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Cardiovascular Manifestations of Moderate to Severe Carbon Monoxide Poisoning

Satran D, Henry CR, Adkinson C, et al (Univ of Minnesota, Minneapolis; Minneapolis Heart Inst Found; Hennepin County Med Ctr, Minneapolis)

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Objectives: We describe the cardiovascular manifestations of carbon monoxide (CO) poisoning.

Background: Carbon monoxide poisoning is a common cause of toxicologic morbidity and mortality. Although the neurologic sequelae of CO poisoning have been well described, the cardiovascular consequences are limited to isolated case reports.

Methods: We reviewed the cardiovascular manifestations of 230 consecutive patients treated for moderate to severe CO poisoning in the hyperbaric oxygen chamber at Hennepin County Medical Center (HCMC), a regional center for treatment of CO poisoning.

Results: The mean age was 47.2 years with 72% men. Ischemic electrocardiogram (ECG) changes were present in 30% of patients, whereas only 16% had a normal ECG. Cardiac biomarkers (creatinine kinase-MB fraction or troponin I) were elevated in 35% of patients. In-hospital mortality was 5%.

Conclusions: Cardiovascular sequelae of CO poisoning are frequent, with myocardial injury assessed by biomarkers or ECG in 37% of patients. Patients admitted to the hospital with CO poisoning should have a baseline ECG and serial cardiac biomarkers.

Comment: This prospective study found a surprisingly large number of patients with evidence of concomitant myocardial injury after CO poisoning. The patients are described as moderate or severely poisoned, and descriptive data support that they were indeed quite ill. The average carboxyhemoglobin was probably in the low 30s, and half of all the patients were intubated. The data do not support a detailed understanding of the cardiovascular effects of CO because cardiovascular manifestations were very broadly defined—elevated cardiac biomarkers, abnormal findings on echocardiogram, ischemic changes on ECG, etc. Nonetheless, the results support the

evaluation of CO-poisoned patients for myocardial injury, especially when symptoms are severe.

R. J. Hamilton, MD

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Carbon Monoxide Poisoning From Portable Electric Generators

Hampson NB, Zmaeff JL (Virginia Mason Med Ctr, Seattle, WA)
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Background: While the overall death rate from unintentional carbon monoxide (CO) poisoning has decreased in the United States due to improved automobile emissions controls and a decline in CO poisonings from motor vehicles, exposures have not changed from some sources of CO. One of these is the operation of portable electrical generators in poorly ventilated spaces. This study sought to describe the population poisoned from CO produced by portable electric generators, and to determine the reasons that generators are operated in a hazardous fashion.

Methods: Cases of CO poisoning referred for treatment with hyperbaric oxygen at Virginia Mason Medical Center in Seattle from November 1978 to March 2004 were reviewed. Those cases that resulted from portable generator use were selected for analysis.

Results: Sixty-three patients aged 2 to 85 years were treated for CO poisoning from portable electric generators. They included 34 males and 29 females who were poisoned in 37 separate incidents. Thirty-four lost consciousness with the exposure. Of the 63 total patients, 60 spoke English. Generators were typically used when normal electrical service was disrupted by a storm or in remote locations. In 29 of 37 incidents, the generator was operated in the home environment, most commonly in the garage. Lack of awareness of the dangers of CO poisoning or lack of knowledge of ventilation requirements were the most commonly identified reasons.

Conclusions: CO poisoning from portable electric generators occurs in a characteristic population, in a few typical locations and for a limited number of reasons. This information