

Delayed Visual Disturbances in Carbon Monoxide Poisoning: Identification and Evaluation

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Introduction

- Carbon monoxide (CO) poisoning may cause cognitive problems and chronic complaints weeks and months after exposure.
- Some complaints, such as vision disturbances or headaches, could be related to visual system dysfunction.
- The intent of this study is to identify the visual changes and pathology affecting vision that are occurring in patients with prior CO poisoning.

Methods

- We follow CO-poisoned patients
 - Patients presenting for HBO2 with CO poisoning
 - Patients who received treatment elsewhere and have continued problems
 - Medical history and physical/neurological exam
 - Symptom interrogation
- If we identify problems, we refer to specialists
 - Neuro-optometry – vision-related complaint, visual anomaly on exam, other indication the provider deemed relevant to the patient's visual system
 - Headaches, dizziness, and attention/concentration

Methods

- Database query for patients who we referred for neuro-optometry based on this evaluation
 - August 18, 2009 to August 31, 2013.
 - **43 patients**
- Excluded individuals without CO history or visual deformity unrelated to CO.
- Neuro-optometry evaluated:
 - Convergence/divergence disorders
 - Visual field defects
 - Dry eye
 - Ocular motor defects
 - Accommodative dysfunction
 - Visual evoked potentials

Demographics

Age (years)	41.8±14 (17-72)
Female (%)	60
Chronic Exposure (>24hrs)(%)	65
Time from Poisoning to exam (years)	2.4±1.7 (0.05-7.1)

Characteristics at the time of CO poisoning

CoHb (n=28)	16.9±9.9 (1.0-38.8)
LOC (%)	20.9 (Intubated=1)
Headache (%)	77
Nausea/vomiting (%)	53
Dizziness (%)	49
Fatigue (%)	37
Confusion (%)	35
Syncope (%)	14

Symptoms at the time of follow-up evaluation (%)

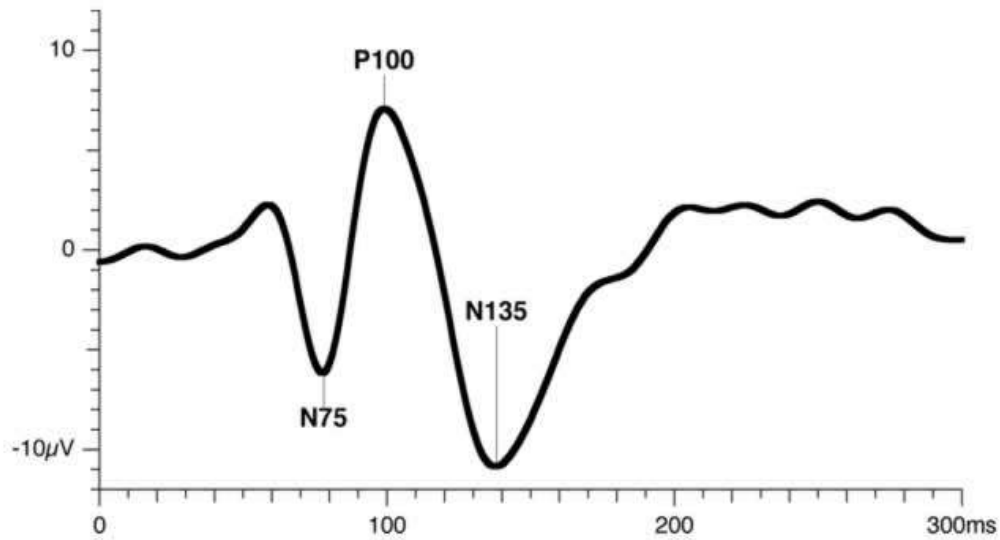
Attention and Concentration	91
Dizziness	63
Balance Problems	81
Headache	93
Vision Symptoms	65
Onset of symptoms: (<6 months post exposure)(n=37)	79

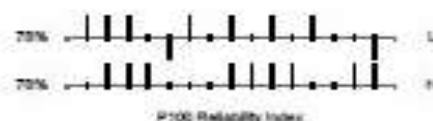
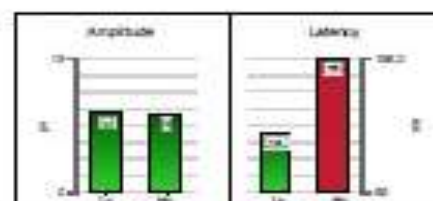
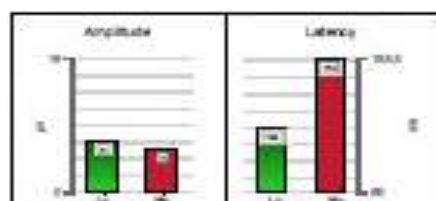
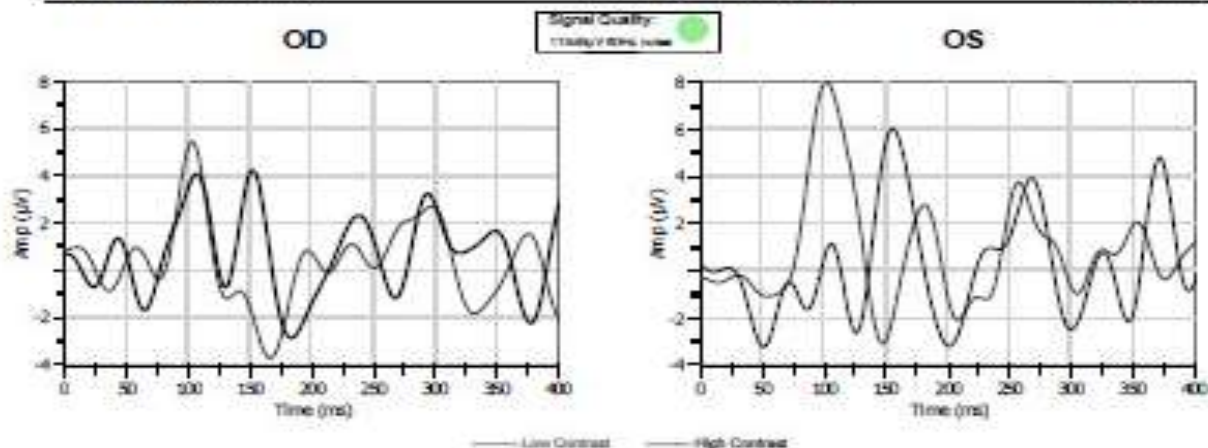
Neuro-optometry findings (%)

Visual Pathology

Convergence/Divergence Disorders, Visual Field Defects, Dry Eye, Oculomotor Defects, Accommodative Dysfunction	91
Convergence Insufficiency	65
Peripheral Vision Defects	21
Oculomotor Defect	33
Visual Evoked Potential abnormality (n=11)	73

Normal VEP Pattern





Parameters	OD	OS	Difference
Amplitude Low Contrast μV	5.8	8.8	-3.1
Amplitude High Contrast μV	4.8	8.8	3.7
Latency Low Contrast ms	104.6	102.5	2.9
Latency High Contrast ms	168.3	168.2	2.9

Remarks
Low
Both Delayed

Operator: Fisher, Judee

Child & Family EyeCare Center - 4074

Comments:

Signature:

Discussion

- CO poisoning can result in damage to the visual system
- These deficits may be responsive to rehabilitation
- Consider referral to neuro-optometry when evaluating CO-poisoned patients with long-term problems