

Pleural Effusions

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Epidemiology

- ✓ Annual incidence: About 1 million Americans each year

Etiology

- ✓ Pleural Effusion is an abnormal accumulation of fluid in the pleural space.
- ✓ The first step in evaluating pleural effusions is determining whether it is Transudative or Exudative.
- ✓ Transudative effusions are a result of pressure filtration without capillary injury (i.e hydrostatic and oncotic pressure abnormalities).
- ✓ Exudative effusions are a result of inflammatory fluid leaking between cells.
- ✓ Most common causes of transudative effusion: 1. LV failure, 2. Cirrhosis
- ✓ Most common causes of exudative effusion: 1. Bacterial PNA, 2. Viral infection, 3. Malignancy
- ✓ Most common malignant effusions: 1. Lung Ca (1/3), 2. Breast ca (1/4), & 3. Lymphoma (1/5)

✓ Presentation

- ✓ Clinical manifestations of pleural effusion can be variable and related to the underlying disease process and small pleural effusions can be asymptomatic.
- ✓ History: Dyspnea, cough, chest pain can be common, but look for other symptoms such as:
 1. CHF: lower extremity edema, orthopnea, paroxysmal nocturnal dyspnea
 2. TB: night sweats, fever, hemoptysis, weight loss
 3. PNA: fever, purulent sputum
- ✓ Physical exam depends on size of the effusion: diminished breath sounds, dullness to percussion, decreased tactile fremitus, & occasionally a localized pleural friction rub

- ✓ On CXR: blunting of the costophrenic angle; a volume of less than 500mL may not be seen on upright CXR, but can be seen on lateral films; Decubitus CXR can help determine if fluid is free flowing or loculated

✓ Diagnosis

- ✓ Lights Criteria: all 3 conditions must be met for an effusion to be transudative; if you fail one of the criterion, the effusion is exudative.

E/S = Effusion to Serum	E/S protein	LDH (Eff)	E/S LDH
Transudative	< 0.5	<200	<0.6
Exudative	>0.5	>200	>0.6

- ✓ E/S = Effusion to Serum
- ✓ Eff = Effusion

1. Thoracentesis: This is the gold standard test; must differentiate between transudative and exudative; Always perform CXR after procedure to rule out pneumothorax;
2. Pleural Fluid WBC > 1000: think exudate
3. Pleural Fluid WBC >10000: think parapneumonic effusion
4. Pleural Fluid WBC >100,000: think empyema
5. Pleural Fluid Eos >10%: PTX, drug reaction, paragonimiasis (trematode: fluke), fungal infection, & asbestosis exposure
6. Pleural fluid Lymphocytes > 50%: Think Tb or malignancy
7. Pleural fluid Neutrophil predominance: Think PNA, pancreatitis, PE, peritonitis
8. Pleural Fluid Glucose: 80 = Tb; 60 = Cancer, empyema; <30 = rheumatoid arthritis
9. Pleural Fluid Amylase: pancreatic fistula, esophageal rupture, & malignancy
10. Pleural Fluid pH: <7 → complicated effusion
11. Pleural Fluid ANA: >1:160 → drug induced SLE & native SLE; if ANA

positive → anti-dsDNA (native SLE)
vs anti-histone ab (drug-induced lupus)

12. Pleural fluid Tg: > 115 (due to chylomicrons) → trauma, lymphoma, mediastinal cancer, & lymphangioleiomyomatosis (LAM); < 50 (due to triglycerides) → Tb & Rheumatoid Arthritis
- ✓ Pleural biopsy: always do if you suspect Tb (20% sensitivity with fluid cultures & 90% sensitivity with bx) or if cytologic analysis is neg for malignancy
 - ✓ Malignancy: Fluid cytology is the gold standard to evaluate for malignancy (3 effusion samples have a combined yield of 90%)
 - ✓ Bacterial: Pleural effusion gram stain and culture are the gold standard tests to order for this etiology

✓ Treatment

- ✓ Transudative effusion: due to systemic disorder → treat the underlying etiology
- ✓ Exudative effusion: requires further testing → due to **local** disorders
- ✓ Indications for Chest Tube Placement:
 1. Pus in pleural space (>10,000 WBC)
 2. Positive culture and/or gram stain on pleural space fluid
 3. Complicated (loculated) parapneumonic effusion
- ✓ Thoracotomy: if loculated empyema does not respond to chest tube and antibiotics

✓ Pearls

- ✓ Always do pleural biopsy if you suspect TB
- ✓ Effusion cytology is diagnostic test of choice in malignancy
- ✓ Pulmonary embolism is the most overlooked disorder in the workup of a pleural effusion
- ✓ After performing thoracentesis always order post-procedure CXR to rule out pneumothorax
- ✓ Removal of >1.5L in one session may result in re-expansion pulmonary edema

✓ References

- ✓ Le et al. First Aid for the Internal Medicine Boards. 2006.
- ✓ Light RW. Clinical Practice: Pleural Effusion. NEJM 2002; 346 (25): 1971 – 1977.

- ✓ Marx: Rosen's Emergency Medicine, 7th Ed. 2009.
- ✓ Mcgrath, EE et al. Diagnosis of Pleural Effusion: A Systematic Approach. AMJCC March 2011; 20 (2): 119 – 127.
- ✓ Med Study. Internal Medicine Review: Core Curriculum. Book 2. 2007/2008.
- ✓ Porcel et al. Diagnostic Approach to Pleural Effusion in Adults. American Family Physician. 2006.