

## Pleural Disease Diagnostics

Light's Criteria	Two-test rule	Three-test rule
Pleural protein:serum protein > 0.5	Pleural cholesterol > 45	Pleural fluid protein > 2.9
Pleural LDH:serum LDH >0.6	Pleural LDH > 0.45 upper limit	Pleural cholesterol > 45
Pleural LDH > 2/3 upper limit		Pleural LDH > 0.45 upper limit

Some basic cutoffs		
Tuberculous effusion protein is > 4.0	Cholesterol >250 is chyliform, longstanding effusion	LDH > 1000 – empyema, rheumatoid
Protein > 7 – think multiple myeloma	TAG > 110 is a chylothorax	PJP has LDH ratio >1; very low protein
Very low glucose (less than 60)		
rheumatoid	Esophageal rupture	Empyema
Malignant	Lupus	Tuberculous

Some more obscure pleural fluid tests	
Urinothorax – pleural: serum creatinine >1 (usually 1.7)	Peritoneal dialysis – pleural:serum glucose >1
Hemothorax – pleural:blood hematocrit >0.5	CSF – beta-2 transferrin

Pleural eosinophilia	
Pneumothorax (including catamenial)	Hemothorax
Pulmonary infarction	Benign asbestos effusion
Parasitic disease	Fungal – coccidio, crypto, histo
Malignancy (absence of eos does not rule out)	Drugs

Always Transudates	
Atelectasis	Due to increased negative intrapleural pressure
CSF leak	Surgery, trauma, ventriculopleural shunts
Heart failure	Diuresis may make this appear exudative
Hepatic hydrothorax	On the right, should have ascites as well
Hypoalbuminemia	Rare
Nephrotic	Bilateral and subpulmonic
Peritoneal dialysis	Acute and large 48 hours after initiating dialysis
Urinothorax	Ipsilateral obstructive uropathy, i.e., a stone

Some selected exudates (there are a lot...)	
Infectious	Pneumonia, Tb, hepatic and splenic abscess/infarction, hepatitis, esophageal rupture
Iatrogenic	CVC migration (s/p Fontain), drug-related, RFA of lung nodules
Malignancy	Carcinoma, Mesthelioma, Leukemia, Mult. Myeloma and Waldenstrom's
CTD	SLE, RA, MCTD, EGPA, GPA, FMF
Endocrine	Hypothyroidism, ovarian hyperstimulation
Lymphatic	Malignancy, chylothorax, yellow nail syndrome, LAM, lymphangiectasia
Abdominal	Pancreatitis, Meigs' syndrome, Malignant ascites, Subphrenic abscess,
Other	Trapped lung, benign asbestos effusion, PE, Radiation therapy, Sarcoidosis, post cardiac injury

### When you still do not have a diagnosis:

1. Revisit the history with special attention to **drugs**, exposures, PE, Tb, and comorbidities
2. Time course helps – some last for weeks to months (parapneumonia, Tb, postcardiac injurt) and others last for years or forever (yellow nail, lymphangectasia, trapped lung, malignancy)
3. Consider trapped lung with history of pneumonia, pneumothorax, surgery, hemothorax, RA, Tb, malignancy
4. If still unsure- get a CT (PET has an emerging role here) and consider pleural biopsy