Tracheostomy and Chest tube

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Definition

- An artificial (usually) surgically created airway fashioned by making a hole in the anterior wall of the trachea and the insertion of a tracheostomy tube, which may or may not be permanent.

Types of surgical airway

1- Elective Tracheostomy

2- Cricothyroidotomy (Mini Tracheostomy)

3- percutaneous Dilatational Tracheostomy

Indications

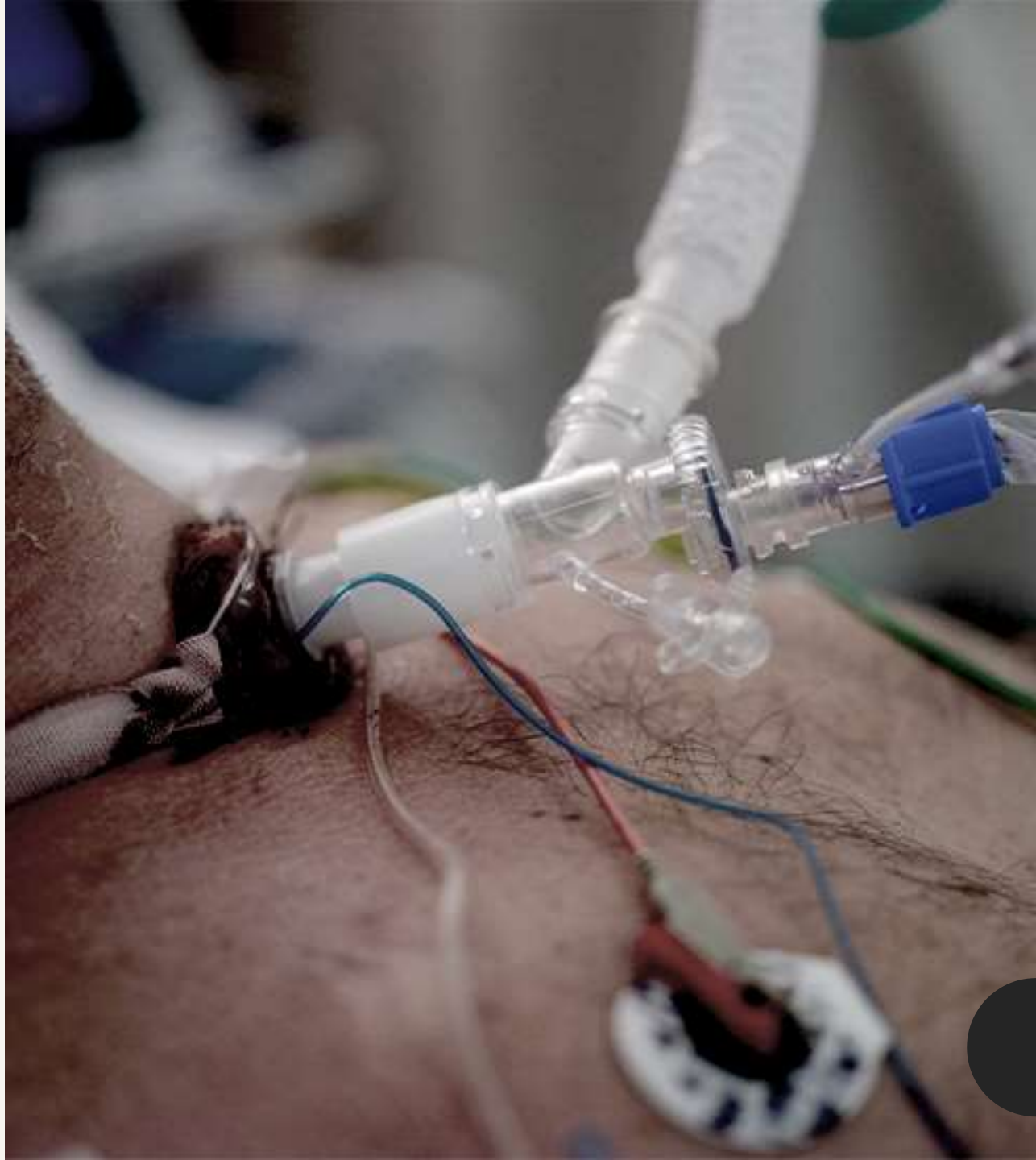
- . Upper Airway Obstruction.
- . Pulmonary Ventilation.
- . Pulmonary Toilet.
- . Elective Procedure.

Upper Airway Obstruction

- Trauma
- Foreign body
- Infections
- Malignant lesions
- Vocal cord palsy

Pulmonary Ventilation

- Tracheostomy should be performed in a patient still requiring ventilation through an endotracheal tube for more a one week



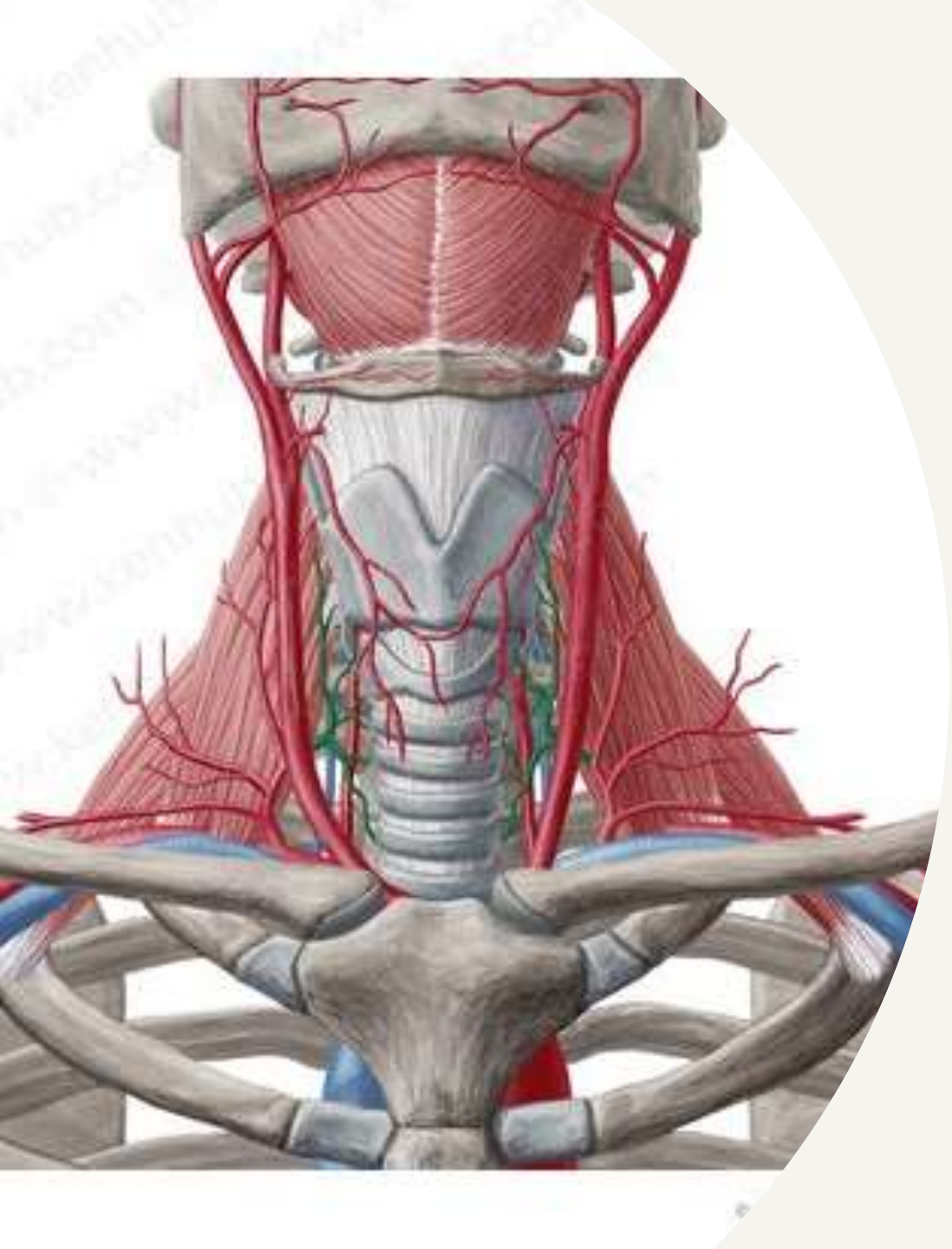
Pulmonary toilet

Those who cannot cough and clear their chest.

Prevent aspiration by low-pressure high-volume cuff tracheostomy tube.

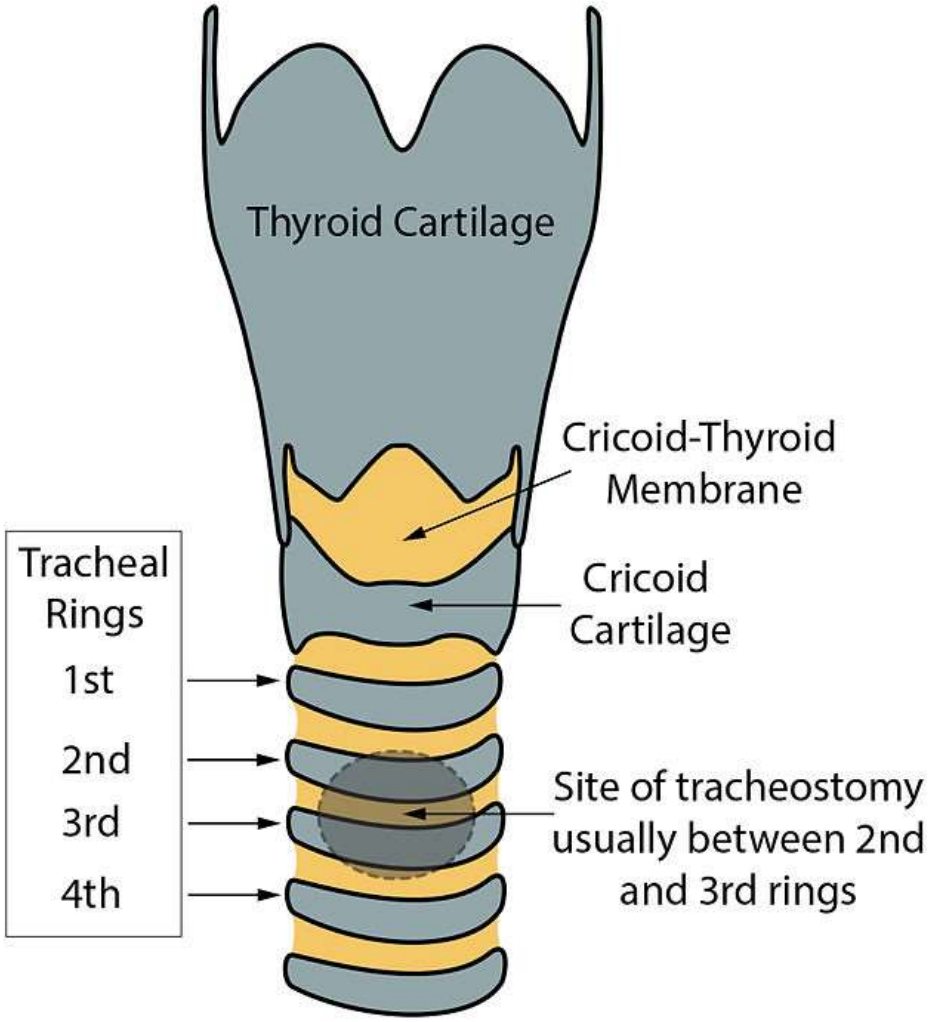
Elective procedures

- For major head and neck operations.



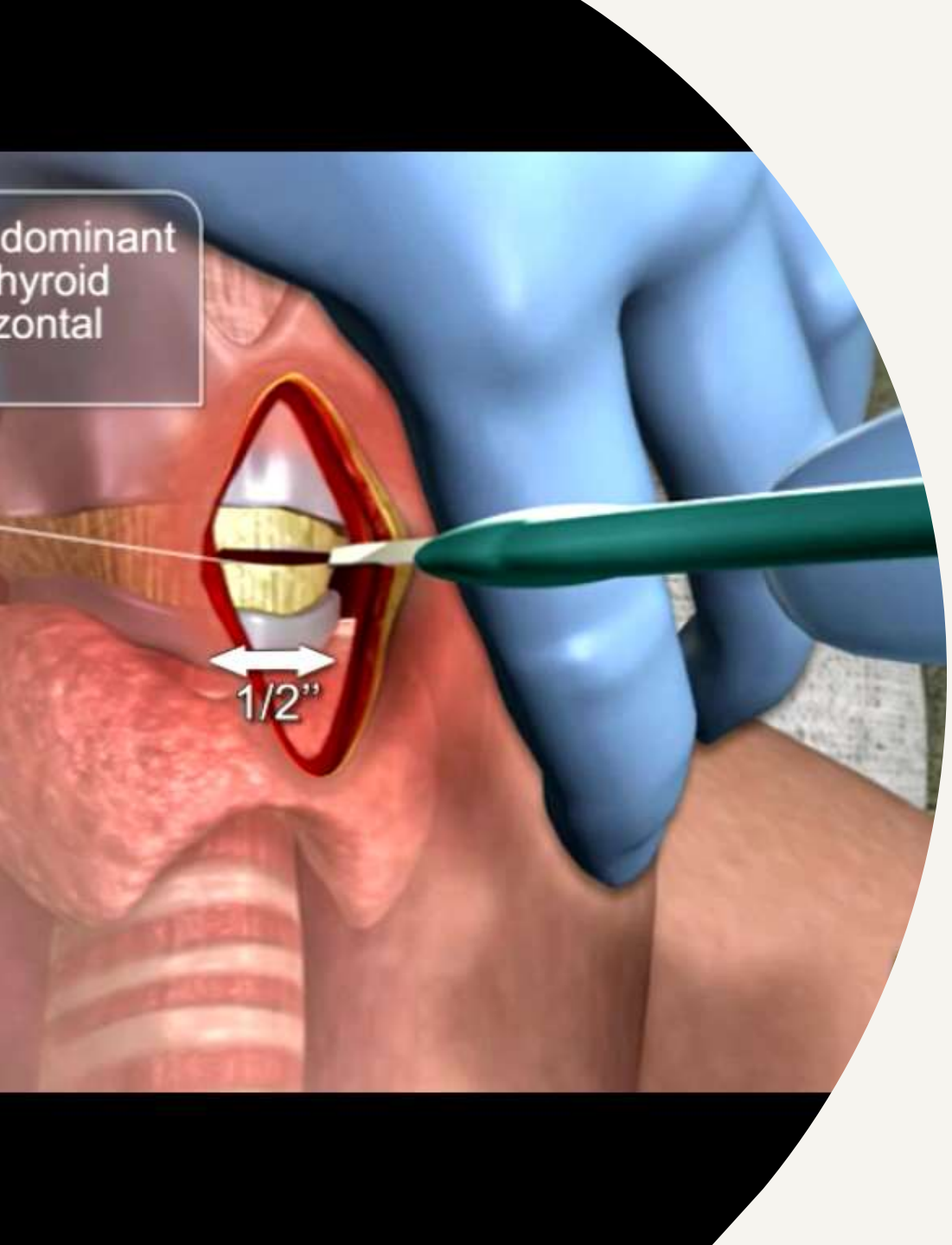
anatomy

- 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.



- Where do cricothyroidotomy insert?
- Where do tracheostomy insert?
- What are the layers anterior the trachea?

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

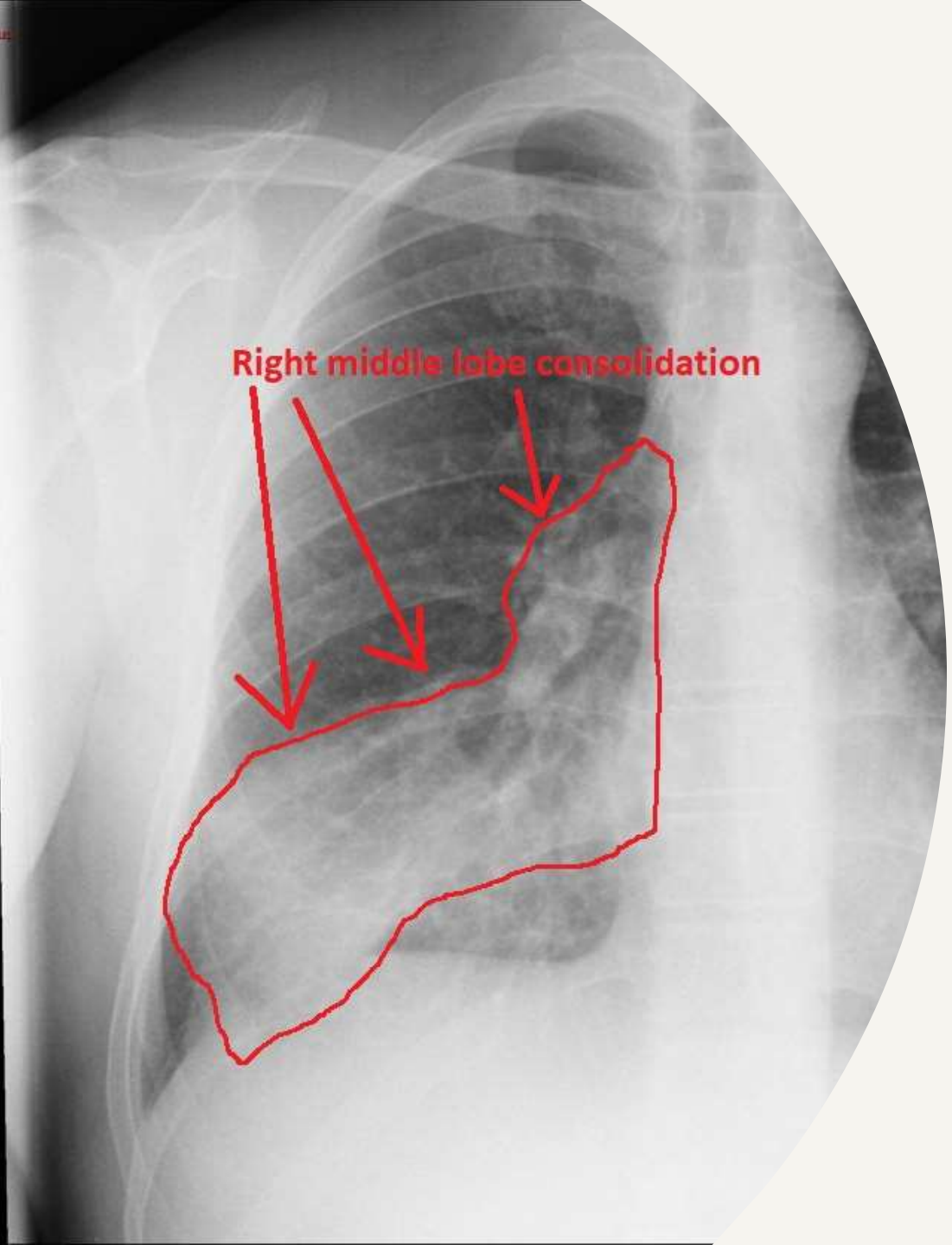


Cricothyroidotomy (mini tracheostomy)

- Transverse incision over the cricothyroid membrane.

Percutaneous dilatational tracheostomy

- ICU bed side tracheostomy.
- Use of guide wire and dilators.
- May be under the vision of bronchoscope through endotracheal tube.
- Less time, less expensive.
- Not suitable for thick neck and in emergency.



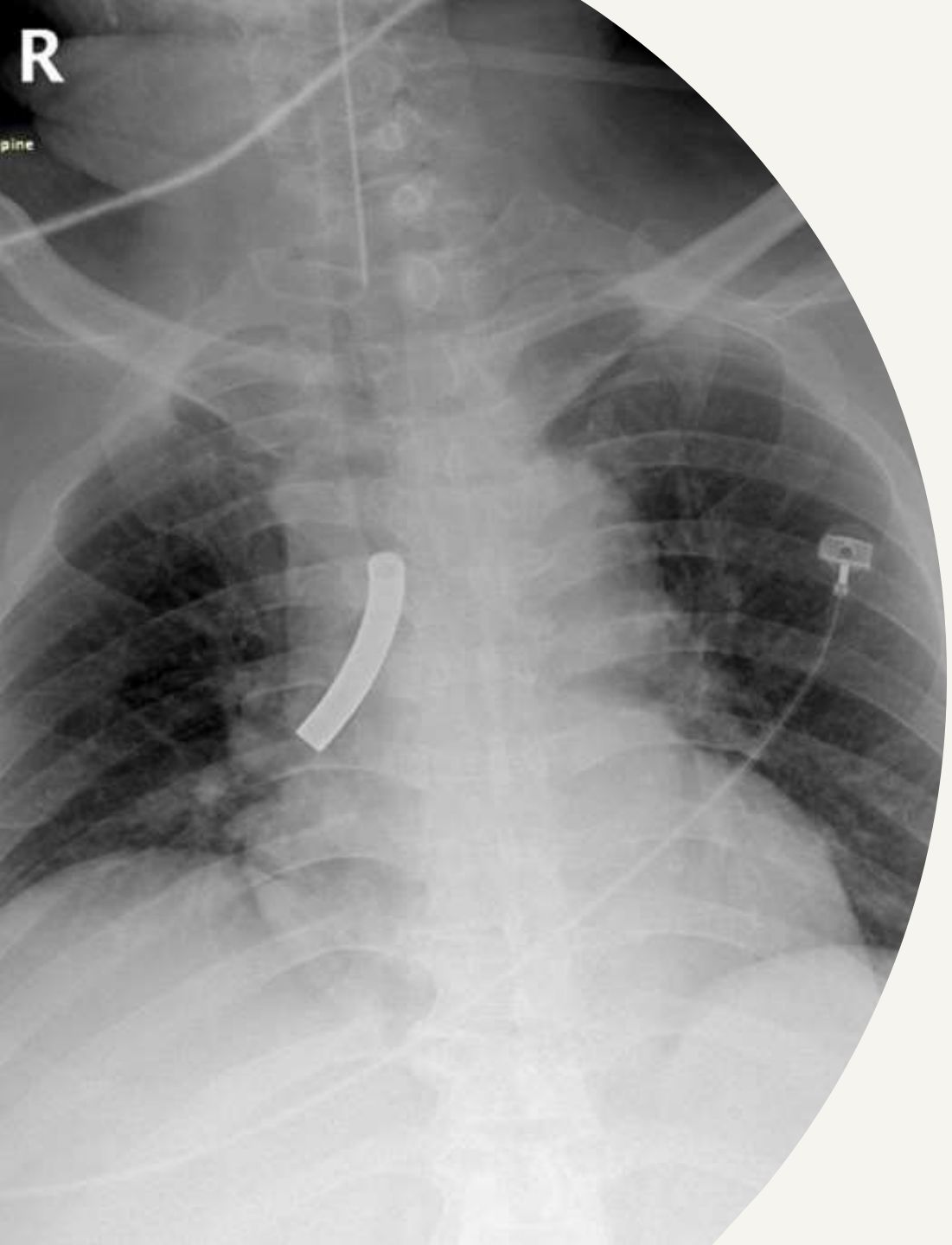
Complications of tracheostomy

Intraoperative complications:

- Loss of airway
- Bleeding and injury to big (major) vessels
- Injury to tracheoesophageal wall
- Pneumothorax
- Aspiration

Early complications

- Bleeding and local hematoma
- Tracheostomy tube obstruction and desaturation
- Tracheostomy tube displacement
- Infection
- Surgical emphysema

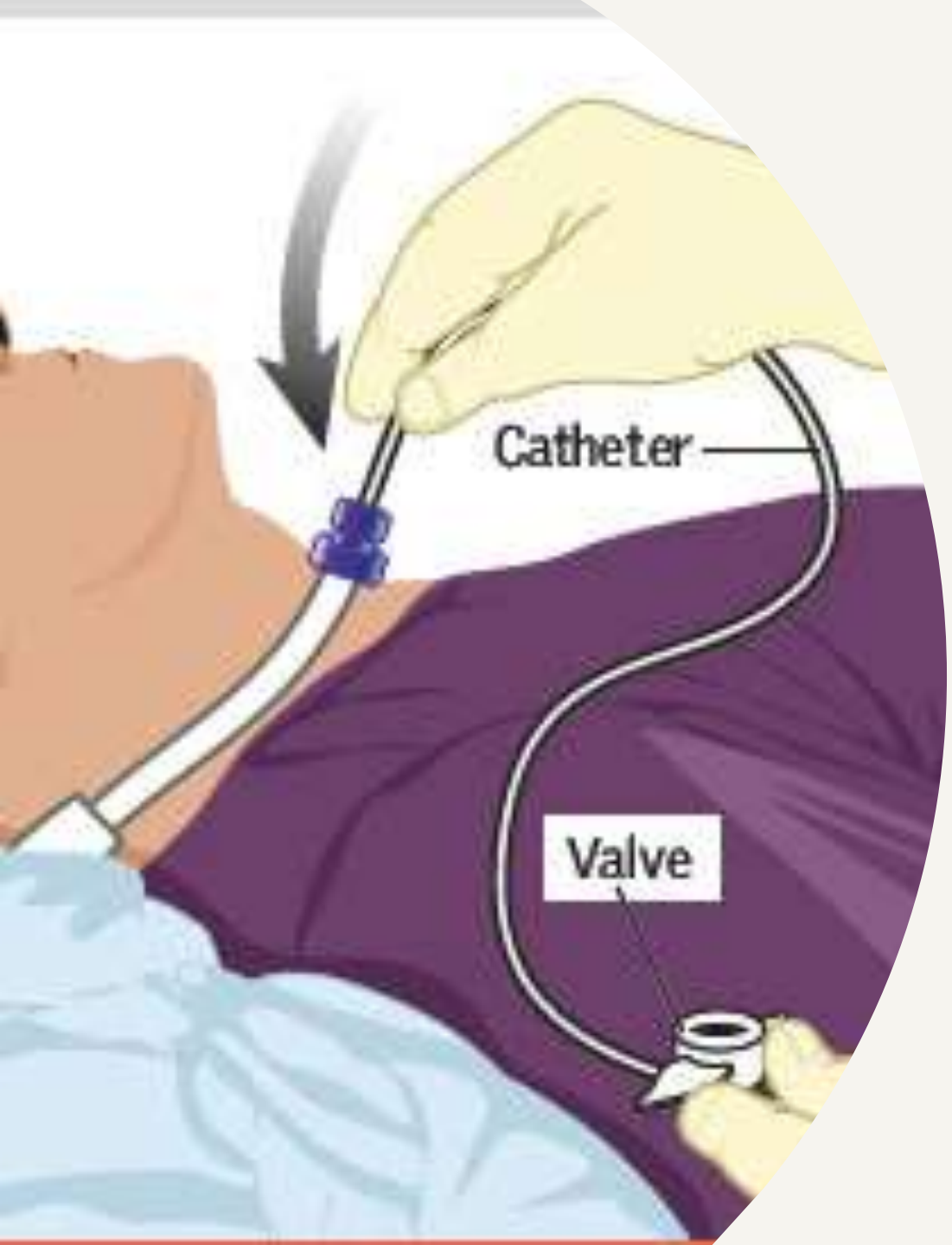


Late complications:

- Tracheal or subglottic stenosis
- Granulation tissue
- Tracheocutaneus fistula
- Tracheo-esophageal fistula
- Dislocation of tracheostomy tube
- Bleeding from stoma or during suction
- Blockage of tracheostomy tube
- Laryngeal injury or alteration of phonation

Tracheostomy tubes

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



Tracheostomy patient care

- Safety first
- Care of the stoma (suction) - using aseptic technique and dressing – 2 to 3 times per day – once removed the stoma will close over few days.
- Nutrition - can the patient eat?
- Infection control

Chest tube

Intercostal drainage is the insertion of a tube into the pleural space to evacuate air/fluid, to help regain negative pressure and thus promote lung expansion.

Indications

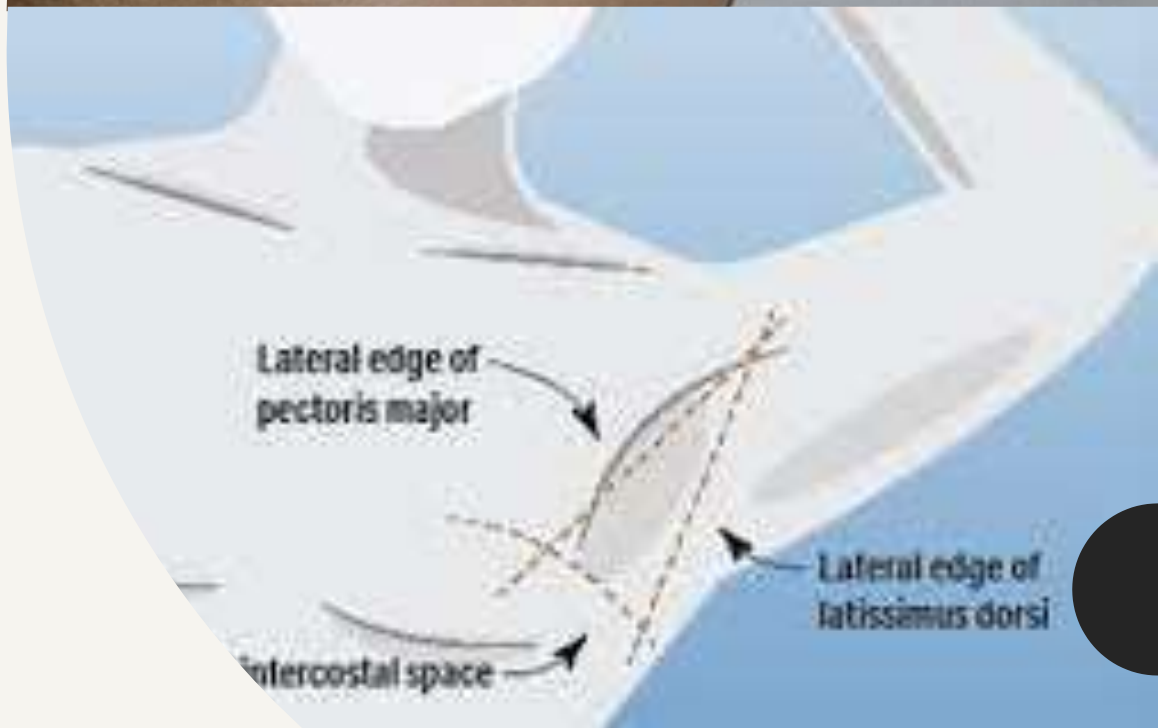
- Pneumothorax (primary – secondary – tension)
- Hemothorax
- Pleural effusion (malignant – empyema)
- Chylothorax
- Post operative cardiothoracic surgery
- Mechanically ventilated patients with any size pneumothorax / hemothorax

Contraindications

- *Lung adherent to the chest wall*
- *Uncorrected coagulopathy*
- *Skin infection*
- *Loculated pleural effusion*

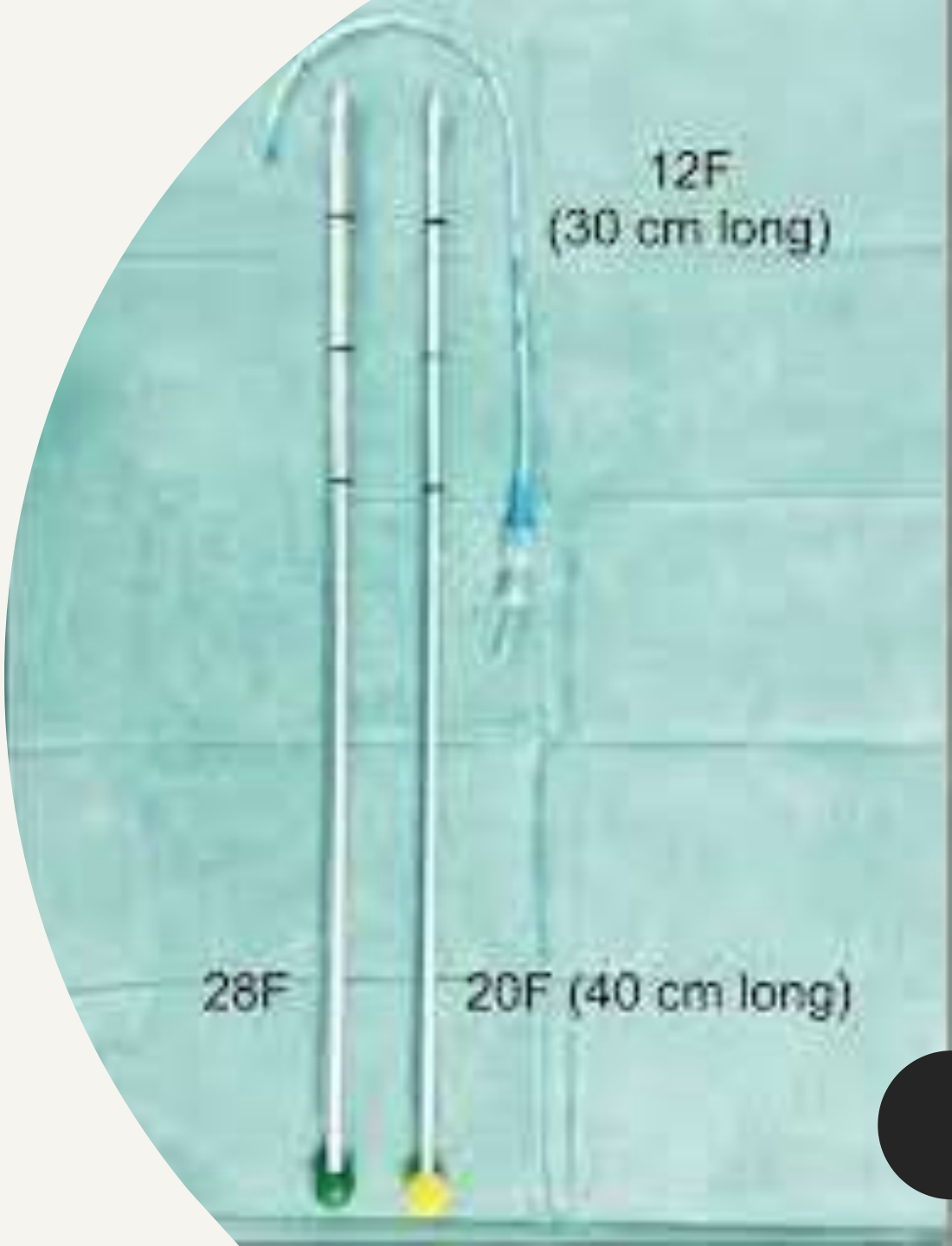
Site of insertion

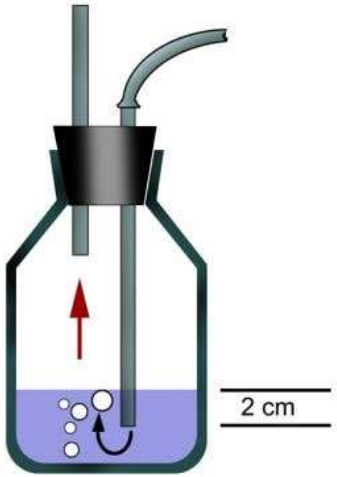
- Triangle of safety – boundaries ?
- 4th to 5th intercostal space, anterior to the mid axillary line
- Patient position ? (supine – sitting/semi - lateral position, with ipsilateral arm behind her/his head)

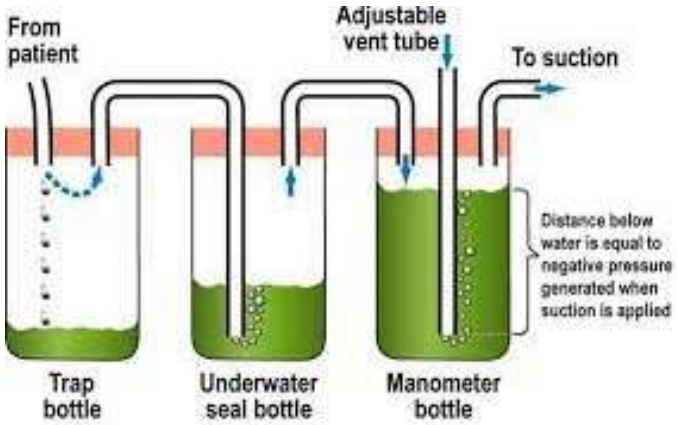


Size of tube

- The unit of chest tube size is French sizing, which refers to circumference in millimeters
- Adult : 28-32 Fr
- Child : 18 Fr
- Newborn : 12-14 Fr

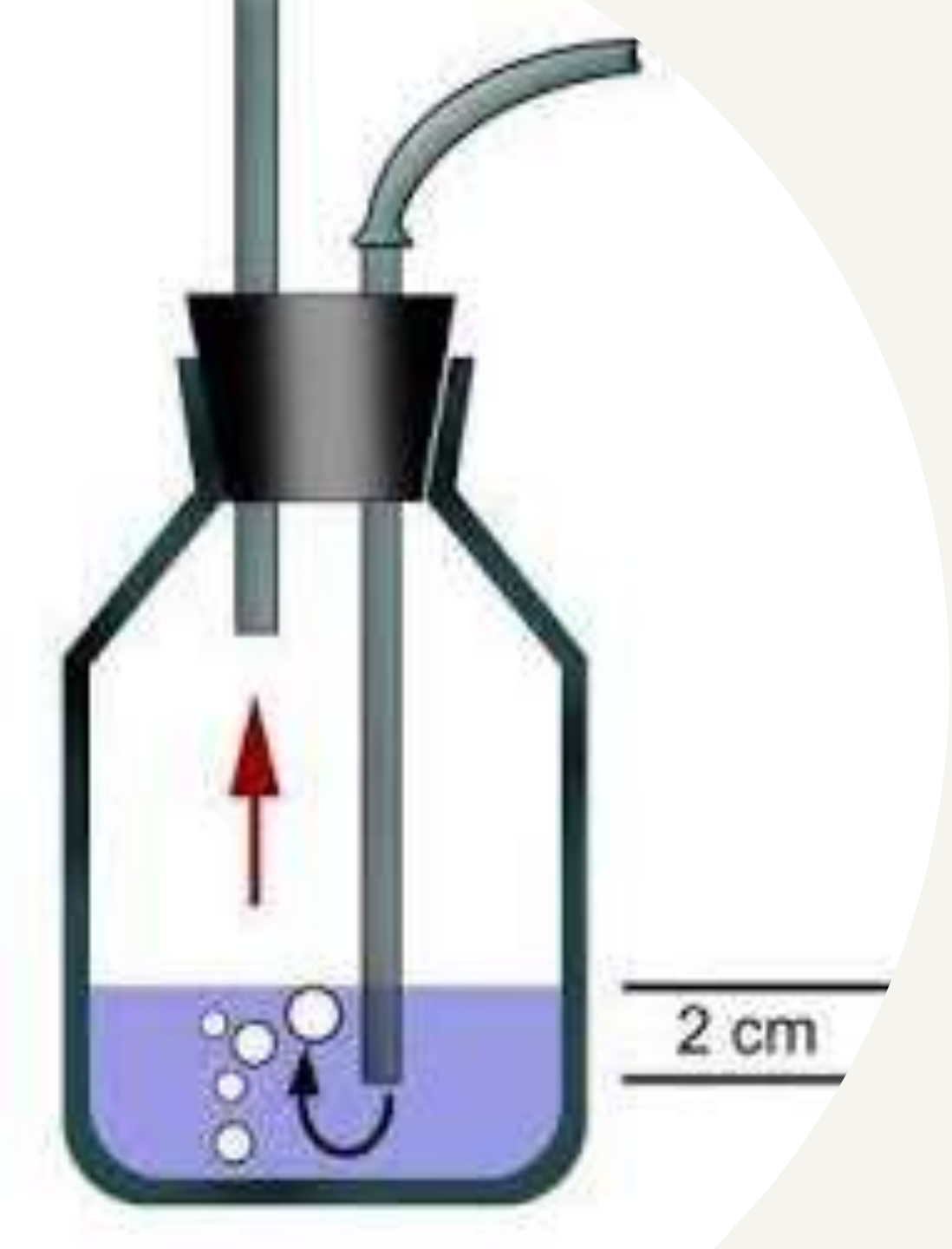






Chest tube bottle

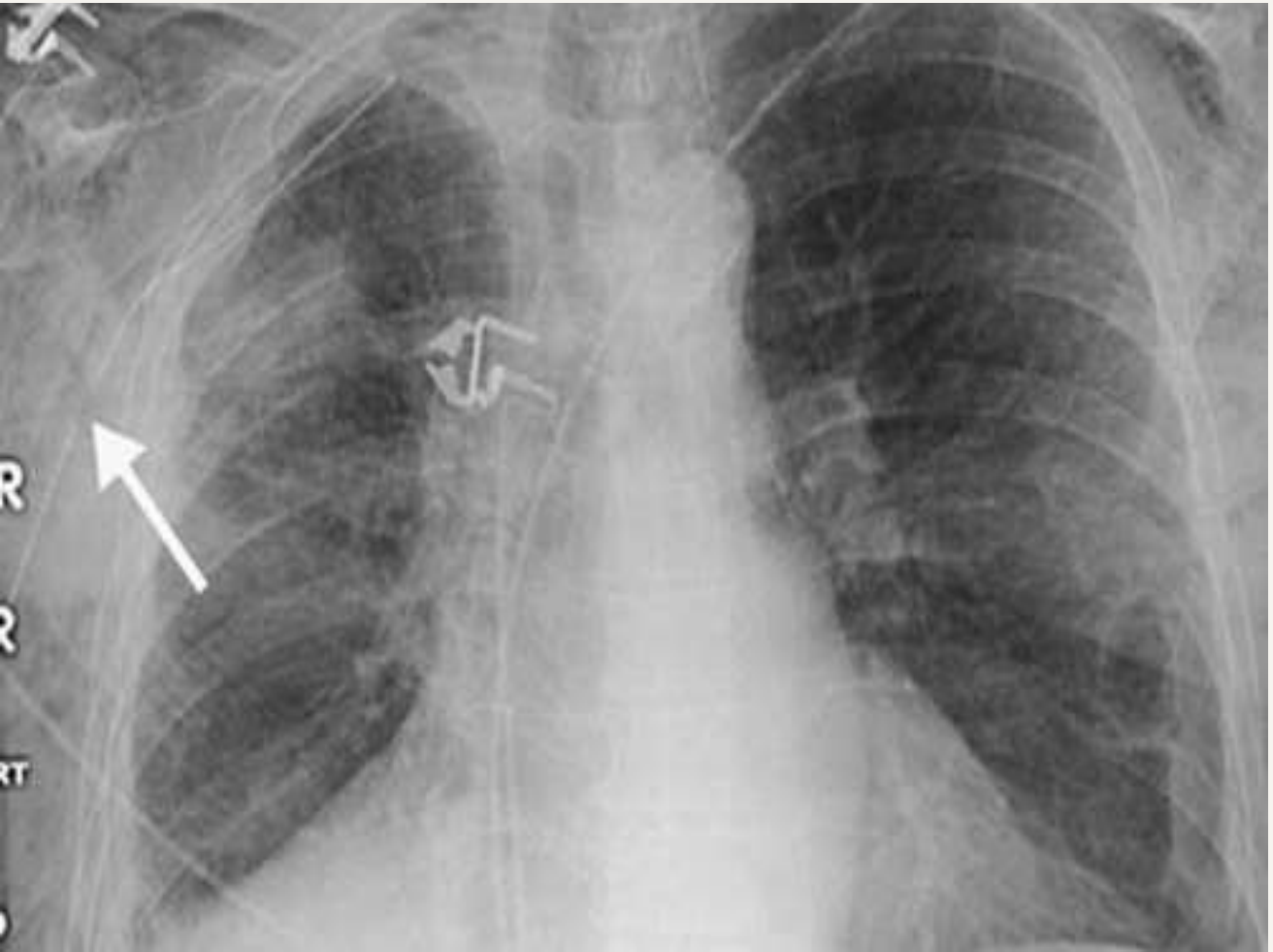
- Underwater seal
- 3 chamber bottle (collection chamber – water seal chamber – suction control chamber)



How to confirm that the chest tube is functioning?

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

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