Clinical Analyses of 429 Cases of Acute CO Poisoning.

Li Z., Gao C., Huang M.E.X. Wang G., Ge H., *Anesthesiology* 2007; 107: A1490.

Introduction

Acute CO poisoning frequently occurs in winter in northern part of China. After CO poisoning, COHb has an evident increase. It is well known that rising COHb affects the transportation of oxygen and triggers the poisoning. Methemoglobin formation results from the oxidization of the bivalent iron of hemoglobin into trivalent iron, which lacks the capacity of carrying and releasing oxygen. However, there is no literature reporting the change of methemoglobin formation in acute CO poisoning patents (ACOP). With the application of Rad-57 Pulse CO-Oximeter, (Masimo Corporation) we have observed the changes of COHb and MetHb of 429 acute CO poisoning patients and studied the roles of COHb and MetHb in triggering acute CO poisoning as well as their relations.

Methods

The subjects are 429 acute CO poisoning patients in Beijing Chaoyang Hospital and Beijing Shunyi Hospital from November, 2006 to March, 2007 with 100 healthy people who do not smoke as the control group. We employed Rad-57 Pulse CO-Oximeter to observe the levels of COHb and MetHb of the emergency patients when they went to see the doctor. After 2h inhaling of oxygen (through nose at the rate of 3L/min) or one hyperbaric oxygen therapy (2ATA, breathe oxygen for 60min), the levels of COHb and MetHb were measured again and the changes observed. We also recorded general situation, cause of the disease and clinical classifications etc. of the patients. Then we utilized SPSS11.0 software for statistic analysis.

Results

CO poisoning of 98% of the patients is due to inappropriate use of coal stoves. Clinical classification: Light poisoning 274 cases; intermediate poisoning: 77 cases; severe poisoning: 78 cases. A total of 98 emergency patients have MetHb>1.2% at the first measurement. The concentrations of both COHb and MetHb of the patients are evidently higher than that of the control group ($p<0.01$, $p<0.01$ as shown in table 1). The levels of COHb and MetHb of the first measurement of such patients present significant positive correlation (Pearson correlation $r = 0.374$, $p<0.01$). For the change of MetHb before and after the treatment, very significant difference only occurs in light ACOP patients of the ordinary oxygen-inhaling group and hyperbaric oxygen treatment group ($p<0.01$). No significant difference is observed for intermediate and heavy poisoning patients ($p>0.05$) although fifty patients out of 58 cases showed small decrease in MetHb.

Conclusions

(1) Inappropriate use of coal stove is the main cause of acute CO poisoning in northern part of China. (2) MetHb may be involved in the

physiopathological process of hypoxia of ACOP patients. MetHb of such patients is clearly higher than that of the control group, but only 98 patients have MetHb >1.2%. This indicates that the rise of MetHb level is not the key factor leading to hypoxia in ACOP patients. The increase of COHb level is the main cause. (3) Whether hyperbaric oxygen treatment can effectively cure methemoglobinemia still requires further study. (4) The Rad-57 Pulse CO-Oximeter provides a noninvasive tool to greatly facilitate the clinical diagnosis & treatment for CO poisoning patients.

Table 1

group	COHb	MetHb
Control group	1.28±0.68	0.25±0.12
ACOP group	18.28±8.40	0.86±0.82
P -value	<0.01	<0.01