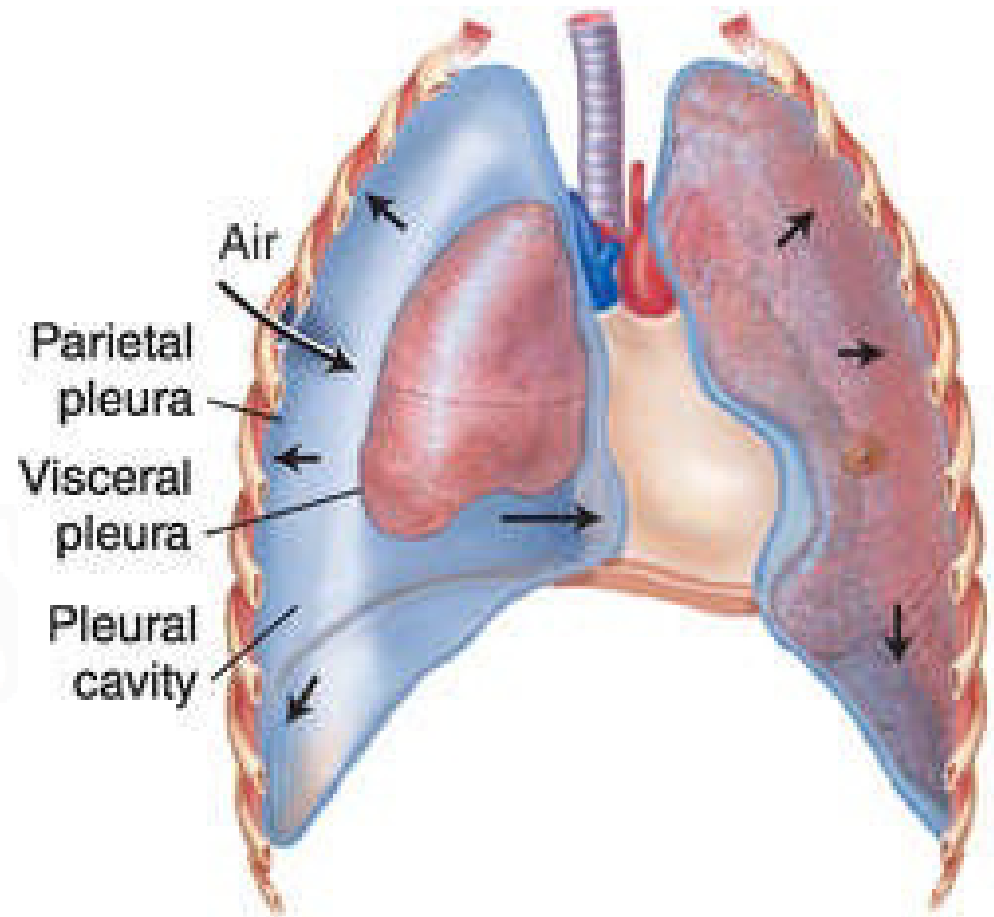


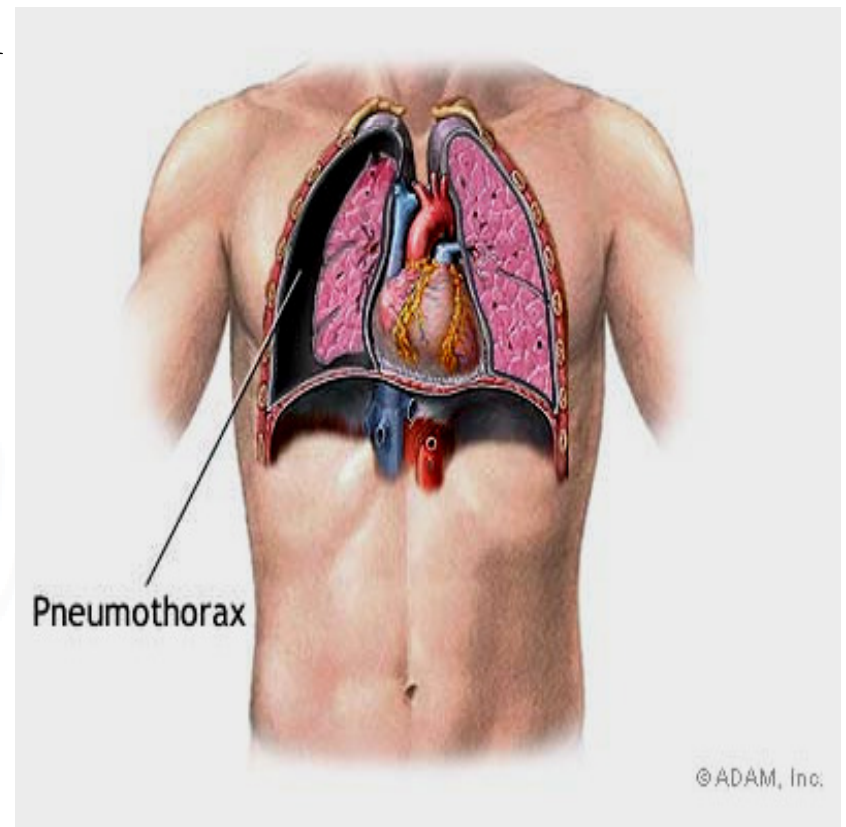
Pneumothorax



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Introduction

- **Pneumothorax**
- **Air in pleural space**
 - Air can enter from the outside
 - Injury penetrated the chest wall
 - Air can enter from inside
 - if the lung is torn or ruptured
 - E.g. (pulmonary bleb).



High Risk Patients for Pneumothorax

- **Acute Respiratory Distress Syndrome**
- **Hemodynamically unstable who may require**
 - **Invasive Procedures**
 - **Ventilator**
 - **Resuscitations**
- **Postoperative Patients**
- **Trauma**
 - **Penetrating Injury of Chest**
 - **Rib Fracture**
- **Procedures**
 - **Thoracentesis**
 - **Central Venous Catheter placement**
 - **Bronchoscopy**
 - **Pericardiocentesis**
 - **Tracheostomy**

Types/ Etiology

Etiology

- Spontaneous
 - Primary
 - Secondary
- Iatrogenic / Traumatic

Type

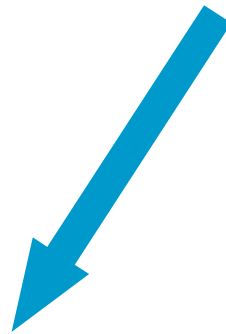
- Open Pneumothorax
- Close Pneumothorax
- Tension Pneumothorax

Spontaneous Pneumothorax

- Condition in which the lung collapses with no apparent injury or trauma
- Primary
 - Rupture of apical subpleural bleb
- Secondary
 - COPD = Emphysematous Bullae
 - Bacterial pneumonia
 - Lung abscess
 - Whooping cough
 - Asthma
 - AIDS/ Lung Tumor
 - Infective or Infiltrative Lung Disease
 - Pulmonary infarct

How Mechanical Ventilation Responsible for Pneumothorax ?

Biotrauma



Barotrauma

&

Volutrauma



Atelectrauma

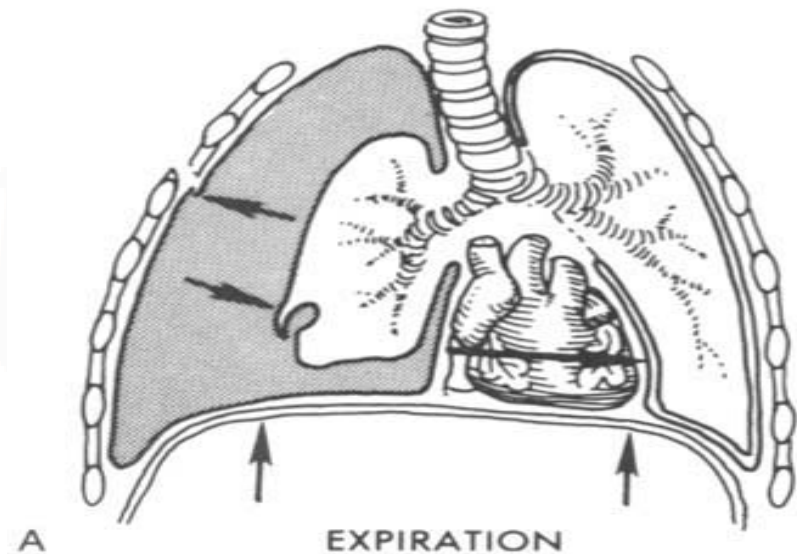
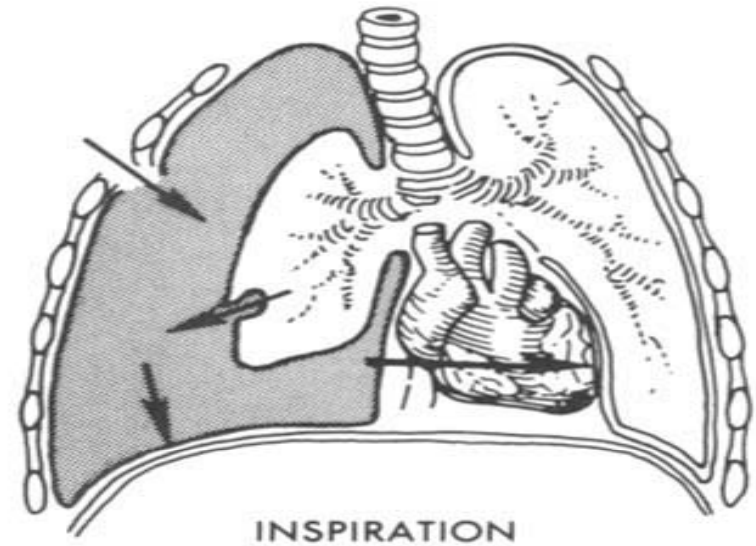
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Barotrauma & Volutrauma & Atelectrauma

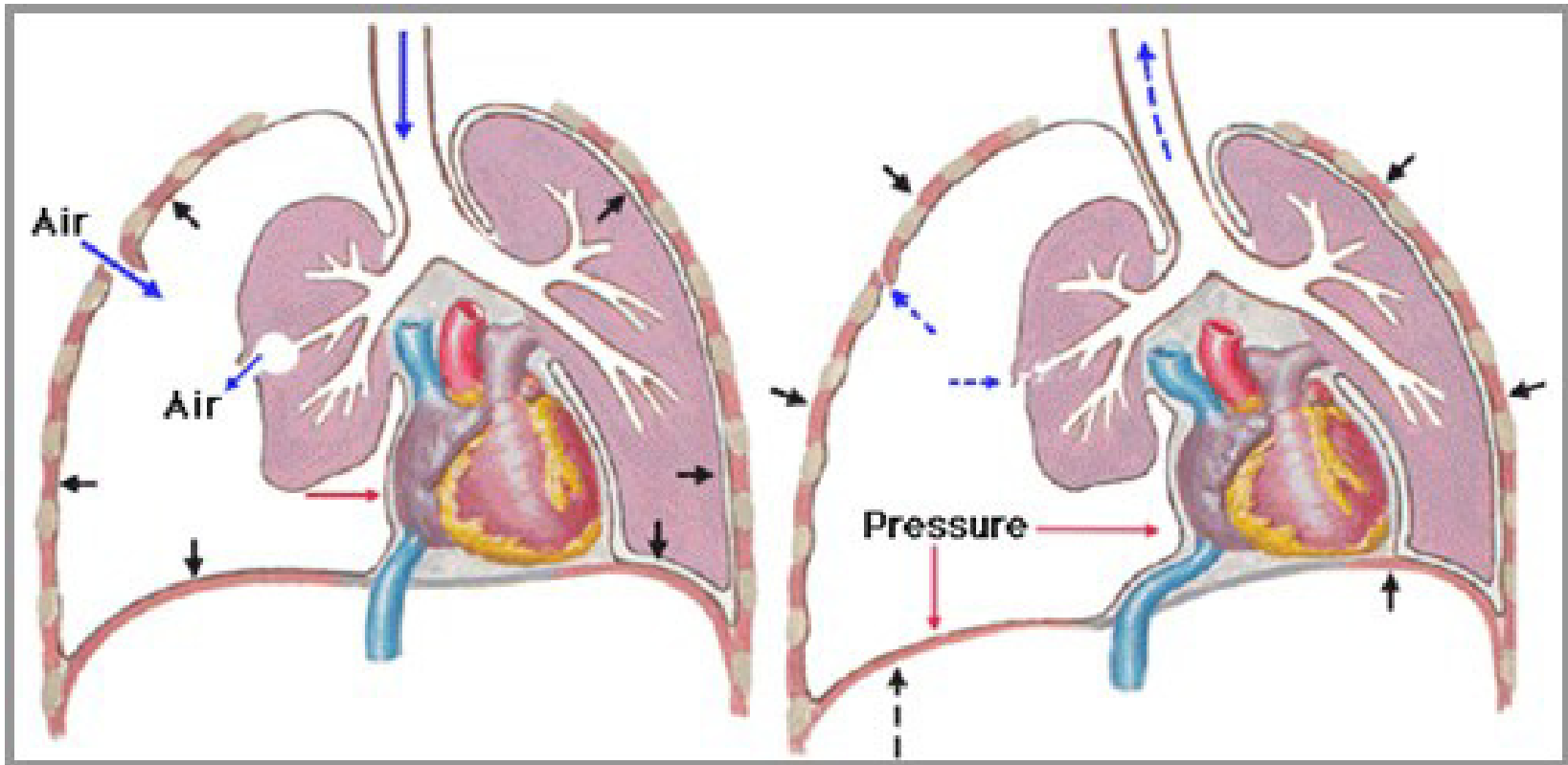
- **Barotrauma & Volutrauma**
- Ventilator-induced lung injury by high levels of mechanical stress and strain that occur
 - When high airway pressures(Barotrauma) delivered.
 - When high volumes (Volutrauma) delivered .
- This stress and strain can disrupt the pulmonary fibroelastic skeleton and trigger a secondary inflammatory response.
- **Atelectrauma**
 - Stress and strain due to cyclic opening & closing of Alveoli.
 - Directly induce the release of inflammatory mediators and noxious proteinases.

Tension Pneumothorax

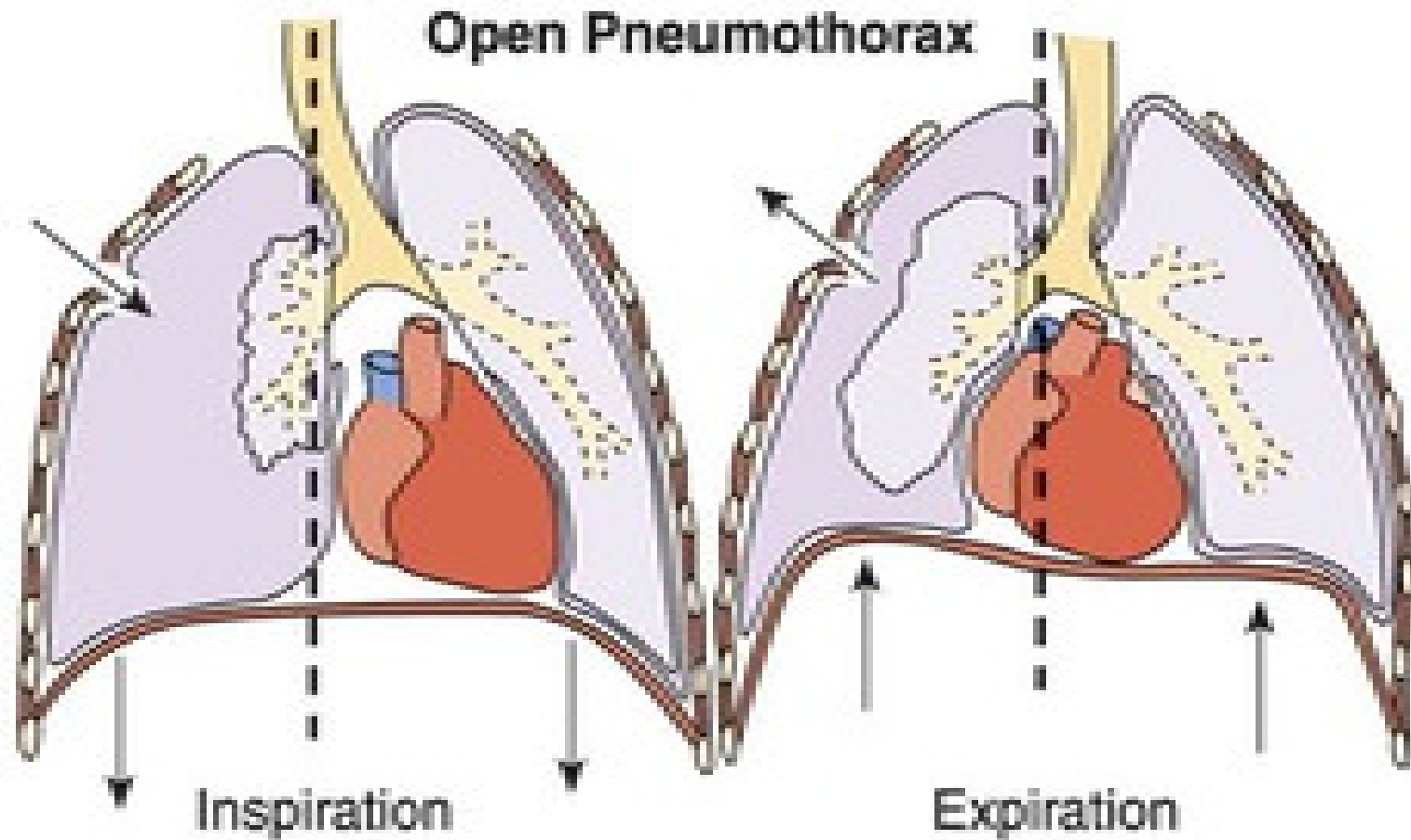
- When the pleural pressure is positive throughout respiratory cycle
- “Ball-valve mechanism”
- Injury to pleura creates a tissue flap that opens on inspiration and closes on expiration



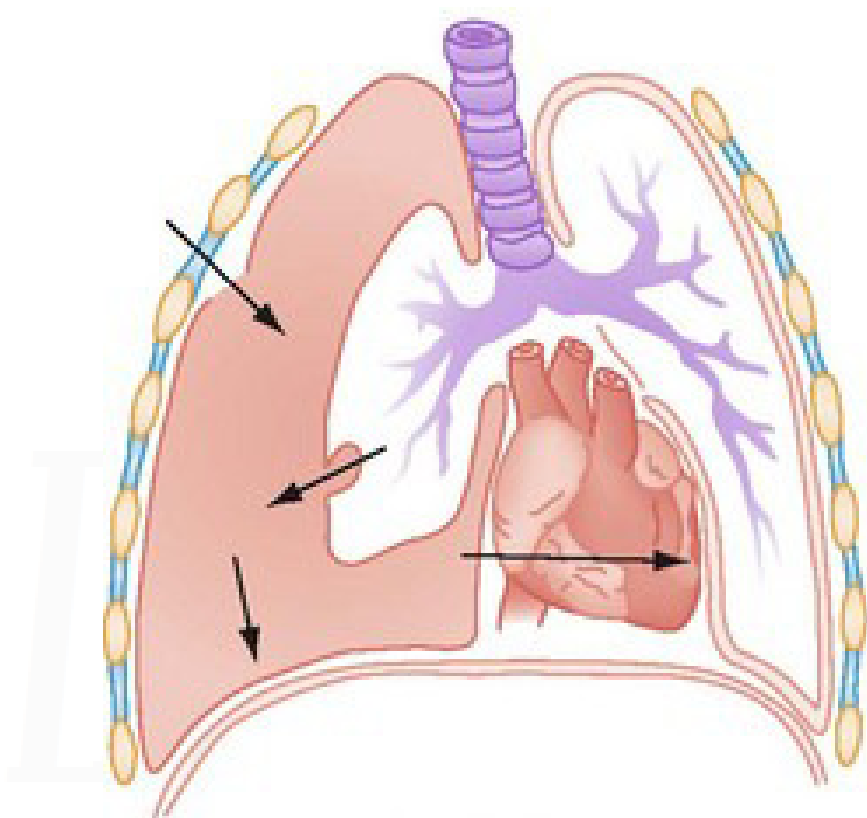
Tension Pneumothorax



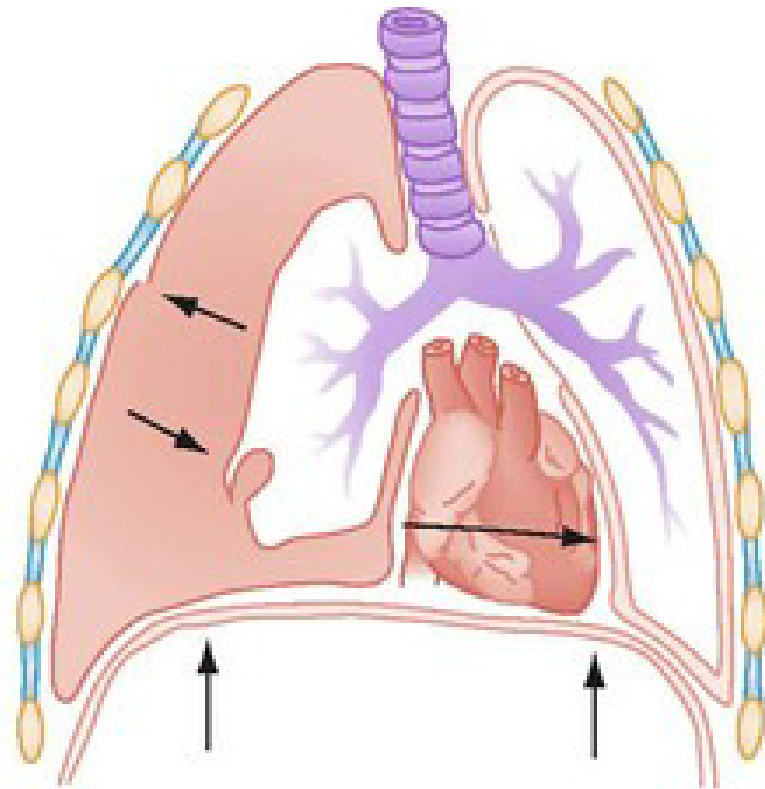
Open Pneumothorax



Close Pneumothorex



Inspiration



Expiration

Clinical Feature - Symptoms

- **Pain**
 - **Sharp Stabbing chest pain**
 - **Radiating to the shoulder and or back**
- **Acute Breathlessness - Respiratory Distress**
- **Dry coughing**
 - **Because of irritation of the diaphragm.**
- **Palpitation**
- **Shock**
 - **Vaso vagal effect due to Mediastenal shifting**
- **Syncope**

Clinical Feature - Sign

- **Marked tachycardia**
- **Hypotension**
- **Inspection**
 - **Diminished chest expansion on affected site.**
 - **Bulging on affected side**
 - **Displaced apex beat**
- **Palpation**
 - **Trachea displaced**
- **Percussion**
 - **Tympanic**
- **If Lt side**
 - **Cardiac dullness diminished**
- **If Rt side**
 - **Reduce upper level of liver dullness**

Auscultation

- **Close Pneumothorax**
 - **Decrease Air entry**
- **Open Pneumothorax**
 - **To and Fro Air sound**
 - **Voice and coughing heard with echo**
- **Tension Pneumothorax**
 - **Same as close pneumothorax**
 - **Mediastinal shifting more**
 - **Cynosis**
 - **Distended neck vein**
 - **Widening intercostal space.**

Investigations

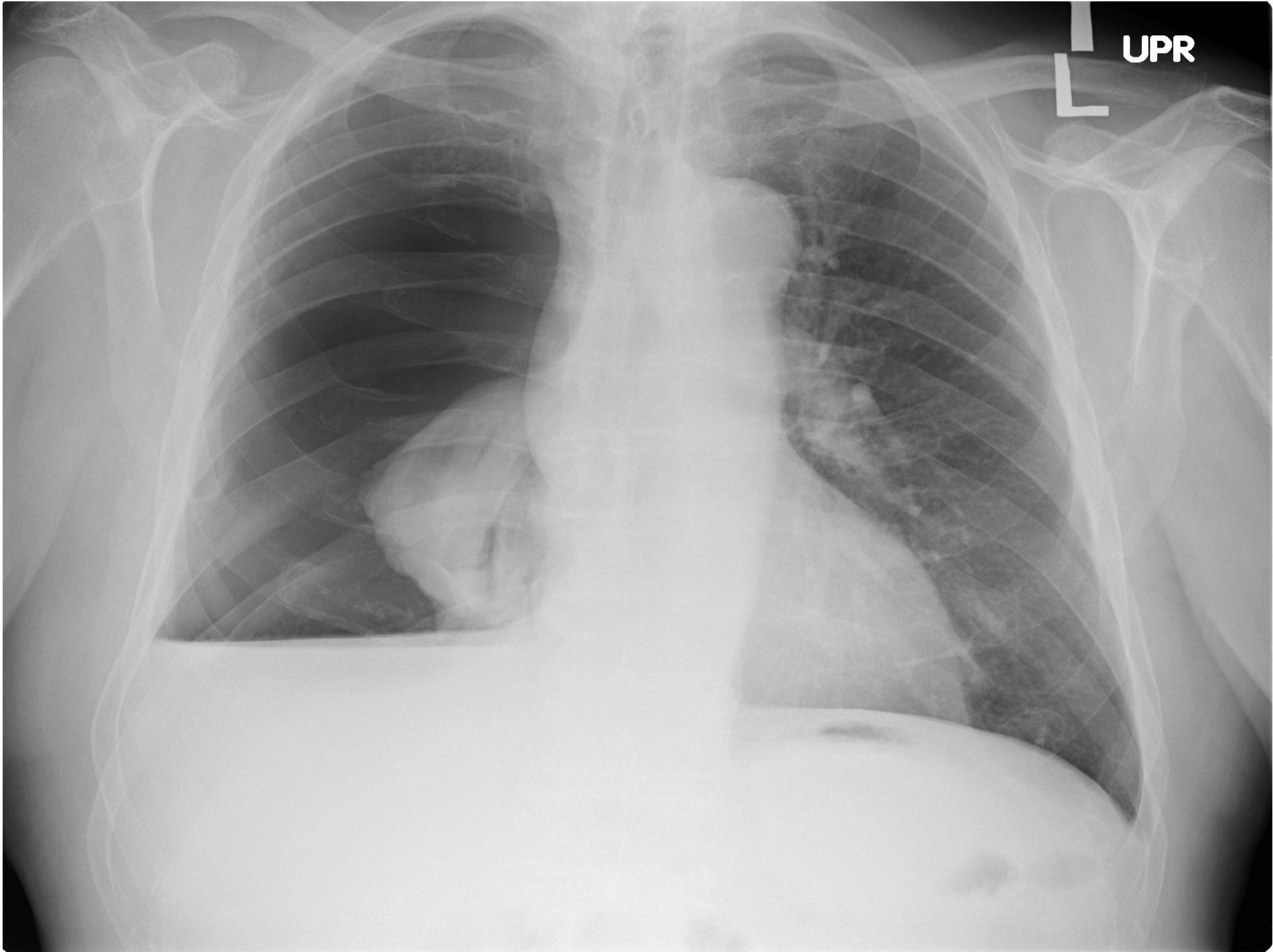
Investigation to Diagnose Pneumothorax

- X-Ray Chest
- CT-Scan

Investigation to Find Cause of Pneumothorax

- CBC
- Sputum Culture & Sensitivity
- CT-Scan
-

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UPR



X- Ray Finding

- Relative Hyperlucency Shadow
- Broncho-Pulmonary marking absent
- Contralateral Mediastinal Shifting
- Obliterated costophrenic angle (the deep sulcus sign)
- Raised Hemi-diaphragam

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CT Thorax



Treatment

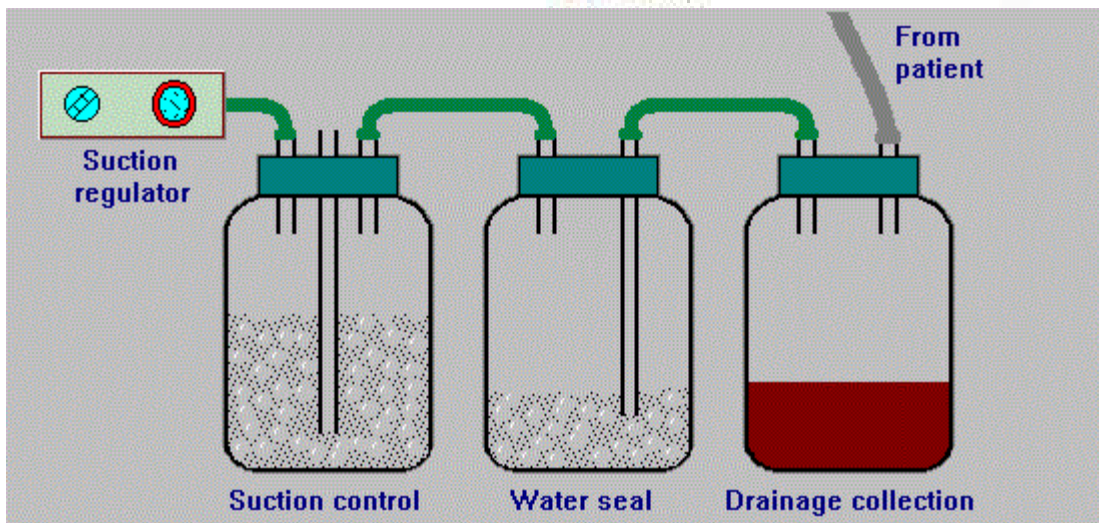
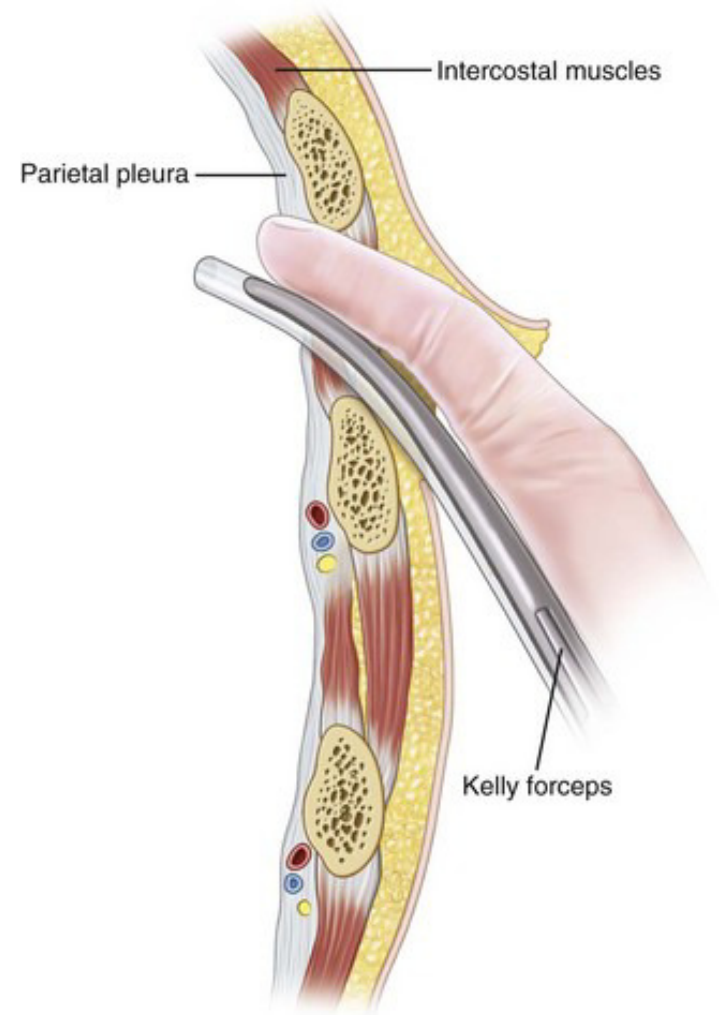
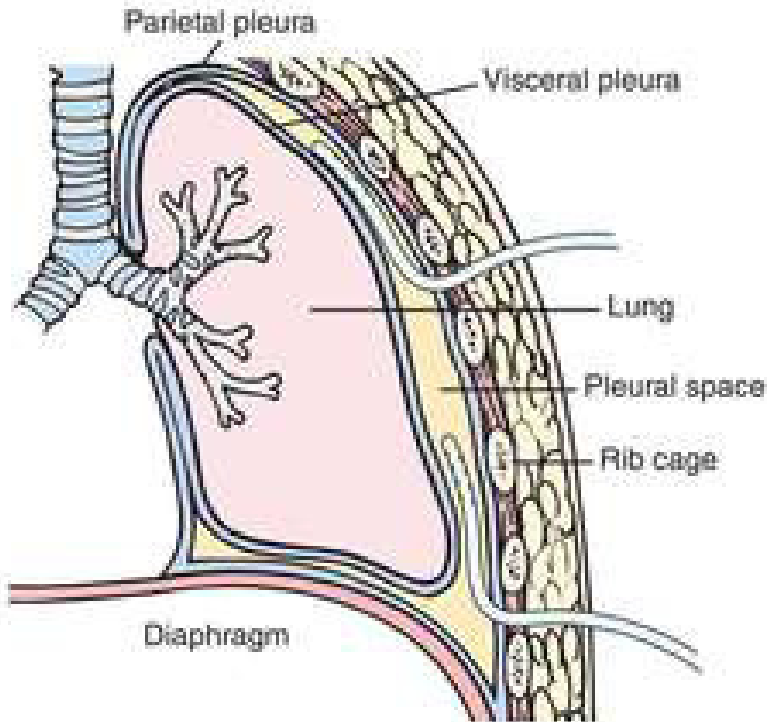
- **Small pneumothorax**
 - Resolve over days to weeks
 - Supplemental oxygen and observation
- **Spontaneous pneumothorax**
 - Asymptomatic – Follow up with serial CXR
 - Symptomatic – Tube Thoracostomy
- **Tension Pneumothorax**
 - Tube Thoracostomy
 - Until the lung leak seals on its own
 - This usually occurs within two to five days.

Treatment Options for Pneumothorax

- **Observation**
- **Needle aspiration**
- **Surgical Closure of bronchopleural fistula**
- **Percutaneous catheter to drainage**
- **Tube thoracostomy**
- **Tube thoracostomy with instillation of pleural irritant**
- **Segmental resection**
- **Thoracotomy**

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Thoracostomy (Chest tube)



C

Indications for Surgical Intervention

- Second episode
- Persistent air leakage for greater than 7-10 days
- First episode with unexpanded, “trapped” lung
- History of contralateral pneumothorax
- Bilateral pneumothorax
- Occupational risk (driver, airplane pilot, living in a remote area)
- Large bulla
- Large undrained hemothorax
- First episode in a patient with one lung
- First episode in a patient with severely compromised pulmonary function

A GRIM FAIRY TALE

