E7 Carbon Monoxide Poisoning: A Study of Five Cases and Literature Review

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The goal of this presentation is to highlight the importance of coloration of the hypostases in suspected carbon monoxide poisoning and the importance of quantitative measurement of Carboxyhemoglobin (COHb) in the diagnosis of the cause of death.

This presentation will impact the forensic science community by providing results from a study of five cases of carbon monoxide intoxication and a literature review of carbon monoxide poisoning. This presentation is also an alert to medical examiners of the importance of hypostases coloration in the diagnosis of Carbon Monoxide (CO) poisoning.

CO is the leading cause of poisoning death in the world.[1] CO has a high affinity for hemoglobin, decreasing its ability to carry oxygen, causing hypoxia tissular.[2] At necropsy, there is blood fluidity, clear hypostases, and the organs have a red carmine color.[3]

This study presents five cases of death due to CO poisoning. The diagnosis was confirmed by autopsy in the Central Forensic Institute of Sao Paulo and the quantitative laboratory measurement of COHb was performed by spectrophotometry at the Oscar Freire Institute Department of Toxicology. A review was made of the literature regarding the signs and symptoms of this type of poisoning, as well as COHb values found in other studies. The review used complete studies, using MEDLINE® data from 2009 to 2014, published in English and Portuguese.

The five autopsies were from the same family, but were not performed simultaneously. The first one happened approximately 30 days before the other four; cause of death was unknown, despite a highly suggestive hypostases of CO poisoning. Later, four more necropsies of this same family came to light. Due to the arrival of four more bodies of this same family, with the same descriptive characteristics, CO poisoning was suspected. Laboratory tests showed the qualitative dosage of COHb was positive and the quantitative dosages were 84%, 88%, 94%, 87%, and 88%. Death may occur with COHb concentrations above 30%.[4] Carbon monoxide is colorless, odorless, tasteless, and invisible, features that make this agent imperceptible to an exposed person. The main cause of death due to CO poisoning occurs in fires where the release of gases is due to the combustion of fuel or from defective heaters. Local expertise revealed that the source of emission of carbon monoxide was a gas heater located in the service area of the residence.

In order to suspect CO poisoning, the coroner must be aware that there are cases in which the main symptom, if not the only one, is the red carmine color that the hypostases acquire. Therefore, while performing a necropsy, the hypostases should be evaluated for their existence and location but, most importantly, for their color.

References:

1. Smith PL, Jansen EC, Hilsted L, Hydelogaard O. Effect of hyperbaric oxygen therapy on whole blood cyanide concentrations in carbon monoxide intoxicated patients from fire accidents. *Scandinavan Journal of Trauma, resuscitation and emergency medicine* 2010:18(1):32.
2. Cetin M, Ornek E, Murat Sm, Setin ZG. A Case of carbon monoxide poising presenting with supraventricular tachycardia. *Intern Med* 2011: 50(21):2067-2609.
3. França GV. Forensic medicine. In: Rio de Janeiro BR, Guanabara, editors. 2004: 1927-1928.
4. Gauthier S, Grass H, Lory M, Krämer T. Letal carbon monoxide poising in wood pellet store-rooms: two cases and a review of the literature. Ann occup Hyg. 2012:56(7):755-63.

Carbon Monoxide Poisonig, Carbon Monoxide Intoxication, Death