Poster 31

Neurological Pupil index Predicts Neurological Outcome Early After Cardiac Arrest: An Observational Study

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Introduction
The pupillary light reflex is associated with outcome after cardiac arrest as a dichotomous variable (present/absent) at various time points following resuscitation (ROSC). Infrared pupillometry provides quantitative measures including pupil diameter (PD), and Neurological Pupil Index (NPi) which ranges from 0 (nonreactive) to 5 (brisk) and reflects velocity and degree of pupil constriction in response to a standardized light stimulus. These measures may provide early prognostic information to guide therapy.

Methods
Comatose adult survivors of cardiac arrest treated with targeted temperature management were monitored with the Neuroptics NPi-200 pupillometer. Outcomes were defined as good (GO) if discharge Cerebral Performance Category score was 1-2, and poor (PO) if 3-5. Data are presented as median (IQR). Groups were compared using non-parametric statistical tests.

Results
Fifty-one patients were enrolled; the median age was 57 (48.5-68.5), and 33 (65%) were male. Initial rhythm was VT/VF in 55%, asystole in 23%, and PEA in 20%. Outcome was good in 16 (31%) patients. The initial PD did not differ between outcome groups [3.1 (2-4.7) PO vs 3.0 (2-4.2) GO]. The initial NPi was lower in poor outcome patients [3.3 (1.5-4) vs 3.9 (2.4-4.2) GO, p=0.005] measured 4.5 (3.4-6.3) hours after ROSC. NPi dropped below 3 in more poor outcome patients [27(77%) vs 6(37.5%) GO, p=0.015], and to zero in 18(51%) poor vs 1(6%) good outcome patients (p=0.005). Receiver operator characteristic curves confirmed that initial NPi predicted poor outcome better than pupil diameter (AUC 0.78 vs 0.61, p=0.016).

Conclusions
A low Neurological Pupil index predicted poor outcome 4-6 hours after resuscitation from cardiac arrest, and dropped to abnormal levels (<3) and to zero (reflecting a non-reactive pupil) more often in patients with poor outcomes. Additional research is needed to define potential confounders, optimal timing, and thresholds for different levels of neurological risk with pupillometry.