

## A New Tool for the Early Diagnosis of Carbon Monoxide Intoxication.

Piatkowski A., Ulrich D., Grieb G., Pallua N. *Inhal Toxicol* 2009 Nov;21(13):1144-7.

### Introduction

Invasive measurement of carboxyhemoglobin (COHb) by blood gas analysis (BGA) is accepted as the standard diagnostic procedure in diagnosis of inhalation injury and carbon monoxide (CO) intoxications. The main disadvantage of BGA with COHb testing is the unavailability in pre-hospital rescue conditions. The non-invasive SpCO analysis using pulse CO-Oximetry (Rad57, Masimo Corp., USA) represents an easy-to-handle device to facilitate the diagnosis of CO intoxication.

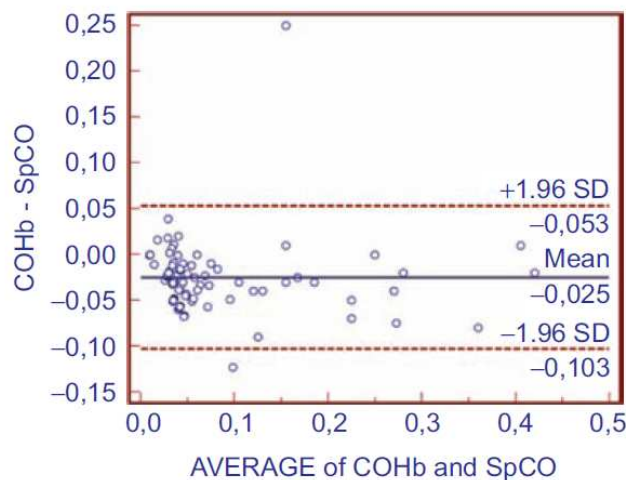
### Methods

Between January 2006 and August 2008, 20 patients who were admitted with CO intoxication to our burn centre were included in this study. Blood gas analysis including COHb testing was performed on the first day, hourly. At the same time, SpCO was determined using the Rad57 pulse CO-Oximeter. Patients received inhalative oxygen according to the parameters of blood gas analysis or hyperbaric oxygenation if COHb > 10%. Five young healthy volunteers served as control group. The SpCO of the volunteers was cross-checked against their COHb levels, which were measured by blood gas analysis.

### Results

Results of pulse CO oximetry revealed a mean error of approximately 3.15% from the results achieved by blood gas analysis. If COHb resulted in values higher than 10%, the bias remained approximately the same (3.43%/precision 2.362%). When different blood gas analyzers in our department were tested with the same patient sample, a mean error of 2.4% was found. This is only 1% lower compared to the mean error of pulse CO oximetry.

### Bland–Altman plot showing COHb from Blood Gas Analysis compared to SpCO values of 20 patients.



Bias (blue line) and the 95% confidence interval of the mean difference (dotted red line).

### Conclusion

Pulse CO oximetry represents a reliable measurement technique that is easy to handle and could facilitate the early diagnosis of CO intoxication in pre-hospital rescue conditions.