case report 3

Ischemia and herniation due to severe brain edema

Microdialysis in Neurointensive Care

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Case story

A 74-year old man admitted to hospital after motorcycle accident. After the evacuation of an acute subdural haematoma and temporal contusion on the right side one microdialysis catheter was inserted into the biochemical penumbra zone surrounding the evacuated contusion (worse position). An intraventricular catheter was placed in the left ventricle for continuous recording of ICP and a second microdialysis catheter was introduced into the frontal grey matter via a separate burr hole (better position).

Operation

Brain edema may lead to increased ICP, ischemia and eventually herniation and death.These events usually affect the two hemispheres very differently. We, therefore, recommend to implant one catheter in the penumbra of the lesion (worse) and a second catheter in the contralateral hemisphere (better). The trauma and edema often give rise to early, severe and profound changes in the catheter on the worse side, while the biochemistry on the better side may show pathological signs very late when the outcome is already severe.

Fig 1. Patient herniating after TBI. ICP increases to blood pressure levels. Glucose levels are initially high on the better side (blue) but decline as cerebral blood decreases and the supply of glucose goes down. On the worse side (red) glucose levels are low even before the rise in ICP.

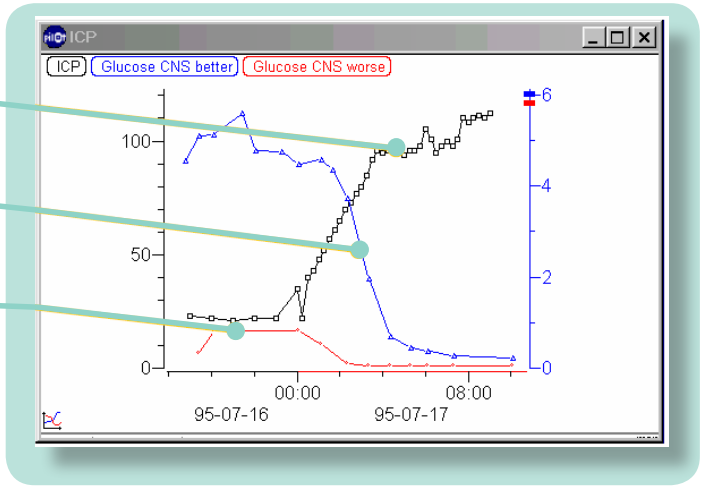
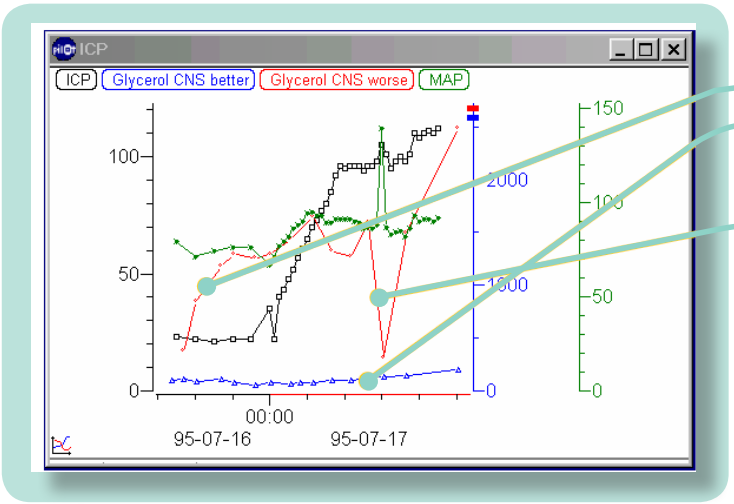


Fig 2. Glycerol on the worse side (red) is increasing before the rise in ICP while glycerol on the better side (blue) is barely affected even when the ICP levels are at blood pressure levels. The sudden decrease in glycerol on the worse side is probably due to the herniation. The Cushing reflex increases blood pressure and blood flow through the brain which washes out accumulated glycerol.



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