

Carbon monoxide may produce long term electroencephalographic abnormalities consistent with permanent cerebral network dysfunction

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BACKGROUND

Introduction: CO poisoning often results in permanent neurological sequelae. Literature about EEG abnormalities after CO poisoning is limited, and most relate to severe acute exposures rather than those with chronic ongoing complaints.

METHODS

We queried our CO patient database to identify patients with EEGs following CO poisoning. We excluded patients with previous head trauma, neurologic disease, history of drug abuse or confounding medications. EEG abnormalities are present in 1% of patients with similar exclusions.

RESULTS

Twelve (33%) of 36 patients with persistent symptoms have abnormal EEGs greater than 1 year after exposure (mean 2.01, median 1.05). The disproportion of females with abnormal EEGs approaches significance ($p = 0.067$).

Specific EEG findings include diffuse generalized slowing (8), 2 with slowing in the theta range (4-7Hz), 2 in the delta range (1-3 Hz), and 1 with mixed delta and theta slowing. Focal abnormalities were present in 7 patients (58%), predominantly left-sided temporal (3), hemispheric (2), fronto-temporal (1), posterior (1) and right hemispheric (1). Bilateral involvement was seen in the posterior (2) and frontal (1) tracings.

All 12 patients with abnormal EEGs described chronic headaches, memory, and balance disturbances since their poisoning. Other complaints included anxiety (6), vision changes (4), depression (4), and irritability (3).

	Patients with EEGs and Persistent Neurologic Symptoms (n=73)	
	Abnormal EEG (n=23)*	Normal EEG (n=50)§
Met inclusion criteria (n)	12	36
Age (years) (mean/median/range)	34 / 32 / 17-63	38 / 36 / 7-76
Gender (n)	3 male, 9 female	20 male, 16 female
COHb (%) (mean/median/range)	20 / 18 / 7-32	17 / 16 / 3-39

*Exclusions: Medication (N=9), Epilepsy/epileptiform EEG (N=1), Trauma (N=1).

§Exclusions: Medication (N=12), Epilepsy (N=1), Trauma (N=1)

CONCLUSIONS

One-third of patients we evaluated with persistent symptoms have abnormal EEGs > 1 year after CO poisoning. Carbon monoxide poisoning may cause longstanding focal and/or generalized EEG abnormalities consistent with focal or generalized cerebral network dysfunction and neuronal loss.