

CEREBRAL PERFUSION IN ACUTE STROKE MONITORED BY TIME-DOMAIN NEAR-INFRARED REFLECTOMETRY

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Abstract

Though potentially relevant for monitoring of acute stroke, even specialized stroke units do not provide continuous methods to determine cerebral perfusion at the bedside. We present patient measurements on cerebral perfusion in ischemic stroke applying optical bolus tracking. To this end, our portable time-domain near-infrared reflectometer has been optimized and technically approved for clinical studies by a notified body. We used data analysis based on statistical moments of measured time-of-flight distributions of photons. Selective sensitivity to deep absorption changes and a suitable representation of cerebral signals is associated with the suppression of movement artifacts in severely affected patients. The proposed technique offers a unique possibility for a frequently repeatable monitoring of cerebral blood flow during acute and subacute cerebral ischemia directly at the bedside.

Keywords: light propagation in tissues, time-resolved imaging, optical bolus tracking