Screening for Carbon Monoxide Exposure in Selected Patient Groups Attending Rural and Urban Emergency Departments in England: A Prospective Observational Study

Clarke S., Keshishian C., Murray V., Kafatos G. , Ruggles R., Coultrip E., Oetterli S., Earle D., Ward P., Bush S., Porter C., for the Carbon Monoxide in Emergency Departments (COED) Working Group. *BMJ Open* 2012 Dec 13;2(6)

Objectives

Carbon monoxide (CO) exposure does not produce a classical toxidrome and so it is thought that it may easily be missed, allowing patients to continue to be exposed to CO. The aim of this study was to determine the proportion of raised carboxyhaemoglobin (COHb) levels in a targeted population of patients presenting to four emergency departments (EDs) in England.

Methods

Design: A prospective observational study undertaken over a 9-month period. Setting: Four EDs; one in a rural/suburban area and three serving urban populations. **Participants:** 1758 patients presenting to the EDs with chest pain, exacerbation of chronic obstructive pulmonary disease (COPD), non-traumatic headache, seizures or flu-like symptoms. **Main outcomes:** Measures COHb levels measured using a pulse CO-oximeter or venous sample. Patients with COHb levels ≥2.5% (non-smokers) or ≥5% (smokers) completed a questionnaire assessing potential sources. Patients were defined to be positive for CO exposure if they had a positive COHb and either an identified source or no other reason for their raised level.

Results

Proportion of positive patients was: overall— 4.3%; COPD—7.5%; headache—6.3%; flu-like—4.3%; chest pain—3.3%; seizures—2.1%. A variety of gas and solid (predominantly charcoal) fossil fuel sources were identified.

Conclusions

This study showed that 4.3% of patients presenting to EDs with non-specific symptoms had unexpectedly raised COHb levels 1.4% of patients had a source of CO identified. Study limitations included nonconsecutive recruitment, delays in COHb measurements and a lack of ambient CO measurements, which precludes precise determination of incidence. However, this study should alert clinicians to consider CO exposure in patients presenting with non-specific symptoms, in particular headache and exacerbation of COPD, and if necessary refer patients for suitable public-health follow up, even in the presence of low COHb readings. Further research should include standardised scene assessments.