

Optoacoustic Cerebral Blood Flow (CBF) Monitoring During Induction of Anesthesia in Humans

*W Andrew Kofke¹, Giovanni Rivera¹, Moshe Kamar²,
Zmira Silman², Kirk Jackson¹*

¹*Department of Anesthesiology and Critical Care, University of Pennsylvania, Philadelphia, PA*

²*Ornim Medical, Kfar Saba, Israel*

CBF is an important variable in Neurocritical care but a non-invasive monitor of CBF has not been available. A recently developed approach is based on an opto-acoustic adaptation of near infrared spectroscopy. Our objective was to determine whether the optoacoustic CBF monitor would detect changes in CBF which are known to occur with propofol (decrease) and subsequent endotracheal intubation (increase)(1).

Methods: 57 patients scheduled for elective non-intracranial surgery were enrolled. Patients with intracranial disease were excluded. A CerOx3215F (Ornim, Israel) optoacoustic CBF monitor was used. On arrival in the operating room, the optoacoustic transducers were applied bifrontally. Baseline values were obtained. Subsequently changes in CBF from baseline were determined at three points: two minute baseline, the lowest value over three minutes after propofol injection and the highest value over five minutes after laryngoscopy. SaO² and mean arterial pressure were determined at the same time points. Data were evaluated by repeated measures ANOVA.

Results: Mean dose of propofol given was 213±77.1 mg/kg. CBF decreased to 83±14% of baseline after propofol (P<0.001) and increased to 146±34% of baseline after endotracheal intubation (P<0.001). Concurrently SaO² remained >95% across all measurement times. At each measurement time MAP was 105±15 mmHg (baseline), 84±18 (propofol) (P<0.001), and 96±22mmHg (laryngoscopy) (P=0.11)

Conclusions: Our data are congruent with TCD observations (1) made under similar conditions and similar experimental paradigm. This supports the notion that optoacoustic monitoring yields valid real-time measures of changes in CBF in humans. Further validation research compared against other quantitative measures of CBF would be appropriate.

Presented at the NCS 2015 Meeting, October 2015

(1.) Kofke WA, et al: Transcranial Doppler Ultrasonography with Induction of Anesthesia for Neurosurgery. J Neurosurg Anesth 6:89-97, 1994.