

# What is New in Eurasian Journal of Emergency Medicine-Long-term Cardiac Effect of Carbon Monoxide Poisoning

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Carbon monoxide (CO) poisoning is the second most common cause of fatal poisoning in the United States (1). It can be likened to the tip of an iceberg. It is suspected to be the most common cause of fatal poisoning worldwide, especially given the underreported cases in Asia and Europe (2-4).

The primary target tissues for CO poisoning are the brain and the myocardium. The major morbidity and mortality related to CO poisoning are mainly due to cardiac and neurological dysfunctions.

The long-term neurological effects of CO poisoning are well reported as delayed neurological sequelae in the literature and can occur 4 days to 5 weeks after CO exposure. The reported incidence varies widely, from 3% to 40% of patients (5). Reported neurological effects include cognitive impairment and affective disorders (6).

Besides neurological sequelae, the long-term effects of CO poisoning in the myocardium remain an important issue, and long-term mortality is known to increase, particularly if myocardial injury occurs in severely intoxicated cases. The cardiovascular complications of CO poisoning include acute myocardial ischemia, cardiomyopathy, left ventricular dysfunction, pulmonary edema, and arrhythmia.

A cohort of patients who suffered an acute myocardial injury caused by moderate to severe CO poisoning and followed long-term follow-up (median 7.6 years) had a mortality rate of 24% (7). The mortality rate among poisoned patients with myocardial

injury was more than twice that of poisoned patients without signs of cardiac injury, and it is projected to be three times that of a comparable, unpoisoned cohort. With a mean age of 47 years, the study population was young and had a low incidence of identified cardiac diseases or risk factors associated with them, except for smoking (7).

Based on initial ED results, Cha et al. (8) found that the incidence of cardiomyopathy was as high as 74.4% (32 of 43 patients) in CO-poisoned patients with cardiac injury. They also reported the incidence and patterns of CO-induced cardiomyopathy as global left ventricular dysfunctions (51.2%), non-cardiomyopathy (25.6%), and Takotsubo-like cardiomyopathy (23.2%).

The risk of myocardial infarction after CO poisoning is another concern related to moderate-to-severe CO poisoning. Acute myocardial infarction has been reported from increased thrombogenicity due to CO poisoning (9).

In a cohort study with a population-based design conducted across the country, Huang et al. (3) found that after adjusting for other independent predictors involving older age, male sex, and underlying comorbidity of hypertension, diabetes, and renal disease, CO-poisoned patients had an increased risk of myocardial infarction, with an incidence rate of 1.45 compared to the non-CO-poisoned patients. However, another study that evaluated the relationship between coronary artery health and the development of cardiomyopathy in CO-poisoned patients with myocardial injury showed that not all patients with CO-induced cardiomyopathy require coronary artery evaluation



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(10). In general, patients with underlying coronary artery disease (CAD), persistent LV dysfunction, or risk factors for CAD may benefit from additional testing, such as angiography and revascularization (11).

In summary, the rates of cardiac disease-related complications and mortality were 2 to 3 times higher in CO poisoning patients who experienced acute phase cardiac injury over the course of a long-term (7-8 years) follow-up than in patients without cardiac injury (7). Early detection of cardiac damage in CO poisoning patients is crucial for determining whether to proceed with additional therapy or to forecast mortality and morbidity (12).

In this regard, the prospective cross-sectional cohort study entitled "Comparison of Myocardial Infarction Frequency in Normal Population and Population of Late Period after Carbon Monoxide Poisoning" published in this issue of the Eurasian Journal of Emergency Medicine is interesting and provides additional information for myocardial infarction due to CO poisoning compared to the normal population (13). The follow-up period was approximately 5 years. Their observations also demonstrated the myocardial infarction types and mortality in patients with CO poisoning.

In our country, where CO poisoning is frequently observed and related deaths often occur, acute complications and long-term cardiac/neurologic effects due to CO should be well known, and follow-up and treatment should be performed accordingly in cases of CO poisoning.

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