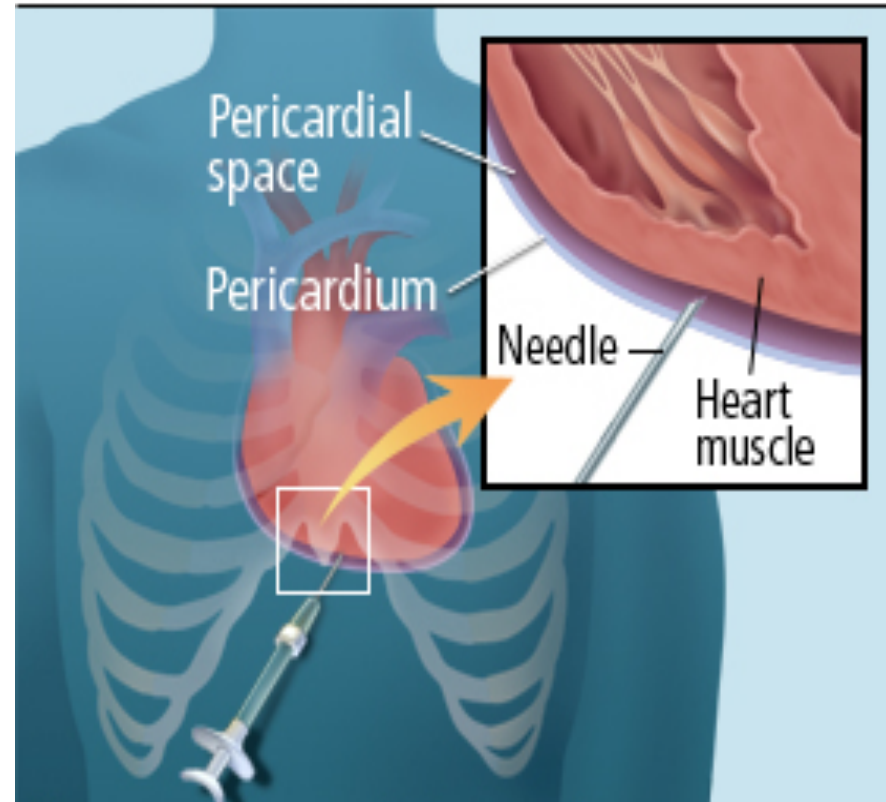
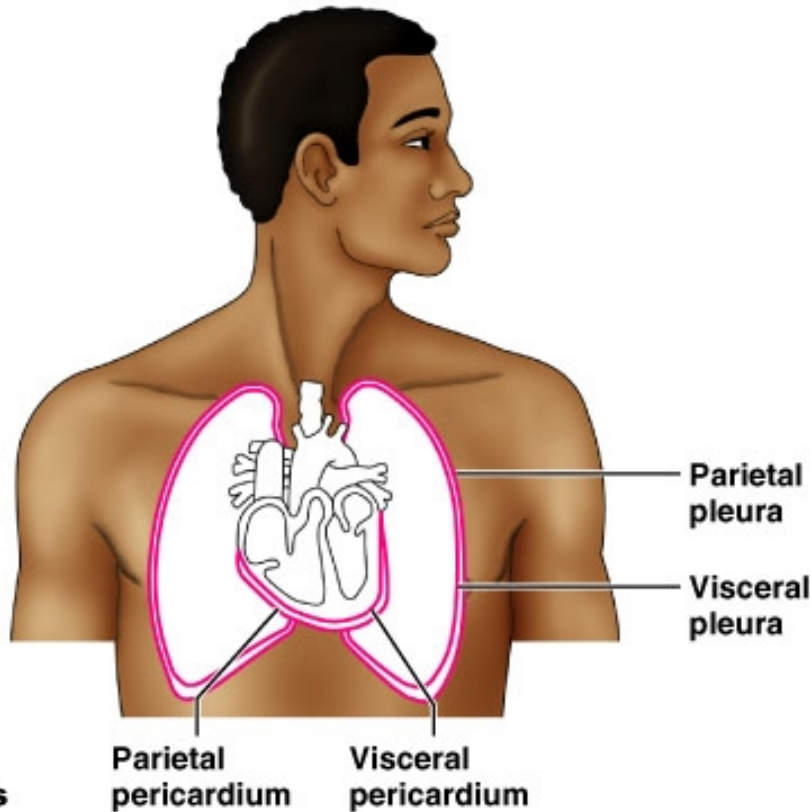


3rd Lec. Serous Fluid Analysis (Pericardial and Pleural fluid analysis)



By

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1. Pericardial fluid:

Pericardial effusions are characterized by accumulation of fluid in the pericardial space due to injury of the pericardium or pericarditis.

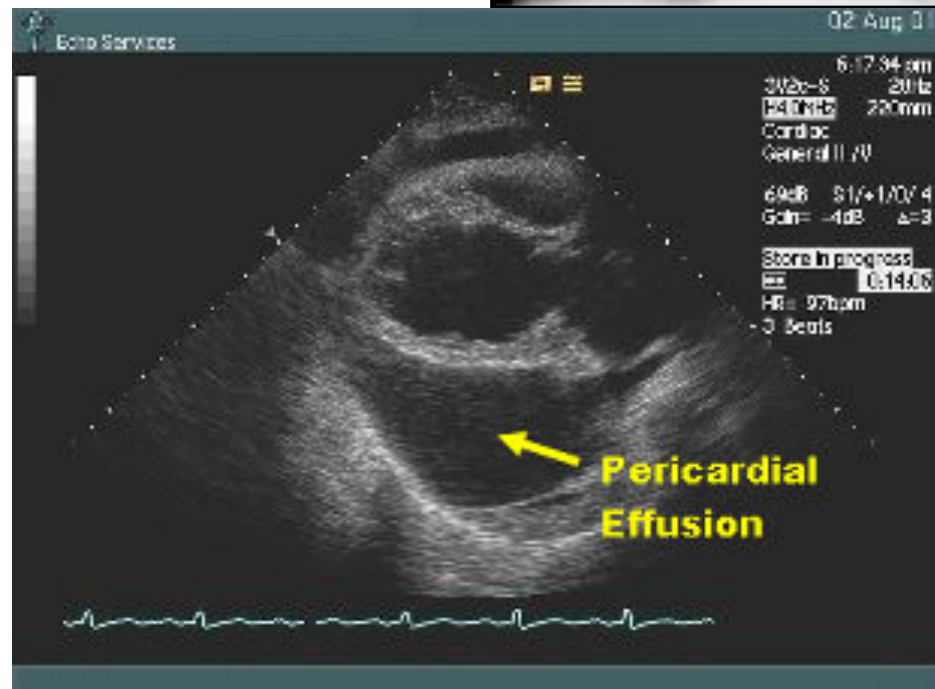
- In a healthy individual there is usually 15-50ml of clear, straw - colored fluid.
- Rapid accumulation of pericardial fluid may cause elevated **intrapericardial** pressures with as little as 80 mL of fluid, while slowly progressing effusions can grow to 2 L without symptoms.

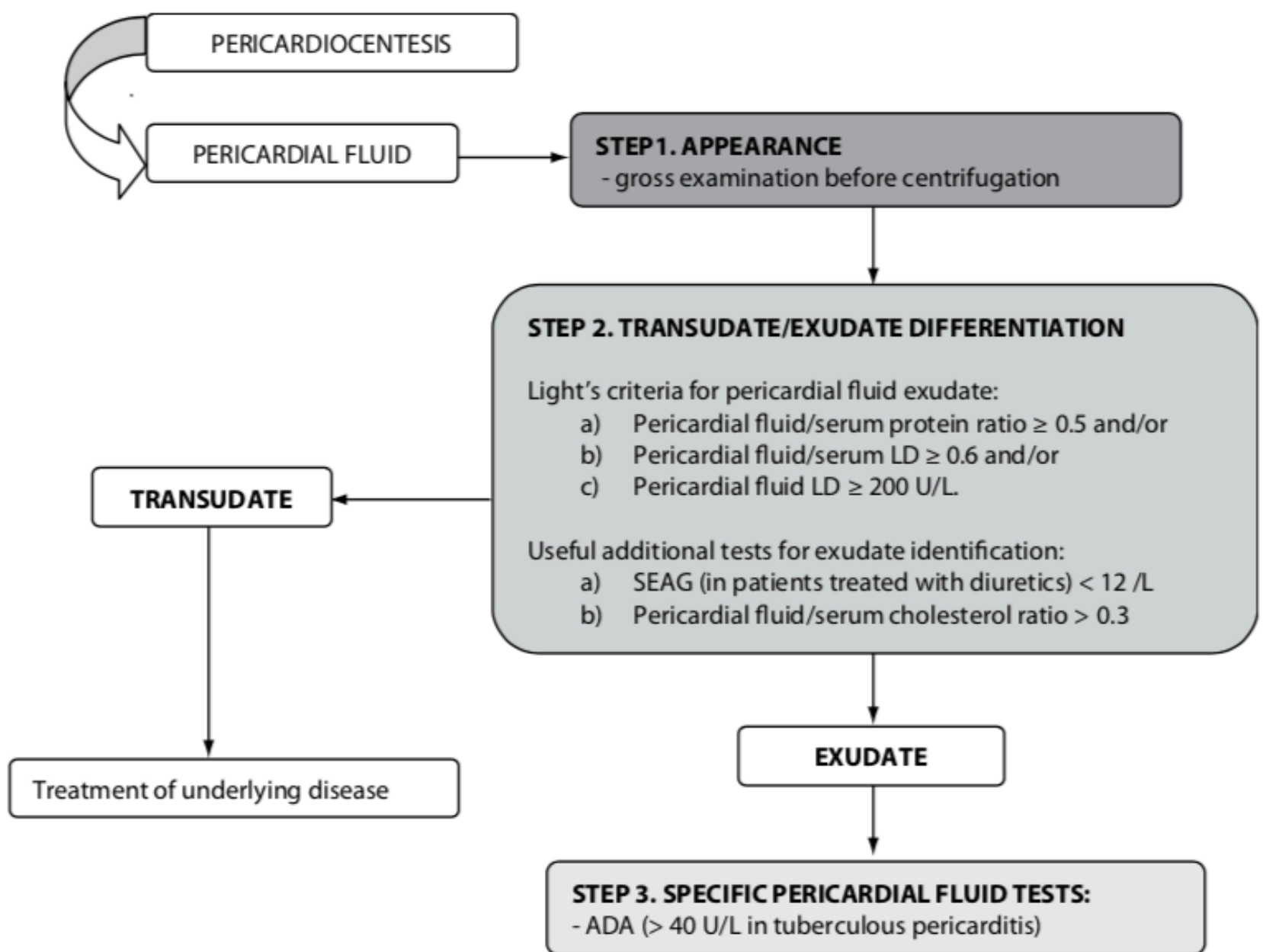
Causes

- Any condition lead to pericarditis can lead to pericardial effusion .
- The most common cause are:
 - **Transudative** pericardial effusions are usually associated with **heart failure, hypoalbuminemia, Uremia (post-radiation therapy and renal insufficiency), Trauma, Following cardiac operation.**
 - Pericardial effusions are usually **exudates.** Exudative effusions result secondary to pericardial **inflammatory, infectious, malignant or auto-immune processes.**

Echocardiography is used to diagnose the presence of pericardial effusions, but cannot be used to clearly determine their etiology.

Pericardicentesis is a procedure used to remove the pericardial fluid from the pericardial cavity. Which is used both for diagnostic and therapeutic purposes.





Biochemical analysis of pericardial effusions.

LD–lactate dehydrogenase; SEAG–serum effusion albumin gradient; ADA-adenosine deaminase.

2. Pleural fluid:

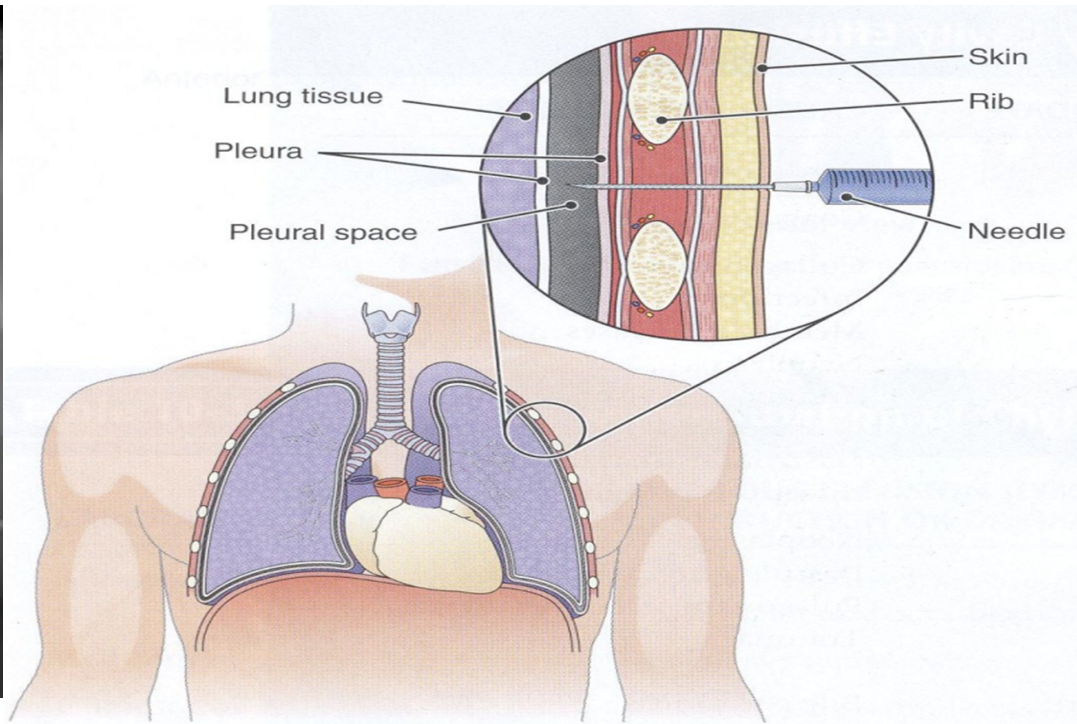
- The pleural cavity normally contains less than 30 ml of fluid.
- Pleural effusions occur when fluid accumulates around the lungs (accumulation in the pleural space).
- The most common conditions causing pleural effusions are heart failure, malignancy, pneumonia, tuberculosis and pulmonary embolism.

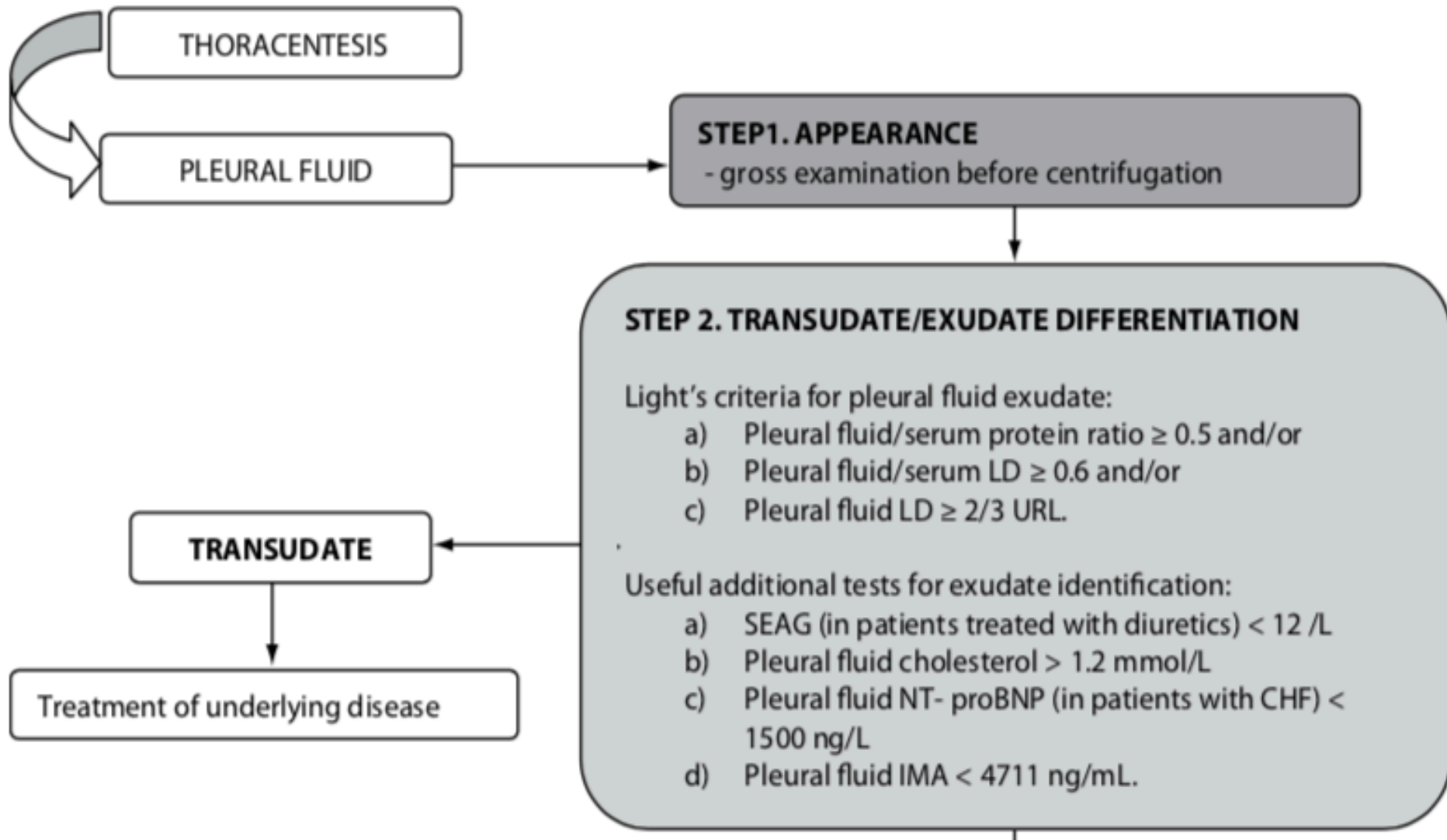
Pleural Effusion:

- Patient history and physical examination are crucial.
 - Confirmation of pleural effusion.
1. Patient history and physical examination are crucial for the clinical evaluation of pleural effusions.
 2. Radiological or/and ultrasound studies or computed tomography (CT) chest scans.
 3. Thoracentesis, the removal of pleural fluid using a needle or syringe.
 4. To differentiation of transudative from exudative effusions, **thoracentesis** should be coupled with blood sampling (within 30 minutes from obtaining the pleural fluid sample).

Pleural Effusion

Sample collection (Thoracentesis): Pleural Fluid for laboratory examination by needle aspiration from the lungs cavity.





Biochemical analysis of pleural effusions.

LD–lactate dehydrogenase; CHF – congestive heart failure; IMA- ischemia modified albumin; SEAG – serum effusion albumin gradient; NT-proBNP-N-terminal brain natriuretic peptide precursor

↓
EXUDATE
↓

STEP 3. SPECIFIC PLEURAL FLUID TESTS FOR EXUDATE EVALUATION:

- a) Total and differential cell count (total leukocytes $> 500 \times 10^6 / L$, neutrophil predominance in acute inflammatory processes)
- b) pH (< 7.300 predicts shorter survival in malignant effusions)
- c) Glucose (< 3.4 mmol/L in parapneumonic effusions, malignant disease or tuberculosis)
- d) Triglycerides (> 1.2 mmol/L in chylothorax, < 0.6 mmol/L in pseudochylothorax)
- e) Cholesterol (< 5.2 mmol/L in chylothorax, > 5.1 mmol/L in pseudochylothorax)
- f) ADA (> 40 U/L in tuberculous peritonitis)
- g) IFN- γ (lack of definite cutoff point)
- h) Amylase (pleural fluid/serum ratio > 1 in pancreatic pseudocyst, malignant disease, liver cirrhosis, esophageal rupture)
- i) Creatinine (pleural fluid/serum ratio > 1 in urinothorax)
- j) CRP (> 53 mg/L in parapneumonic *versus* malignant effusions).

Biochemical analysis of pleural effusions.

URL—upper reference limit of serum LD; ADA – adenosine deaminase; IFN- γ - Interferon- γ ; CRP – C-reactive protein.