

Assessment of the CerOx Cerebral Oxygenation Monitor in Severe Traumatic Brain Injury Patients

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Object: Development of a noninvasive monitor to assess cerebral oxygenation has long been a goal in neurocritical care. The authors evaluated the feasibility and utility of a noninvasive cerebral oxygenation monitor, the CerOx 3110, which uses near-infrared spectroscopy and ultrasound to measure regional cerebral tissue oxygenation in patients with severe traumatic brain injury (TBI), and compared measurements obtained using this device to those obtained using invasive cerebral monitoring.

Methods: Patients with severe TBI admitted to the intensive care unit at Hadassah-Hebrew University Hospital requiring intracranial pressure (ICP) monitoring and advanced neuromonitoring were included in this study. The authors assessed 18 patients with severe TBI using the CerOx monitor and invasive advanced cerebral monitors.

Results: The mean age of the patients was 45.3 ± 23.7 years and the median Glasgow Coma Scale score on admission was 5 (interquartile range 3–7). Eight patients underwent unilateral decompressive hemicraniectomy and 1 patient underwent craniotomy. Sixteen patients underwent insertion of a jugular bulb venous catheter, and 18 patient underwent insertion of a Licox brain tissue oxygen monitor. The authors found a strong correlation ($r = 0.60$, $p < 0.001$) between the jugular bulb venous saturation from the venous blood gas and the CerOx measure of regional cerebral tissue saturation on the side ipsilateral to the catheter. A multivariate analysis revealed that among the physiological parameters of mean arterial blood pressure, ICP, brain tissue oxygen tension, and CerOx measurements on the ipsilateral and contralateral sides, only ipsilateral CerOx measurements were significantly correlated to jugular bulb venous saturation ($p < 0.001$).

Conclusions: Measuring regional cerebral tissue oxygenation with the CerOx monitor in a noninvasive manner is feasible in patients with severe TBI in the neurointensive care unit. The correlation between the CerOx measurements and the jugular bulb venous measurements of oxygen saturation indicate that the CerOx may be able to provide an estimation of cerebral oxygenation status in a noninvasive manner. (<http://thejns.org/doi/abs/10.3171/2013.12.JNS131089>)