Pupillometry in detecting Cerebral Spine Fluid infection

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Pupillometry is emerging as non-invasive Intracranial Pressure (ICP) monitoring procedure. By using an infrared method, it calculates pupil diameter, and give us a measure of pupil size at rest and after light stimulus. NPI has been proposed as index highly correlated with light reflex, and some studies showed that it can be an early indicator of high ICP. Pupillometry abnormalities during Cerebral Spinal Fluid (CSF) infection are unknown. Here we report on a patient in whom the pupillometry led us to an early diagnosis of ventriculitis. A 52 years-old man was admitted in neuro-intensive care unit after subarachnoid hemorrhage (H-H4, Fisher 4). Cerebral angiography showed a ruptured aneurysm in the left anterior communicating artery that was excluded by embolization; then, an external ventricular drain was placed to treat acute hydrocephalus. After 15 days ventricular drain was removed. GCS was 10 (E3V1M4). Since then, pupillometry was performed three times a day, and normal values were observed (Fig.1A). Three days after, GCS was 9 (E2V1M4). Pupils were bilaterally miotic and no significant evident variation on light reflex was observed. Pupillometry detected a pathological pupillary reactivity (Fig. 1B). A CT scan was performed, and pus in occipital horns of lateral ventricles was observed (Fig. 1C). An external ventricular drain was placed; during the procedure, CSF pressure was in normal range. After surgery, pupillometry was not modified, showing pathological value of NPi (Fig. 1D). CSF examination showed bacterial infection. After one week of antibiotic therapy, NPi came back to normal values. The diagnosis of ventriculitis is often difficult in coma patients, and prompt antibiotic therapy is crucial for good outcome. Pupillometry was able to detect neurological deterioration related to CSF infection, before significant clinical and pupillary modifications. It may be a simple monitoring tool in neurosurgical intensive care unit.

A	Destra	Sinistra	Diff
NPi	4.6	4.8	S > D 0.2
Dia.	3.01 mm	2.35 mm	D > S 0.66
MIN	2.23 mm	1.80 mm	D > S 0.43
CH	26%	23%	
CV	2.09 mm/s	1.24 mm/s	
MCV	2.87 mm/s	1.99 mm/s	
LAT	0.20 sec	0.23 sec	
DV	0.84 mm/s	0.88 mm/s	

B	Destra	Sinistra	Diff
NPi	1.3	1.6	S > D 0.3
Dia.	4.20 mm	4.06 mm	D > S 0.14
MIN	3.98 mm	3.77 mm	D > S 0.21
CH	5%	7%	
CV	0.56 mm/s	0.33 mm/s	
MCV	0.92 mm/s	0.67 mm/s	
LAT	0.20 sec	0.27 sec	
DV	0.20 mm/s	0.30 mm/s	

D	Destra	Sinistra	Diff
NPi	1.2	1.6	S > D 0.4
Dia.	6.27 mm	5.26 mm	D > S 1.01
MIN	5.63 mm	4.55 mm	D > S 1.08
CH	10%	13%	
CV	0.55 mm/s	0.87 mm/s	
MCV	2.10 mm/s	1.23 mm/s	
LAT	0.17 sec	0.13 sec	
DV	---	0.43 mm/s