

POST-OPERATIVE ICU CARE OF THE CRANIOTOMY PATIENT

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Yearly, an average of 25% of all ICU patients in Turku require neuro intensive care. The most common reasons are traumatic brain injury (TBI) and subaracnoid haemorrhage (SAH).

So far, we don't have magic bullets. What is lost in the primary assault (injury, spontaneous bleeding etc.) is lost for good. The main goal of the neuro intensive care is to protect the area surrounding the damaged part to avoid secondary injury and optimize the situation for the surviving brain tissue, to enable its optimal survival.

Multimodal monitoring is essential for the neuro patient. One can create an optimal therapy based on the observed individual pathophysiological changes. Having said that, we still follow established treatment protocols. The maintaining of adequate oxygen levels and ventilation ($O_2 > 13 \text{ kPa}$, $CO_2 4,5 - 5 \text{ kPa}$), stable and adequate hemodynamics ($MAP > 90 \text{ mmHg}$, $CPP > 60 \text{ mmHg}$ or above), good brain tissue oxygenation levels ($BtI O_2 > 20 \text{ mmHg}$) and minimizing intracranial pressure ($ICP < 20 \text{ mmHg}$, children $< 15 \text{ mmHg}$) are of great importance. We also have to remember to prevent/treat infections, to set the intestinal system in motion through enteral nutrition (to kick start the body's own immune system and immunity response) and maintain an adequate glucose level ($P\text{-gluc } 6 - 10 \text{ g/l}$), just to mention a few.

Multimodal monitoring and our professional experience and knowledge helps us to recognize when the brain is in trouble. We start a stepwise approach in order to help the brain maintain or regain balance.

In the first phase the sedation and analgesia is intensified, the patient is in deep sleep (RASS -4 to -5) with no regular wake up tests. At this point antiepileptics is at least considered, if not immediately applied.

The second phase consists of considering ventriculostomy and balancing the intracranial pressure situation with it.

In the third phase hyperosmolar therapy ($NaCl 7,5\%$) is applied regularly or as often as needed. Hypothermia - treatment is also a possibility (usually 35 C). At this point (the latest) an EEG is recorded and depending on the results, antiepileptic medication started or intensified.

The last and fourth step is decompressive craniectomy, which in Finland is considered the last step. If the brain swelling and the problems it creates are still not resolved with this, the prognosis is unfortunately poor.

The staff of the ICU not only takes care of the patient, but also of the patient's family. It is part of our job to support the family, keep them up to date and help them maintain a positive mind set and hope. Sometimes it's also part of our job to help them face the worst possible outcome.