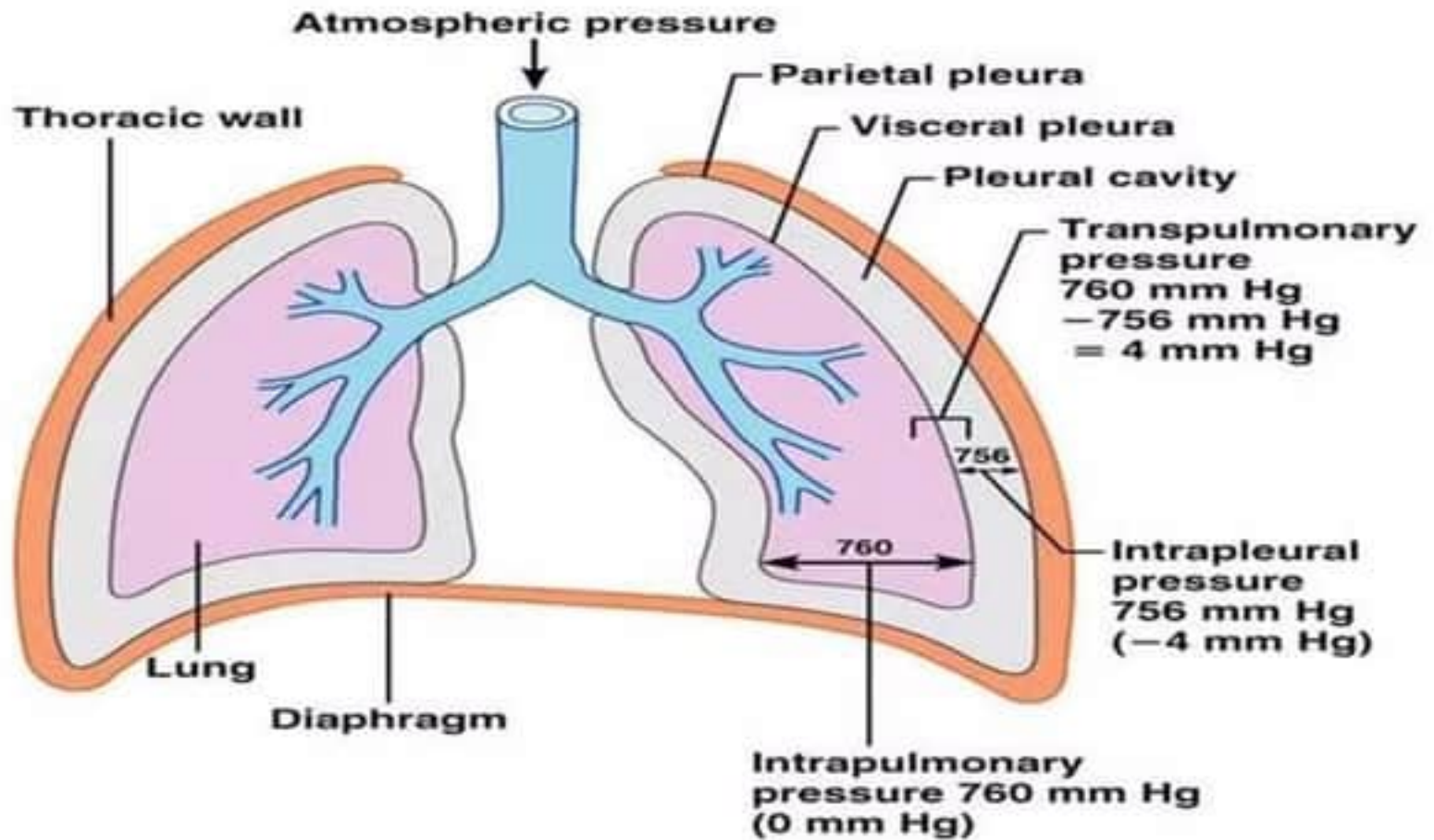


PNEUMOTHORAX



Medrockets

Pneumothorax

- + **Definition:** Collection of air within the pleural space
 - + Due to rupture of a subpleural or intrapleural bleb
 - + Intrapleural pressure is the *same* as the atmospheric pressure
- + Transforms the potential space into a real one
- + With Progression, the intrapleural pressure may exceed atmospheric pressure creating a tension-scenario
 - + Impairs respiratory function
 - + Decreases venous return to the right side of the heart

Atmospheric pressure

Thoracic wall

Parietal pleura

Visceral pleura

Pleural cavity

Transpulmonary pressure

**760 mm Hg
- 756 mm Hg
= 4 mm Hg**

756

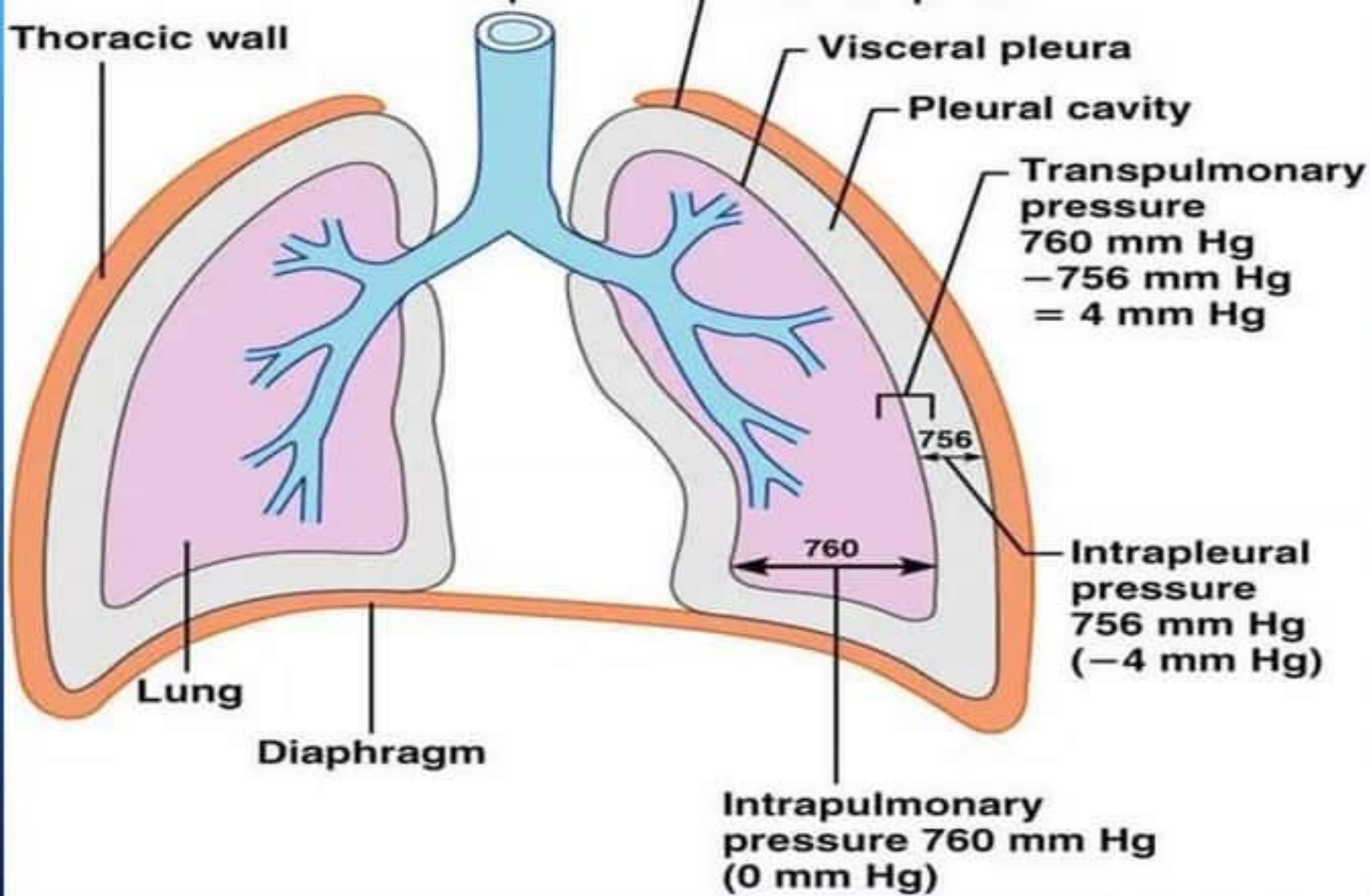
Intrapleural pressure
**756 mm Hg
(-4 mm Hg)**

760

Intrapulmonary pressure
**760 mm Hg
(0 mm Hg)**

Lung

Diaphragm



Classification of Pneumothorax

+ Spontaneous Pneumothorax

+ Primary spontaneous pneumothorax

- + Occurs without a precipitating event in a person who does not have known lung disease

+ Secondary spontaneous pneumothorax

- + Occurs due to an underlying lung disease

+ Traumatic/Tension Pneumothorax

+ Pulmonary source

+ Tracheobronchial source

+ Esophageal source

Epidemiology of Spontaneous Pneumothorax

- + More common in men than women
- + Spontaneous pneumothorax: commonly seen in **tall, thin, young men 20 to 40 years of age**
- + Risk increases with **smoking**
- + Approximately 25% recurrence rate within 2 years

Causes of Spontaneous Pneumothorax

+ Primary Spontaneous Pneumothorax

- + Idiopathic → most common
- + Scuba Diving
- + Marfan Syndrome
- + Homocystinuria
- + Thoracic endometriosis

+ Secondary Spontaneous Pneumothorax

- + COPD (most common), Asthma & Cystic Fibrosis
- + Immunocompromised Infections
 - + Pneumocystis jirovecii pneumonia → On the rise due to AIDS
 - + TB & Cocci

Pathogenesis of Spontaneous Pneumothorax

- + Rupture of the apical subpleural or intrapleural bleb produces a hole in the pleura.
- + Pleural cavity pressure is the same as the atmospheric pressure.
- + Spontaneous pneumothorax: loss of negative intrathoracic pressure
 - + Causes a portion of lung or the entire lung to collapse

Hypoxemia & Hypercapnia

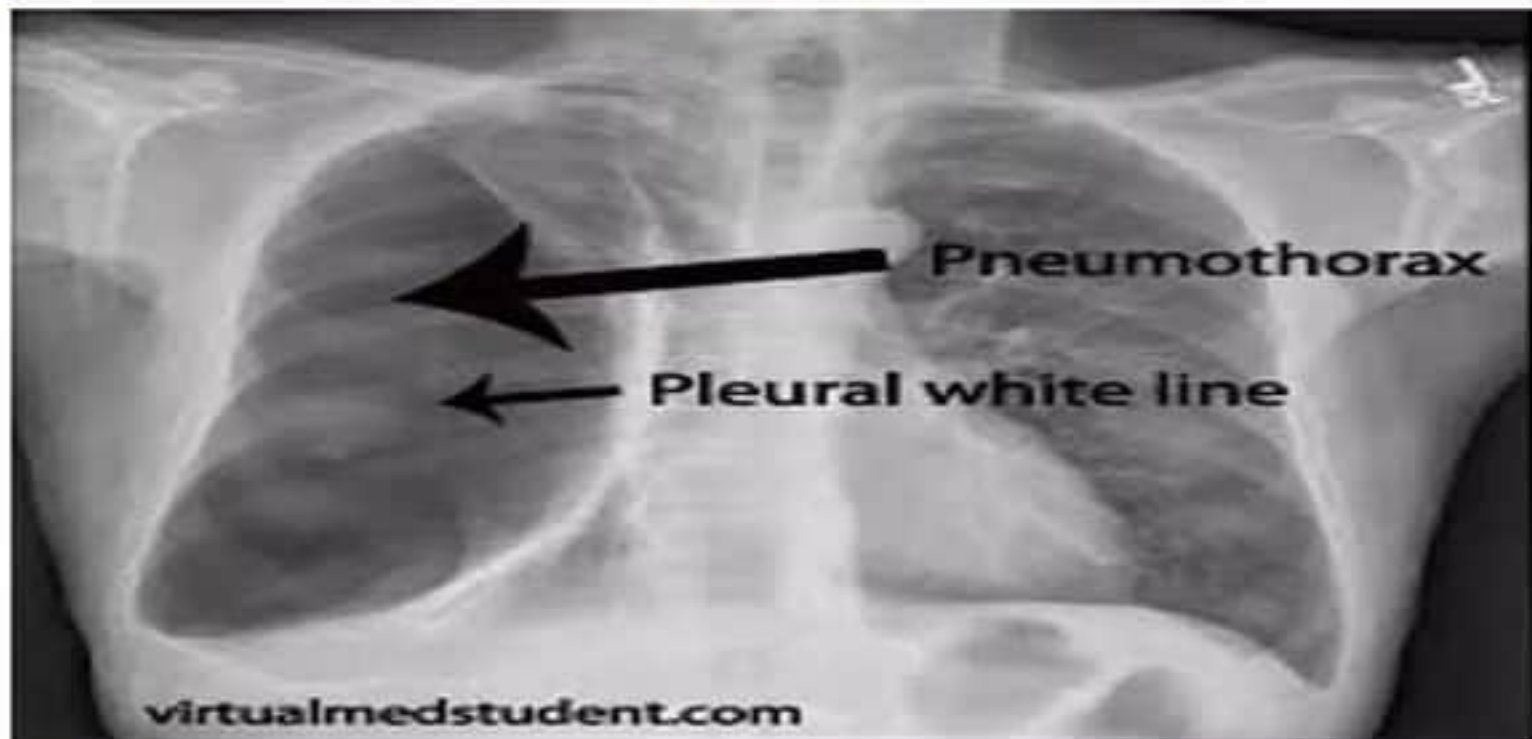
- + Hypoxemia is common
 - + collapsed and poorly ventilated portions of lung continue to receive significant perfusion → V/Q mismatch
- + Hypercapnia is unusual
 - + underlying lung function is relatively normal and adequate alveolar ventilation can be maintained by the contralateral lung

Clinical Findings in Spontaneous Pneumothorax

- + **Sudden onset of dyspnea** with pleuritic type of chest pain (90%)
- + Physical examination
 - + Tympanic percussion note
 - + Absent breath sounds
 - + Trachea deviated to the side of the collapse if there is total lung collapse

Upright chest x-ray

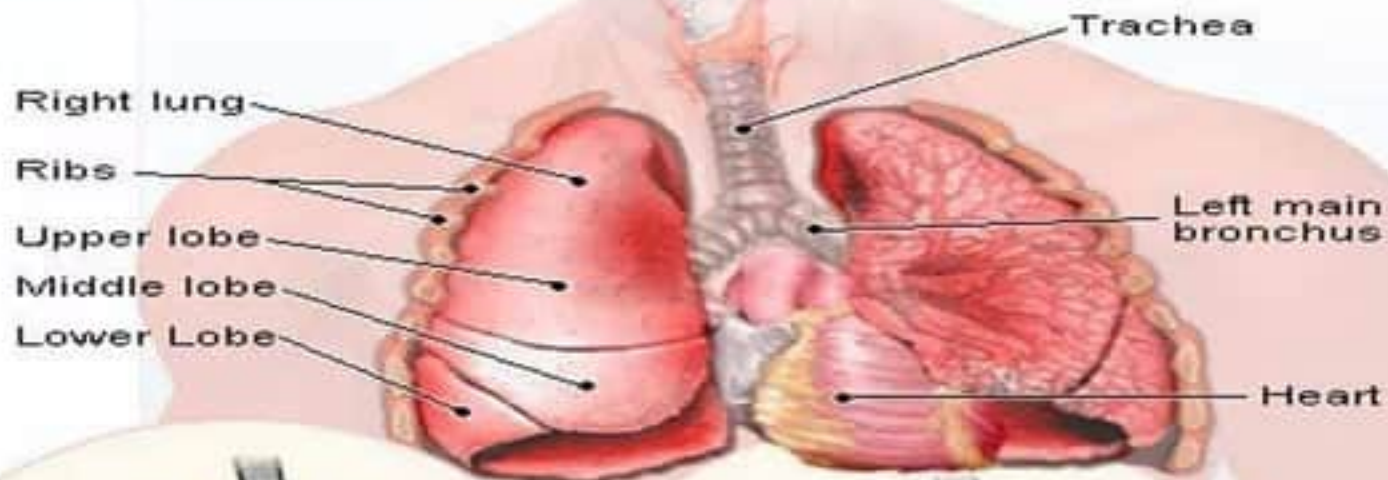
- + White visceral pleural line
- + Absence of vessel markings peripheral to line



Treatment of Spontaneous Pneumothorax

- + Observation alone if asymptomatic and pneumothorax < 15%
- + One hundred percent oxygen administration
 - + Reduces partial pressure of nitrogen → increases rate of pneumothorax absorption
- + Chest tube insertion or thoracoscopy may be required.
 - + V.A.T.S. (Video Assisted Thoracoscopic Surgery) is becoming the standard

Pneumothorax



Small pneumothorax

Air collects between the lung and the chest wall



Large pneumothorax

A lot of air collects and pushes on the lung and heart



Treatment of a large pneumothorax

Trapped air is removed by using a chest tube

Tension Pneumothorax

- + **Definition:** A tension pneumothorax is generally considered to be present when a pneumothorax leads to **significant impairment of respiration and/or blood circulation**

Causes of Tension Pneumothorax

- + Penetrating trauma to the lungs (e.g., knife wound) → valve type of pleural tear
- + Rupture of tension pneumatocysts

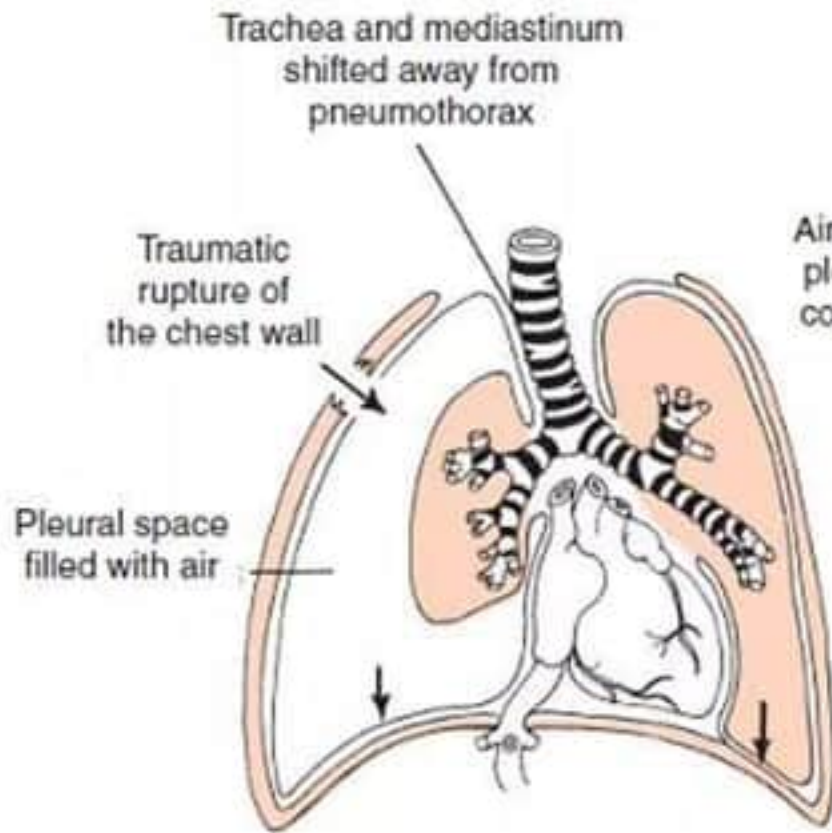
Pathogenesis of Tension Pneumothorax

- + Flap-like pleural tear (check valve) allows air into the pleural cavity but prevents its exit.
 - + Similar in concept to filling a tire up with air
- + Increased pleural cavity pressure
 - + Increase in pleural cavity pressure with each breath
- + Produces compression atelectasis
 - + a condition in which a region of the lung cannot be ventilated as a result of intrathoracic pressures that compress the alveoli in that region

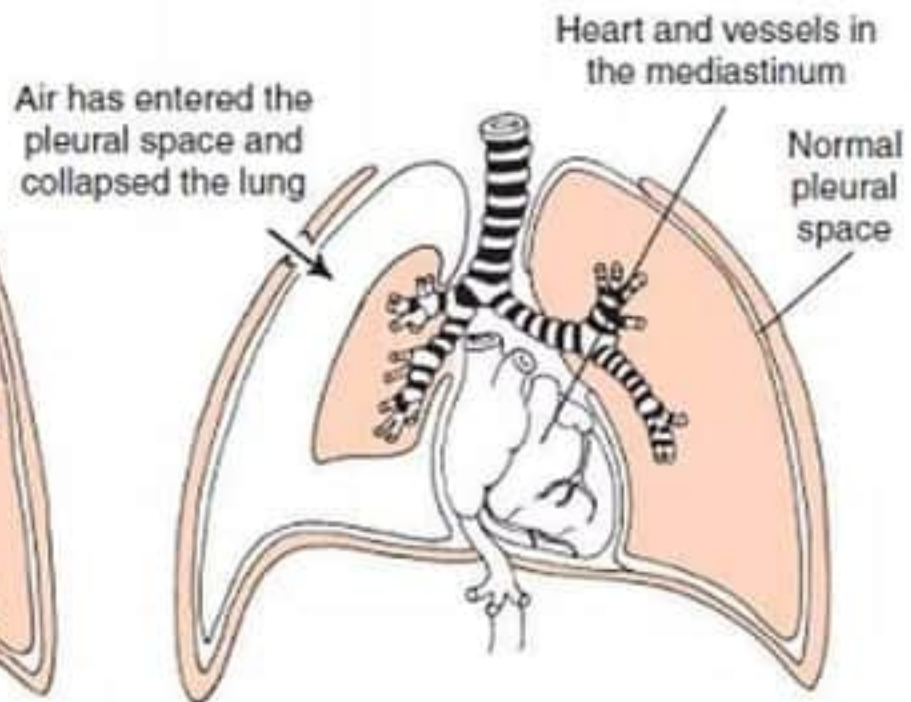
Clinical Findings of Tension Pneumothorax

- + Sudden onset of severe dyspnea and pleuritic chest pain
- + Physical examination
 - + Tympanic percussion note and absent breath sounds
 - + Trachea and mediastinal structures deviate to contralateral side if large tension pneumothorax
- + Compromised venous return to the heart, if the pneumothorax is located on the left side
 - + Due to obstruction of the venous return

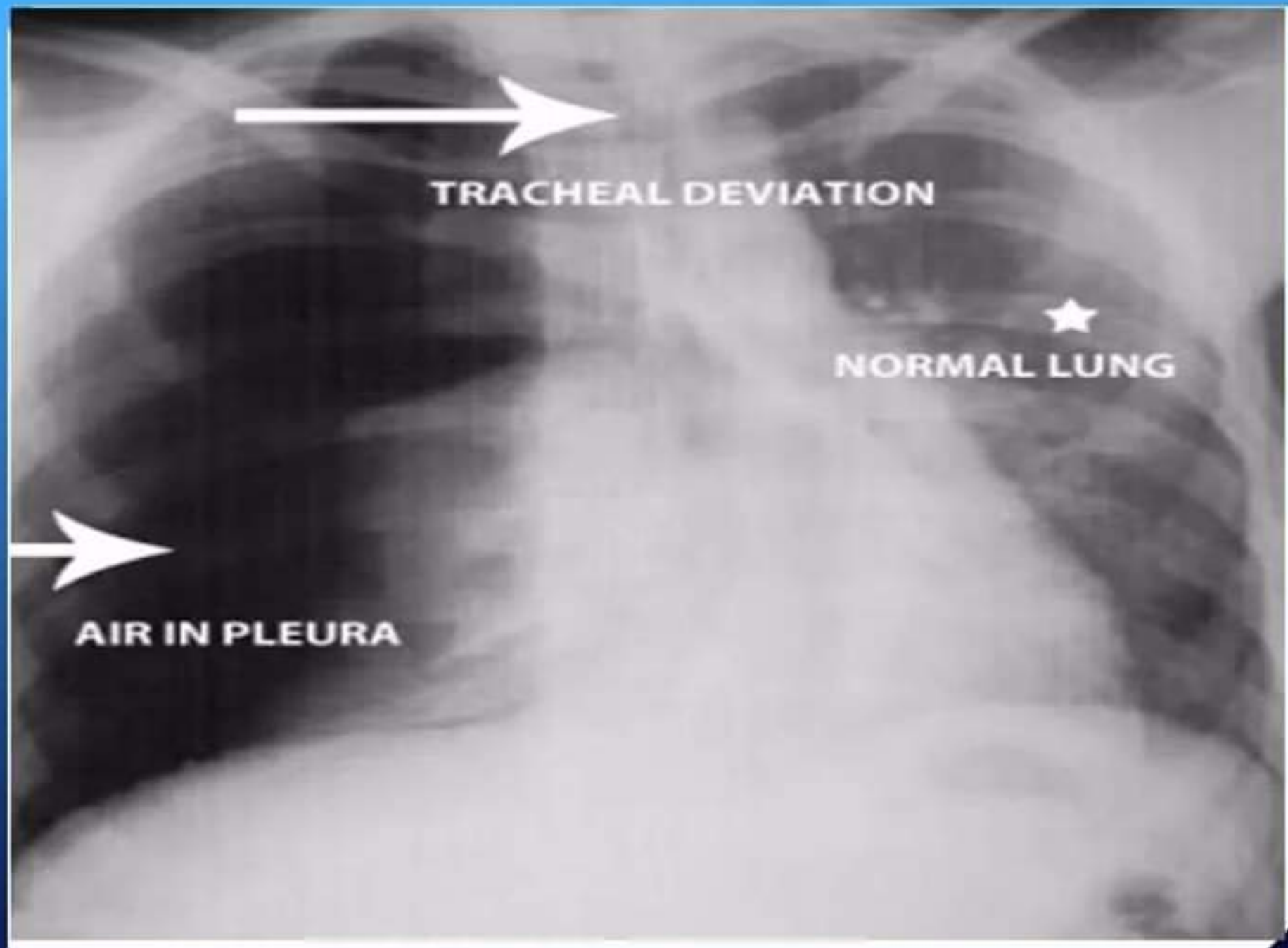
(Chest wall injury permits
air to flow in and out of the pleural
space on the affected side)



Inhalation: air enters the injured
side, causing collapse of the lung
and shift of the mediastinum and
heart toward the unaffected side



Exhalation: the air is partially
forced from the affected side
pleural space and the mediastinum
shifts toward the affected side



Treatment of Tension Pneumothorax

- + Relieve pressure first.
 - + Insert a needle into the second intercostal space on the midclavicular line.
- + Insert a chest tube.

HEMOTHORAX



Blood in
pleural space

Hemothorax

+ **Definition:** The collection of blood between the visceral and parietal pleura → In the pleural space

Causes of Hemothorax

- + Pulmonary: Bullous Emphysema, PE, Infection, TB, AVM's
- + Pleural: Torn adhesions, Endometriosis
- + Neoplastic: Primary, Metastatic (Melanoma)
- + Blood Pathology: Thrombocytopenia, Hemophilia, Anticoagulation medications (Heparin, Warfarin)
- + Thoracic Pathology: Ruptured aorta

Pathogenesis of Hemothorax

- + The accumulation of pleural blood forms a stable clot
- + Overall ventilation & Oxygenation becomes impaired
 - + Mechanical compression of the lung parenchyma
 - + Mediastinal shift
 - + Flattening of the hemidiaphragm

Clinical Findings of Hemothorax

- + Dyspnea
- + Tachypnea
- + Cyanosis → Due to loss of blood
- + Hypotension → Due to loss of blood
- + Tachycardia → Normal Response to hypotension
- + Tracheal deviation to unaffected side
- + Decrease or absent of breath sounds on the affected side



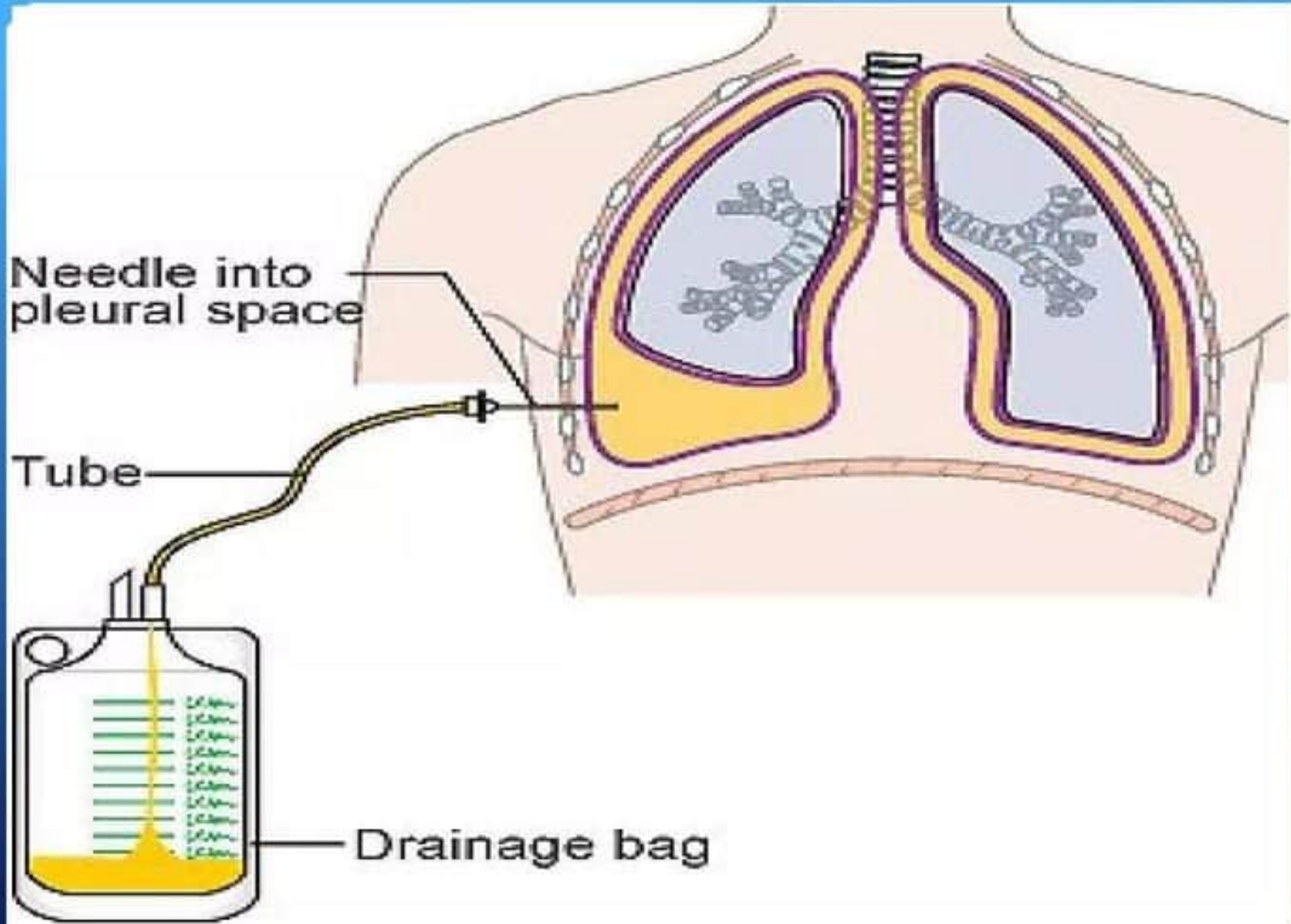
Treatment of Hemothorax

- + **Goal of treatment:** To remove the pleural blood and allow for complete lung re-expansion
 - + Thoracocentesis or Thoracostomy → Remove blood

Needle into
pleural space

Tube

Drainage bag



This patient is undergoing a....?



- A. Ascitic tap
- B. Cannulation
- C. Dialysis
- D. Ultrasound

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Noori**