A case of abnormal CSF chemistry results

A case of increased CSF IgG – Albumin index

Identification of sample type

HOSP #		**WARD**	Red Cross Children's Hospital, Neurosurgery ward
CONSULTANT	George van der Watt	D**OB/AGE**	11y Male

Abnormal Result

CSF Glucose: <0.1 mmol/L

CSF Protein: <0.01 mmol/L

Both of the above results have already been rerun on the same analyzer with the same result.

Presenting Complaint

It was then suspected in the lab that the results might have been obtained from a urine (or other fluid) sample rather, which might accidentally been registered / recorded as CSF.

An MC&S (Microscopy, Culture and Sensitivity testing) was also requested on an aliquot of the sample.

History

The above result was obtained from a patient known with hydrocephalus. No other information was available at the time of analysis.

Examination

N/A

Laboratory Investigations

As above abnormal results.

Other Investigations

Microscopy: No leucocytes; No bacteria; India Ink stain was pending.

The following possibilities were thought of:

- Pre-analytical factors:
  - A urine sample was sent and incorrectly registered as CSF
    - A possibility to quickly exclude this was to determine the creatinine on the sample if urine, then the creatinine will measure in the thousands (umol/L) or in the mmol/L range.
    - One could also do CSF identification by CSF electrophoresis for the presence of beta-2 transferrin or beta trace protein identification, but this is expensive and laborious.
  - Bacteria metabolised all the glucose, and for some reason the protein did not go up in the patient, although the protein <0.01g/L is extremely low,

making the possibility of this scenario unlikely.

- Analytical factors:
  - Bubble aspiration, although the rerun gave a similar result.
  - Interferents: none could be thought of in this scenario.
- Post-analytical:
  - The result was obtained directly from the analyzer’s user interface, hence making transcription / translation errors unlikely.

Final Diagnosis

The clinician, a neurosurgery doctor, was phoned to enquire about the history, and it was indeed a sample from the cerebro-spinal space, but upon questioning the Neurosurgery doctor, it became known that:

- This sample was obtained intra-operatively during placement of a ventriculo-abdominal shunt for hydrocephalus
- During the procedure, the ventricles have been flushed with Normal Saline, which explains the low CSF protein and the low Glucose.

Take Home Messages

The history from the clinician was confirmation that this sample was indeed from the cerebrospinal space, although not representative of the cerebrospinal space, as it was taken during a procedure, hence likely pure saline was measured.

Adequate history from the clinician is most often the most useful information that can be obtained, especially when severely abnormal results are obtained.

When results do not make sense, one should not authorize them

without discussing with the clinician first.

The neurosurgery doctor agreed that to request the chemistry on this sample was not indicated and they actually only wanted the Microbiology investigations as proof of some sort that an infection was not present, for which exact indication the Microbiology team might comment on.

Results was thus not authorized, but rather cancelled with a comment, stating that sampling was not representative of the physiological CSF.