

Assessment of carbon monoxide inhalational poisoning in flame burned patients at a Kenyan National Hospital

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Background

Victims of flame burns invariably inhale smoke which contains potentially toxic gases that may contribute to their morbidity and mortality. The most significant inhalational toxin in many fires is carbon monoxide (CO). This study aimed to assess clinical evidence for possible CO poisoning and measure Carboxyhemoglobin (COHb) levels on fire casualties presenting to a tertiary teaching and referral hospital in Kenya. The gold standard, serum COHb spectrophotometry was unavailable hence pulse CO-oximetry was utilised to measure carboxyhemoglobin saturation (SpCO).

Methodology

This was a prospective descriptive study. It was approved by institutional ethics committee. Eighty non-pediatric patients presenting with acute (<24 h) flame burns were recruited and assessed for potential CO poisoning. COHb levels were assessed by *Masimo SET^R Radical 57TM* pulse CO-oximeter; a device approved by the US Food and Drug Administration (2008) and validated for non invasive SpCO measurement. Statistical Package for Social Sciences version 21 was used for analysis.

Results

44% of the patients were females and 56% males. Excluding wound pain, common complaints were confusion (28.7%) and headache (26%). Mean total burn surface area (%TBSA) was 30.9% and SpCO was 5.48%. Only 7 patients had SpCO above 10%. Average time lapse between incident to SpCO measurement was 8 h 50 min. Twenty-eight-day mortality was 38.7%. Analysis revealed non-correlation of SpCO with clinical features suggestive of CO poisoning ($p = 0.183$); neither did SpCO correlate with mortality ($p = 0.708$). However, %TBSA ($p = 0.001$), GCS ($p = 0.001$) and oropharyngeal injury ($p = 0.024$) did.

Conclusion

SpCO measurements in 9% of the flame burned patients were found to be >10% indicating CO toxicity. However, the majority recorded nontoxic levels of <10% on a background of a relatively long time lapse. Neither clinical symptoms nor mortality could be ascribed to carbon monoxide exposure. %TBSA, GCS and oropharyngeal injury correlated significantly with mortality.