

Serial Nonsense? Clinical Characteristics and Trends in Cases with Serial Carboxyhemoglobins

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Background: Carboxyhemoglobin (COHgb) levels are commonly obtained when there is suspicion for carbon monoxide exposure though their true prognostic value remains controversial. For unclear reasons, serial COHgb levels are sometimes obtained despite the well-established half-life of COHgb with various degrees of oxygen supplementation. We sought to evaluate the clinical characteristics and trends when serial carboxyhemoglobin levels were obtained.

Methods: A retrospective review of all patients with at least one COHgb level between 4/2010 - 4/2015 at a quaternary care academic medical center was performed. All charts were individually reviewed and interrater reliability assured through training and evaluation of Kappa scores.

Results: The search identified 624 cases. A total of 106 (17%) of these cases had multiple carboxyhemoglobin levels obtained. The mean number of COHgb levels obtained was 2.6 (range 2 - 9). The average initial level was 8.9%, subsequent levels averaged 2.8% at 353 minutes, 1.8% at 663 minutes, 1.1% at 1,095 minutes. The longest interval was 3,807 minutes (2.6 days) to obtain a total of four levels. The serial COHgb group was more likely to be admitted to the ICU, have a burn injury, and receive hyperbaric oxygen therapy. No significant difference was found in age, gender, rate of smoking, initial COHgb level, or mortality. A total of four patients were identified as having a change in carboxyhemoglobin level from normal (defined as <2% by the institution lab) to abnormal on serial levels. The largest interval increase was 1.9%. All four patients were current smokers, none of their subsequent carboxyhemoglobin levels exceeded 4% at any time and there were no deaths.

Conclusion: Ordering of serial carboxyhemoglobin levels occurred in 17% of cases of which four patients (3.8%) were observed to increase from normal to abnormal carboxyhemoglobin levels based on the laboratory standard however the clinical significance of this increase is questionable. Despite being more likely to have a burn injury, be admitted the ICU, and receive hyperbaric oxygen therapy there was not statistically significant difference in mortality. This study presents evidence that there is minimal value in obtaining serial carboxyhemoglobin levels and the practice should be discouraged.