

Publication

Near-infrared spectroscopy can monitor dynamic cerebral autoregulation in adults

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 1195589**Author(s)** Steiner, Luzius A; Pfister, David; Strebel, Stephan P; Radolovich, Danila; Smielewski, Peter; Czosnyka, Marek**Author(s) at UniBasel** [Steiner, Luzius A.](#) ; [Strebel, Stephan P.](#) ;**Year** 2009**Title** Near-infrared spectroscopy can monitor dynamic cerebral autoregulation in adults**Journal** Neurocritical care**Volume** 10**Number** 1**Pages / Article-Number** 122-8**Keywords** Cerebrovascular circulation, Near-infrared spectroscopy, Transcranial Doppler ultrasonography, Human, Adult

OBJECTIVE: To study the correlation between a dynamic index of cerebral autoregulation assessed with blood flow velocity (FV) using transcranial Doppler, and a tissue oxygenation index (TOI) recorded with near-infrared spectroscopy (NIRS). **METHODS:** Twenty-three patients with sepsis, severe sepsis, or septic shock were monitored daily on up to four consecutive days. FV, TOI, and mean arterial blood pressure (ABP) were recorded for 60 min every day. An index of autoregulation (Mx) was calculated as the moving correlation coefficient between 10-s averaged values of FV and ABP over moving 5 min time-windows. The index Tox was evaluated as the correlation coefficient between TOI and ABP in the same way. The indices Mx and Tox, ABP and arterial partial pressure of CO₂ were averaged for each patient. **RESULTS:** Synchronized slow waves, presenting with periods from 20 s to 2 min, were seen in the TOI and FV of most patients, with a reasonable coherence between the signals in this bandwidth (coherence >0.5). The indices, Mx and Tox, demonstrated good correlation with each other ($R = 0.81$; $P < 0.0001$) in the whole group of patients. Both indices showed a significant ($P < 0.05$) tendency to indicate weaker autoregulation in the state of vasodilatation associated with greater values of arterial partial pressure of CO₂ or lower values of ABP. **CONCLUSION:** NIRS shows promise for the continuous assessment of cerebral autoregulation in adults.

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