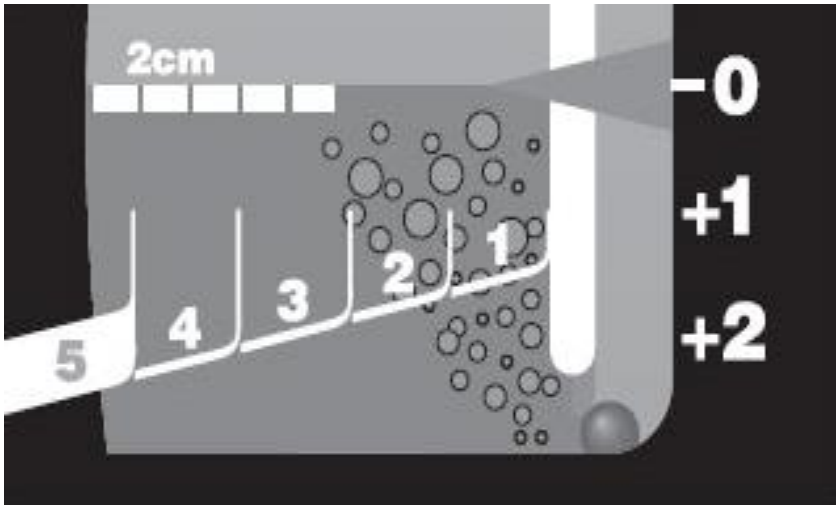
Suction Control Chamber

- regulates the suction level acceptable for thoracic drainage
- Suction increases drainage rate
- Suction is controlled by water level
- Regulate wall suction until gentle bubbles appear



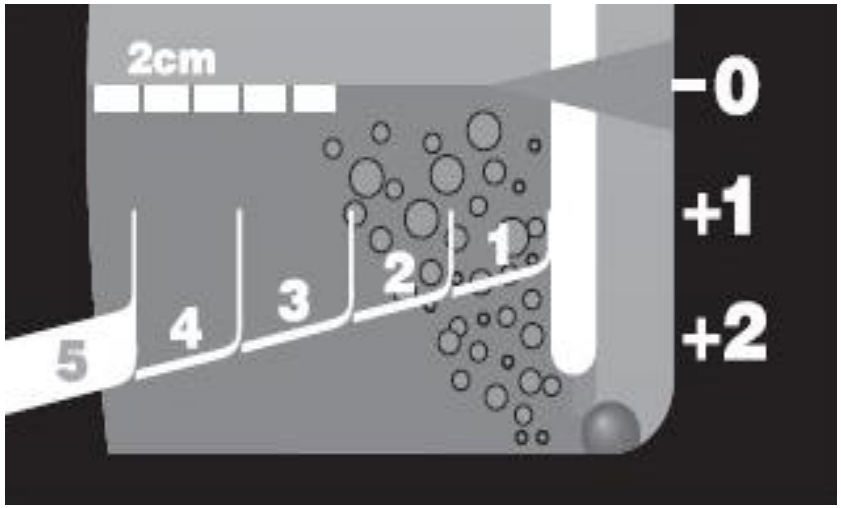
Monitoring air leak

- Water seal is a window into the pleural space
- Not only for pressure
- If air is leaving the chest, bubbling will be seen here
- Air leak meter (1-5) provides a way to “measure” the leak and monitor over time – getting better or worse?



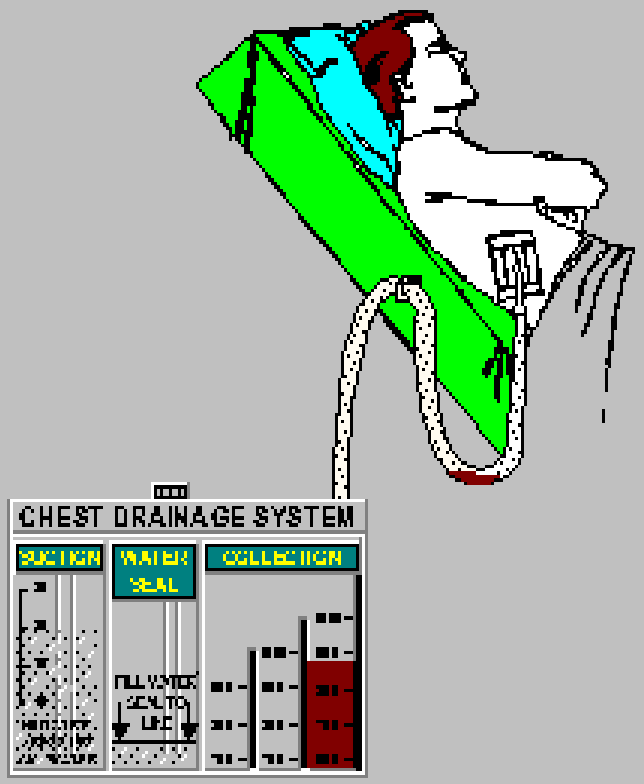
Monitoring air leak

- Continuous bubbling in the water seal chamber after initial out rush of air when tube is inserted indicates **an air leak.**
- You should only see bubbling when patient coughs or exhales. Check all obvious sites for a leak.

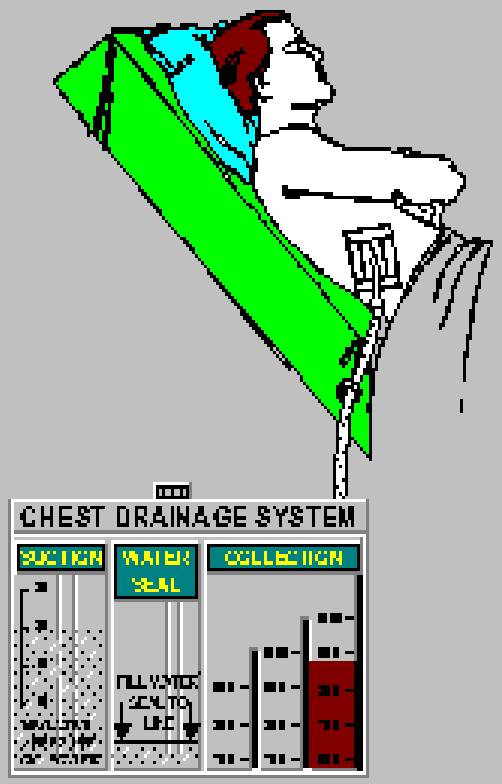


Air Leaks

- Continuous bubbling initially - OK
- Bubbling when pt coughs or exhales.
- As long as there is intermittent bubbling, the client needs the chest tube because air is still leaking out of the pleural space
- If there is continuous bubbling in the water seal chamber, then you have an air leak in the system.
- Palpate area around chest tube insertion site for crepitus, which indicates that air is leaking into subcutaneous tissue (subcutaneous emphysema)



Dependent Loop



No Dependent Loop

TROUBLESHOOTING TECHNIQUES

Tubing from the chest tube must not be allowed to form any dependent loops as drainage problems and tube obstruction may occur. The tubing should be coiled flat on the bed and from there fall in a straight line to the chest drainage system. Additionally, when the patient is in bed, a semi-sitting position will promote drainage; so will turning the patient toward the side of the chest tube and having him/her periodically exhale and cough.

Tubing from chest drainage system

- Make sure connections are tight and taped
- No Dependant loops
- Milking or Stripping- only done if clot is suspected
  - Controversial : may cause damage to lung tissue as increased negative pressure is exerted
- “Milking and stripping” chest tubes is contraindicated because it increases negative intrapleural pressure; it does not significantly affect tube patency

Milking

Transporting a patient with a chest tube

- Keep the drainage system lower than the patients chest
- May open suction end to air which equals a water seal
- Mayo clamps (rubber tipped hemostats) should be kept at the bedside

Then: Assess the CDU

- Check the dressing
- Check tubing - dependent loops
- Check drainage in tubing & collection chamber
- Check water seal chamber
  - Bubbling
  - tidaling
- Check level of water
  - Water seal chamber
  - suction control chamber
- Check tubing CDU to wall suction: open?

Accidental disconnection of tube and drainage system

- Reconnect ASAP or
- Place end of tube in a sterile water bottle until new system arrives
- Monitor patient for s/s of resp distress
- Notify physician

Accidental DC of Chest Tube

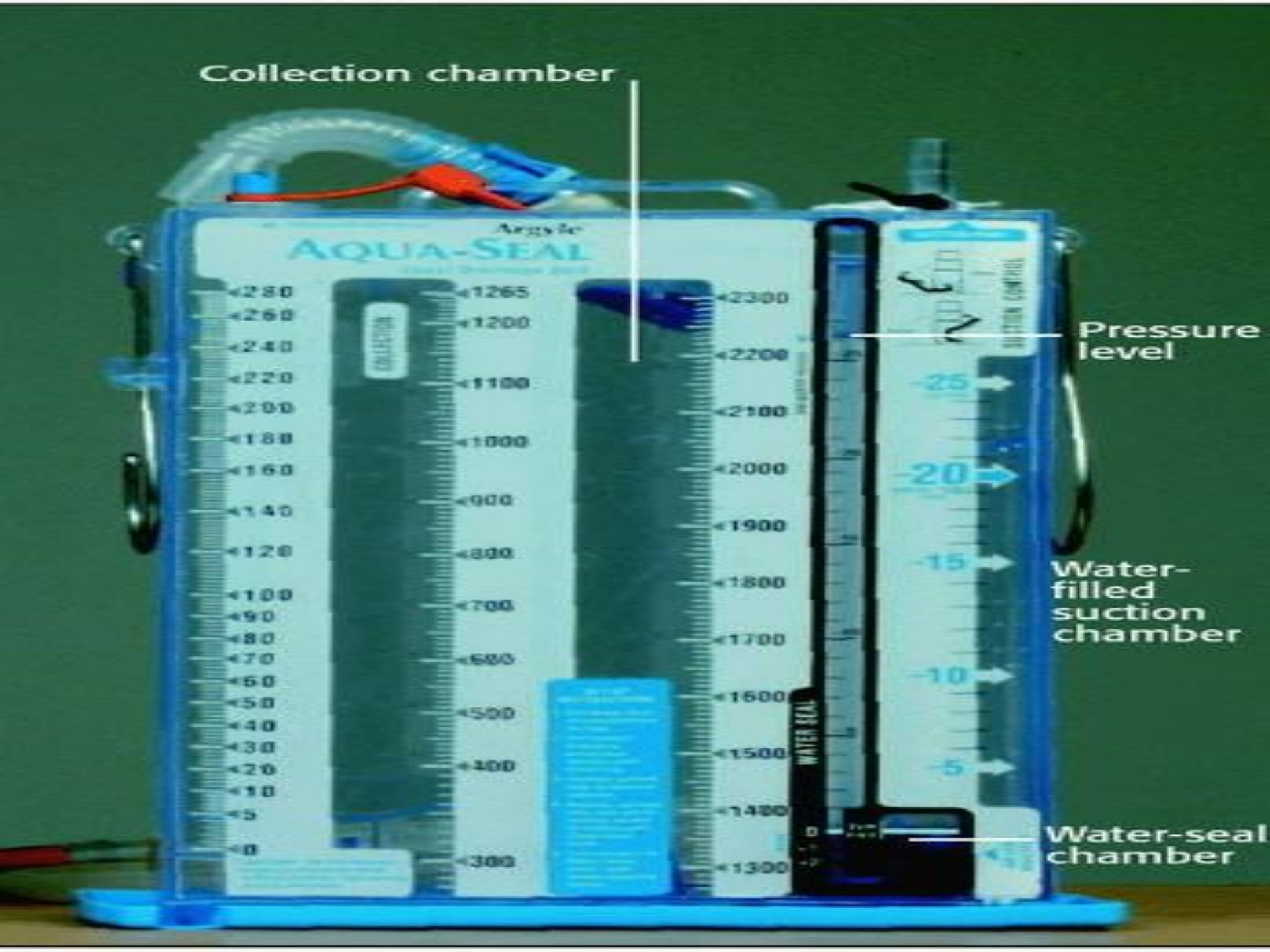
- Seal off insertion site – dry, sterile dressing or, petroleum gauze dressing
  - secure on 3 sides
- Notify physician
- Assess patient prepare to assist with reinsertion
- Watch for tension pneumothorax

Termination of Chest Tube

- Assess for signs of re-expansion
  - Minimal drainage
  - Minimal bubbling / fluctuations in water seal chamber
  - Chest x-ray shows re-expansion
- MD may leave to gravity 24°

Chest Tube Removal

- Explain procedure to patient
- Equipment
  - Suture removal kit, gloves, Vaseline gauze,
  - 4x4s, tape, towels
- Tube should be pulled at the end of full inspiration.
- Have patient take a deep breath and hold (Valsalva) and place an occlusive petroleum dressing over the site


Collection chamber
AQUA-SEAL
Pressure level
Water-filled suction chamber
Water-seal chamber