Delayed visual disturbances in carbon monoxide poisoning: identification and evaluation

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BACKGROUND

Carbon monoxide (CO) poisoning may result in neurological and cognitive sequelae, including visual problems, weeks, months, and years after initial poisoning. We performed neuro-optometric examinations in patients who reported vision-related changes or attention complaints during long-term follow-up evaluations after CO poisoning.

METHODS

We performed a retrospective chart review of patients with CO poisoning that also had neuro-optometry evaluations between 08/28/2009 and 8/31/2013. Data collected include general demographics, symptomatic changes prompting neuro-optometric examination, and pathologic findings during this examination.

RESULTS

We identified 43 CO-poisoned patients receiving neuro-optometry evaluation. The convergence insufficiency and peripheral vision defect findings are greater than what would be expected in the normal population. The prevalence for convergence insufficiency in a healthy population is 1 to 5%. Peripheral visual field defects in the elderly are less than 5%. The ocularmotor defects and visual evoked potential changes are pathologic when compared to the appropriate accepted standards.

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)

Initial Presentation	
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

Evaluation Symptoms (%)	
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, Ocular-motor Defects, Accommodative Dysfunction)	91
Convergence Insufficiency	65
Peripheral Vision Defects	21
Ocularmotor Defect	33
Visual Evoked Potential abnormality (n=11)	73

CONCLUSIONS

These finding support that CO poisoning can result in visual pathology. Of clinical importance, these may be responsive to rehabilitative interventions. Specialized visual evaluation and testing is an integral aspect of care in CO-poisoned patients with visual complaints or exam findings.