

# A Rare Cause of Carbon Monoxide Intoxication: Hookah

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## Abstract

Carbon monoxide is a gas formed by partial combustion of carbon containing fuels and leads to intoxication with various non-specific clinical findings. Although hookah is a common way of tobacco consumption among people living in the Middle East, Asia and Africa, it has become popular in European countries and United States of America (USA). In our country, hookah smoking is especially common among young people and more common in cafes. In our case report, two cases with carbon monoxide (CO) poisoning findings after smoking hookah. In both cases, non-specific clinical findings were observed after hookah smoking and blood carboxyhemoglobin fraction (FCOHb) levels were higher than normal values in laboratory parameters.

**Key words:** Carbon monoxide, hookah, intoxication

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## Introduction

Carbon monoxide (CO) is a colorless, tasteless, odorless gas formed by partial combustion of carbon containing fuels and it has a 200 times greater binding affinity to hemoglobin than oxygen (Kesner et al., 2012). CO intoxication is one of the most common causes of morbidity and mortality in the world, which can be prevented and treated (Sircar et al., 2015). CO intoxication findings are seen in vital organs with high oxygen dependence such as central nervous system and cardiovascular system (Karaca et al., 2013). Suicidal or fire exposure related intoxications are more commonly reported in developed countries, whereas in our country, poisonings due to stoves, water heaters and combi boiler use are more common (Metin et al., 2011). The use of barbecues and hookah smoking in small areas with insufficient ventilation are rare causes of CO intoxication. Hookah is a common way of tobacco consumption among people living in the Middle East, Asia and Africa. Nowadays, it is becoming

more popular in European countries and United States of America. In our country, hookah smoking is more common among young people (Kocak et al., 2017). In our case report, we aimed to discuss two cases of CO intoxication with different clinical findings after hookah smoking and to draw attention to the risks of hookah smoking.

### Case 1

A 37-year-old male was brought to the emergency department with presyncope. His general status was good, oriented and cooperative. Glasgow Coma Score (GCS) was 15, blood pressure was 120/80 mmHg, heart rate was 80/min (min) and respiratory rate was 22/min. In his detailed anamnesis, he described nausea, dizziness and faintness after smoking hookah in an outdoor café for about 1 hour. In his background story, there is no features other than smoking. He did not describe any illicit substance intake. Detailed physical examination revealed no abnormal findings. His 12-lead ECG was normal. Blood hemogram and biochemical values were normal. Cranial imaging of the patient did not show any abnormal findings. In the arterial blood gas analysis of the patient, carboxyhemoglobin fraction (FCOHb) was measured as 32.3% (0.5-1.5%). The patient was diagnosed as CO intoxication and normobaric oxygen (O<sub>2</sub>) therapy (at a rate of 10 lt/min) was started with a reservoir mask. After 12 hours of oxygen therapy, the FCOHb levels regressed to normal values and no impairment was observed in the patient's clinic. The patient was completely recovered and discharged from the emergency department.

### Case 2

A 25-year-old male patient was admitted to the emergency department with headache, discomfort, numbness in the hands, nausea, chest pain and tachycardia. GCS was 15, blood pressure was 120/70 mmHg, heart rate was 118 / min and respiratory rate was 25/min. In the detailed anamnesis of the patient, he described hookah smoking in a café for about 40 minutes. The patient described that his complaints had begun after smoking hookah. His 12-lead ECG revealed sinus tachycardia. FCOHb was measured as 28.5% (0.5-1.5%) in the arterial blood gas. Other laboratory parameters were normal. The patient was diagnosed as CO intoxication and treated with normobaric O<sub>2</sub> (at a rate of 10 lt/min). After 8 hours, FCOHb levels regressed to normal values and the

patient whose clinical findings were stable discharged with full recovery. After 8 hours, FCOHb levels regressed to normal values and the patient whose clinical findings were stable discharged with full recovery.

### Discussion

Although hookah is a common way of tobacco consumption among people living in the Middle East, Asia and Africa, it has become popular in European countries and United States of America (USA). Especially among the young-adults, the use in cafes has become widespread (Kocak et al., 2017). Hookah consists of various shapes, sizes, materials and colors. A typical hookah contains the following sections (Figure 1) (Karaca et al., 2013);



Figure 1: Hookah

1. A pit head located at the top, where the tobacco is placed and usually burned with embers.
2. A jug or bottle of water to filter smoke.
3. The long body of the hookah that connects the head to the bowl and carries the smoke into the water through a tubular line.
4. Tube (hookah tube) that takes the smoke from the bottle and delivers it to the mouth

When a person inhales from hookah tube, the smoke draws from the reservoir and then passes through the water in the bottle and reaches the smoker. The water in the hookah, cools the smoke and filters some of the tar and some particles in the smoke (Ozkan et al., 2013). Water in the hookah, filters only a small part of the harmful substances. Longer duration of hookah smoking and deep

inhalation with less irritant effect of water moistened smoke causes more CO is exposed than cigarette (Shihadeh and Saleh, 2005). Also, due to the coal used to burn the hookah tobacco, the CO concentration increases (Knishkowsky and Amitai, 2005). In addition, hookah is often smoked in indoor areas and this leads to CO level increase in area due to accumulation of smoke, and the O<sub>2</sub> level decreases in the opposite direction. This increases the likelihood of CO intoxication for people who smoke hookah.

The clinical signs and symptoms of CO intoxication may be non-specific. The best method for detecting intoxication is clinical suspect. Although nonspecific symptoms such as fatigue, nausea, vomiting, headache, and dizziness are observed, loss of consciousness, seizures, cardiac arrhythmias, myocardial ischemia and even death may develop. The severity of toxicity is related to the current chronic diseases, advanced age and CO exposure time (Von Rappard et al., 2014; Ozkan et al., 2013).

After evaluating vital functions, the basis of treatment of CO intoxication cases is O<sub>2</sub> support. In order to eliminate CO from circulation, normobaric or hyperbaric oxygen therapy can be used. While the half-life of CO in room air is 4-5 hours, it may decrease to 60 minutes with normobaric oxygen therapy and to 20 minutes with hyperbaric oxygen therapy. Treatment continues until patients become asymptomatic and until the level of blood FCOHb is lower than 10% (Kao and Nanagas, 2004; Yurtseven et al., 2015).

### Conclusion

As seen in our cases, CO intoxication can be encountered in patients presenting with nonspecific symptoms after hookah smoking. Physicians should keep CO intoxication in mind in the differential diagnosis of patients presenting with nonspecific symptoms to the emergency room and focus on detailed anamnesis; and should not forget that CO intoxication due to hookah use can be seen.

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