

The Investigation of Pleural Effusions

Please state the fluid type clearly on the request form under 'specimen type'.

1. What are the sampling requirements?

- Microbiology – culture bottles for bacterial culture and one universal for gram staining and tuberculosis culture.
- Biochemistry – protein, LDH, lipids and amylase in plain container; glucose in fluoride oxalate bottles; pH in heparinised blood gas syringe immediately after aspiration. Purulent samples may block or damage the gas analyser and should not be analysed (see point 4).
- Cytology – one universal for differential cell count or may use remnant of the above.

2. What is the appearance of the effusion and what does it signify?

- Clear, straw-coloured, non-viscous and odourless: normal.
- Homogeneously bloody sample: may be consistent with a haemothorax and/or a malignant exudative process or due to a traumatic tap. Samples that show haemolysis post-centrifugation will not be analysed for Biochemistry tests.
- Turbid/milky/cloudy: chylothorax or pseudochylothorax (see point 9).
- If an urinothorax is suspected, request fluid creatinine. A detectable creatinine is indicative of the presence of urine in an effusion.

3. Is it a transudate or exudate?

- Total Protein: > 35 g/L – exudate; <25 g/L – transudate.
- If total protein: 25-35 g/L, check LDH: If >300 u/L (local cut-off) classify as an exudate.
- Causes of transudates: CHF, cirrhosis, nephrotic syndrome
- Causes of exudates: Infection, inflammation, neoplastic, drug-induced – methotrexate, amiodarone, phenytoin, beta-blockers, etc.

4. Does the effusion need draining?

- If purulent (pus visible), draining almost always indicated; pH not required.
- If non-purulent, a pH < 7.2 or [H⁺] > 63 nmol/L indicates the need for pleural fluid drainage

5. Is infection a cause of an effusion?

- Microbiology tests required - gram staining & culture.

6. Is malignancy a cause of an effusion?

- Tumour markers in pleural or peritoneal effusions are **not** recommended. Suggest cytology, radiology & serum tumour markers as appropriate.

7. Is it rheumatoid?

- Pleural fluid glucose <1.6 mmol/L reported in 78% of patients with rheumatoid arthritis. Rarely useful.

8. Is pancreatitis a cause?

- Amylase has been shown not to be useful in the investigation of a pleural effusion (Brance et al, *Arch Intern Med* 2001; 161: 228-232).

9. Why does the effusion appear milky or turbid?

- Chylothorax, if triglyceride concentrations >1.24 mmol/L; pseudo-chylothorax, if cholesterol >5.18 mmol/L. Rarely, clinically useful.

