Pleural fluid

- **Appearance**
  - Normally pale yellow
  - Haemorrhagic in trauma, malignancy, pulmonary infarction, post-pericardiotomy
  - Turbid, purulent if parapneumonic effusion or empyema

- **pH**
  - <7.3 with empyema—often with raised lactate

- **Protein**
  - Pleural fluid: serum ratio <0.5 protein level in a transudate (pleural fluid protein <30 g/L)—heart failure, liver failure, nephrotic syndrome, protein-losing enteropathy, hypothyroidism, pulmonary embolism, fluid overload
  - Pleural fluid: serum ratio >0.5 protein level in an exudate (pleural fluid protein >30 g/L)—parapneumonic effusion, empyema, subphrenic abscess, oesophageal rupture, pancreatitis, malignancy, pulmonary embolism

- **Lactate**
  - Pleural fluid: serum LDH ratio <0.6 in a dehydrogenase transudate
  - Pleural fluid: serum LDH ratio >0.6 in an exudate

- **Glucose**
  - Less than half serum glucose level seen in bacterial infections, malignancy, rheumatoid arthritis, SLE

- **White cells**
  - Neutrophilia with parapneumonic effusion, empyema and pulmonary embolism
  - Lymphocytosis with TB, rheumatoid arthritis, SLE, sarcoidosis, malignancy

- **Cytology**
  - Malignant cells
  - Mesothelial cells are normal or increased in mesothelioma
  - Multinucleated giant cells in rheumatoid arthritis

- **Other findings**
  - Acid-fast bacilli with TB
  - Chylomicrons and triglyceride in chylothorax
  - Amylase greater than serum in ruptured oesophagus, pancreatitis, malignancy, bacterial pneumonia
  - Haematocrit >0.50 with haemothorax