Pleura

- Visceral pleura covers lungs and extends into fissures
- Parietal pleura limits mediastinum and covers dome of diaphragm and inner aspect of chest wall.
- Two layers between them (pleural cavity) contains <15 ml of clear serous fluid.
- Pleural layers lined by a single layer of flattened mesothelial cells. Underneath the lining cells is a thin layer of connective tissue

Diseases

- Inflammations
- Non-inflammatory pleural effusions
- Pneumothorax
- Tumours

Inflammation

- Inflammatory involvement of the pleura is called *pleuritis or pleurisy*
- 1. Serous, fibrinous and serofibrinous
- 2. Suppurative or empyema
- 3. Haemorrhagic pleuritis.
- **Serous, fibrinous and serofibrinous:**
- Most of the causes are infective in origin, within lungs, such as tuberculosis, pneumonias, pulmonary infarcts, lung abscess and bronchiectasis.
- Other causes include a few collagen diseases (RA, SLE) uraemia, metastatic involvement of the pleura, irradiation of lung tumours and diffuse systemic infections (e.g. typhoid fever, tularaemia, blastomycosis and coccidioidomycosis).

- **Suppurative or empyema:**
- Bacterial or mycotic infection of pleural cavity that converts a serofibrinous effusion into purulent exudate is called suppurative pleuritis or empyema thoracis.
- Most common cause is direct spread of pyogenic infection from lung. Other causes, direct extension from subdiaphragmatic abscess or liver abscess and penetrating injuries to chest wall
- In empyema, exudate is yellow-green, creamy pus that accumulates in large volumes. Empyema is finally replaced by granulation tissue and fibrous tissue

- **Haemorrhagic pleuritis.**
- Metastatic involvement of pleura, bleeding disorders and rickettsial diseases.

Non-inflammatory pleural effusions:

- Hydrothorax
- Hemothorax
- Chylothorax

- **Hydrothorax:**
- Hydrothorax is non-inflammatory accumulation of serous fluid within pleural cavities.
- May be unilateral or bilateral depending upon underlying cause
- Most common cause of hydrothorax, often bilateral is CHF

- Other causes are renal failure, cirrhosis of liver, Meig's syndrome, pulmonary oedema, primary and secondary tumours of the lungs
- Non-inflammatory serous effusion in hydrothorax is clear, straw-coloured and has characteristics of transudate
- **Hemothorax:**
- Accumulation of pure blood in pleural cavity
- Common causes of haemothorax are trauma to chest wall or to thoracic viscera and rupture of aortic aneurysm
- **Chylothorax:**
- Accumulation of milky fluid of lymphatic origin into pleural cavity

- Common causes, from rupture of the thoracic duct by trauma or obstruction of thoracic duct by malignant tumours, most often malignant lymphomas**.**

- **Pneumothorax:**
- Accumulation of air in the pleural cavity

1. Spontaneous pneumothorax
2. Traumatic pneumothorax
3. Therapeutic (artificial) pneumothorax

- **Spontaneous pneumothorax:**
- Due to spontaneous rupture of alveoli in any form of pulmonary disease, commonly in emphysema, asthma and tuberculosis other causes, chronic bronchitis in an old patient, bronchiectasis, pulmonary infarction and bronchial cancer.
- **Traumatic pneumothorax:**
- Caused by trauma to chest wall or lungs, ruptured oesophagus or stomach, and surgical operations of thorax.
- **Therapeutic (artificial) pneumothorax:**
- Formerly in the treatment of chronic pulmonary tuberculosis in which air was introduced into the pleural sac so as to collapse the lung and limit its respiratory movements

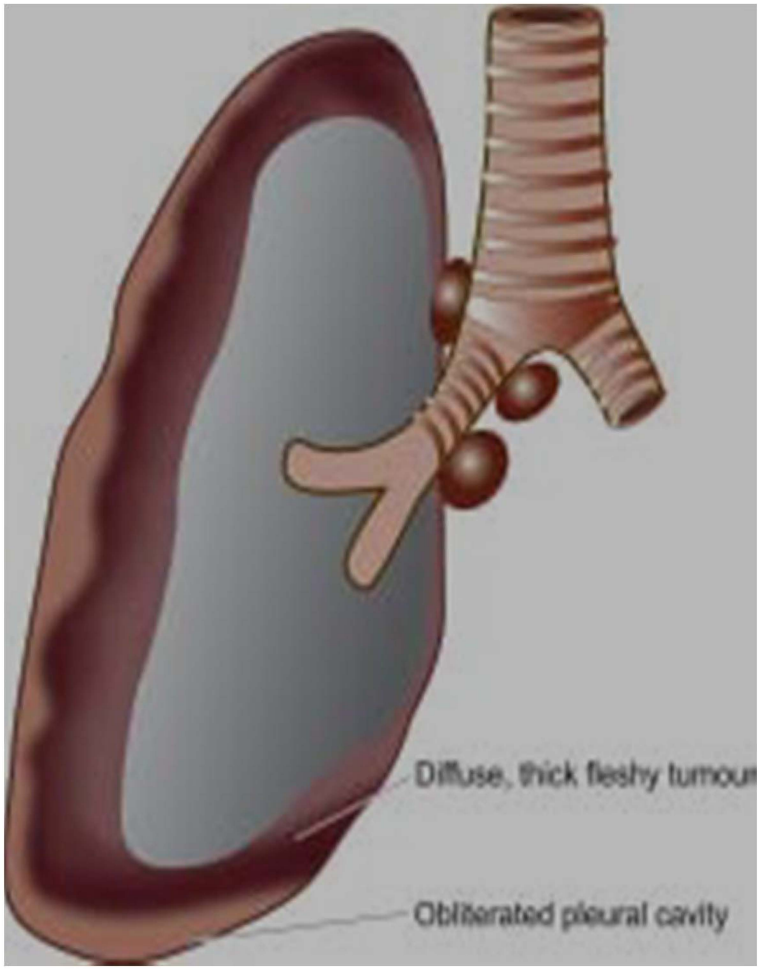
Tumors of Pleura

- Primary
- Secondary

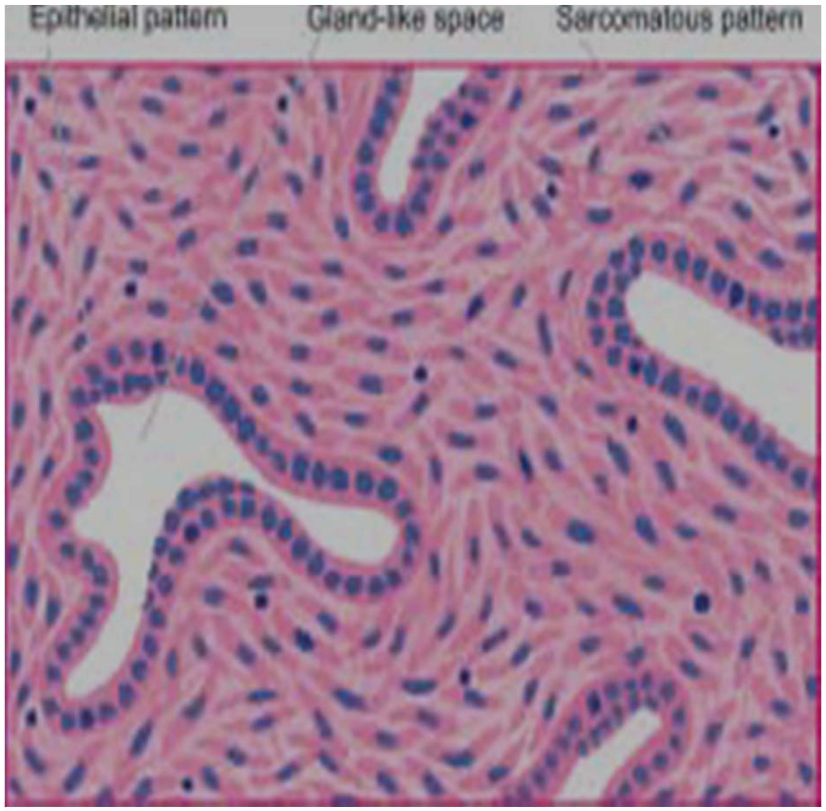
- **Mesothelioma:**
- Uncommon tumour arising from mesothelial lining of serous cavities, often in pleural cavity, rarely in peritoneal cavity and pericardial sac
- Benign
- Malignant

Malignant mesothelioma

- Rare and highly malignant.
- *Association with occupational exposure to asbestos (crocidolite) for* a number of years, usually 20 to 40 years
- About 80-90% of malignant mesotheliomas are asbestos-related
- Exact mechanism of carcinogenicity by asbestos is not clear but amphibole type of asbestos is capable of inducing oncogenic mutation in the mesothelium
- **G/A:**
- Diffuse tumor, forming a thick, white, fleshy coating over the parietal and visceral surfaces


Diffuse, thick fleshy tumour
Obliterated pleural cavity

- **M/E:**
- May have epithelial, sarcomatoid or biphasic pattern.
- 1. **Epithelial pattern** resembles an adenocarcinoma, consisting of tubular and tubulo-papillary formations
- 2. **Sarcomatoid pattern** consists of spindle cell sarcoma resembling fibrosarcoma
- 3. **Biphasic pattern** shows mixed growth having epithelial as well as sarcomatoid pattern
- Slit-like or gland-like spaces lined by neoplastic mesothelial cells separated by proliferating spindle shaped tumour cells


Epithelial pattern
Gland-like space
Sarcomatous pattern

- **Clinical features:**
- Chest pain, dyspnoea, pleural effusion and infections.
- Prognosis is poor; 50% of patients die within one year of diagnosis

- **Secondary pleural tumors**:
- More common than the primary tumours
- Appear as small nodules scattered over lung surface
- Common are lung and breast through lymphatics, and ovarian cancers via haematogenous route.