PLEURA

LESIONS
Lesions of Pleura

- **Primary**
  - Intra pleural bacterial infections
  - Neoplasm

- **Secondary**
  - A complication of some underlying disease

**Pleural Effusion**

- Is a buildup of fluid between the layers of tissue that line the lungs and chest cavity.
- Common manifestation of both primary and secondary pleural diseases
  - Inflammatory
  - Non Inflammatory
- Occurs in following settings
  - Increased hydrostatic pressure
  - Increased vascular permeability
  - Decreased oncotic pressure
  - Increased intrapleural negative pressure
  - Decreased lymphatic drainage
Inflammatory Pleural Effusion

- Serous
- Serofibrinous
- Fibrinous (later)

Causes
- Tuberculosis
- Pneumonia
- Lung infarcts
- Lung abscess
- Bronchiectasis
- RA
- DLE
- Uremia
- Diffuse systemic infections
- Metastatic involvement of pleura
- Radiation therapy for tumors in lung or mediastinum

### TABLE 15-14 Pleural Space Fluid Accumulations

<table>
<thead>
<tr>
<th>Condition</th>
<th>Type of Fluid</th>
<th>Common Associations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inflammatory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serofibrinous pleuritis</td>
<td>Serofibrinous exudate</td>
<td>Inflammation in adjacent lung</td>
</tr>
<tr>
<td>Suppurative pleuritis (empyema)</td>
<td>Pus</td>
<td>Suppurative infection in adjacent lung</td>
</tr>
<tr>
<td>Hemorrhagic pleuritis</td>
<td>Bloody exudate</td>
<td>Tumor</td>
</tr>
<tr>
<td><strong>Noninflammatory</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydrthorax</td>
<td>Transudate</td>
<td>Congestive heart failure</td>
</tr>
<tr>
<td>Hemothorax</td>
<td>Blood</td>
<td>Ruptured aortic aneurysm, trauma</td>
</tr>
<tr>
<td>Chylothorax</td>
<td>Chyle (lymph)</td>
<td>Tumor obstruction of normal lymphatics</td>
</tr>
</tbody>
</table>
Empyema

- Purulent pleural exudate
- Occasionally through lymphatic or hematogenous dissemination
- Rarely sub-diaphragmatic or liver abscess may extend by continuity
- Characterized by loculated, yellow-green, creamy pus composed of masses of neutrophils admixed with other leukocytes
- Usually in small volume and localized (but may be large)

**Empyema**

- Usually organized into dense, tough fibrous adhesions frequently obliterating the pleural space or envelop the lungs---
- Restrict pulmonary expansion
Hemorrhagic Pleuritis

- Infrequent
- Found in hemorrhagic diathesis, rickettsial diseases, neoplastic involvement of pleural cavity
- Sanguineous inflammatory exudates
- Careful search should be made for presence of exfoliated tumor cells

Non Inflammatory Pleural Effusion- Hydrothorax

- A condition that results from serous fluid accumulating in the pleural cavity.
- Found in cardiac failure, renal failure and cirrhosis of liver with ascites
- Accompanied by pulmonary congestion and edema
- Fluid is clear and straw-colored

Hemothorax

- The escape of blood into the pleural cavity
- May occur post-operatively
- A fatal complication of a ruptured aortic aneurysm or vascular trauma
**Chylothorax**
- Accumulation of *milky fluid* in the pleural cavity
- Chyle contains finely emulsified fat
- Most often caused by thoracic duct trauma or obstruction (malignant conditions)

**Pneumothorax**
- Presence of air or gas in pleural cavities
- **Spontaneous**
  - Any form of pulmonary disease that causes rupture of an alveolus
  - Any abscess communicating directly or indirectly with the pleural space
  - Most commonly associated with emphysema, asthma and tuberculosis
- **Traumatic**
- **Therapeutic**
- **Spontaneous idiopathic pneumothorax** is encountered in relatively young people
- Also causes compression, collapse and atelectasis resulting into marked respiratory distress
- **Tension pneumothorax** The defect act as a flap valve and permits the entrance of air during inspiration but fails to permit escape during expiration
**Pleural Tumors**

- Secondary metastatic involvement is far more common than primary tumors
- Most frequent metastatic malignancies arise from **lung** and **breast** followed by **ovarian carcinoma**
- Careful cytologic examination of the sediment is of considerable diagnostic value

**Solitary Fibrous Tumor**

- Recognized as a soft tissue tumor mostly occurring in the pleura, less commonly in the lung, as well as other sites
- Variable size but confined to surface of lung
- Grossly consisting of dense fibrous tissue with occasional cysts filled with viscid fluid
- M/S whorls of reticulin and collagen fibers with interspersed spindle cells resembling fibroblasts
- Rarely malignant (pleomorphism, mitotic activity, necrosis and > 10 cm)
- CD34+, keratin –ve (opposite in malignant lesion)
- No relationship to Asbestos exposure
Malignant Mesothelioma

- Arising from visceral or parietal pleura
- Uncommon but incidence is increased among people with heavy exposure to Asbestos (90%)
- Long latent period of 25-45 yrs
- No increased risk in asbestos workers who smoke
- Deletion in Chr 1p, 3p, 6q, 9p, 22q…. 60-80%
- P16 mutations….. 31%
- Presence of SV40(potent carcinogen inactivating p53 and RB etc) in 60-80% cases

Morphology

- Diffuse lesion, spreading widely in pleural space, usually associated with extensive pleural effusion
- Affected lung become ensheathed by a thick layer of soft, gelatinous, greyish pink tumor tissue
- M/S may be
  - Epithelioid
  - Sarcomatoid
  - Mixed
**Morphology- Epithelioid**

- Cuboidal, columnar, or flattened cells forming **tubular** or **papillary structures** resembling adenocarcinoma
- Positive staining for acid mucopolysaccharide
- Lack of staining for CEA
- Strong staining for keratin
- Positive staining for calretinin, WT-1, CK5/6 and D2-40

**Morphology- Epithelioid**

- Long microvilli and abundant tonofilaments seen on E/M
Morphology

- **Sarcomatoid**
  - Spindle cell carcinoma
  - Resembling fibrosarcoma

- **Mixed type**
  - Containing both patterns

Clinical Course

- Chest pain, dyspnea and recurrent pleural effusion
- Concurrent asbestosis (20% cases of pleural and 50% of peritoneal mesotheliomas)
- Invasion to lung
- Metastasis to hilar LN, liver and other distant organs
- 50% of patients die within 12 months
- Few survive longer than 2 yrs
- Extra-pleural pneumonectomy, chemotherapy, and radiation therapy is some helpful in cases of pleural mesothelioma

Peritoneal Mesothelioma

- Mesothelioma also arise in the peritoneum, pericardium, tunica vaginalis and genital tract
- Peritoneal Mesotheliomas are related to Asbestose exposure (50%)
- 50% also have pulmonary fibrosis
- Intestinal involvement frequently leads to death due to obstruction
Malignant Mesothelioma

- primary pleural
- Asbest exposition
- hydrothorax, chest pain
- Pleuroscopic biopsy
MALIGNANT MESOTHELIOMA

IHC phenotype: epithelial and mesenchymal marker+++ (cytokeratin, vimentin); calretinin, ill mesothelioma Ab-1

Epithelial / mesenchymal / myxed