MED437
KING SAUD UNIVERSITY

SURGERY TEAM 437

Presentation & Management of Common Thoracic Diseases

Objectives:
1-Bronchogenic carcinoma
2-Assessment for pulmonary resection.
3-Mesothelioma
4-Mediastinum
5-Pneumothorax
6-Emphysema

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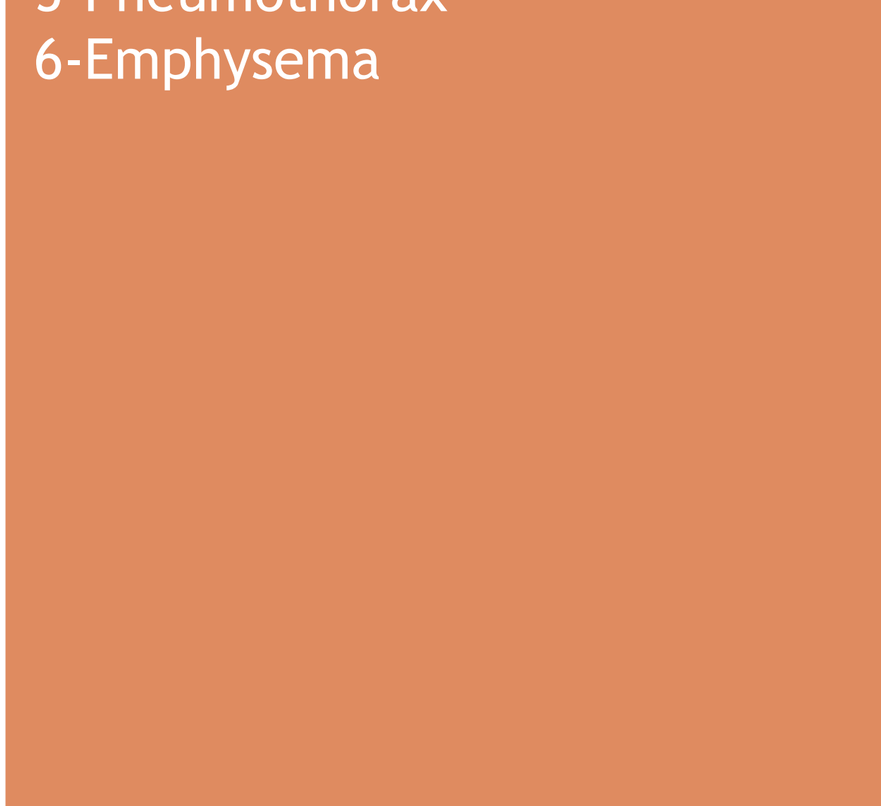
Color Index:

- Important
- Doctor's Notes
- Extra
- Davidson's

Editing File / Feedback



The Lung

Embryology:

- Bronchial system
- Alveolar system

Anatomy:

- Lobes and Fissures
  - RIGHT LUNG: divided into 3 lobes (upper,middle and lower) by the oblique and horizontal fissures
  - LEFT LUNG: divided into two lobes (upper and lower) by the oblique fissure, the Lingular division of upper lobe in the left = middle lobe of the right
- Segments
- Blood supply

Blood supply:

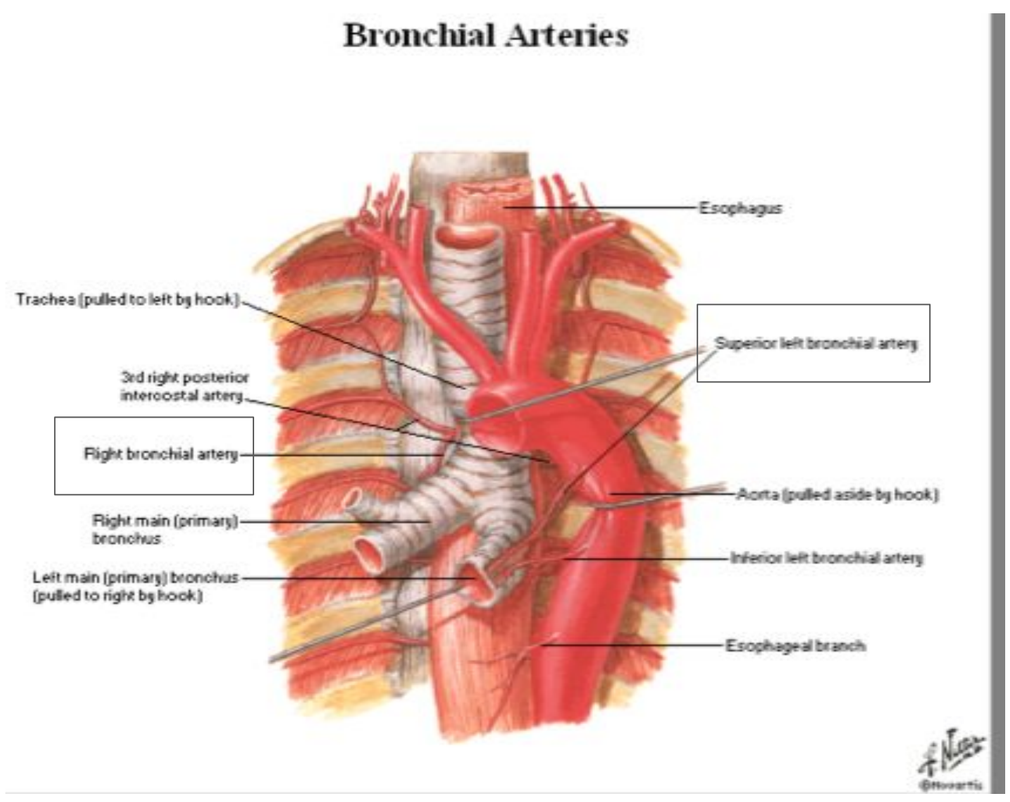
•Lungs do not receive any vascular supply from the pulmonary vessels (pulmonary aa. or veins). (as they have a different function which is oxygenation of the blood)

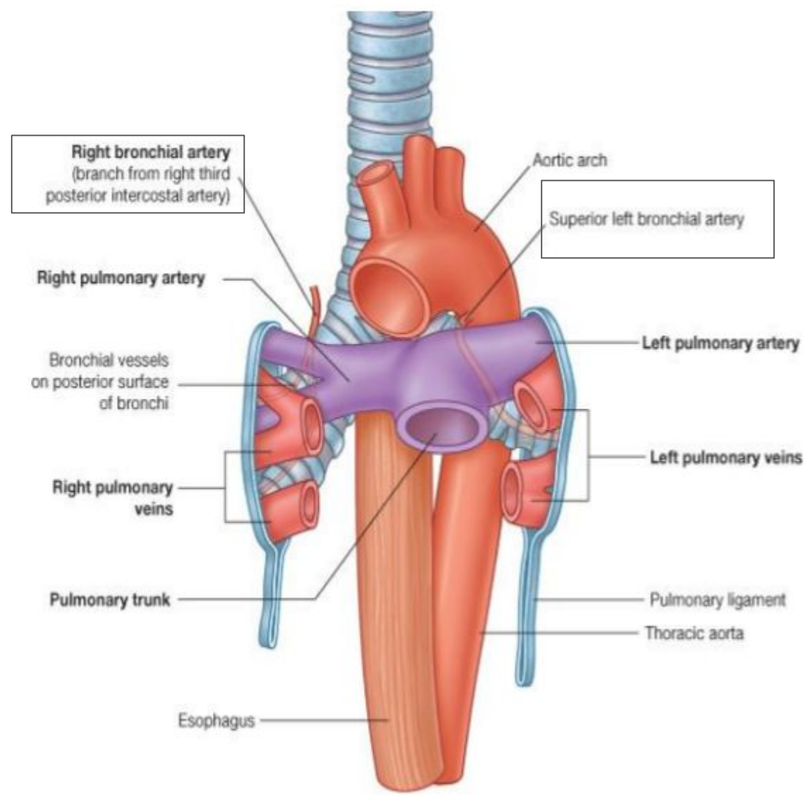
•Blood delivered to lung tissue via the bronchial arteries.(which arising from aortic arch or intercostal arteries)

•Vessels evolve from aortic arch.(direct supply)

•Travel along the bronchial tree.

Clinical aspect: the blood supply to the lungs as an organ is very poor, that's why it heals in a very poor way in compare to the liver for example.



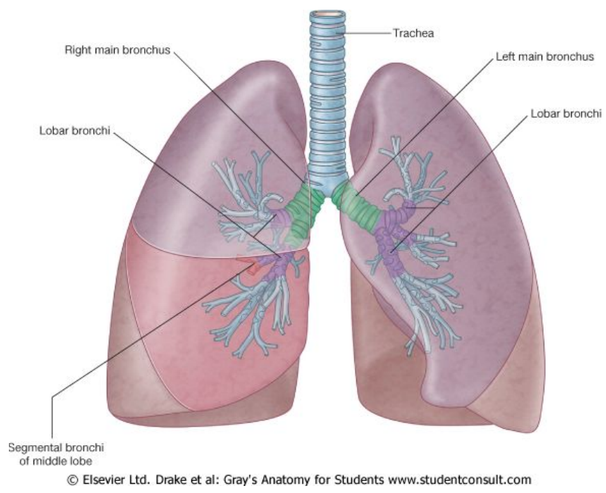


The Lung

Airways

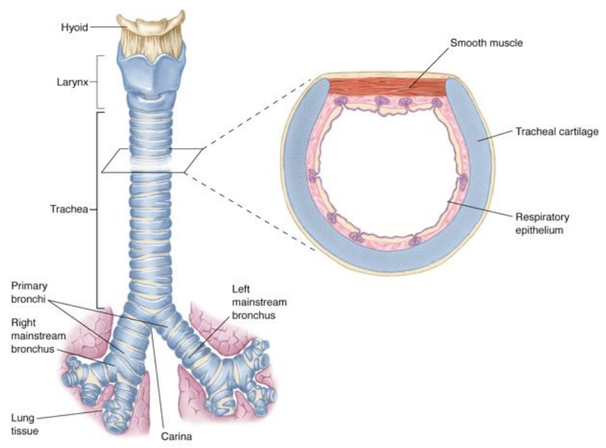
- Trachea, primary bronchi, secondary bronchi, tertiary bronchi out to **25 generations**
- <u>All comprised of hyaline cartilage</u>

Airways



Trachea:

- Begins where larynx ends (about C6 - below cricoid cartilage) and ends at T4 (bifurcates to primary right and left bronchi (the site of primary carina)
- 10 cm long, half in neck, half in mediastinum 20 U-Shaped rings of hyaline cartilage
- keeps lumen intact but not as brittle as bone
- t has a cartilage anteriorly, Posteriorly it is Membranous with smooth muscle because it's in contact with esophagus
- Lined with epithelium and cilia which work to keep foreign bodies/irritants away from lungs



Tracheoesophageal fistula due to pressure necrosis of the posterior wall of the trachea **(emergency).**

- Causes:

- Prolonged intubation (balloon inflation), for example if the patient was intubated for a long time (such as in ICU) and we inflate the tracheostomy very hard or with uncontrolled pressure.

- Pressure of NasoGastric Tube and cervical vertebra.

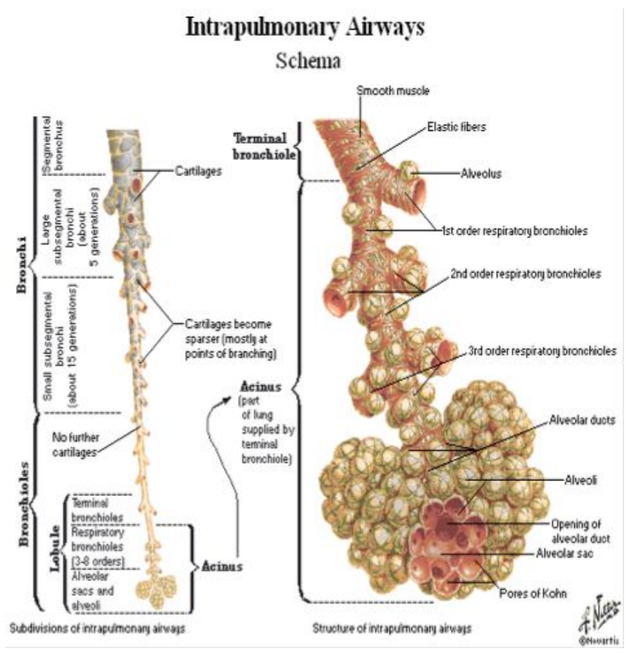
Treatment : tracheotomy

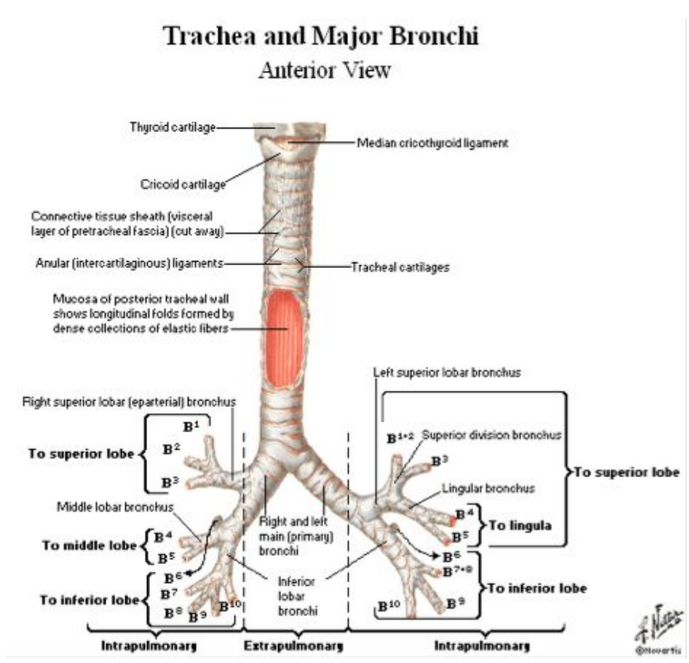
Bronchioles:

- First level of airway surrounded by smooth muscle; therefore can change diameter as in bronchoconstriction and bronchodilation
- Terminal (25 generations)
- Respiratory
- 3-8 orders

★ **alveoli**

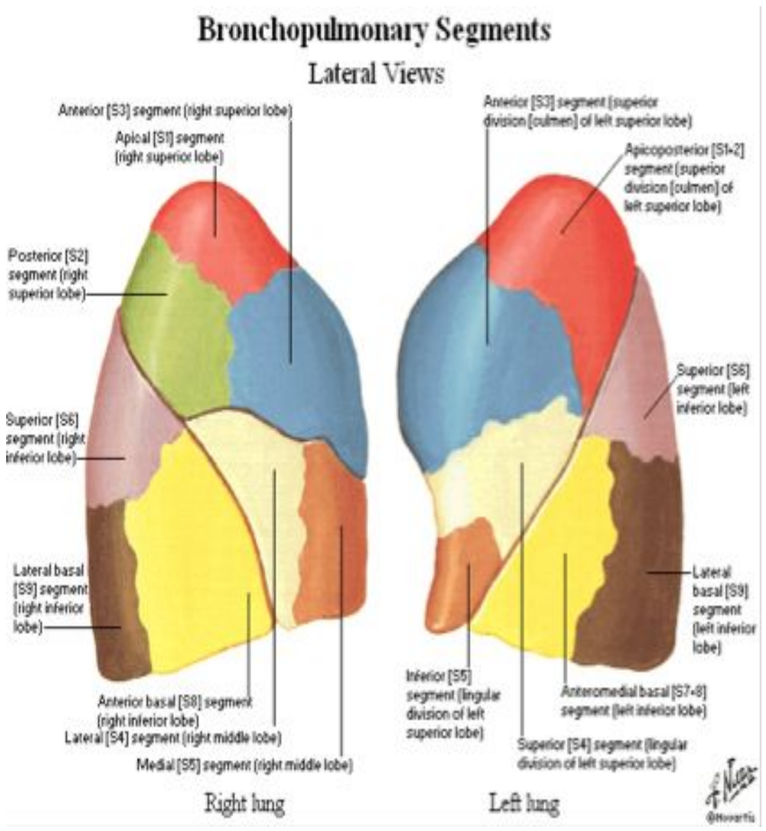
Clinical: Right primary bronchus is shorter, wider, and more vertical than the left primary bronchus. Therefore when foreign bodies get aspirated, they often lodge to the right main bronchus (wider).

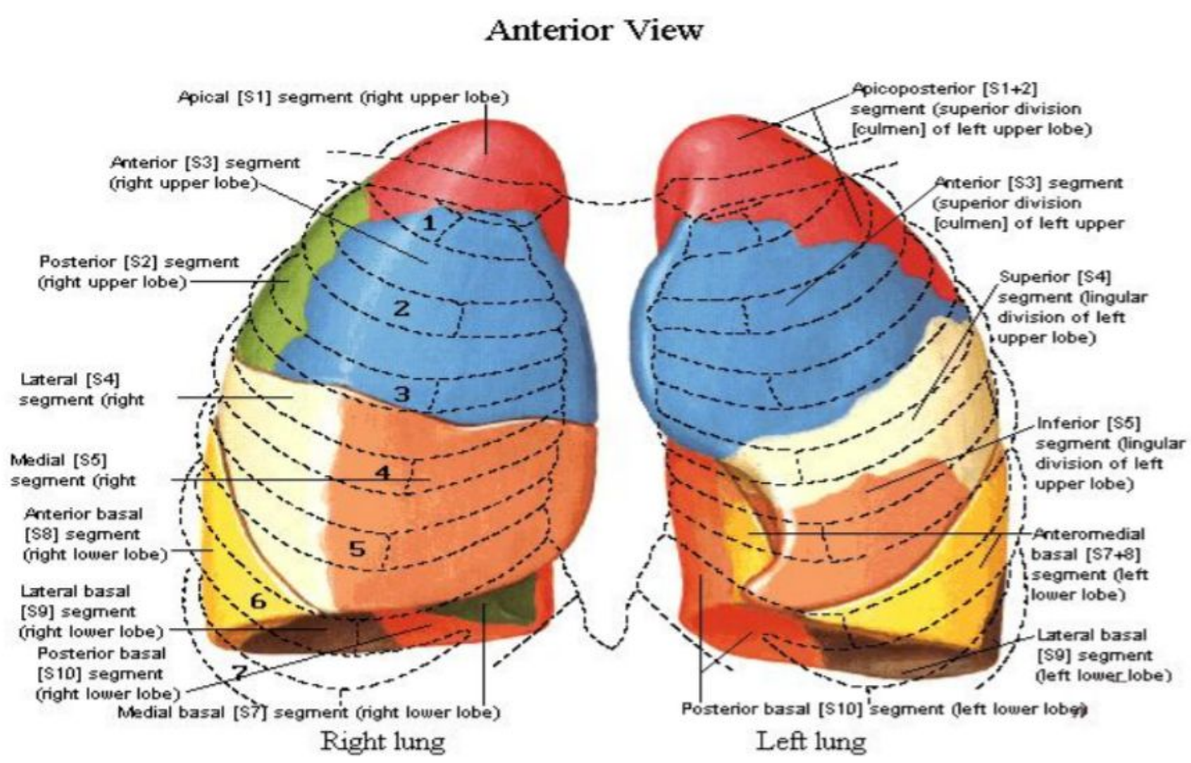


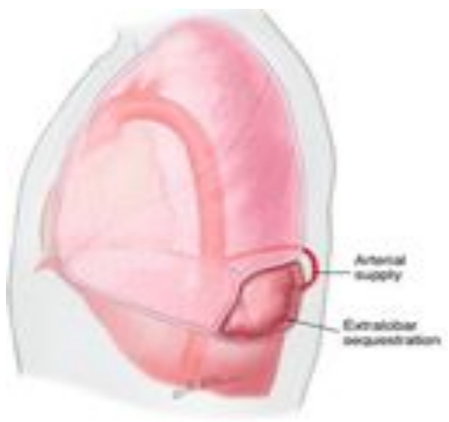


Bronchopulmonary Segments - for your information only

Right	left
Upper lobe	Upper lobe
Apical (S1), Posterior (S2), Anterior (S3)	Apico-posterior (S1+S2), Anterior (S3)
Middle Lobe	**Lingular division of upper lobe**
Lateral (S4), Medial (S5)	Superior lingular (S4), inferior lingular (S5)
Lower Lobe	**Lower Lobe**
Superior or Apical lower (S6), Medial basal (S7), Anterior basal (S8), Lateral basal (S9) and Posterior basal (S10)	Superior or Apical lower (S6), Anterior-medial basal (S7+8) (no medial segment, think of it is the place for the heart and left ventricle) , Lateral basal (S9) and Posterior basal (S10)
Total of 10 segments	Total of 8 segments, (Apico-posterior one segment - no medial segment in lower lobe)





A. Congenital Lung Diseases	
Agenesis	Absence of the lungs, (a child with one lung only for example)
Hypoplasia	Incomplete development of the lungs, so a patient may present with small lungs (not functioning).
Cystic adenomatoid malformation:	Abnormal embryogenesis. Usually an entire lobe of the lung is replaced by a non-functioning cystic are
Pulmonary sequestration  	- also called Accessory lung - Divided into intralobar and extralobar sequestration - It consists of a nonfunctional mass of normal lung tissue that lacks normal communication with the airways. - A part of the lung loses its connection from the major bronchial tree, so all of secretion in this part will accumulate there and the patient presents with repetitive infection, sometimes it is misdiagnosed as asthma. - It can be extra-lobar or intra parenchymal. Located in the left lower lobe most of the time. - It is characterized by receiving its own arterial blood supply from the systemic circulation (especially thoracic aorta, it could be two or three major artery). So the surgeon should identify the blood supply (in case of resection) by CT scan with contrast to locate the blood supply (these vessels could be above, below, or directly on the diaphragm) to prevent massive bleeding, so we have to control the abnormal systemic blood supply coming from a major Aorta
Lobar emphysema	- could be congenital - Emphysema is characterized by progressive loss of interalveolar septae, Large air spaces are formed throughout the lungs, which become grossly enlarged with severely affected areas that are neither ventilated nor perfused. This causes progressive loss of respiratory function, culminating in respiratory failure and death. - In less than 10% of cases, however, it can also result from a deficiency of α1-antitrypsin, affecting younger patients from the third decade and having a **lower lobar distribution.** - It could affect children and newborns, the entire lobe is replaced with big cyst or emphysematous bullae, so the newborn is not able to breath and need to be on ventilator. When we put them on ventilator the emphysematous bullae become larger and start to compress the other parts of the lung. So to relieve the patient from the ventilator, we have to take this big bullae out and remove the entire lobe surgically.

A. Congenital Lung Diseases

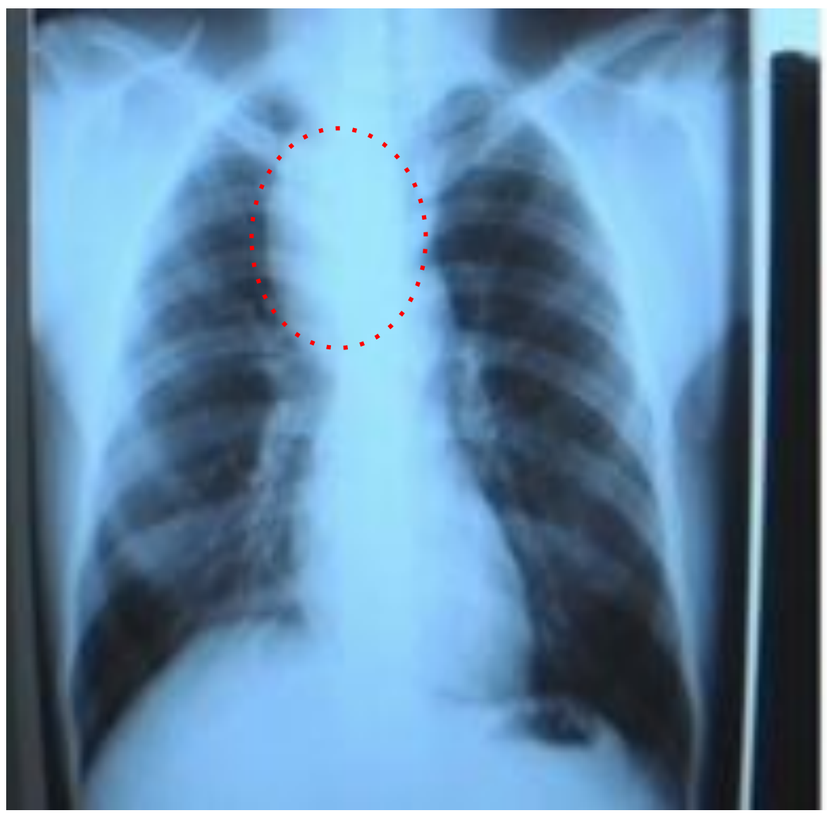
Bronchogenic cyst

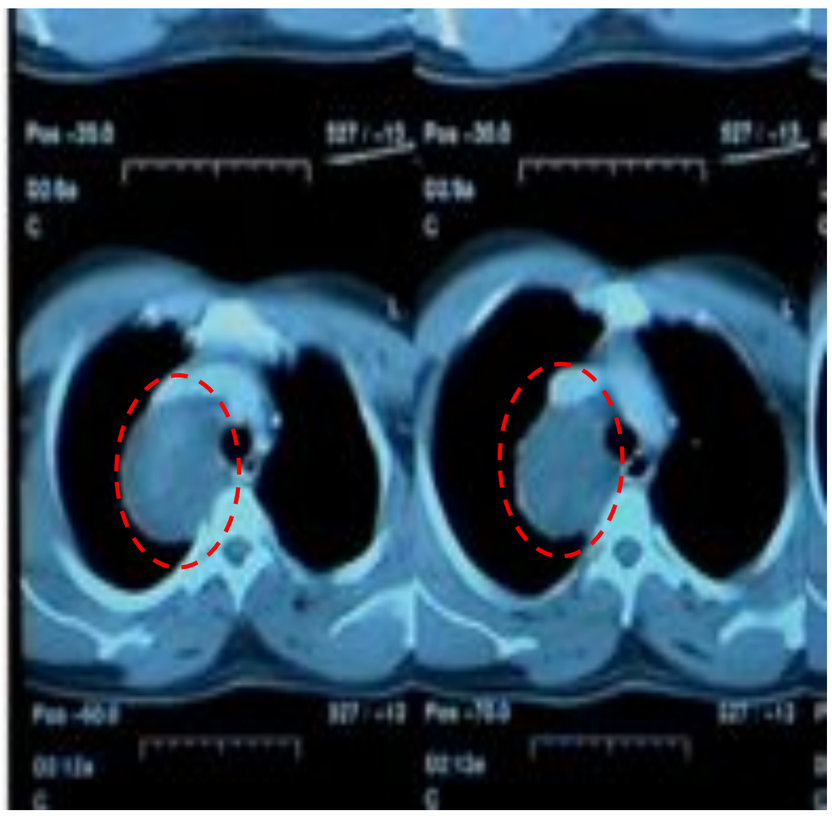
(benign cysts with malignant position)

- Location:
  - Paratracheal (right) most common
  - Subcarinal

- They consist of semisolid cartilaginous material that secretes cheesy like material that is prone to infections.
- May lead to serious complication when it increases in size leading to hemorrhage and compression of the surrounding structures (I.e. trachea, esophagus).
- Could be asymptomatic and founded incidentally. Or presents with symptoms : SOB, stridor, cough and dysphagia or it could be very severe dyspnea and may differ with position.
- If it is not treated for a long time it could transform to adenocarcinoma.

- **Work up:** Full history and examination
- **Treatment**:
  - Excise the cyst to establish diagnosis, prevent infection or bleeding, prevent transformation to malignant adenocarcinoma.. But **mainly, you remove it to relieve the compression on the structure.**

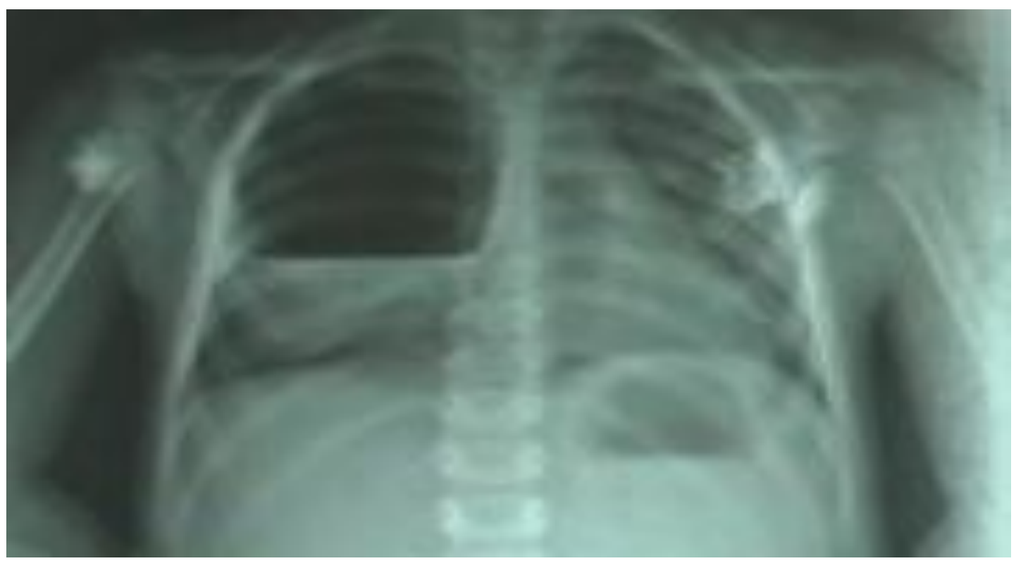




- (radiolucency = black) while (radiopaque = white)
- There is a big cyst posterior to superior vena cava and near to trachea, if it increases in size,it will compress on trachea or esophagus, could even lead to compression of SVC and massive bleeding.

B. Infectious Lung Disease

1. Lung Abscess

Cause	As a complication of pneumonia, bronchial obstruction (by tumor or inhaled foreign bodies esp. In children) bacteremia, and septic emboli. Could be due to: - Renal failure - Showering emboli - Immunocompromised (Diabetic, HIV, etc) - Leukopenic - Superinfection
Clinical Features	- Copious production of foul smelling sputum - Productive cough and hemoptysis - High fever & chills - Severe chest pain
Diagnosis	Full history and examination with chest x-ray for investigation 

Treatment	• **Antibiotics**
	• **Drainage:**
	  ○ Internal bronchoscope
	  ○ External Percutaneous Tube Drainage
	• **Pulmonary resection (surgical)**
	  ○ **Indications**:
	  ■ Failure of medical RX
	  ■ Giant abscess (>6cm)
	  ■ Hemorrhage
	  ■ Inability to Rule Out carcinoma
	  • Which carcinoma causes abscess? Squamous
	  • (eg, 60 years old, heavy smoker presents with cough and hemoptysis and unexplained weight loss).
	  ■ Rupture with resulting empyema
	  ○ Type of Resection
	  ■ Lobectomy
	  ■ segmentectomy
	  ■ Pneumonectomy

B. Infectious Lung Disease

2. Bronchiectasis

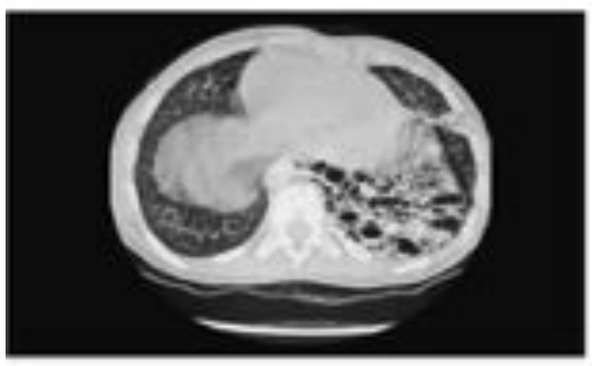
Characteristics	Bronchial dilation, usually affecting the lower lobes. It has 2 types:Cystic & Cylindrica

Cause	• **Congenital** : (**bilateral**)
	  ○ Mucoviscidosis (Cystic fibrosis)
	  ○ Immotile ciliary syndrome (Kartagener)
	• **Infections**: like measles, whooping cough (rare now due to the development of vaccination)
	• Obstruction (obstruction won't make the secretions of the lung to be excreted,leading to a collapse of the lung and chest infection and finally bronchiectasis
	طفل بلع فستق وجلس يكح لين راحت للرئه راح تجيك امه بعدين وتقول انه كل سنه نروح المستشفى ويقولو عنده ربو

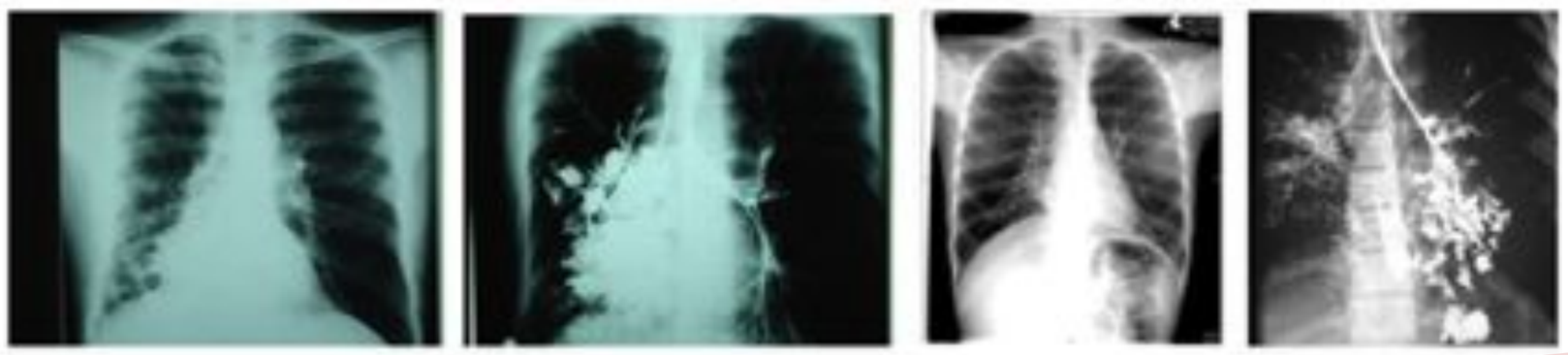
Clinical Features	- Productive cough (in morning due to collection of secretion during sleep) - Dyspnea - Haemoptysis (50%) - Clubbing - Local wheezing
Diagnosis	- Bronchogram (not anymore) - CT High-resolution (best diagnostic test) - Bronchoscopy (not commonly used) - V-Q scan (non-perfused area) - CXR (cystic formation) > initial test.

Treatment	• Medical:
	  ○ Resolves most cases (Antibiotics, bronchodilator, physiotherapy)
	• Surgical indications:
	  ○ Failure of medical Rx
	  ○ Unilateral localized disease
	  ○ If bilateral, lung transplantation is necessary
	  ○ Cystic dilation.
	  ○ Non-perfused (by V/Q scan)
	  ○ Most cystic types are non perfused, while most cylindrical are perfused.

CT scan

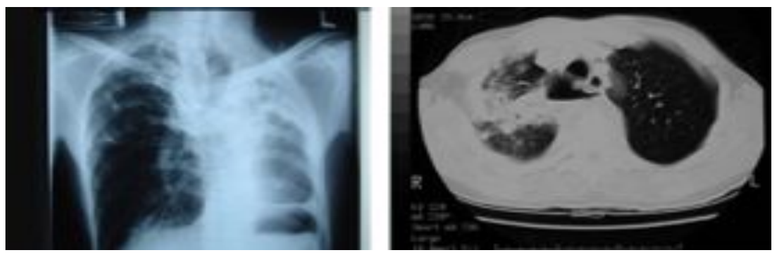


Bronchogram



B. Infectious Lung Disease

3. Tuberculosis

Cause	● Pulmonary: ○ TB empyema (not pyogenic) ● Extrapulmonary (any organ) ○ potts TB (vertebra) ○ empyema (pleural cavity) ○ lymphadenitis (lymph nodes)
Diagnosis	- CXR - AFB (acid-fast bacillus) sputum culture (if positive confirms TB) - Tuberculin skin test (latent TB) - Bronchoscopy - Chest CT scan (infiltration, abscess formation, lymph nodes) - Mediastinoscopy (caseating granuloma) **Pic 1**: left lung destruction, the trachea is pulled due to fibrosis and collapse **Pic 2**: there is a fistula between the lung and mediastinum 
Treatment	● Medical: effective in most cases (isoniazid (INH), rifampin, pyrazinamide, and ethambutol) ● Surgical indications: ○ Failure of medical Rx (Multidrug resistant) ○ Destroyed lobe or lung ○ Pulmonary haemorrhage, or massive hemoptysis ○ Persistent open cavity with + ve sputum ○ Persistent bronchopulmonary fistula (persistent pneumothorax) ○ Superinfection (inf. Occurring on top of earlier one) ○ Empyema

B. Infectious Lung Disease

4. Aspergillosis

General Features

Caused by: Aspergillus fumigatus and Aspergillus niger

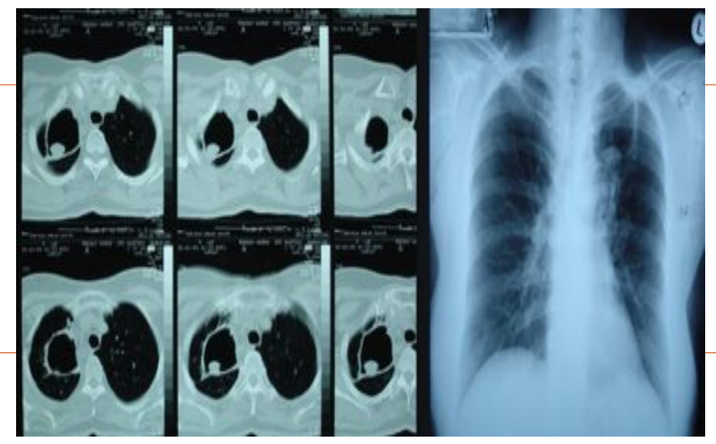
Transmitted by: Inhalation of airborne conidia, contaminated water (while showering), and nosocomial infections. Especially in immunocompromised patients (HIV, TB, hepatitis, etc)

Forms:

- Allergic & Saprophytic (aspergilloma/mycetoma)
- Characterized by Asp infection with no tissue invasion, usually with underlying TB and/or sarcoidosis
- Invasive (patient with hemoptysis)

Clinical Features

- Aspergilloma/mycetoma cavity ball-like in CT (mobile)
- Comes with a warning sign of Hemoptysis (50%) (patient with preexisting Disease)
  - very high mortality and morbidity
- Chronic productive cough



Diagnosis

- Skin test, sputum fungal culture & biopsy (Invasive)
- CXR (radiolucent) or CT

(if there are air crescent sign + aspergilloma)

Treatment

- Medical: IV antifungal (amphotericin B)
- Surgical:
  - Indication: A significant aspergilloma & Haemoptysis
  - Type of resection:
    - Lobectomy (surgical operation where a single lobe is removed)
    - Segmentectomy (surgical removal of a segment of a lung lobe)
    - Pneumonectomy (If associated with TB destroying the whole lung)

5. Hydatid Cyst

Cause

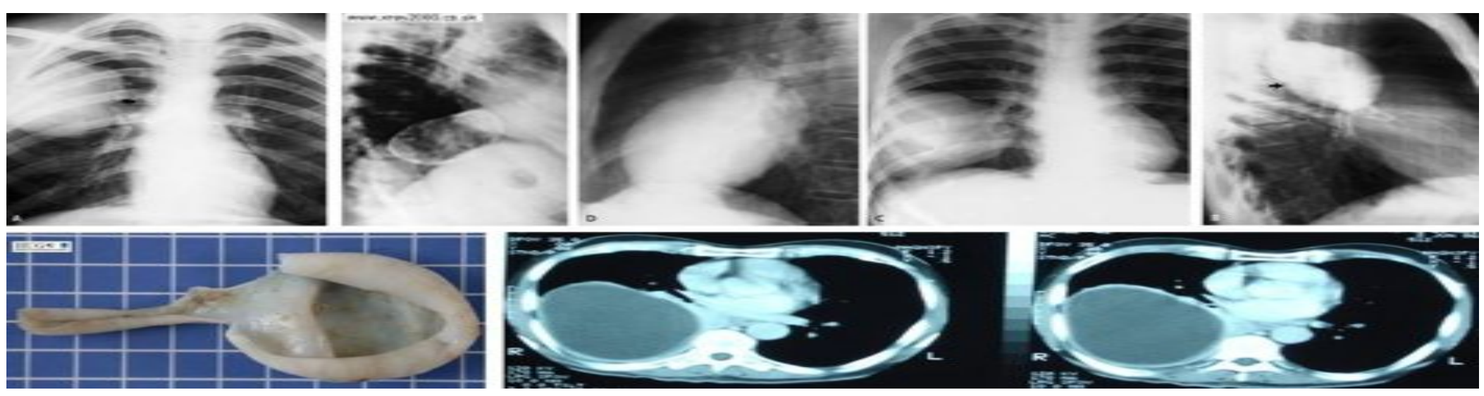
Echinococcus granulosus: By eating sheep's liver (not properly cooked) or directly from cats/dogs (feces) It will affect the liver first before the lung and can spread systemically after that it is highly infective

Layers

- Adventitia: The outer pericyst is composed of host cells that are formed as a reaction to the parasite (false layer)
- The middle Laminated membrane (external layer of cyst)
- The inner Germinal layer (gives eggs)

Diagnosis

- Skin test (Casoni's reaction) & CXR
- CT scan (a chronic cyst appears calcified, can be found incidentally or after complications)
- High echinococcus titers and other serologic tests



Treatment

Surgery + inject hyperosmotic saline + albendazole (Needle aspiration is contraindicated)

Lung Tumors

- **Benign**
- **Malignant:** 1. Primary/ 2. Secondary

Primary Lung Carcinoma

- **Incidence** (Worldwide, lung cancer is the most common cause of cancer death)
- **Risk factor**: Smoking (most important).
- others: radiation, industrial chemicals, diet, genetic factors, radon. The combination of asbestos exposure and cigarette smoking produces a many-fold increase in risk.
- **Pathology:** With the exception of alveolar cell carcinomas, which arise from cells lining the alveoli, Primary lung cancers arise within the bronchial epithelium and are hence termed bronchogenic carcinoma.

➢ Classification: 1- Non-Small Cell Carcinoma. 2- Small Cell Carcinoma. We divide them according to their difference in management.

➢ Staging is very important because it tells you about the appropriate management

NSCLC	SCLC
● Epithelial origin ● 75-80% 1. Adenocarcinoma (40%) peripherally located 2. Squamous cell carcinoma: (30%) centrally located. 3. Large cell carcinoma.(9%) peripherally located.	● Neuroendocrine origin ● 20-25% ● centrally located ● Poor prognosis ● patient usually presents with systemic disease.
● **Management:** Depends on stage, cell type and patient's physical fitness	
Treatment of NSCLC: - Surgical (always preferred in early stages and if limited to the lung) - Neoadjuvant chemotherapy (intermediate stage) > means before surgery to down stage the tumor - Radiotherapy \ Chemotherapy	**Treatment of SCLC:** - **Non surgical** (because tumor is usually discovered late when metastasis has already happened, and it involves a lot of organs in the body) - **chemotherapy** only +\- radiotherapy

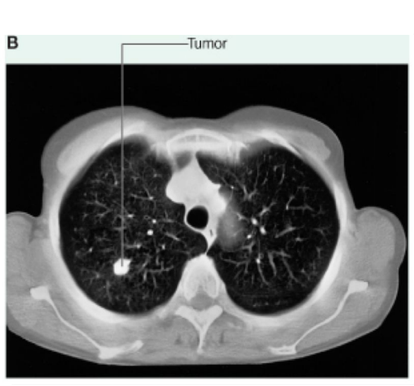
★ **Clinical features:** according to the tumor location (peripheral or central). Peripheral lesions may grow to 8 cm or more before causing local symptoms such as chest wall pain. Central lesions tend to occlude the airways, causing varying degrees of pulmonary collapse and consolidation

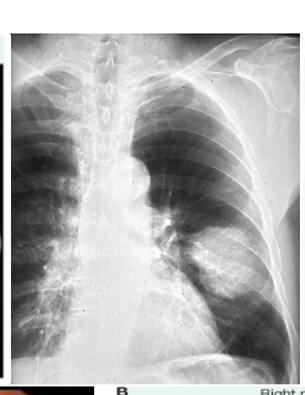
- ★ Asymptomatic (found incidentally on CXR)
- ★ Symptomatic:
  - Lung: (mostly cough & hemoptysis)
    - General manifestations: (loss of appetite, fever, weight loss, fatigue)
  - Surrounding structures
    - Recurrent Laryngeal nerve (hoarseness) & Oesophagus (dysphagia)
    - C8, T1 nerve (brachial plexus pain ex.: pancoast tumor “superior sulcus tumor”)
    - Sympathetic chain (horner syndrome) & Pleura (pleuritic chest pain)
    - SVC (SVC obstruction syndrome, can also happen in hodgkin lymphoma)
  - Distal (paraneoplastic syndrome)
    - PTH (hypercalcemia)
    - ADH (hyponatremia by increasing plasma vol.)
    - ACTH (cushing’s syndrome)
    - Hypertrophic pulmonary osteoarthropathy (HPOA)

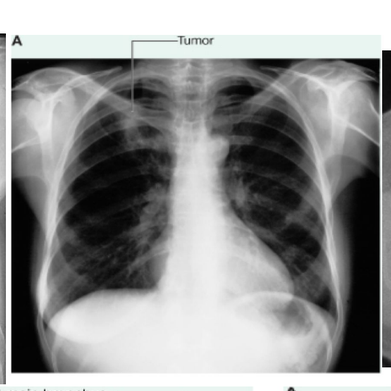
Primary Lung Carcinoma

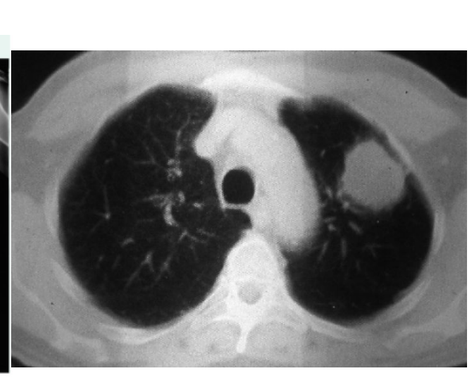
★ **Investigations:**

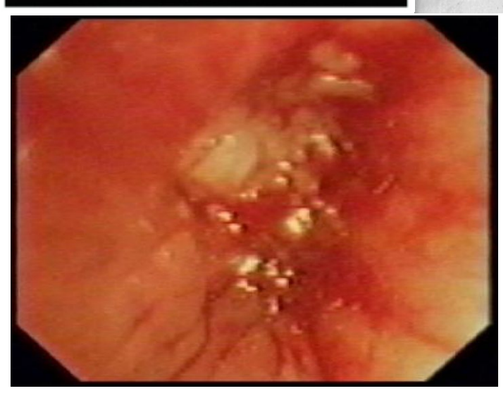
- CXR
- Bronchoscopy
- Transthoracic needle aspiration (to confirm the diagnosis)
- CT Scan (it is the golden choice in staging the tumors)
- MRI (Very poor modality for the purpose of staging)

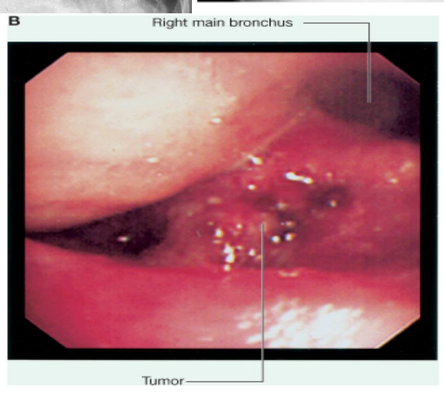


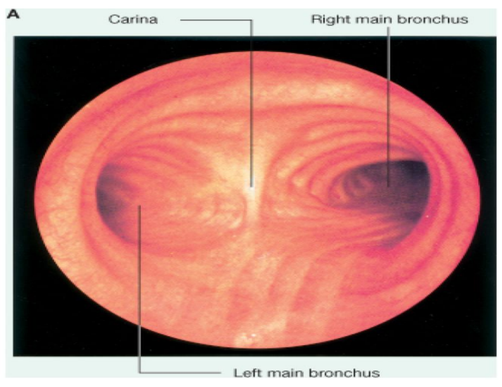












Secondary Lung Carcinoma

- Neoplasm that have spread from a primary lesion in another organ.
- secondary lung tumors appear as multiple solitary lung nodules (well marginated, single, mass< 3 cm, intraparenchymal opacity)

➢ **Solitary lung Nodule DDX:**

- Primary carcinoma
- Tuberculous Granuloma
- Mixed tumor
- Secondary carcinoma (metastasis)
- Miscellaneous

➢ **Hamartoma - carcinoid** (benign Vs malignant):

Carcinoid is potentially malignant (semi benign). It has two types typical and nontypical, usually affects the major airway in middle aged patients. Treatment in early stage is surgical(typical 90% or Atypical(10%) when it goes to lymph node.

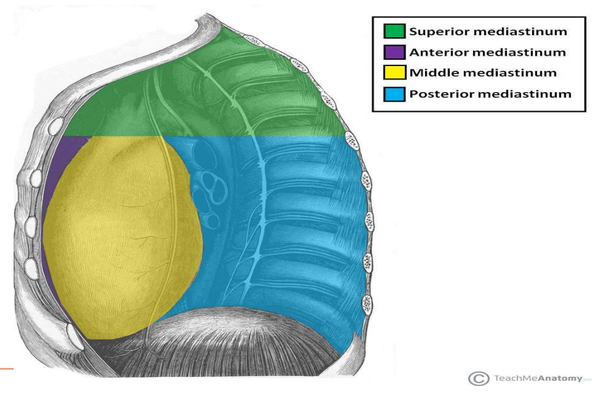
- Age: hamartomas occur primarily in adults > 50 y\o
- Sex: males 3 times more likely than females
- X- rays (usually peripherally located)
  - Size (usually small <4 cm in diameter, rounded or popcorn like)
  - Time: grows slowly
  - Calcification: sometimes with varying patterns

Mediastinum

Boundaries

The space in the thoracic cavity between the lungs

- Superior: thoracic inlet
- Inferior: diaphragm
- Anterior: sternum and costal cartilages
- Posterior: thoracic spine
- Lateral: mediastinal pleura



Division

- Traditional.
- Clinical, as in the table below

Access

- Mediastinoscopy endoscope for a biopsy.
- Mediastinotomy surgical opening called Chamberlain procedure to access the aortopulmonary lymph nodes.

Mediastinal Mass Lesions

1. **Superior/ Anterior Mediastinum (5 T's):**
   a. Thyroid "retrosternal goiter"
   b. Thymoma
   c. TB lymphadenitis
   d. Teratoma
   e. T cell lymphoma
2. **Middle Mediastinum:**
   a. Cyst: bronchogenic cyst & enteric cyst
3. **Posterior Mediastinum:**
   a. Neurogenic tumor: schwannoma

Thymoma

Incidence

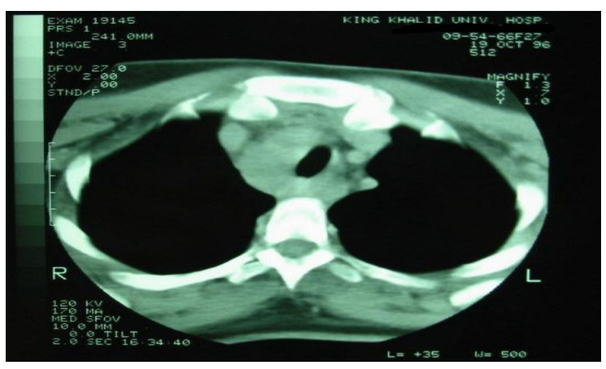
- The most common tumor of the anterior mediastinum.
- Peak 40-60y
- M:F (1:1)
- I (intact capsule),
- II (invade capsule but not invade surrounding structure)
- III (invade surrounding structures (phrenic nerve, pericardium and lung)
- IV (metastasis)

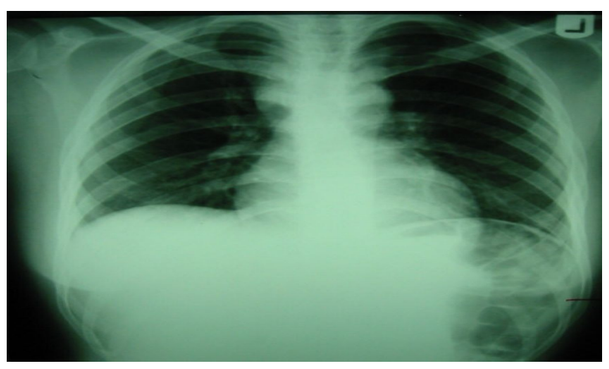
Clinical Features

- Asymptomatic
- Symptomatic
  - Mass effect: SVC syndrome, dysphagia, and cough.
  - Systemic effect: associated with d autoimmune disorders, like: **myasthenia gravis** (40-50% of patient have thymoma)

Investigation

- All cases: CXR, CT Scan & biopsy
- Selected cases: Bronchoscopy, esophagoscopy & angiogram



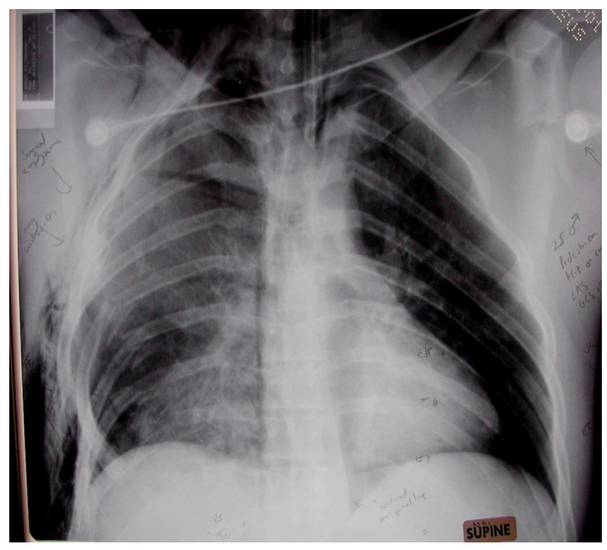


Treatment

- Benign: complete excision
- Potentially Malignant: start with chemotherapy/radiation before "neoadjuvant" then complete excision if possible
- Post-op radiotherapy: If non-resectable or if resection was incomplete

Trauma

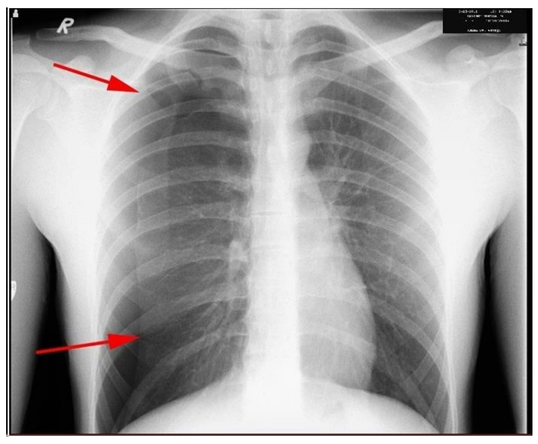
Features	- Trauma is injury is either blunt or penetrating - Road Traffic Accident (RTA). - Fracture ribs (simple - complicated): - (most common blunt thoracic injuries)
Hemothorax	Accumulation of blood in pleural cavity ○ Appears as radio-opacity on CXR. ○ Cause is mostly traumatic
Traumatic Pneumothorax	- occurs when air enters the potential space between the visceral and parietal pleura through either an external chest wound or an internal air leak. - External Air Entry: occurs with a traumatic chest wall defect, and the resulting open pneumothorax is often associated with a 'sucking wound', where air moves in and out of a chest wound with respiration. - Internal Air Leakage: may follow esophageal perforation or anastomotic breakdown, as air can enter the pleural cavity via the mouth.However, the most common cause of pneumothorax is leakage of air from the lung, due either to a traumatic puncture wound or to spontaneous leakage from a large (bulla) or small (< 1 cm, 'bleb') air sac on the lung surface.
Tension pneumothorax:	- The pulmonary leak point may have a flap valve mechanism that allows air out of but not back into the lung, causing a rapid buildup of pressure within the pleural cavity,This can be fatal, as the high intrapleural pressure completely flattens the ipsilateral lung while deviating the mediastinum to the opposite side, impeding venous return. **Causes:** Mechanical ventilation with associated barotrauma. CPR: Trauma **Clinical features:** - Hypotension and tachycardia - Distended neck veins - Shift of trachea away - Decreased breath sounds on affected side - Hyperresonance - Muffled heart sound **Diagnosis:** clinically (no time for CXR!) - by assigning respiration and hemodynamic state - it causes obstruction of IVC ⟶ SVC ⟶ aorta ⟶ low cardiac output **Treatment: (Medical emergency!)** - If tension isn't relieved patient is likely to die from hemodynamic compromise. - Immediately decompress the pleural space via large-bore needle or chest tube. - In the second intercostal space above the 3rd rib



Trauma

Spontaneous Pneumothorax

- ○ is described as primary or secondary.
  - ○ Primary pneumothorax typically occurs in young (15-35 years) individuals with
    essentially normal lungs apart from a few apical bullae or blebs.
  - ○ Secondary pneumothorax develops in elderly patients (55-75 years) with a background of emphysema and chronic obstructive pulmonary disease. It is caused by rupture of a bulla.



- ● Clinical features:
  - ○ Sudden ipsilateral chest pain
  - ○ Dyspnea and cough
  - ○ Decreased breath sounds over affected side
  - ○ Hyperresonance over the chest
  - ○ Decreased tactile fremitus
  - ○ Mediastinal shift towards the side of pneumothorax
- ● Diagnosis: CXR
- ● Treatment:

- Primary spontaneous pneumothorax:

If small and patient is asymptomatic:

- ○ Observation (should resolve spontaneously in 10 days) reassess with CXR.
- ○ Small chest tube may benefit some patients.

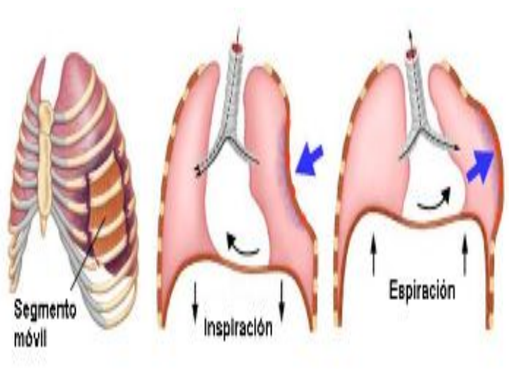
If larger and/or patient is symptomatic:

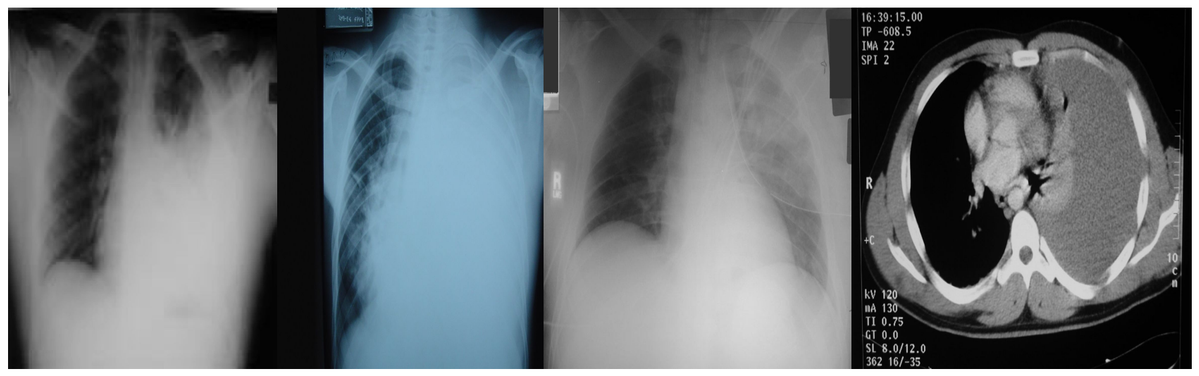
- ○ Administration of supplemental oxygen
- ○ Chest tube insertion to allow air to be released.

- ■ Secondary spontaneous pneumothorax:
- ■ Chest tube drainage.

Flail Chest

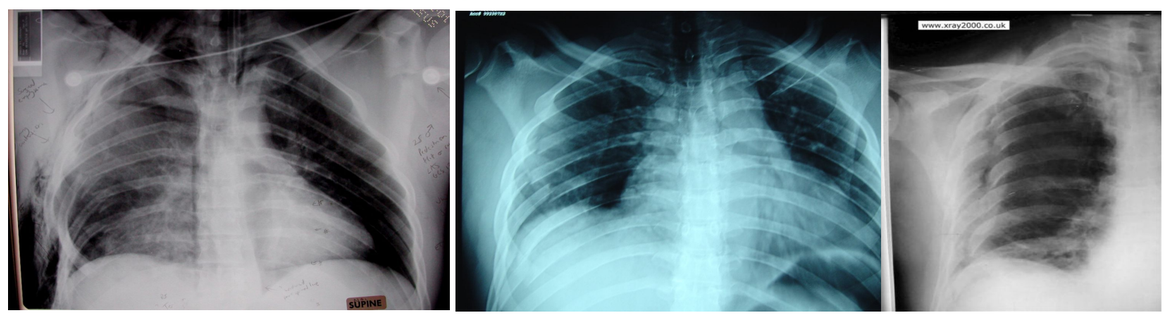
- Both ends fractures of several adjacent ribs (two or more) producing a free unstable segment of chest wall that results in paradoxical movement (you only see it when self ventilated not on machine) should be on. There is usually associated lung contusion (usually the lung is affected too due the trauma).
- When you say collapse it is a general word, you have to say collapse due to (massive hemothorax, massive pleural effusion, massive empyema, pneumothorax, secretion or foreign body or tumor)

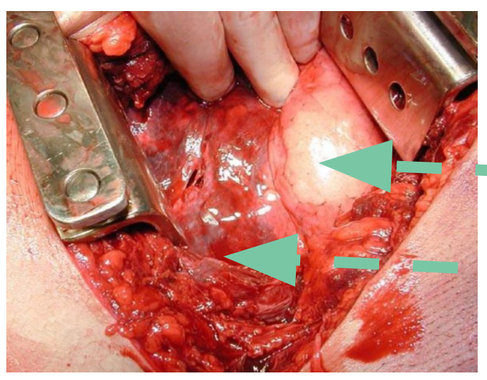




Lung Contusion & ARDS

- Contusion: accumulation of the fluid inside the lung
- A patient might have contusion after trauma



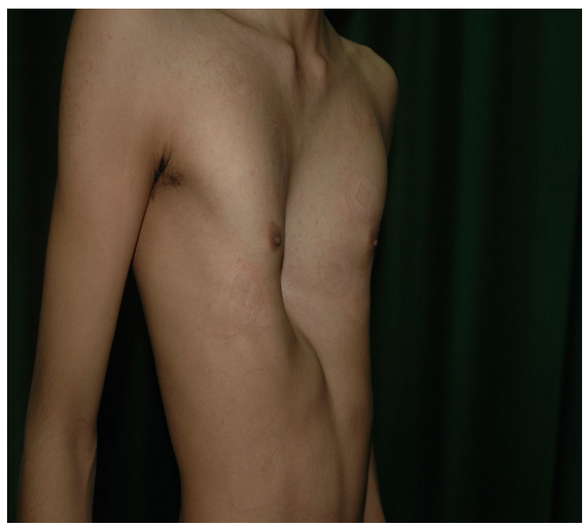


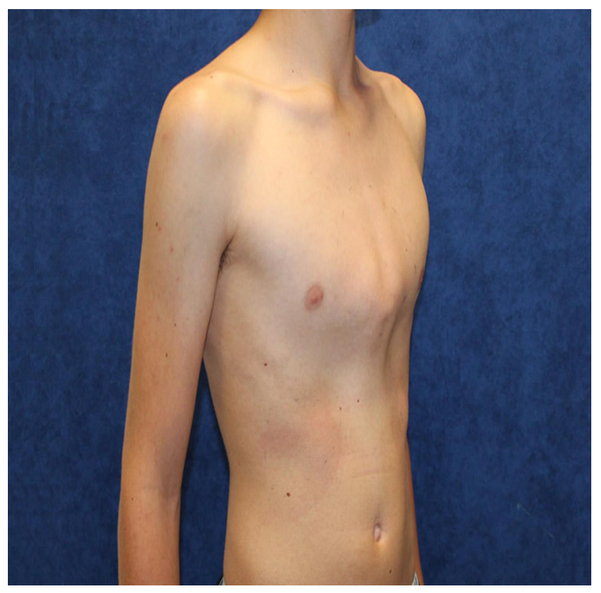
normal

bleeding

Chest Wall

- Deformities:
  - ➢ Pectus excavatum “funnel chest”
  - ➢ Pectus carinatum “pigeon chest”
- Infection: (e.g. abscess, empyema, costochondritis..)
- Chest wall tumor mostly benign
- Thoracic outlet syndrome.
- Treatment: surgery “nuss procedure”





Pleura

- Spontaneous pneumothorax
- Pleural effusion
- Empyema collection of pus in the pleural cavity.
- ***Mesothelioma:*** rare cancer***: “in objectives”***

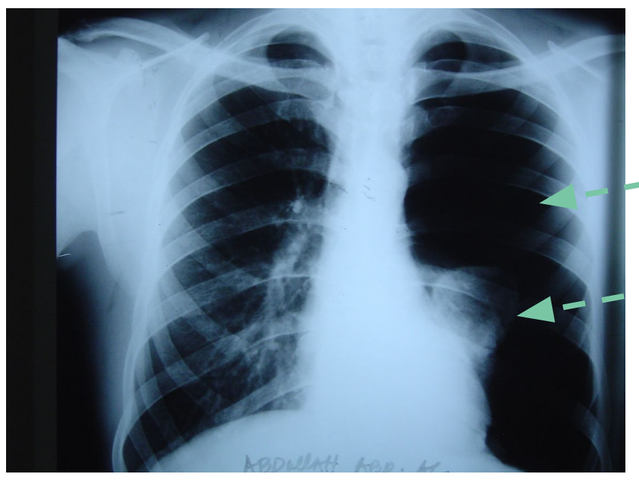
■ This causes progressive thickening of the parietal and visceral pleura, with subsequent encasement of the lung and the formation of a large pleural, causing pain and SOB,It is strongly related to a history of asbestos. The patient commonly presents with shortness of breath, owing to a large pleural effusion. In many cases, the diagnosis is made by a percutaneous pleural biopsy but, if this is not successful, thoracoscopy or open pleural biopsy is useful.

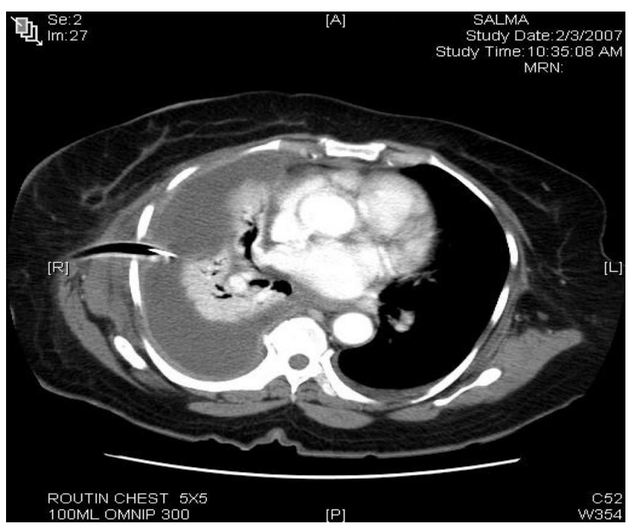
Air-way:

- ➢ Congenital tracheal anomalies
- ➢ Tracheal stenosis
- ➢ tracheostomy

Surgery:

- ➢ Thoracotomy
- ➢ Thoracoscopy
- ➢ Sternotomy
- ➢ Analgesia





Summary

Congenital Lung Diseases	
Agenesis	Absence of the lungs, (a child with one lung only for example).
Hypoplasia	Incomplete development of the lungs, so a patient may present with small lungs (not functioning).
Cystic adenomatoid malformation	Abnormal embryogenesis. Usually an entire lobe of the lung is replaced by a non-functioning cystic area. And a child may present with repetitive chest infection, needs surgery.
Pulmonary sequestration:	A part of the lung loses its connection from the major bronchial tree.
Bronchogenic cyst	(benign cysts with malignant position), Location: Paratracheal (right) most common, Subcarinal.
Infectious Lung Diseases	
1- Lung Abscess:	**patient presents with:** High fever & chills, Severe chest pain, Cough and hemoptysis, Copious production of foul smelling sputum (pus like), Leukocytosis, do CXR and(CT to rule out empyema) , **treat with** antibiotics , drainage , or pulmonary resection if indicated.
2- Bronchiectasis:	**Definition**: Bronchial dilation, usually affecting the lower lobes, either **causes**: congenital , infections , obstruction. **Presentation:** Productive cough, Dyspnea, Hemoptysis (50%), Clubbing. **Investigations**: CT is of choice. **Treatment**: medical when bilateral perfused and cystic treat with antibiotics bronchodilators and PT ,surgical if no response to medical or unilateral localized , or when non-perfused cystic .
3- Tuberculosis:	**causes:** Pulmonary: non pyogenic empyema . Extra-pulmonary: Pott's disease (in vertebra), Tuberculoma (in meningitis) ,TB lymphadenitis(lymph node of mediastinum), **Treatment:** medical (antibiotics),surgical if indicated.
4- Aspergillosis:	**Causes:** Aspergillus fumigatus, Aspergillus niger. **Forms:** Allergic, Saprophytic (aspergilloma/mycetoma) ,Invasive. **Saprophytic form: Clinical findings:** Aspergilloma/mycetoma cavity ball-like in CT, hemoptysis (50%) ,Chronic productive cough . **Investigations:** Skin test, Biopsy (Invasive), Sputum fungal culture ,CXR (radiolucent) or CT (if there are air crescent sign + aspergilloma> diagnosis will be TB).**Treatment**: amphotericin b and surgical if indicated.
5- Hydatid cyst:	**Cause**: Echinococcus granulosus. **Investigations**: CXR ,CT ,skin test. **Treatment**: surgical excision.

Summary

Lung tumors:	
Investigations	CXR, Bronchoscopy, Transthoracic needle aspiration, CT Scan (it is the golden choice in staging the tumors)
NSCLC	Adenocarcinoma Squamous cell carcinoma Large cell carcinoma. **Treatment of NSCLC:** Surgical (always preferred in early stages and if limited to the lung), Neoadjuvant chemotherapy (intermediate stage) > means before surgery to down stage the tumor ,Radiotherapy \ Chemotherapy.
SCLC	Poor prognosis, patient usually presents with systemic diseases, **Treatment of SCLC :**Non-surgical (because tumor is usually discovered late when metastasis has already happened, and it involves a lot of organs in the body) ,(chemotherapy only +\- radiotherapy).
Mediastinum:	
Superior Anterior mediastinum:	5 T's: ● Thyroid "retrosternal goiter" ● Thymoma ● TB lymphadenitis ● Teratoma ● T cell lymphoma (or triple lymphoma)
Middle mediastinal	Cyst: ● bronchogenic cyst ● pericardial cyst
Posterior mediastinal	Neurogenic tumor.

Thymoma
The most common tumor of the anterior mediastinum. - Classification: Epithelial, Lymphocytic, Lymphoepithelial ,Spindle cell. - Benign OR Malignant. - Clinical features :Asymptomatic or Symptomatic (Mass effect: SVC syndrome, dysphagia, and cough.) ,Systemic effect: associated autoimmune disorders, most commonly myasthenia gravis 40-50%. Investigations :CXR,CT Scan ,BIOPSY. Selected cases: Bronchoscopy Esophagoscopy ,angiogram. Management : Benign: complete excision ,Potentially Malignant: start with chemotherapy/radiation before, then complete excision if possible.
Trauma
Road Traffic Accident (RTA). Fracture ribs (simple - complicated with hemothorax), Haemothorax, Traumatic Pneumothorax,Tension pneumothorax, flail chest.
Pleura
- Spontaneous pneumothorax ,Pleural effusion, Empyema collection of pus in the pleural cavity. - Mesothelioma: rare cancer: This causes progressive thickening of the parietal and visceral pleura, with subsequent encasement of the lung and the formation of a large pleural, causing pain and SOB,It is strongly related to a history of asbestos. The patient commonly presents with shortness of breath, owing to a large pleural effusion. In many cases, the diagnosis is made by a percutaneous pleural biopsy but, if this is not successful, thoracoscopy or open pleural biopsy is useful.
Chest wall Deformities:
-Pectus excavatum funnel chest (caved-in), need surgery usually. -Pectus carinatum "protrusion of sternum" -Infection: (e.g. abscess, empyema, costochondritis..) -Chest wall tumor mostly benign -Thoracic outlet syndrome. -Treatment: surgery

Quiz

Questions in red are VERY IMPORTANT, it might come in the exam!

Q1. A 32 years old male presented with history of mild chest pain, productive cough especially early in the morning and dyspnea for 6 weeks. He gave history of swallowing a metal object. Chest CT-scan showed cystic abnormality. What is the most likely diagnosis?

A. Bronchiectasis

B. Bronchitis

C. Thymoma

D. Pneumonia

Answer: A, The cause could be Congenital, infectious or obstruction. The productive cough early in the morning is characteristic for bronchiectasis due to the dilatation, secretions accumulate during the sleep.

Q2. In SCLC, which one of the following used for staging?

A. Lung aspiration

B. MRI

C. CT

D. Bronchoscopy

Answer: C

Q3. What is the GOLDEN STANDARD method to investigate primary lung carcinoma?

A. MRI

B. CT scan with IV contrast

C. Chest X-ray

D. Bronchoscopy

Answer: B

Q4. Which one of the following statements are correct regarding SCLC management?

A. Surgery only

B. Chemotherapy to down stage the tumor and then the patient undergo surgery

C. No surgical indication to do any intervention

D. None of the above

Answer: C

Q5. A 20 years old non-smoker male presented with complaints of cough with productive yellowish foul smelling sputum and fever for 3 days. On examination, dullness, decreased breath sound and coarse inspiratory crackles were found. HR= 88 beat/min , respiration= 20 breath/min and his blood pressure was 110/70 mm of hg. What is the most likely diagnosis?

A. Pneumonia

B. Lung abscess

C. Bronchitis

D. Aspergillosis

Answer: B

Q6. In which of the following patients we have to check for thymoma?

A. Lung abscess patients

B. Lymphoma patients

C. SVCS patients

D. Myasthenia gravis patients

Answer: D

Surgical recall: Should myasthenia gravis patients undergo thymectomy? YES, and counterintuitively, myasthenia patients without thymoma have better symptomatic improvement after thymectomy than patients with thymoma.

Doctor's note: In every myasthenia gravis patient you should check for thymoma