**The Newcastle upon Tyne Hospitals NHS Foundation Trust**

# Protocol for the collection, handling and transport to the laboratory of CSF requiring spectrophotometric scanning for the detection of bilirubin in suspected subarachnoid haemorrhage

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| Ratified By: | Julie Day, Consultant Clinical Scientist |

## 1 Principles

Spectrophotometric scanning of CSF is performed to try to identify those patients who have had a subarachnoid haemorrhage (SAH) but in whom the CT scan is negative. The spectrophotometric scan detects bilirubin in CSF and this finding is consistent with bleeding into the CSF. This procedure should only be undertaken after a CT scan has been performed and found to be negative but where there is still a clinical suspicion of SAH.

The formation of bilirubin after haemorrhage occurs in vivo and is a time-dependent process. Bilirubin may not be detectable soon after a bleed. **On current evidence it is recommended that CSF should not be sampled until at least 12h after a suspected event.**

The opening pressure should always be recorded when performing a lumbar puncture.

Lumbar puncture should only be performed in patients with papilloedema, focal neurological deficit or reduced conscious level after discussion with a Specialist Registrar or Consultant.

You **MUST** indicate on the request form:

- Clinical indication for the request
- Result of CT scan
- Date and time of onset of symptoms/event
- Time of lumbar puncture
- If the differential diagnosis includes meningitis

## 2 Specimens to be taken

- CSF will be required for microbiological examination and for protein and glucose estimation as well as for xanthochromia screening. Sufficient CSF will therefore be needed for all of these required investigations and several **separate** samples are required (see below). **Samples for different disciplines (i.e. microbiology and biochemistry) must be sent SEPARATELY to the different laboratories**. Failure to do this will result in delay of processing of the sample and may invalidate the results.
- Label **four** sterile universal containers and **one** fluoride oxalate tube each with the patient's name, hospital number, ward, date of birth, **time** that the CSF was obtained and the sequence order of sampling. (The universals should be labelled **CSF 1, CSF 3, CSF 4 and CSF 5** and the fluoride oxalate tube should be labelled **CSF 2**.)

## 3 Sample collection procedure

- The **first sample** (at least 0.5 mL, approx. 10 drops) should be collected into the **universal container labelled CSF 1.** This will be used for cell counts (to look for a traumatic tap )
- The **second sample** (at least 0.5 mL, approx. 10 drops) should be collected in the **fluoride oxalate tube labelled CSF 2** for glucose estimations. (Please note, this sample is not suitable for protein analysis by method used in Newcastle.)
- The **third sample** (at least 0.5 mL, approx. 10 drops) should be collected into the **universal container labelled CSF 3** for protein analysis.
- The **fourth sample** (at least 1 mL, approx. 20 drops) should be collected into the **universal container labelled CSF 4**. This will be used for cell counts (to look for a traumatic tap) and for microbiological studies.
- The **fifth sample** (at least 1 mL, approx. 20 drops) of CSF should be placed in the final **universal container labelled CSF 5** for the spectrophotometric scan (for xanthochromia). **Protect this sample from the light** by placing it in a thick brown envelope and then placing this in the usual plastic specimen bag.
  (Please note, light rapidly denatures bilirubin and failure to do this may result in a false negative scan)
- **Blood specimens.** A clotted sample (labelled **Blood 1)** and a fluoride oxalate sample (labelled **Blood 2)** should be taken at the same time for serum bilirubin and total protein and plasma glucose estimations that are needed to aid interpretation.

## 4 Sample dispatch

- **Samples should be dispatched rapidly** to the biochemistry and microbiology departments. Failure to process the sample for xanthochromia screening within 1 hour of collection may result in deterioration of the sample and invalidate the result.
- **Samples should NOT be sent through the air tubes.** Transport via the pneumatic tubes system may result in rupture of any red cells present in the CSF leading to the formation of oxyhaemoglobin which may interfere with the detection of a small bilirubin peak and may give a false result.

- **CSF samples 1 and 4 should** be sent to the **Microbiology department**.
  The Microbiology department MUST be contacted
  **Freeman 26291 (Daytime), via switchboard at night**
- **CSF samples 2, 3 and 5** (protected from light) and the **blood samples 1 and 2** should be sent to **Clinical Biochemistry department.**
  The Clinical Biochemistry Department **MUST be contacted** when a CSF has been taken for xanthochromia scanning.
  **RVI Telephone 29719**
  **Freeman Telephone 48889**

- Do NOT send samples for Microbiology and Biochemistry in the same bag. If samples are sent to the wrong departments it will lead to delay in the processing of the samples and may invalidate the result)

**If this procedure is not followed analysis is likely to be compromised.**

## 5 References

Revised National Guidelines for analysis of cerebrospinal fluid for bilirubin in suspected subarachnoid haemorrhage. Annals of Clinical Biochemistry 2008 **45** 238 – 244

O'Connel D M. Watson I D. Definitive angiographic detection of subarachnoid haemorrhage compared with laboratory assessment of intracranial bleed in CT-negative patients. Annals of Clinical Biochemistry 2003 **40** 269 - 273

Author: Hilary J Wastell, July 2004
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