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Cardiovascular Manifestations of Moderate to Severe Carbon Monoxide Poisoning

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J Am Coll Cardiol. 2005;45:1513-1516

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.

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doi:10.1016/j.annemergmed.2006.01.009

Carbon Monoxide Poisoning From Portable Electric Generators

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J Am Coll Cardiol. 2005;28:123-125

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

may help target prevention efforts for this form of poisoning, such as warning labels or educational programs.

Comment: People resort to alternative methods to create heat and electric power—especially generators and heaters that burn fossil fuel—when storms cut off electric power. For emergency physicians and toxicologists, a bad storm should be the epidemiologic clue to

raise the index of suspicion for CO as a cause for syncope, headaches, coronary ischemia, etc.

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doi:10.1016/j.annemergmed.2006.01.010

2006 Medical Toxicology MoC Assessment of Cognitive Expertise Examination

The American Board of Emergency Medicine (ABEM), the American Board of Pediatrics (ABP) and the American Board of Preventive Medicine (ABPM) will administer the recertification examination in Medical Toxicology on Thursday, November 2, 2006. This examination will be administered at computer-based testing centers throughout the United States.

Physicians must submit an application to the board through which they hold their primary certification and through which they received their initial certification in Medical Toxicology. Physicians certified by an American Board of Medical Specialties member board other than ABEM, ABP, and ABPM who attained Medical Toxicology certification through ABEM must apply for this examination through ABEM. Upon successful completion of the examination, continued certification is awarded by the board through which the physician submitted the application.

Application materials will be available for ABEM diplomates on February 1, 2006, and will be accepted with postmark dates through May 1, 2006. ABP and ABPM diplomates should contact their Boards for application cycle information.

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