

Portable infrared pupillometer in patients with subarachnoid hemorrhage: prognostic value and circadian rhythm of the “Neurological Pupil index”.

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Introduction: Portable automated infrared pupillometers are popular. To generate an objective standard, the Neurological Pupil index (NPi) has been introduced, which combines different values of the pupillary light reflex (PLR). However, the NPi cannot be regarded as a standard yet. The aim of the current explorative study was to examine different aspects of NPi in relation to clinical severity and outcome in patients with aneurysmatic subarachnoid hemorrhage (aSAH).

Methods: Patients with serial assessment of the NPi (NeuroOptics pupillometer NPi-200, Irvine, USA), starting no later than day two after proven aSAH were included. Relative number of pathological NPi's, absolute NPi-values, and its variances were compared according to clinical severity grade, functional outcome and case-fatality. Further, its correlation to ICP, and its periodicity were examined.

Results: A total of 18 patients with 4,456 NPi's values were eligible for the analysis. The general trend of NPi values over time reflected the neurological illness course. NPi values tended to be lower and variance to be higher in patients with severe aSAH, unfavorable outcome, and in-hospital mortality. A significant difference was found in the proportion of pathological NPi's in patients with severe aSAH and poor outcome. An inverse correlation between NPi and ICP was found (Spearman's $r=-0.551$, $p < 0.001$). A circadian pattern of NPi's was observed, which was seemingly disrupted in patients with fatal outcome.

Conclusions: Assessment of NPi using the portable pupillometer is feasible and might add useful information in a multimodal neuro-monitoring setting for patients after aSAH.