

# PLEURAL EFFUSION

**Table 3. Characteristics of the Three Stages of Parapneumonic Pleural Effusions**

	Exudative Stage	Fibrinolytic Stage	Organizing Stage (Empyema)
Appearance	Nonpurulent, not turbid	Nonpurulent, not turbid	Purulent, turbid
Fluid consistency	Free-flowing	Loculated	Organized
Gram stain and culture results	Negative	Transitional	Positive (before antibiotic treatment)
Glucose	>100 mg/dL	<50 mg/dL	<50 mg/dL
Protein	<3 g/dL	>3 g/dL	>3 g/dL
pH	>7.30	<7.30	<7.30
WBCs	Few	PMNs	PMNs

PMNs, polymorphonuclear neutrophils; WBCs, white blood cells.

**Table 4. Pleural Fluid Diagnostic Studies**

Study	Transudate	Exudate
<i>Biochemical</i>		
Pleural LDH	<200 IU	≥200 IU
Pleural fluid/serum LDH ratio <sup>a</sup>	<0.6	≥0.6
Pleural fluid/serum protein ratio <sup>a</sup>	<0.5	≥0.5
Specific gravity	<1.016	≥1.016
Protein level	<3.0 g/dL	≥3.0 g/dL
<i>Other studies</i>		
Glucose	Usually >40 mg/dL	Typically <40 mg/dL
Amylase	May be elevated in some neoplasms, GI trauma, or surgery	
Rheumatoid factor, LE prep, ANA	Are occasionally helpful if collagen vascular disorders are within the differential	
<i>Hematologic</i>		
WBC count	Although high counts (>100/mm <sup>3</sup> ) are suggestive of an exudate, the results are quite variable	
WBC differential	May actually provide more useful information	
Lymphocyte count	May be elevated in neoplasms, tuberculosis, and some fungal infections	
Segmented neutrophils	May be elevated in bacterial infections, connective tissue disease, pancreatitis, or pulmonary infarction	
Eosinophil count	May be elevated in bacterial infections, neoplasms, and connective tissue diseases	
RBC count	If >100,000/mm <sup>3</sup> , is suggestive of trauma, neoplasms, or pulmonary infarction	
Cytology and chromosomal studies	May show evidence of malignant cells or chromosomal abnormalities	
<i>Microbiology</i>		
Gram stain		
Fluid culture for aerobes and anaerobes		
Acid-fast stain (if tuberculosis is in the differential)		
Fungal culture		
Viral culture		
Counterimmune electrophoresis may aid in the detection of a bacterial infection)		

ANA, antinuclear antibody; LDH, lactate dehydrogenase; LE prep, lupus erythematosus cell preparation; WBC, white blood cell.

<sup>a</sup>These tests are more reliable in differentiating transudate from exudate than specific gravity or protein level.