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Category: **Neuro-intensive care and emergency medicine:**
Neurological intensive care

Title: **NON-INVASIVE MONITORING OF BRAIN OXYGENATION (FORE-SIGHT TECHNOLOGY) FOR COMPLEX CEREBRAL ANEURYSM SURGERY**

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Text: Complex cerebral aneurysm surgery carries a high risk for intra-operative ischemic insults, especially if multiple periods of temporary clipping seem necessary to allow final aneurysm clipping. The use of non-invasive neuromonitoring, applied during aneurysm surgery, could guide as well intra-operative neuroprotective strategy as postoperative neuro-critical care.

In 12 pts, scheduled for elective complex cerebral aneurysm surgery by supra-orbital incision, non-invasive cerebral oximetry was applied over the patient's forehead, enabling bilateral brain saturation monitoring intra-operatively and for the first 12hrs after ICU admission. Fore-Sight monitor is a continuous wave, spatially resolved, near-infrared spectrometer that measures absolute cerebral tissue oxygen saturation (SctO₂ %) using 4 wavelengths. Validation studies proved a stable correlation between SctO₂ and jugular bulb saturation (SjO₂) with SctO₂ 10% higher than SjO₂. As SjO₂ has a normal safe limit of 45%, the absolute SctO₂ threshold is estimated at 55%.

In 3 of 12 pts, excessive intra-operative ambient light interfered with SctO₂ monitoring and no SctO₂ data could be obtained. In 7 of 9 remaining pts, multiple periods of temporary clipping were applied. In all pts, a small, nonsignificant decrease in ipsilateral SctO₂ was observed during temporary clipping, but in all periods, SctO₂ values remained above 55%. After release of the temporary clip, an immediate, shortlasting (3-5min) and significant increase in ipsilateral SctO₂ was observed in 5 of 7 pts. After release of the temporary clip, ipsilateral SctO₂ immediately increased by a mean of 8.4% (range 7-11%) with return to baseline values after a mean of 4min. This could point to a local and important hyperperfusion occurring after the release of the temporary clip. All pts remained sedated until stable postoperative conditions were obtained. During postoperative ICU course, all pts revealed slightly increased (bilateral) SctO₂ values without any values below 55%, even during awakening procedure. No pt revealed any neurologic deficit at awakening (mean 6.4hrs after ICU admission).

This first report reveals the feasibility of intra- and post-operative non-invasive cerebral oxygenation monitoring, using absolute SctO₂ monitoring, during complex cerebral aneurysm surgery. Brain oxygenation monitoring during critical periods of temporary clipping may guide optimal postoperative neuro-critical care.

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