Unsuspected Carbon Monoxide Toxicity Detected by Noninvasive Monitoring: A Case Report.

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Introduction

Carbon monoxide (CO) poisoning is the most common cause of poisoning in the United States. Approximately 15,200 patients were treated for suspected or confirmed non-fire related unintentional CO exposure annually in emergency departments (EDs) in the United States from 2001-2003. In the same period approximately 480 people succumbed to CO poisoning from unsuspected CO exposure. Since adopting Co-oximetry as part of the standard triage process in a high volume (>95,000 annual adult census), urban ED, we have identified 9 cases of unsuspected CO poisoning over a 5-month period. A case report of one of these patients follows:

Case

A 52 year old previously healthy non-smoking female patient was brought to the ED by ambulance. The patient complained of headache, nausea, dizziness and feeling cold. She described to the triage nurses that she was emotionally upset because her electric utilities were terminated and she had an argument with her son. She denied syncope or chest pain, and offered no history of CO exposure. The patient's vital signs included a temperature of 96.8 F, heart rate 103, blood pressure 139/88mm/Hg, respiratory rate 16, and pulse oximetry 95% on ambient air. At the same time that her vital signs were taken, a SpCO was obtained using a noninvasive spectral analysis CO-Oximeter. The level recorded was 33%, later confirmed with a venous carboxyhemoglobin of 36%. Her physical examination was within normal limits. The patient was placed immediately on high flow oxygen with a non-rebreather mask. Her SpCO was monitored during treatment and after 120 minutes had fallen to 9%, with complete resolution of her symptoms. Further questioning of this patient revealed that after her electric utilities were interrupted she began using an outdoor use gas-powered electric generator in her basement. The local fire department was contacted and a home investigation initiated. No other persons were found in the home.

Discussion

Carbon monoxide is a colorless, odorless gas that is a product of combustion. The symptoms of early CO toxicity are non-specific, and include headache, nausea, vomiting, diarrhea and weakness. CO toxicity can rapidly progress to cardiac ischemia, confusion, seizures, coma and death if a person is not removed from the source of exposure. Because early CO toxicity shares similarities with other more common illnesses, physicians must maintain a high index of suspicion for CO poisoning to avoid incorrect diagnosis, management and disposition. Unrecognized CO poisoned patients returned to the site of exposure may develop more serious CO toxicity. Many patients are unaware that they were exposed to CO and may not provide the clinician with sufficient history to prompt sending a venous carboxyhemoglobin level. As a result, the prevalence of CO exposure and poisoning in the general population is unknown and many cases may go unrecognized. Fires, certain work environments, mass casualty and disaster situations are all known to be associated with CO poisoning. Venous carboxyhemoglobin analysis, the

current gold standard, is invasive, time-consuming, and costly. Routine screening of large numbers of patients using this method is not cost effective or practical. The use of non-invasive spectral analysis CO-Oximetry is a rapid, inexpensive method for screening large numbers of patients for CO toxicity and identifying unsuspected cases that might otherwise be missed.