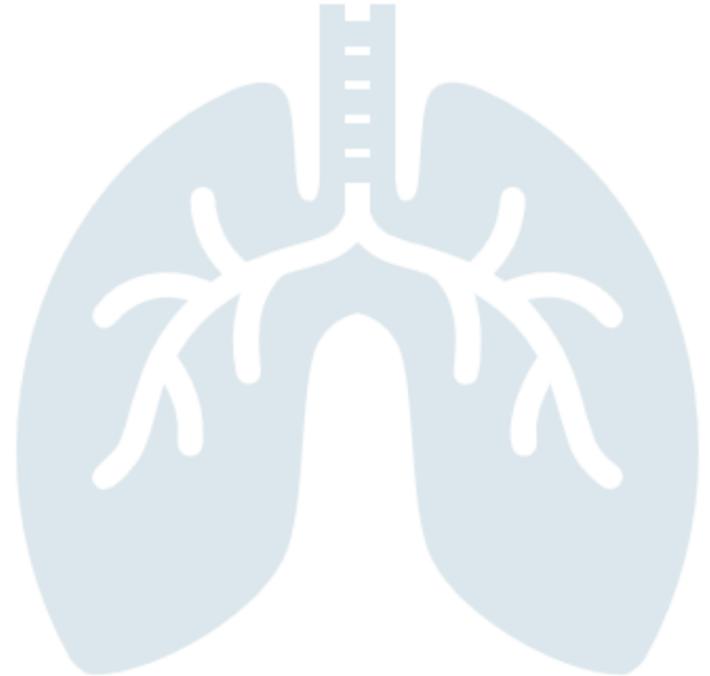




# Tracheostomy & Chest tube

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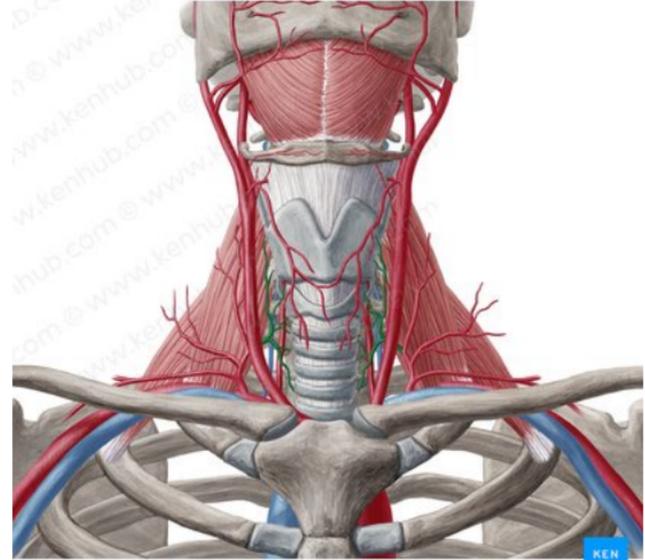




Tracheostomy

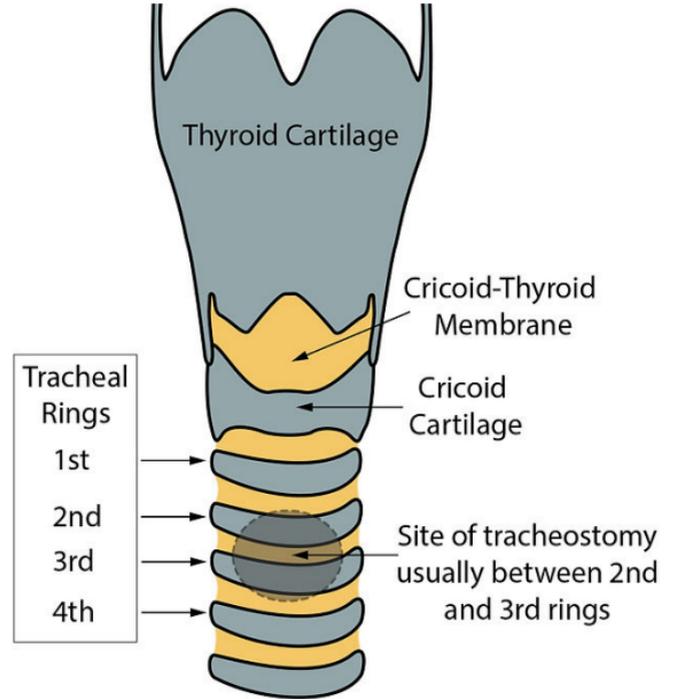
# Anatomy..

- Trachea lies in midline of the neck extending from cricoid cartilage **C6** superiorly to the tracheal bifurcation at the level of sternal angle of Luis **T4**.
- Comprises of **16-20** C shaped cartilage rings.
- Length **10-12** cm.
- Diameter **15-20** mm.



# Layers anterior to the trachea

- 1- skin
- 2- subcutaneous tissue and fascia
- 3- anterior jugular vein
- 4- pretacheal muscle + strap
- 5- thyroid isthmus
- 6- pretracheal fascia
- 7- trachea



# Definition

Opening ( stoma ) in **anterior neck** to create a surgical airway

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## Indication :



### Relieve upper airway obstruction :

Foreign body

Trauma

Bloody / mechanical edema (anaphylaxis)

Croup (Sever acute laryngitis)

Bilateral Vocal cords paralysis

Congenital ( web / atresia )

Tumors



2

# Improve respiratory function



Acute sever pneumonia



Flail chest



Unconscious patient  
(following sever head or  
chest injury )

*Sever Head*

③

# Substitute intubation

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Any patient who needs **prolong intubation** more than 2 weeks

# Contraindication

## Absolute :

if we can do translaryngeal intubation

Fractured larynx / damaged airway

Transection of trachea with distal end retracted into mediastinum

## Relative :

Infants ✓

Acute laryngeal disease ✓

Massive neck edema ✓

Bleeding tendency ✓



# Complication: **Immediate** ( during procedure )

- Bleeding  
- Injury  
- Per  
- Pneum

Loss of Airway

- ① **Loss of airway**
- ② **Bleeding** and injury to **major vessels**
- ③ Injury to **neighboring structures**
- ④ **Pneumothorax**
- Aspiration** ✓
- Cardiac arrhythmias** ✓

# Early complications

Bleeding and local hematoma ✓

Tracheostomy tube obstruction and desaturation ✓

Tracheostomy tube displacement

Infection ✓

Aspiration

Surgical emphysema ✓

Bleeding  
[ Early Hx ]

infect.  
Obstruction  
• Surgical emphysema

# Late complications:

~~\*~~ ~~\*~~ Tracheal or subglottic stenosis

Granulation tissue

Tracheocutaneous fistula

Tracheo-esophageal fistula

✓ Dislocation of tracheostomy tube

✓ Bleeding from stoma or during suction

✓ Blockage of tracheostomy tube

Laryngeal injury or alteration of phonation ✓

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# Types of surgical airway

Elective  
Tracheostomy

Cricothyroidotomy  
( Mini  
Tracheostomy )

Percutaneous  
Dilatational  
Tracheostomy

# Technique for elective tracheostomy :

Position ; neck hyperextended

Under anesthesia

Skin incision ( long or transverse ) 2-3 cm above suprasternal notch

Expose trachea at midline by retracting strap muscles laterally and evert thyroid isthmus and vessels superiorly

Palpate thyroid and cricoid cartilages , allocate 2<sup>nd</sup>. And 3<sup>rd</sup>. Tracheal rings

\*\*\* Don't go beyond 4<sup>th</sup>. Ring □ risk of tracheoinnominate fistula; don't go through 1<sup>st</sup>. Ring □ risk of stenosis

massive major bleeding

Do either long, transverse or H-shaped incision

Use dilator , then insert tube



# Tracheostomy tubes

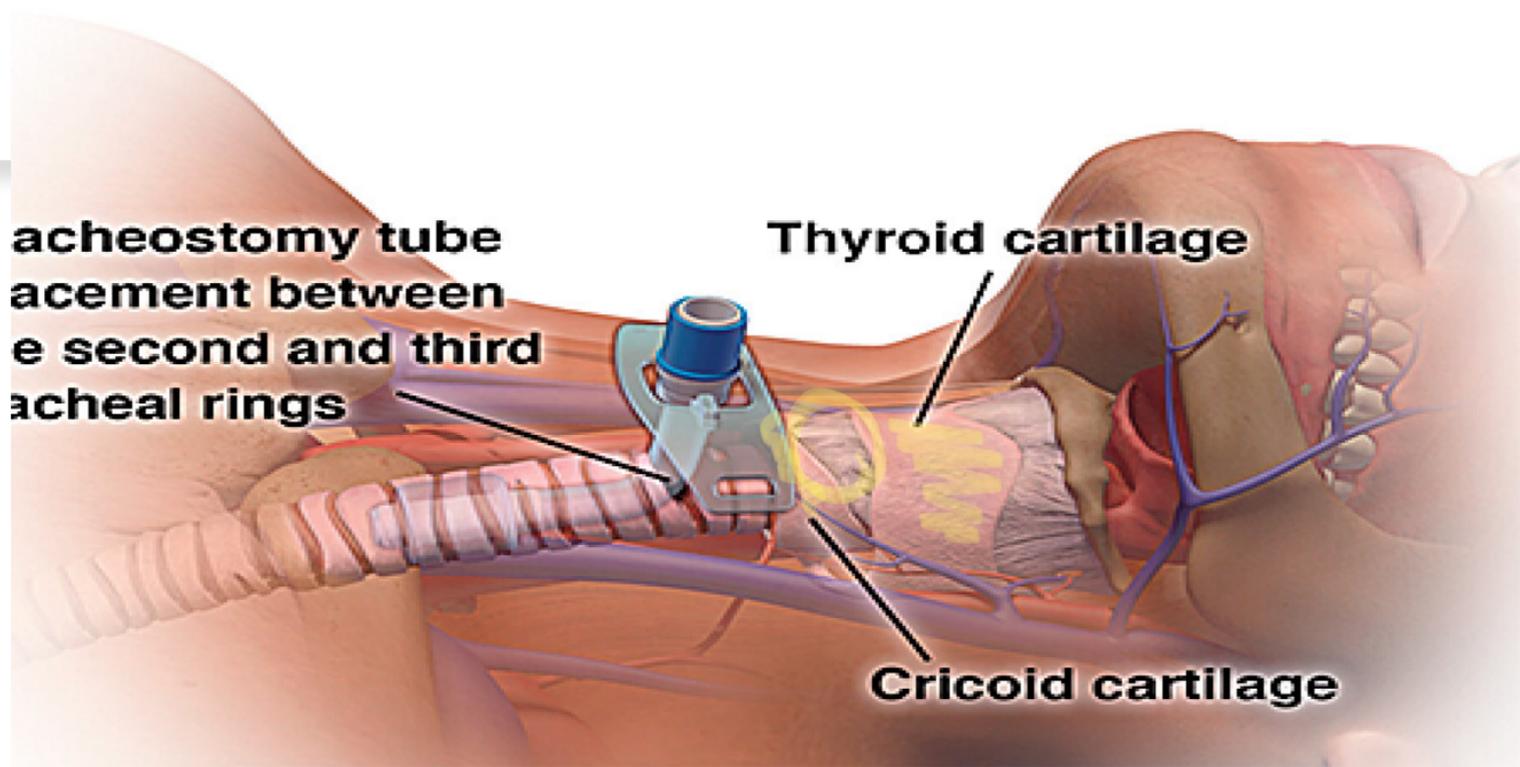
- Plastic / metal
- Fenestrated / Non fenestrated
- Cuffed / uncuffed



**Tracheostomy tube  
placement between  
the second and third  
tracheal rings**

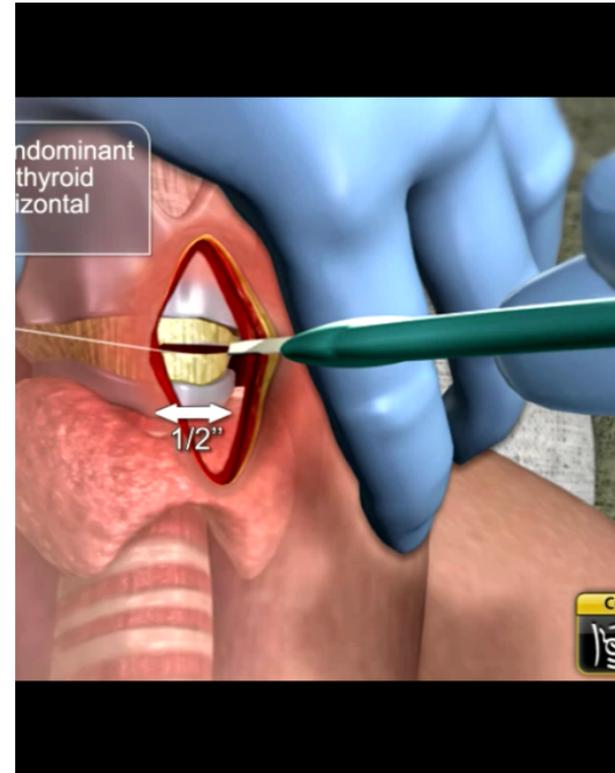
**Thyroid cartilage**

**Cricoid cartilage**



# Cricothyroidotomy ( mini tracheostomy )

- Quicker
- Easier
- In Emergency cases
- Transverse incision over the cricothyroid membrane.



# Percutaneous dilatational tracheostomy

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ICU bed side tracheostomy.

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Use of guide wire and dilators.

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May be under the vision of bronchoscope through endotracheal tube.

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Less time, less expensive.

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Not suitable for thick neck and in emergency.



# How to prevent complications



Sterile technique



Change tube



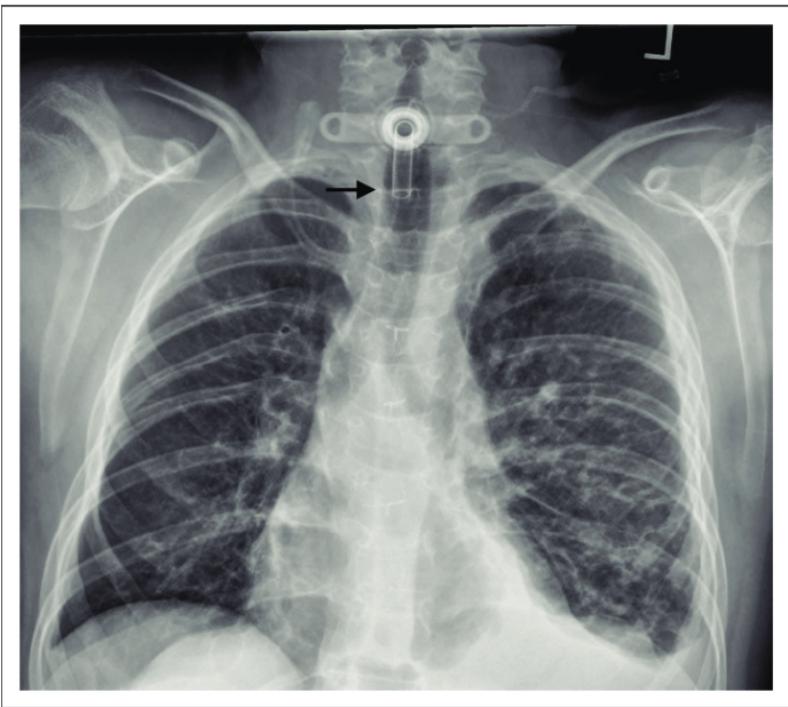
Proper care ( atraumatic suctioning , humidified O2, use mucolytic and physiotherapy )



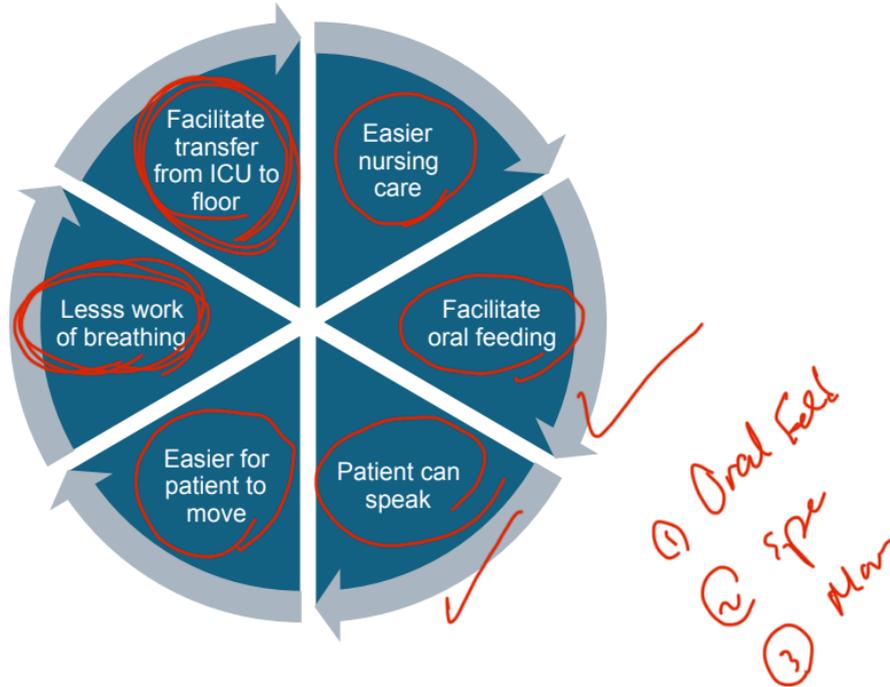
Chest x-ray



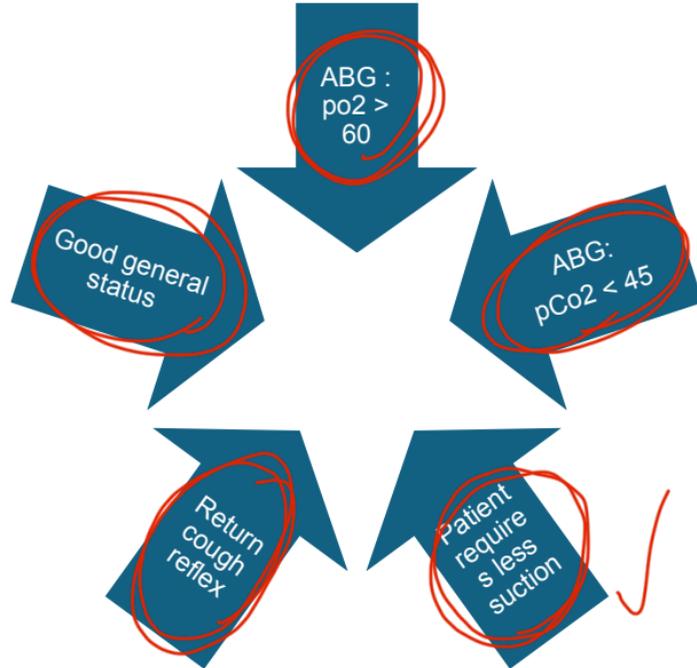
Deflate cuff Q 5 mins to prevent tracheal ischemia



# Advantages over Translaryngeal Intubation



# When to remove Tracheostomy



✓  
ABG  
Cough Reflex  
less Suck





## Chest Tube



Intercostal drain which inserted in the pleural cavity to evacuate air/fluid, to help regain negative pressure and thus promote lung expansion.

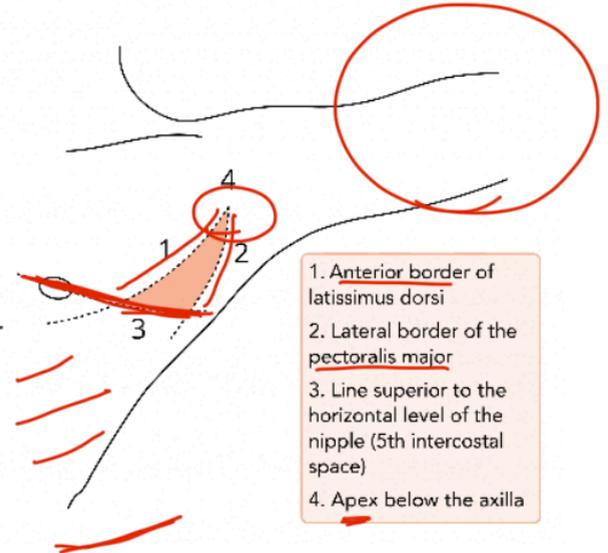
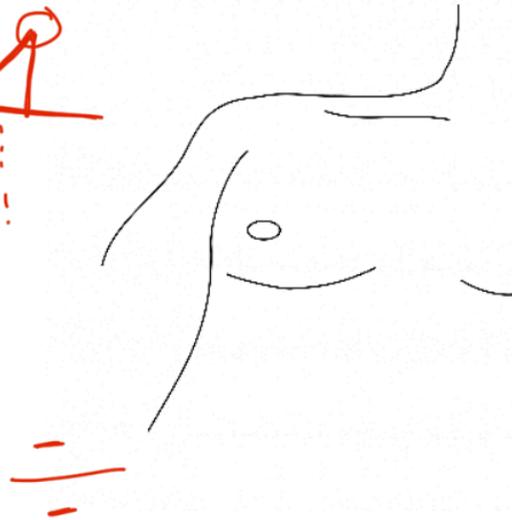
# Indications

- Pneumothorax ( primary – secondary – tension )
- Hemothorax
- Pleural effusion ( malignant – empyema )
- Chylothorax
- Post operative cardiothoracic surgery
- Mechanically ventilated patients with any size pneumothorax / hemothorax



# Site of insertion

- Triangle of safety – boundaries
- 4th to 5th intercostal space, anterior to the mid axillary line
- Patient position ? ( supine – sitting/semi - lateral position, with ipsilateral arm behind her/his head )



1. Anterior border of latissimus dorsi
2. Lateral border of the pectoralis major
3. Line superior to the horizontal level of the nipple (5th intercostal space)
4. Apex below the axilla

① Strike the Area

② Local Anes

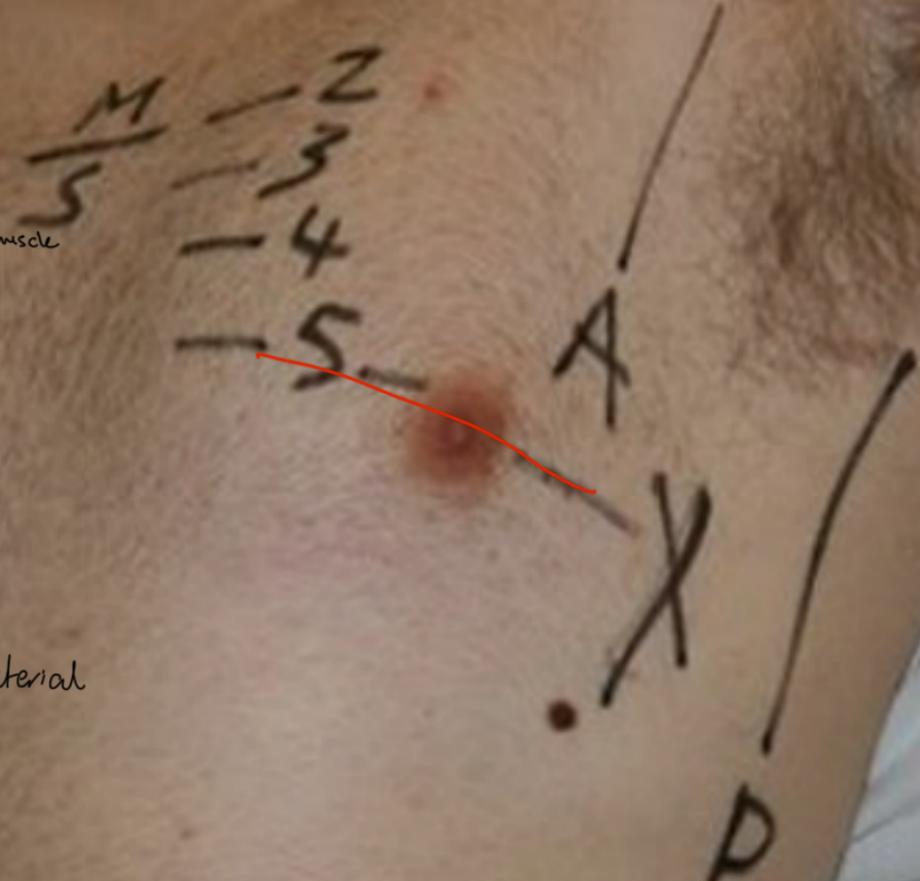
③ Incision

④ Dilator to Reach  
+ Retract IC muscle

⑤ Open Pleural

⑥ Insert Chest Tube  
↓  
Above the Rib

③ Suturing Material

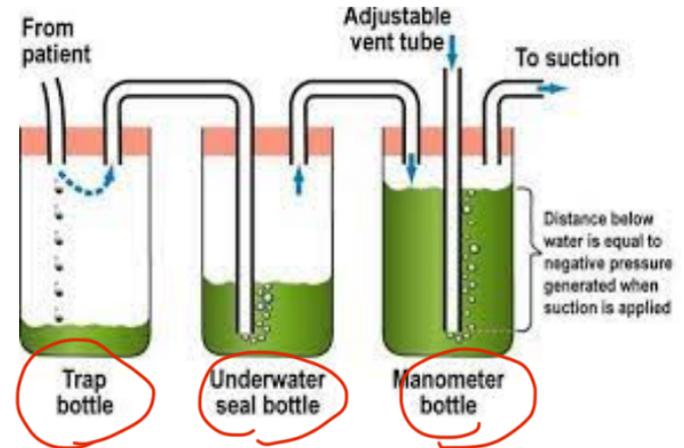
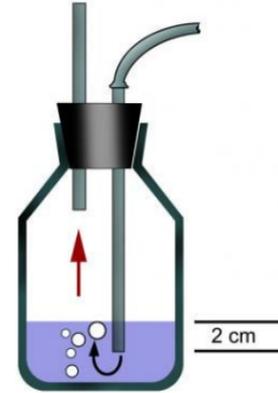


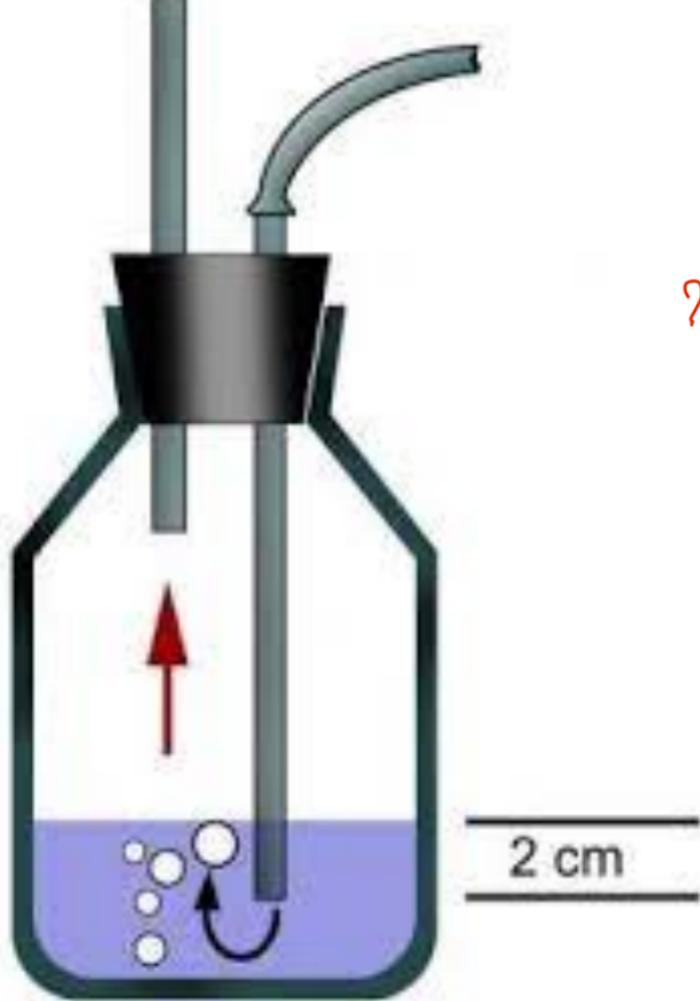
## Note :

Chest tube is placed over the rib to avoid  
the vessels and nerves

# Mechanism :

- **Collection tube** ( <sup>valve</sup> collects fluid / pus/ blood or chyle )
- **Underwater seal** ( one-way valve )  
Allow air to be removed from pleural space but doesn't allow air to enter pleural cavity
- **3 chamber bottle** ( collection chamber – water seal chamber – suction control chamber )



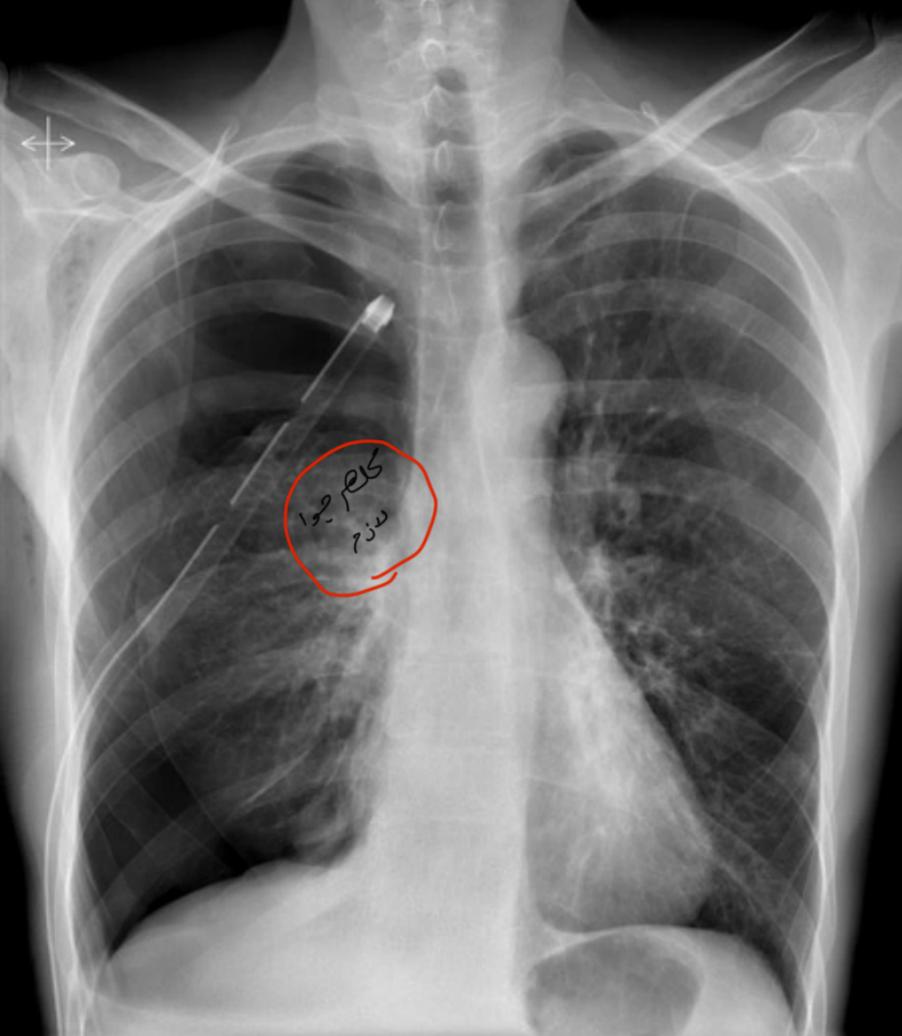


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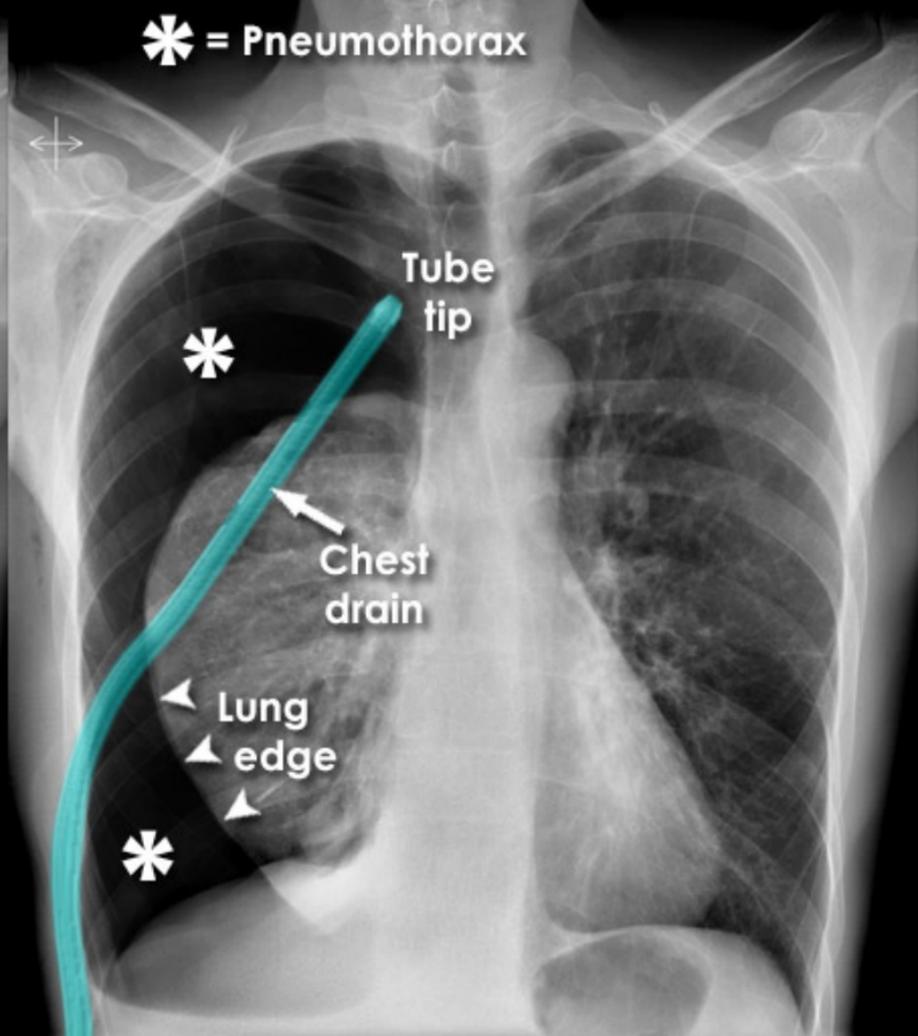
## How to confirm that the chest tube is functioning?

- physical examination : bilateral chest wall movement – air entry – improve saturation .
- ✓ fogging of the tube (3)
- ✓ bubbling (2)
- ✓ chest Xray (1)

\* Isolation



\* = Pneumothorax



• ICS



# Complications

✓ Injury to the neurovascular bundle in the ICS

✓ Injury to lung parenchyma

Injury to the diaphragm and consequent injury to intraperitoneal structures

Injury to the heart and other great vessel

\* Massive bleeding

Empyema \* \* \*

\* Skin excoriation and inflammation

Subcutaneous emphysema and hematoma \* \* \*

\* Obstruction

\* Malposition

Re-expansion pulmonary edema

\* \* \*  
1.5 Clamp

# Contraindications



Lung adherent to the chest wall

*injury to lung*



Uncorrected coagulopathy

*Bleeding*



Skin infection



Loculated pleural effusion

*Decortication*

# When and How to remove ?

*2x1m*



If no pneumothorax or air leak after 24 H.



Cut the stitch



Ask patient to exhale and inhale maximally



Rapidly remove the tube and at the same time we placed jelly gauze covered by 4\*4 & dressing



Obtain chest x-ray

Thank you

