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# New Guidelines: Carbon Monoxide Poisoning

Nicholas Gross, MD, PhD Nov 19, 2012

# Practice Recommendations in the Diagnosis, Management and Prevention of Carbon Monoxide Poisoning

Hampson NB, Piantadosi CA, Thom SR, Weaver LK

Am J Respir Crit Care Med. 2012 Oct 18. [Epub ahead of print]

### Summary

The first consensus guidelines for the management and prevention of carbon monoxide (CO) poisoning have recently been published. The toxicity of CO is **not** solely due to its binding to hemoglobin and thus reducing hemoglobin's oxygen-carrying capacity. CO poisoning causes cellular changes, including immunologic and inflammatory damage. The effects of this damage are long-lasting, independent of hypoxia, and contribute to the morbidity of patients who recover from CO poisoning. The guidelines point out that the diagnosis is often missed in both emergency departments and clinics. <sup>[1]</sup> Nonspecific symptoms such as headache, nausea, and fatigue are the rule, so a high degree of suspicion by healthcare providers is warranted. The classic description of "cherry-red" skin is only seen with lethal CO poisoning. CO-oximetry on arterial blood is a more reliable test.

Oxygen accelerates the elimination of carboxyhemoglobin (COHb) and should be administered at 100% to anyone suspected of CO poisoning while the definitive measurement of the COHb level is being determined. The former practice of adding carbon dioxide to the inspired air to hasten elimination of COHb is no longer recommended. With 100% oxygen breathing, the half-life of COHb is approximately 74 minutes. In theory, the use of high partial pressures of oxygen by hyperbaric chamber should provide better neurologic outcomes, although clinical proof of that concept is lacking. When available, the authors recommend 3 treatments with hyperbaric oxygen in the first 24 hours to avoid late cognitive sequelae, but the optimal dose and frequency of treatments are unknown.

The late effects of neurologic damage are a particular concern and can occur with relatively mild CO poisoning and in children as well as adults. The risk for these was substantially reduced in the only objective study of the use of hyperbaric oxygen. <sup>[2]</sup> As hyperbaric chambers are not available in most hospitals, the risks of moving patients to another facility must be considered. Similar considerations apply when, as is often the case, CO poisoned patients have complicating factors such as burns or pregnancy. If poisoning is due to attempted suicide, the presence of drugs and substances of abuse should be considered. Metabolic acidosis and cyanide poisoning are complications of house fires, for which empiric treatment with hydroxocobalamin may be considered.

Follow-up care should consider the possibility of adverse sequelae months or years later, including memory disturbance, mood changes, and vestibular and motor problems. Survivors have been reported to be more likely to experience problems such as falls, motor vehicle accidents, and increased mortality.

# Viewpoint

Carbon monoxide is well known to be a poisonous gas by the public, yet 50,000 fatalities due to CO poisoning occur each year, and that number is not declining. Indeed, it is one of the commonest poisoning fatalities in both children and adults and, in adults, is commoner than heroin fatalities. Only about half of all CO fatalities are accidental, many being due to suicide. Although important advances in its prevention and management have occurred in the last decade, the only authoritative consensus guidelines are more than a decade old and were published in a specialty journal. <sup>[3]</sup> The present review by 4 experts in the field is therefore timely.

Two issues seem of particular importance. Early diagnosis leads to early institution of appropriate therapy, and the key to early diagnosis is awareness and a high degree of suspicion on the part of healthcare providers. The presenting symptoms, being vague, call for more frequent blood analysis. Secondly, death is very uncommon in CO poisoned patients who arrive at an emergency facility. This fact leads to 2 conclusions: delay in the recognition and response to CO poisoning causes the fatalities. But for those patients who do arrive at an emergency department, the avoidance of late neurologic problems should be a goal.

In prevention, the importance of awareness programs and more widespread employment of CO alarms are stressed. Additionally, CO poisoning can occur in unexpected places such as ice rinks. <sup>[4]</sup>

## Abstract

### References

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Cite this article: Nicholas Gross. New Guidelines: Carbon Monoxide Poisoning. Medscape. Nov 19, 2012.