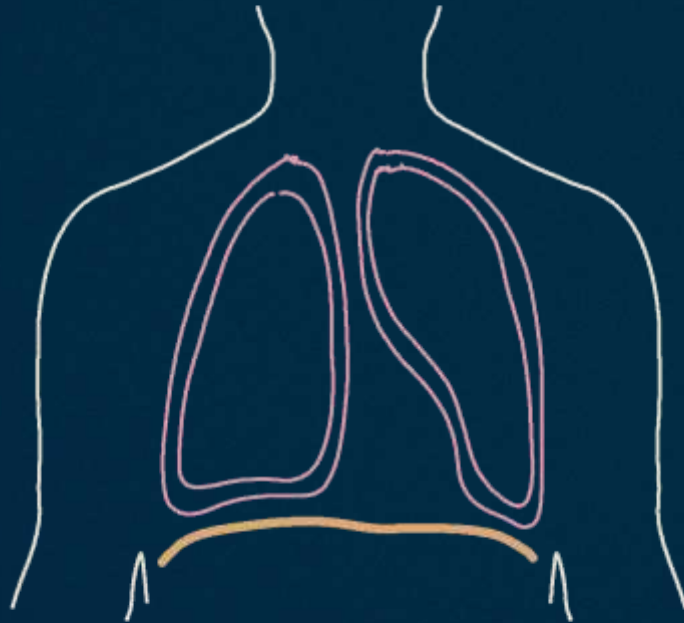
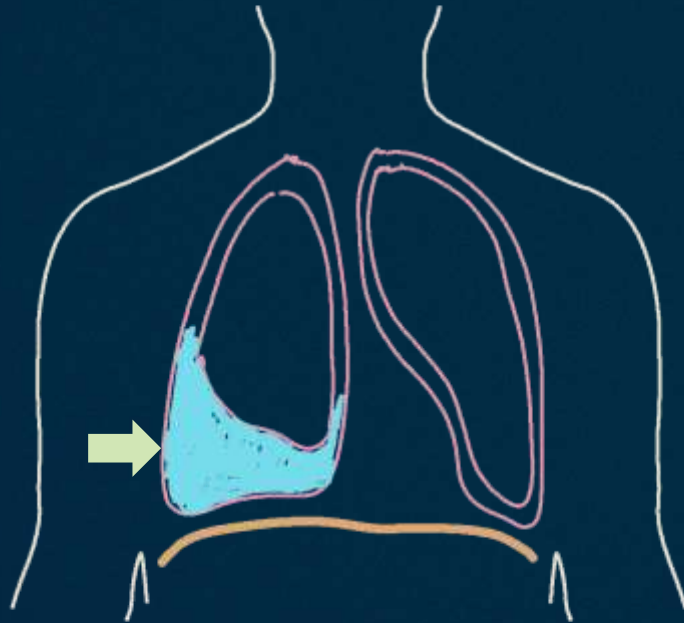

Pleural Effusion

Types, Causes,
Evaluation & Management

Pleural effusion - Accumulation of serous fluid within the pleural space



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Pus in pleural space → **Empyema**

Blood → **Hemothorax**

Chyle → **Chylothorax**

Types of Effusions

1. **Transudative** effusions

- Lower protein content
- Results from –
 - ↑ Hydrostatic Pressure – e.g. Cardiac failure
 - ↓ oncotic pressure – Cirrhosis liver, Renal failure, Nephrotic syndrome or Malnutrition

2. **Exudative** effusions

- Higher protein content
- Results from
 - Increased microvascular permeability, due to disease of pleura *or* adjacent lung

Causes

Common

- Pneumonia - 'Parapneumonic effusion'
- Tuberculosis
- Pulmonary infarction
- Malignancy
- Cardiac failure
- Subdiaphragmatic disorders, like a subphrenic abscess and pancreatitis

Uncommon

- Hypoproteinemia - Nephrotic syndrome, Liver failure or Malnutrition
- Connective tissue diseases – SLE, RA
- Post-myocardial infarction syndrome
- Acute Rheumatic fever
- Meigs' syndrome - Ovarian Tumor + Pleural effusion
- Myxedema
- Uremia
- Asbestos-related benign pleural effusion

Assessment

Symptoms

- **Pleuritic chest pain** - Pain on inspiration & coughing
- **Breathlessness** - depending on size & rate of fluid accumulation

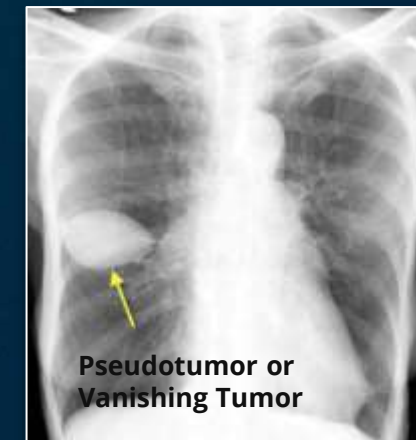
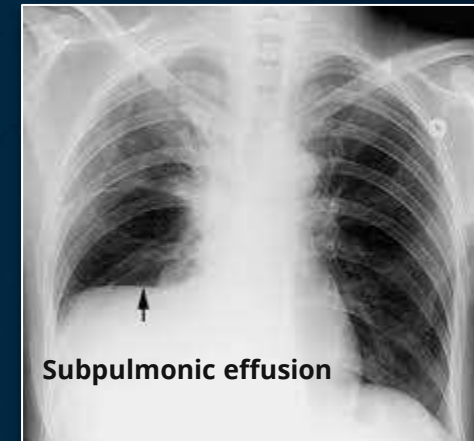
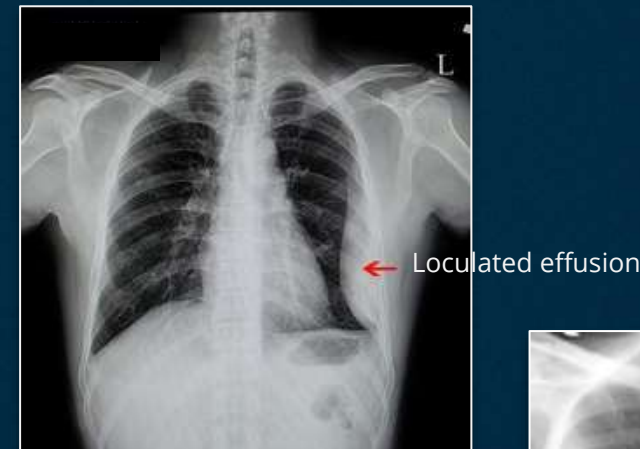
Signs

- **Inspection** - Tachypnoea & ↓ chest movement
- **Palpation**
 - ↓ chest expansion
 - Tracheal & Mediastinal shift to opposite side in large effusion
- **Percussion** - Stony dull
- **Auscultation**
 - Absent breath sounds & vocal resonance
 - Bronchial breathing *or* crackles above the effusion surface

Assessment (Investigations)

Chest X-ray – Erect/PA view

- **Confirms** presence of effusion
- About **200 mL** of fluid needed to be detectable on PA chest X-ray
- Previous scarring *or* adhesions in the pleural space can cause *localized effusions*
- **Subpulmonary effusion** (Pleural fluid localised below the lower lobe) - simulates an elevated hemidiaphragm
- **Pseudotumor or Vanishing Tumor** - Pleural fluid localised within oblique fissure may produce a rounded opacity & may be mistaken for a tumor



Assessment (Investigations)

Ultrasound Chest

- More accurate for determining the presence of fluid
- *Clear hypoechoic space* on ultrasound is consistent with a **Transudate**
- Presence of *moving, floating densities* suggests an **Exudate**
- Presence of septation - Evolving empyema or resolving Hemothorax

CT scan

- When malignancy suspected

Both CT scan & Ultrasound are useful in guiding pleural tap and pleural biopsy

Assessment (Investigations)

Pleural fluid aspiration

- Not needed in transudative causes
- *Inspection of fluid color & texture* – Empyema, chylothorax or bloody
- Send for pH, protein, lactate dehydrogenase (LDH), cytology and microbiology

Protein

- **Exudate** > 30 g/L
- **Transudate** < 30 g/L

Light's criteria

- To distinguish exudate from transudate in borderline protein results
- Do in protein level between 25 – 35 g/L
- Exudate is likely if one or more of the following criteria are met

Light's criteria

- Pleural fluid protein: Serum protein ratio > 0.5
- Pleural fluid LDH: Serum LDH ratio > 0.6
- Pleural fluid LDH > 2/3 of upper limit of normal serum LDH

Assessment (Investigations)

Pleural fluid aspiration

- Not needed in transudative causes
- *Inspection of fluid color & texture* – Empyema, chylothorax or bloody
- Send for pH, protein, lactate dehydrogenase (LDH), cytology and microbiology
- Other tests – Glucose, Amylase

pH - Low

- Infection
- RA
- Ruptured esophagus
- Advanced malignancy

Cytological examination

Gram staining – parapneumonic effusion

Glucose – *Low* → RA, Tuberculosis

Amylase – *High* → Pancreatitis, esophageal perforation

Assessment (Investigations)

Pleural Biopsy

- Ultrasound- or CT-guided
- *Pathological & microbiological analysis*
- **Video-assisted thoracoscopy (VATS)** - Allows visualization of the pleura & direct guidance of biopsy

Management

Therapeutic Aspiration

- To palliate breathlessness in larger effusions
- **Be careful** - Removing > 1.5 L at a time can cause re-expansion pulmonary oedema
- *Never drain to dryness before establishing a diagnosis*, as biopsy may become impossible until further fluid accumulates

Chest Intubation

Indicated if:

- Fluid is purulent, turbid or cloudy, *or*
- Fluid is clear, but the pH is < 7.2 in patients with suspected infection

Treat underlying cause

e.g. Treatment of heart failure, pneumonia, pulmonary embolism or subphrenic abscess – will often be followed by resolution of the effusion

Recurrent Pleural effusion

- Recurrent pleural aspirations
- Pleurodesis
- Indwelling pleural catheter
- Drugs - alleviate symptoms e.g. opioids to relieve dyspnea

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