Detecting vasospasm after Subarachnoid hemorrhage

Microdialysis in Neurointensive Care

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Case story

A 48 year old man was admitted in a slightly drowsy and confused stage. The CT revealed a massive SAH and the patient received ventricular drainage. The angiogram revealed an anterior communicating artery aneurysm, which was clipped the day after the hemorrhage. A microdialysis catheter was introduced in the right temporal lobe during surgery. The day after surgery (50-60 hours after ictus) the patient became restless and the next day (80 hours after ictus), his drowsiness got worse and he responded only to strong stimulation.

Operation

Vasospasm is characterized by an increasing tissue ischemia caused by the decreasing oxygenation of the tissue. During surgery one or two microdialysis catheters are inserted in the area where spasm is most likely to occur as judged from the hemorrhage. Microdialysis detects the chemical signs of ischemia where the catheter has been inserted before clinical symptoms are manifest and before the transcranial doppler values indicate vasospasm. However, the early detection depends upon the localization of the catheter in relation to the area of the spasm.

Fig 1. The first signs of a beginning vasospasm is evident from the sudden change in the lactate trend. The decrease toward normal levels changes into a gradual increase into pathological levels (>10 mM).

The sudden drop in glucose levels is a clear indication of decreased delivery of glucose due to ischemia.

The dramatic increase of glycerol indicates severe ischemic cell damage.

The Transcranial doppler analysis shows manifest spasm more than 24 hours after the microdialysis indication.
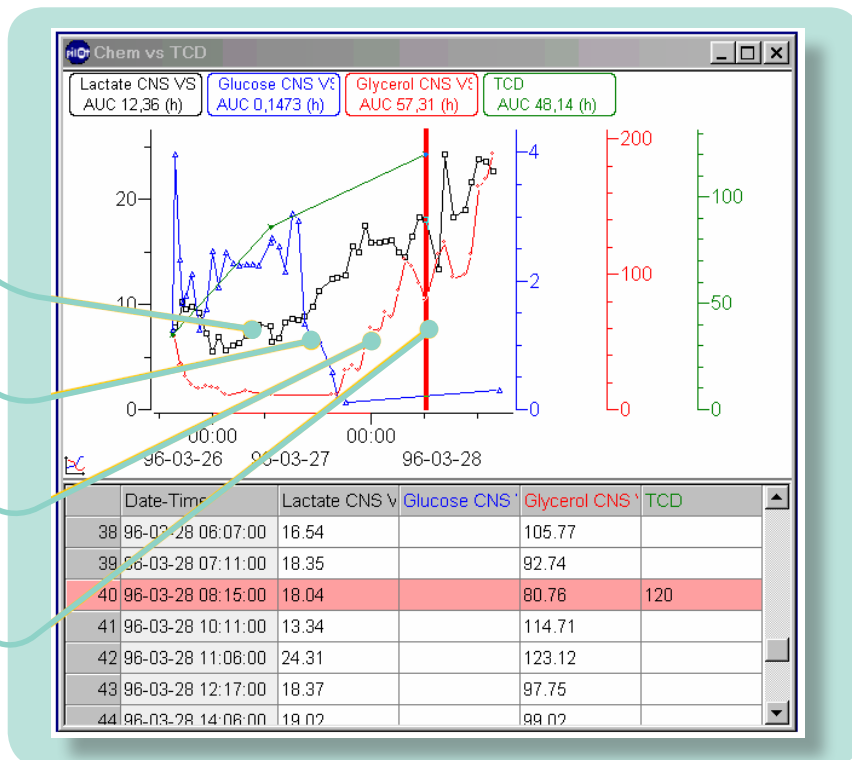
All data shown in the graphs is also available as numerical values that can be immediately displayed at the bottom part of each graph. The vertical red line can be moved by the mouse of the computer to any point in the graph making the numerical values scroll along with the movement of the line.