Pleural Fluid Analysis

Who needs a thoracentesis?: Any new pleural effusion should be tapped, UNLESS:
1. There is not enough fluid to tap
2. The patient has CHF, bilateral effusions, is afebrile and the effusion resolves within 3 days.

Step 1: Is the effusion exudative?

Ddx for Transudative Effusion includes: CHF (90%), cirrhosis (hepatic hydrothorax), pulmonary embolism, nephrotic syndrome, peritoneal dialysis, myxedema, constrictive pericarditis, SVC syndrome.

Ddx for Exudative Effusion includes: Infection, cancer, connective tissue disease, pancreatitis, uremia, chylothorax, drug reaction, post-MI/CABG, esophageal rupture.

Check serum and fluid LDH and total using Light’s criteria (Satisfying any ONE criterium means it is exudative):
- Pleural Total Protein/ Serum Total Protein > 0.5
- Pleural LDH/ Serum LDH > 0.6
- Pleural LDH > 2/3s of the upper limit of normal for serum LDH

**For patient with high suspicion for transudate, but meets Light’s Criteria (ie CHF patient recently diuresed), Dr. Light recommends a serum albumin – pleural albumin < 1.2 mg/dl, to confirm the effusion is exudative.

Step 2: If exudative, obtain the following pleural fluid tests:

Cell Count with differential:
- PMNs > 50%: Parapneumonic, PE, pancreatitis.
- Lymphs > 50%: Cancer, TB, fungus or post-surgery.
- Eos > 10%: PTX, hemotherax, drug reaction, asbestos, parasite infection, Churg-Strauss

Culture and Smear/Gram Stain: Yield is increased if fluid sent in blood culture bottles. Send for fungus and mycobacteria if pleural lymphs > 50% or clinical picture is suspicious. Yield in Tb is <50%.

Glucose: Level <60 mg/dL is seen in complicated parapneumonic effusion, malignancy, hemotherax, Tb, RA, SLE, Churg-Strauss, parasite infection.

Cytology: A case series of 971 lung cancer patients reported 7% prevalence of pleural effusion on chest xray and 40% of these pleural effusions had positive cytology.1 If cytology is negative and cancer is suspected, pleural biopsy should be performed.

Consider Adenosine Deaminase(ADA) for Tb: At least 50% of tuberculous pleural effusions do not involve other organs and are therefore difficult to diagnose. ADA levels >40-60 U/L in the setting of a lymphocytic effusion are specific for Tb.2

Consider Amylase: Elevated in patients with pancreatitis, esophageal rupture, and malignancies.

Step 3: What if the diagnosis is unclear from these tests? The cause of 15% of exudative effusions is not determined. For both transudative and exudative effusions without a cause, pulmonary embolism should be considered. Further evaluation by pleural biopsy via thoracoscopy or open biopsy is indicated for undiagnosed, unresolved exudative effusion.