Team Medicine

Pleural Effusion

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■ Important notes ■ doctor notes

431 Teams
medical students

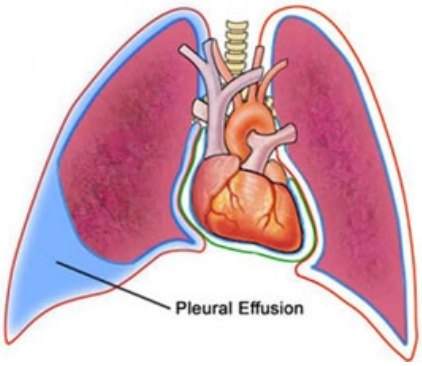
Definition:

Abnormal collection of fluid in the pleural space resulting from excess fluid production or decreased absorption.

Caused by the following mechanisms:

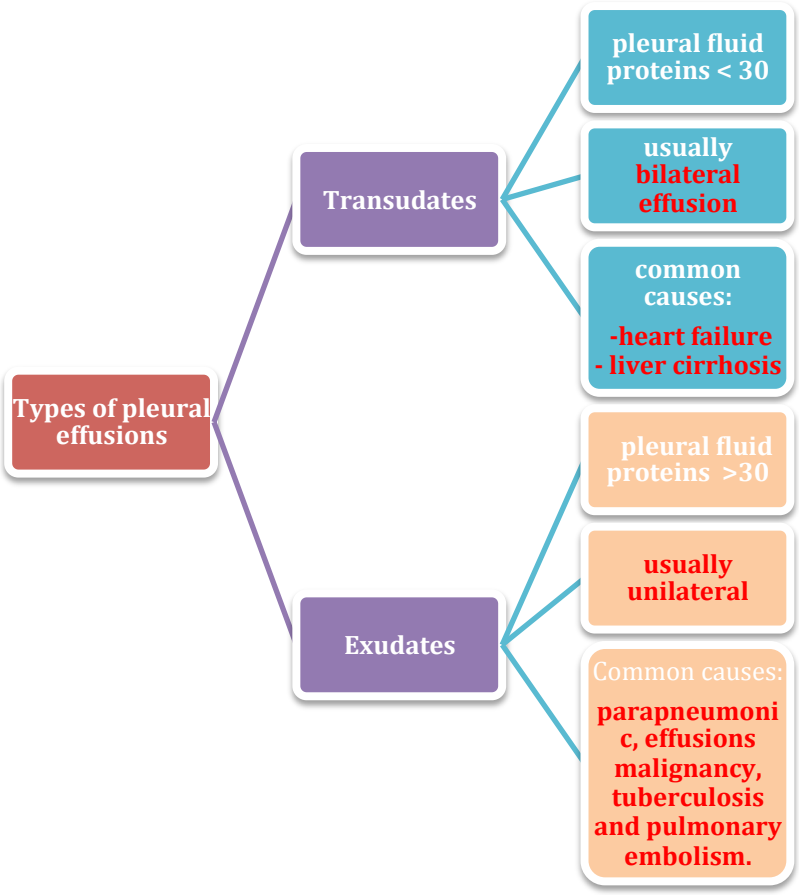
- **Altered permeability of the pleural membranes (trauma, malignancy, inflammation, infection, pulmonary infarction, drug hypersensitivity, uremia, pancreatitis).**
- **Reduction in intravascular oncotic pressure.(hypoalbuminemia, cirrhosis).**
- **Increased capillary hydrostatic pressure in the systemic and/or pulmonary circulation (congestive heart failure, superior vena cava syndrome)**
- **Decreased lymphatic drainage or complete blockage, including thoracic duct obstruction or rupture.**

Helpful Animation press here



Causes:

- **Congestive heart failure (most common)**
- **Pneumonia**
- **Malignancy**
- **Pulmonary embolism**

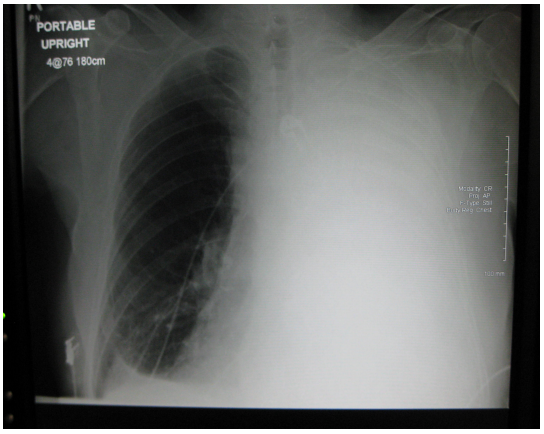


Clinical presentation:

History	Symptoms	Signs
✓ *Patient with history of Infection, malignancy, risk of PE , heart failure etc.)* ✓ *Drug history (e.g. beta blockers)* ✓ *An occupational history* ✓ *Asbestos exposure*	✓ *Asymptomatic (often)(In some cases 1/3 of the lung is effected without any symptoms)* ✓ *Breathlessness* ✓ *Chest pain* ✓ *Cough* ✓ *Fever*	✓ *Dullness to percussion(Stony dull in big effusion)* ✓ *Decreased breath sounds over the effusion* ✓ *Decreased tactile fremitus* ✓ *Asymmetrical chest expansion* ✓ *Mediastinal shift away from the effusion*

Diagnosis:

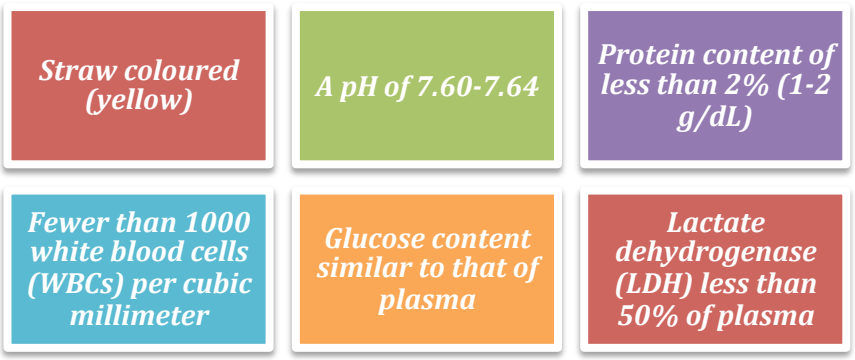
- ✓ *CXR*
- ✓ *Pleural aspiration*
- ✓ *CT scan*
- ✓ *Chest Ultrasound*
- ✓ *Pleural biopsy*
- ✓ *Medical thoracoscopy*
- ✓ *VAT (video assisted thoracoscopy)*
- ✓ *Bronchoscopy .*



Diagnostic Thoracentesis:

Pleural aspiration	**Is a safe procedure in presence of sufficient fluids.**
Contraindications	✓ *Small volume of fluid* ✓ *Bleeding diathesis or anticoagulation* ✓ *Cutaneous disease over the puncture site*
Complication	✓ *Pain at the puncture site (usually)* ✓ *Bleeding* ✓ *Pneumothorax* ✓ *Empyema* ✓ *Spleen/liver puncture*

Characteristics of pleural fluid



LABORATORY:

1- **Biochemistry (5 ml) :**
- ❖ **PH, proteins, glucose and LDH Send serum sample at the same time**

2- **Microbiology lab (20ml)**
- ❖ **Gram stain + culture and sensitivity TB –AFB &TB culture PCR for TB**

3- **Pathology lab (100ml or more)**
- ❖ **Looking for malignant cells**
- ❖ **Ask also for cell block (pleural clot)**

Distinguish transudates from exudates:

Exudative effusions might be suspected (gross observing) by:
- **Frankly purulent fluid indicates an empyema**
- **A milky fluid suggests a chylothorax (lymphatic obstruction)**
- **Grossly bloody fluid**
  - **Trauma**
  - **Malignancy,**
  - **Postpericardiotomy syndrome**
  - **Asbestos-related effusion**

(Hematocrit of > 50% of the peripheral hematocrit defines a hemothorax)

Exudative fluid is considered if any of the following applies (Laboratory testing):

- ❖ **Pleural fluid protein level greater than 2.9 g/dL**
- ❖ **Ratio of pleural fluid to serum protein greater than 0.5**
- ❖ **Ratio of pleural fluid to serum LDH greater than 0.6**
- ❖ **Pleural fluid LDH greater than two thirds of the upper limits of normal serum value**

Clinical judgment is required when pleural fluid test results fall near the cutoff points (e.g. 29,30)

Example:

Heart failure patient on diuretics pleural fluid levels of N-terminal pro-brain natriuretic peptide (NT-proBNP) is elevated in effusions due to congestive heart.

Pleural fluid pH & glucose:

- **Fluid pH of less than 7.1-7.2 indicates the need for urgent drainage of the effusion**
- **A low pleural glucose (30-50 mg/dL) suggests**
  - **Malignant effusion**
  - **Tuberculosis pleuritis**
  - **Esophageal rupture**
  - **Lupus pleuritis.**
- **A very low pleural glucose (ie, < 30 mg/dL) suggests rheumatoid pleurisy or empyema.**

Pleural Fluid Cell Count Differential:

- **Fluid lymphocytosis (> 85%) suggests TB, lymphoma, sarcoidosis, rheumatoid, yellow nail syndrome, or chylothorax, heart failure (causes very high lymphocyte count)**
- **Fluid lymphocyte (50-70%) suggest malignancy**

TB pleural effusion:

- **History of exposure**
- **Positive PPD (tuberculin test)**
- **Lymphocytic exudative effusions**
- **Pleural fluid adenosine deaminase**
- **Interferon-gamma test**
- **PCR for TB**

Fluid usually disappear after starting anti-tuberculous treatment)

IMAGING:

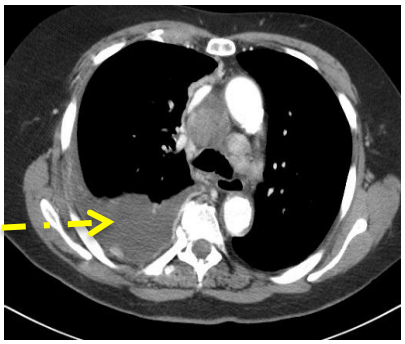
- **Ultrasonography Chest ultrasound is important**
- **for**

- Diagnosis of pleural effusion also, as to guide aspiration and biopsy procedures

- **CT Scanning (very sensitive for fluid)**

Chest CT scanning with contrast.

Thickened pleura can be seen



Biopsy:

should be considered, especially if TB or malignancy is suggested

- **Closed-needle p. biopsy is a blind technique(bedside test)**
- **Medical thoracoscopy has a higher diagnostic yield**
- **Video assisted thoracoscopy(VAT)**

Prognosis:

- **Varies in accordance with the condition's underlying etiology.**
- **The most common associated malignancy in men is lung cancer**
- **The most common associated malignancy in women is breast cancer**
- **Malignant pleural effusion is associated with a very poor prognosis (6 to 8 months survival)**

Treatment: (usually depends on the cause)

Therapeutic Thoracentesis	Tuberculosis pleuritis	Chylous effusions	Malignant pleural effusions	pleurodesis	parapneumonic effusion
- If patient is complaining of severe shortness of breath because the lung has no space to inflate. -The patient will be relieved immediately. - Remove larger amounts of pleural fluid is used to alleviate dyspnea. - Don't go beyond 1.5 L (patient may have rebound pulmonary edema)	Typically is self-limited Disappear after treatment of TB	✓ Rare. ✓ Usually managed by dietary and surgical proc.	✓ Drain large, malignant PE to relieve dyspnea ✓ pleurodesis for recurrent effusions ✓ Or placement of indwelling tunneled catheters.(eg, PleurX catheter)	-You create inflammation between the visceral and parietal pleura, when the 2 surfaces are inflamed they stick together. - You can't do it when there is fluid , you have to drain the fluid first. - Then put the sclerosing agent(makes the inflammation) like (talc, doxycycline, bleomycin)	we go with antibiotic treatment if: ✓ Frankly purulent fluid, ✓ A pleural fluid pH of less than 7.2 ✓ loculated effusions. ✓ Bacteria on Gram stain or culture

Surgical treatment:

- **Video-assisted thoracoscopy .**
- **Obliterate the pleural space.**
- **To drain loculated pleural fluid .**
- **Surgically implanted pleuroperitoneal shunts**

Summary

- Pleural effusion can be caused by several mechanisms:
  - Altered permeability of the pleural membranes .
  - Reduction in intravascular oncotic pressure.
  - Increased capillary hydrostatic pressure in the systemic and/or pulmonary circulation .
  - Decreased lymphatic drainage or complete blockage.
  -

-The most common cause of pleural effusion is congestive heart failure .

- Transudate pleural effusion is usually bilateral (Pleural fluid proteins less than 30) , while exudate pleural effusion is usually unilateral (Pleural fluid proteins more than 30)

-In clinical presentation :

- History :
  - Infection, malignancy, risk of PE , heart failure.
  - Beta blocker drug history.

- Symptoms :
  - Patient present asymptomatic (Often) . 1/3 of the lung can be affected without any symptoms appearing .

- Signs:
  - Only if it's large effusion= stoney dullness in percussion.

- How to distinguish transudates from exudates ?
  - Serum – pleural protein = less than 3.1 g/dl
  - Serum albumin – pleural effusion albumin = less than 1.2 g/dl

- We depend more on pleural fluid protein & PH in diagnosis , although other tests can help e.g. pleural fluid cell count but it's not as imp as them.
- In TB pleural effusion, fluid will disappear after starting anti-tuberculous treatment.
- CT scan is very sensitive in assessing fluids.
- Prognosis:
  - Most common associated malignancy in men is lung cancer ,while in women it's breast cancer.

Treatment usually depends on the cause (please check the table in page 5)