Case Report

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The Result of a Strange Family Habit: Carbon Monoxide Poisoning

Erdal Tekin[1], Fatma Tortum[1]
[1]Department of Emergency Medicine, Ataturk University Faculty of Medicine, Erzurum, Türkiye

Abstract

Carbon monoxide poisoning usually occurs in closed environments through systems used for heating or hot water supply. Rarely, it can also result from the use of barbecues or hookahs in closed environments due to people's habits. In this case report, we aimed to present a case of carbon monoxide poisoning caused by burning a samovar inside the house. Three people from the same family applied to the emergency room with complaints of nausea, vomiting, headache, and dizziness. It was learned from history that the patients lit a samovar for tea in a closed environment and slept in the same environment. The patients' COHb levels in the emergency room were 15.9, 13.6, and 10.1, respectively. The patients were given high-flow normobaric oxygen therapy (13 lt/min). The patients were discharged without any problems in their follow-ups. Carbon monoxide poisoning can also occur, albeit rarely, through fuel sources such as hookah or samovar in closed spaces. Preventing such cases requires effective public health information strategies.

Keywords: Carboxyhemoglobin, CO poisoning, emergency medicine, samovar

Introduction

Carbonmonoxide (CO) poisoning is caused by inadequate combustion of carbon-containing substances. Since CO is a colourless, odourless and tastelessgas, it often goes unnoticed until symptoms appear (1). The affinity of CO gastohaemoglobin (Hb) is 250 times higher than oxygen. During poisoning, it binds to Hband forms carboxyhaemoglobin (COHb) and hypoxaemic hypoxia occurs (2). As a result, many symptoms and signs may occur in patients, including nausea, vomiting, headache, dizziness, syncope, arrhythmia and death (3).

CO poisoning is frequently seen as a result of inhalation of exhaust gases and industrial waste gases in the United States of America, while in our country it is frequently caused by exposure to waste gases of heating and hot water supply systems (4,5). Water heater, combi boiler, solid fuel and natural gas stoves are the most common causes of CO poisoning in our country (6). In addition, CO poisoning can also be seen as a result of exposure to exhaust or hookah smoke indoors. In this case report, we aimed to present CO poisoning in a family who burnt samovar indoors.

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Three patients (50-year-old male, 47-year-old female and 15-year-old female) were admitted to the emergency department with complaints of nausea, vomiting, headache and dizziness. It was learnt from the history of these patients that they lit a samovar for tea in a closed environment. After drinking tea, they slept in the same environment and in the morning, the 47-year-old female patient wokeup with severe headache, nausea and vomiting and presented to the hospital. Since the other two patients also had symptoms and based on the history, investigations were requested with a prediagnosis of CO poisoning. The general condition of all three patients were moderate, conscious, orientated and co-operative. Vital signs were within normal limits. Systemic examination was unremarkable. Cranial CT imaging was not performed because the neurologic examination was unremarkable and the patients responded to symptomatic treatment. The COHb levels of the patients at the emergency department were 15.9, 13.6 and 10.1, respectively. Other laboratory and clinical characteristics are given in Table-1. High-flow normobaric oxygen therapy (13 lt/min) was given

Corresponding Author: Erdal Tekin
e-mail: dret25@gmail.com
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Table 1: Clinical and laboratory characteristics of patients

Variables	Patient 1	Patient 2	Patient 3
Years, years	50	47	15
Sex	Male	Female	Female
Arrival complaint	Nausea, dizziness	Headache, Nausea, Vomiting	Headache, Nausea
SBP/DBP, (mm/Hg)	135/87	121/82	112/72
Pulse, beat / min	84	64	71
Respiratory rate, /min	13	14	14
Fever, ^{0}C	36.7	36.3	36.5
Arrival			
COHb level, %	15.9	13.6	10.1
Lactate, mmol/L	0.9	1.9	1
Creatine, mg / dL	0.79	0.6	0.66
Troponin, ng / L	2.1	3.7	1.4
ALT, U / L	12	53	11
AST, U / L	20	47	20
Glucose, mg / dL	146	111	95
LastCOHblevel, %	4.3	3.2	1.4

SBP/DBP: Systolic blood pressure/Diastolic blood pressure, COHb: Carboxyhemoglobin, ALT: Alanine aminotransferase, AST: Aspartate aminotransferase.

to the patients. In addition, hydration and symptomatic treatment are given. The patients were discharged from the emergency intensive care unit because they had no complaints and COHb levels were within normal limits.

Discussion

CO poisoning is an important cause of mortality and morbidity especially in developing countries. In an autopsy study conducted in Turkey, CO poisoning was found to be the most common cause of death due to poisoning (7). Undoubtedly, there are many studies on CO poisoning in the literature. However, what distinguishes our case from other studies in the literature is the CO poisoning caused by burning a samovar with wood in a closed environment. Samovar is a material used for boiling water in wood fire tobrew tea. Since it releases a lot of smoke and CO gas into the environment, it should be used outdoors. In the province where the case was observed, samovar tea is popular and consumed a lote specially in summer months. However, as in our case, family members burned the samovar in a closed environment instead of an open environment and slept at night without ventilating the environment well. As a result, they were exposed to the dense smoke in the environment and had CO poisoning.

Most CO poisoning occurs in households. CO poisoning occurs as a result of old, poorly maintained or poorly maintained systems used in homes or improper installation (8,9). In order to prevent these poisonings and prevent unwanted deaths, preventive practices should be implemented and public awareness should be raised (10). As a result of raising public awareness and consciousness, incidents such as the one in our case report will not occur.

One of the family members, the mother, wokeup because she had a severe headache, nausea and vomiting and wokeup the other family members. Thus, a family tragedy was avoided. In CO poisoning, various clinical findings ocur depending on the COHb level and the severity of these findings varies according to the level of CO to which the patient was exposed and the duration of exposure (2). It may present with mild symptoms such as fatigue, nausea and vomiting, or serious neurological and cardiovascular findings or death may ocur (11). CO poisoning is also called the silent killer because it causes death without any symptoms and mistand usually in sleep (12). What saves the lives of the patients are the nonspecific symptoms related to intoxication and these symptoms usually wake the patients up from sleep. In our case, it was these nonspecific symptoms of the mother that saved the lives of the family members.

Conclusion

In many countries, including ours, CO poisoning continues to be a major public health problem that can arise from a variety of sources and can have potentially fatal consequences. While the majority of cases are associated with common sources such as faulty heating systems or poor ventilation, lessfrequent but notable examples have been reported due to the use of hookahs or samovars in closed spaces. Given the preventable nature of such incidents, it is essential to implement comprehensive public education campaigns aimed at raising awareness of the risks of CO poisoning, especially in traditional or cultural practices involving indoor fuel burning.

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