PLEURISY
PLEURAL EFFUSION
EMPYEMA
Etiology

- Bacterial pneumonia
- Heart failure
- Rheumatologic causes
- Metastatic intrathoracic malignancy
- Tuberculosis
- Lupus erythematosus
- Aspiration pneumonitis
- Uremia
- Pancreatitis
- Subdiaphragmatic abscess
- Rheumatoid arthritis
Types of Pleurisy

- Dry or plastic
- Serofibrinous or serosanguineous, and
- Purulent pleurisy or empyema.
Dry or Plastic Pleurisy

Etiology:

- Acute bacterial or viral pulmonary infections
- Acute upper respiratory tract illness.
- Tuberculosis
- Connective tissue diseases
The process is usually limited to the visceral pleura, with small amounts of yellow serous fluid and adhesions between the pleural surfaces.

Fibrothorax formation.
Clinical Manifestations

- The primary disease often overshadows signs and symptoms.
- Pain is the principal symptom, and is exaggerated by deep breathing, coughing, and straining.
- Occasionally, pleural pain is described as a dull ache, which is less likely to vary with breathing.
- The pain is often localized over the chest wall and is referred to the shoulder or the back.
- Pain with breathing is responsible for grunting and guarding of respirations.
Early in the illness, a leathery, rough, inspiratory and expiratory friction rub may be audible, but this usually disappears rapidly.

Pleurisy may be asymptomatic.
Laboratory Findings

Plastic pleurisy may be detected on radiographs as a diffuse haziness at the pleural surface or a dense, sharply demarcated shadow.

Chest radiograph may be normal, but ultrasonography or CT will be positive.
Differential Diagnosis

- Epidemic pleurodynia
- Trauma to the rib cage
- Tumors of the spinal cord
- Herpes zoster
- Gallbladder disease
- Trichinosis
Treatment

- Aimed at the underlying disease.
- When pneumonia is present, neither immobilization of the chest with adhesive plaster nor therapy with drugs capable of suppressing the cough reflex is indicated.
- Analgesia may be helpful.
Sero fibrinous/Serosanguineous Pleurisy

Sero fibrinous pleurisy is defined by a fibrinous exudate on the pleural surface and an exudative effusion of serous fluid into the pleural cavity.
Etiology

Lung infections

Inflammatory conditions of the abdomen or mediastinum.

Less commonly, it is found with connective tissue diseases such as lupus erythematosus, periarteritis, or rheumatoid arthritis.

On occasion, it is seen with primary or metastatic neoplasms of the lung, pleura, or mediastinum.
Pathogenesis

The rate of fluid formation is dictated by the Starling law, by which fluid movement is determined by the balance of hydrostatic and pressures in the pleural space and pulmonary capillary bed, and the permeability of the pleural membrane.

Normally, only 4–12 mL of fluid is present in the pleural space, but if formation exceeds clearance, fluid accumulates.

Pleural inflammation increases the permeability of the plural surface, with increased proteinaceous fluid formation; there may also be some obstruction to lymphatic absorption.
Clinical Manifestations

- As fluid accumulates, pleuritic pain may disappear and the patient may become asymptomatic if the effusion remains small, or there may be only signs and symptoms of the underlying disease.

- Large fluid collections may produce cough, dyspnea, retractions, tachypnea, orthopnea, or cyanosis.
Clinical Manifestations

- Chest examination
- Signs may shift with changes in position.
- Signs of underlying disease.
- The process is usually unilateral.
Laboratory Findings

- CXR
- USG
- Examination of fluid
Thoracentesis should be performed when pleural fluid is present or is suggested.

Thoracentesis can differentiate serofibrinous pleurisy, empyema, hydrothorax, hemothorax, and chylothorax.
Complications

- Persistence of pleural
- Recurrent fluid collection
- As the effusion is absorbed, adhesions often develop between the 2 layers of the pleura, but usually little or no functional impairment results.
- Pleural thickening may develop and is occasionally mistaken for small quantities of fluid or for persistent pulmonary infiltrates.
- Pleural thickening may persist for months, but the process usually disappears, leaving no residua.
Treatment

- Diagnostic thoracentesis
- Therapeutic thoracentesis
- Tube thoracostomy
- Patients with pleural effusions may need analgesia,
- Those with acute pneumonia may need supplemental oxygen in addition to specific antibiotic treatment.
Purulent Pleurisy or Empyema

Etiology.

- It is most often associated with pneumonia due to *Streptococcus pneumoniae*, *Staphylococcus aureus*, *Haemophilus influenzae*, Group A streptococcus, gram-negative organisms, tuberculosis, fungi, and malignancy are less common causes.

- The disease can also be produced by rupture of a lung abscess into the pleural space.

- By contamination introduced from trauma or thoracic surgery.

- The extension of intra-abdominal abscesses.
Pathology

- During the **exudative stage**, fibrinous exudate forms on the pleural surfaces.

- In the **fibrinopurulent stage**, fibrinous septae form, causing loculation of the fluid, with thickening of the parietal pleura. If the pus is not drained, it may dissect through the pleura into lung parenchyma, producing bronchopleural fistulas and pyopneumothorax, or into the abdominal cavity. Rarely, the pus dissects through the chest wall.

- During the **organizational stage**, there is fibroblast proliferation, and pockets of loculated pus may develop into thick-walled abscess cavities or the lung may collapse and become surrounded by a thick, inelastic envelope.
CLINICAL MANIFESTATIONS.

- The initial signs and symptoms are primarily those of bacterial pneumonia.

- Most patients are febrile.

- In infants, there may be a moderate exacerbation of respiratory distress.

- Physical findings are identical to those described for serofibrinous pleurisy,
Laboratory Findings.

- Radiographically, all pleural effusions appear similar, but no shift of fluid with a change of position indicates a loculated empyema; this may be confirmed by ultrasonography or CT scan.

- The maximal amount of fluid obtainable should be withdrawn by thoracentesis.

- Blood cultures have a high yield that might be higher than that of the pleural fluid.

- Leukocytosis and an elevated sedimentation rate may be found.
Complications

- Bronchopleural fistulas
- Pyopneumothorax
- Purulent pericarditis
- Pulmonary abscesses
- Peritonitis
- Osteomyelitis of the ribs.
- Septic complications such as meningitis, arthritis, and osteomyelitis may also occur
- The effusion may organize.
Treatment

- Antibiotics
- Thoracentesis
- Chest tube drainage with or without a fibrinolytic agent
- Video-assisted thoracoscopic surgery (VATS)
- Open decortication
## Pleural Fluid Analysis

<table>
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<tr>
<th></th>
<th><strong>TRANSUDATE</strong></th>
<th><strong>EXUDATE</strong></th>
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<tbody>
<tr>
<td>Appearance</td>
<td>Clear</td>
<td>Cloudy</td>
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<tr>
<td>Cell count</td>
<td>&lt;1000</td>
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</tr>
<tr>
<td>Cell type</td>
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<td>PMNs</td>
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<tr>
<td>LDH</td>
<td>&lt;200 U/L</td>
<td>&gt;200 U/L</td>
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<td>Pleural/serum LDH ratio</td>
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<td>&gt;0.6</td>
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<tr>
<td>Protein &gt;3 g</td>
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<td>Common</td>
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<tr>
<td>Pleural/serum protein ratio</td>
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<td>&gt;0.5</td>
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<tr>
<td>Glucose[^1]</td>
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<td>Low</td>
</tr>
<tr>
<td>pH[^1]</td>
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</tr>
<tr>
<td>Gram stain</td>
<td>Negative</td>
<td>Usually positive</td>
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THANK YOU