



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE

TECHNOLOGY

COURSE NAME: INTRODUCTION TO SURGERY

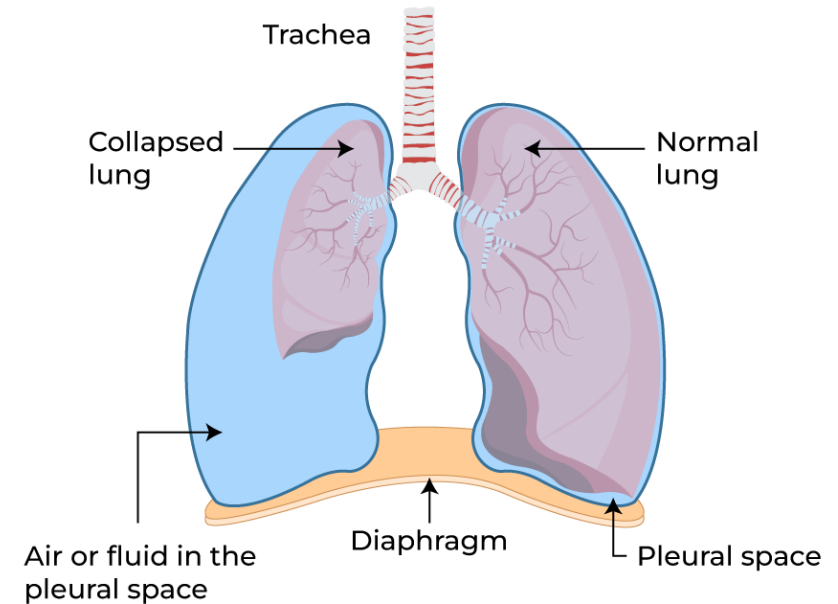
II YEAR

TOPIC : PNEUMOTHORAX

Pneumothorax

Accumulation of air in the pleural cavity causing lungs to collapse

Pneumothorax





Types of Pneumothorax



- Spontaneous – Primary (No predisposing lungs disease)
- Secondary – COPD, Cystic Fibrosis, Pneumonia
- Traumatic - Open- Gunshot, stab
- Close- Fracture ribs
- Iatrogenic –Diagnostic & Therapeutic
- Tension - Fatal- emergency decompression



Pathophysiology



Normally intra-pleural pressure is negative

Open trauma

Close trauma

Air accumulation in pleural cavity (Built up positive pressure)

Compression and collapse of lung

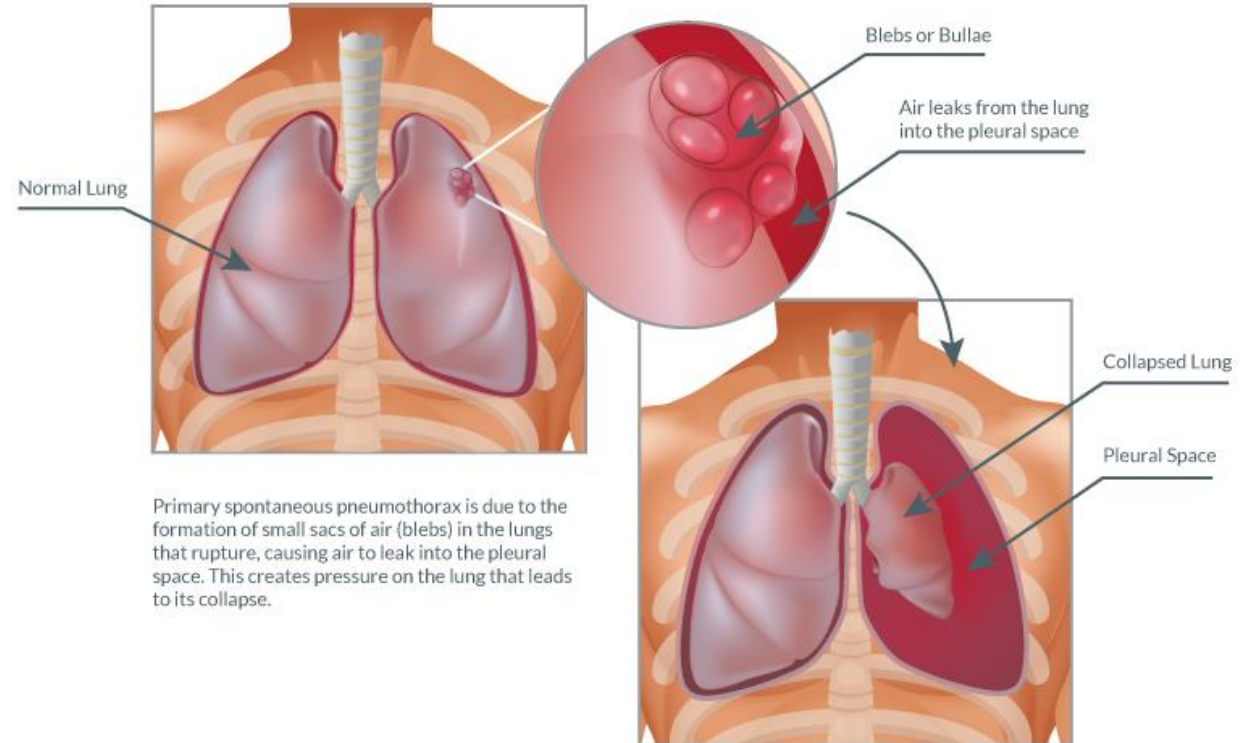
Decrease vital capacity of lungs and mediastinal shift

Primary Spontaneous Pneumothorax

- It occurs in young healthy individuals without underlying lung disease
- It is due to rupture of apical sub-pleural bleb or bullae

Predisposing factors:

- Smoking.
- Tall, thin male.
- Airway inflammation (distal)
- Structural abnormalities of bronchial tree
- Genetic contribution



Secondary Spontaneous Pneumothorax

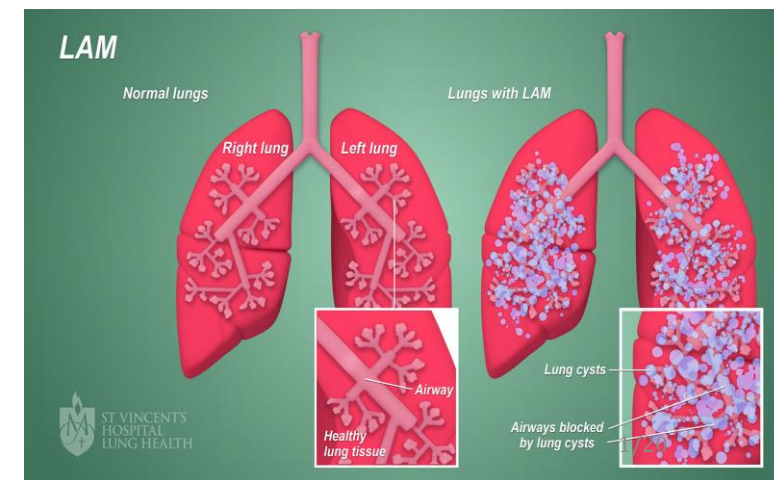
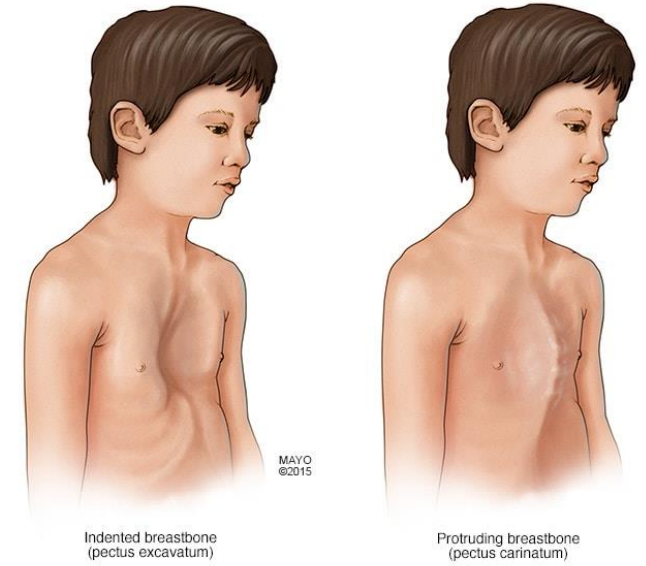
Common causes

- TB
- Asthma
- COPD
- Suppurative pneumonia
- Cystic fibrosis

Rare cause

- Eosinophilic granuloma
- Sarcoidosis
- Lymphangiomyomatosis

- Primary lung carcinoma
- Complication of chemotherapy
- Connective tissue disease
- Marfans syndrome
- Rheumatoid disease
- Pulmonary infarct
- Wegener's granulomatosis...
- AIDS.



Traumatic pneumothorax

Accidental trauma: (non-iatrogenic)

- **Blunt trauma:** with fracture ribs.
- **Penetrating trauma:** stab wound or gun shot injury.

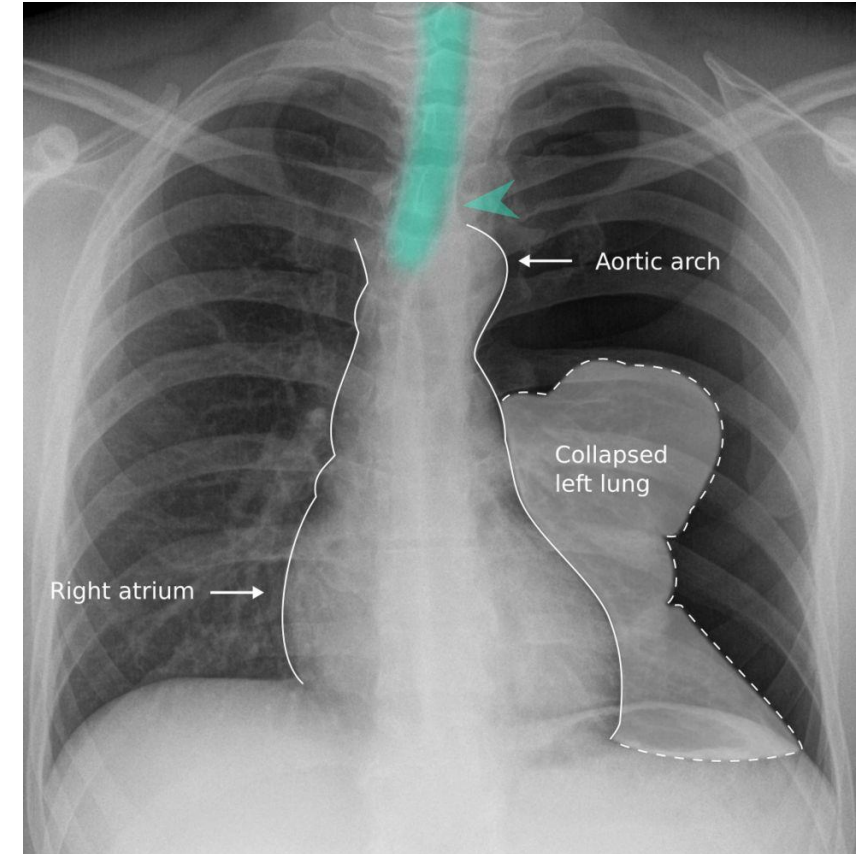
Iatrogenic :

Positive pressure ventilation:

- Alveolar rupture → interstitial emphysema
→ pneumothorax.

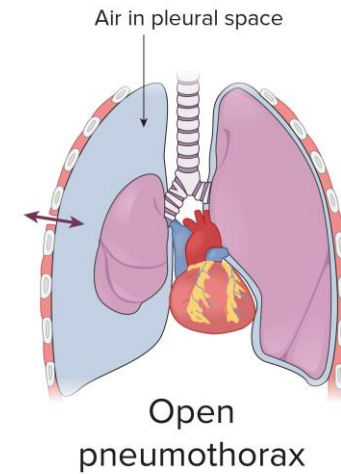
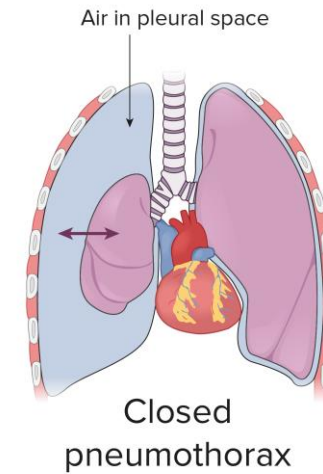
Interventional procedures:

- Biopsy, thoraco-centesis, CVP line, tracheostomy etc..

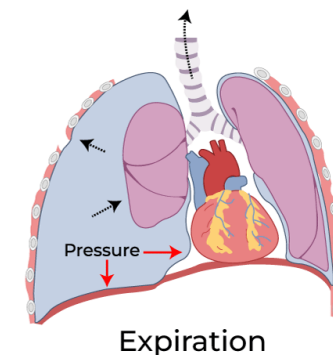
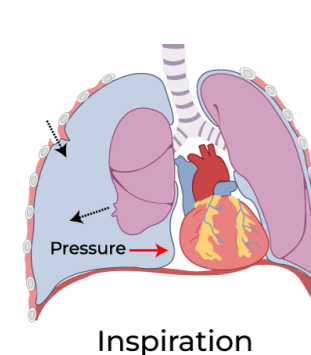


Clinical types

Closed Pneumothorax	Open Pneumothorax	Tension Pneumothorax
The pleural tear is sealed	The pleural tear is open	The pleural tear acts as a ball & valve mechanism
The pleural cavity pressure is < the atmospheric pressure	The pleural cavity pressure is = the atmospheric pressure	The pleural cavity pressure is > the atmospheric pressure



Tension pneumothorax

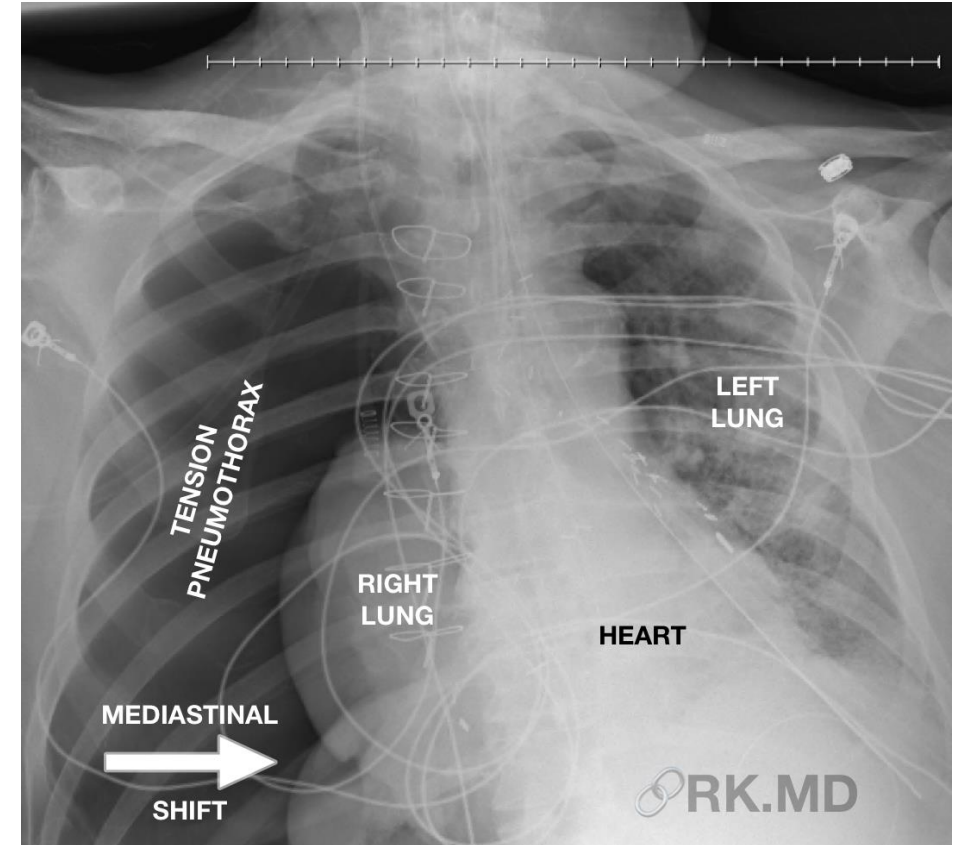


Tension Pneumothorax

- It is life threatening condition.
- Rapidly progressive breathlessness and circulatory collapse (tachycardia, hypotension & sweating).
- Jugular venous distention
- The pleural pressure is more than the atmospheric pressure.

Radiological manifestations of large pneumothorax

- Mediastinal shift,
- Flattening of the hemidiaphragm &
- Lung collapse.
- It is more common with Positive pressure ventilation & Traumatic pneumothorax.





Clinical features



Depends on types, size and extent of pneumothorax

- Tachypnea
- Tachycardia
- Dyspnea
- Shortness of breath
- Pleuritic chest pain
- Cyanosis
- Hypotension
- Shock



Clinical features in critical care



- Patients on Mechanical ventilation or cardiopulmonary resuscitation who suddenly deteriorate clinically, with
- **RAPIDLY PROGRESSIVE DYSPNOEA.**
- Cyanosis
- Marked tachycardia
- Hypotension
- The airway pressure alarms are triggered.

Physical Examination

Inspection

- Tracheal deviation
- Distended neck vein
- Unilateral chest movements

Palpation

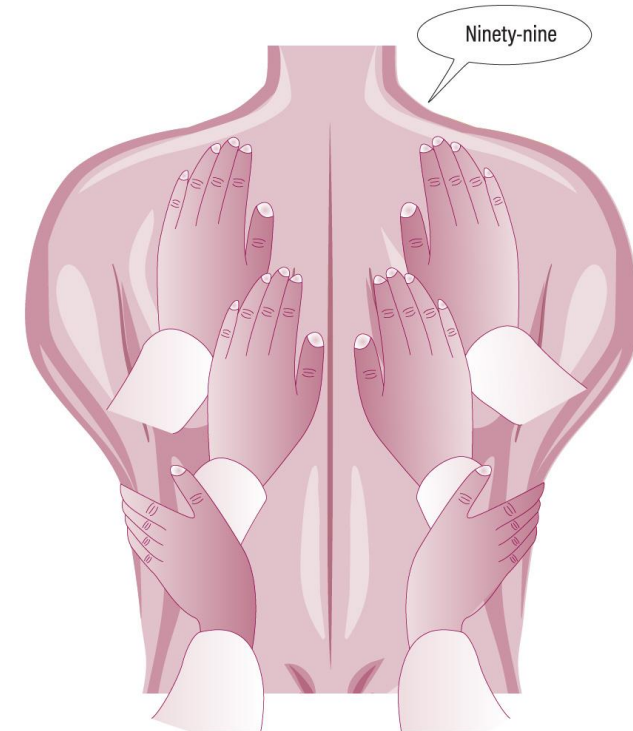
- Absent tactile fremitus

Percussion - Hyperresonance, Hyper tympanic sound over the affected side

Auscultation - Absent/Reduced breath sound on affected side



Figure 1. Technique for assessing posterior tactile fremitus



Investigations

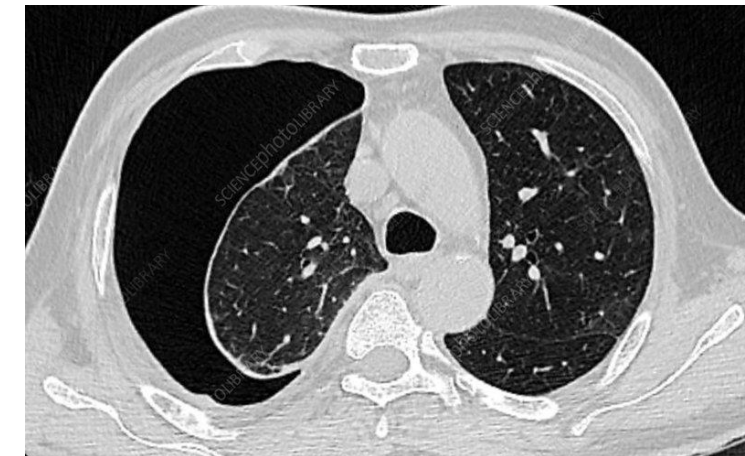
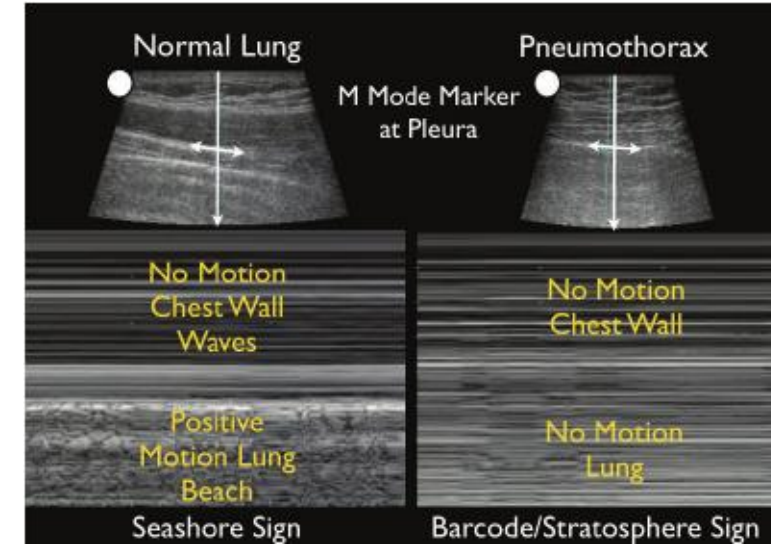
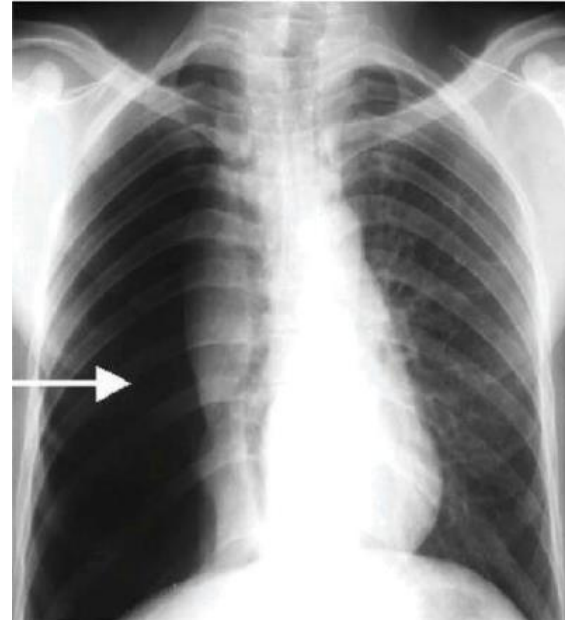
Chest X-ray

- No pleural marking
- Hyperlucency

Chest Ultrasonography

- Accurate size

Chest computed tomography scanning - Prompt and high-quality images





Treatment



- Goal- to evacuate air promptly and allow the lung to re-inflate
- Supplemental oxygen- to treat hypoxia
- Conservative management- resolve at a rate of approximately 1.25-2.2% of the volume per day
- Simple aspiration - First line treatment
- Chest tube drainage - If simple aspiration fails, Emergency decompression for tension pneumothorax



Treatment



- Antibiotics (Cephalosporin)
- Opioids (Fentanyl, morphine)
- Surgery - Open thoracotomy and pleurectomy, Video-assisted thoracoscopic

Pleurodesis or sclerotherapy

- To create adhesion between visceral and parietal pleura – Tetracycline, Doxycycline



THANK YOU



References:

<https://sjrhem.ca/pocus-pneumothorax/>

<https://www.sciencephoto.com/media/1209583/view/pneumothorax-ct-scan>

<https://www.svhlunghealth.com.au/conditions/lam-lymphangiomyomatosis>