An algorithm for the recognition and treatment of fire-related cyanide exposure

Eike Blohm1, Vikhyat S. Bebarta (Lt Col, USAF)2, Kavita M. Babu3

1Division of Medical Toxicology, Department of Emergency Medicine, University of Massachusetts Medical School, Worcester, MA
2Division of Medical Toxicology, Department of Emergency Medicine, San Antonio Military Medical Center, San Antonio, TX

Background
- Multiple patients may present to the ED after a potential cyanide exposure
- Serum cyanide levels often result only hours to days later, and are hence of limited clinical utility
- Many patients have no or mild toxicity and do not require antidotal treatment
- Patients with severe toxicity must be treated rapidly, and often, empirically
- The current literature does not contain a single algorithm to guide the diagnosis and treatment of fire-related cyanide exposure patients across the spectrum of acuity

Hypothesis
- A diagnostic algorithm can be developed for patients with inhalational cyanide toxicity

Methods
- Systematic PubMed review in 9/2013
- Case reports/series, animal studies, observational studies
- Excluded data of chronic cyanide exposure
- English and German literature

Results
- 207 abstracts and 65 studies included
- Certain clinical signs, symptoms and laboratory markers correlate with the degree of cyanide toxicity
- Long-term neurologic sequelae of acute cyanide toxicity were only observed in patients who presented with either coma or significantly abnormal vital signs

Conclusions
- We propose a diagnostic algorithm that delineates evaluation and treatment indications for patients who range from minimally symptomatic to critically ill after potential cyanide exposure via smoke inhalation
- We recommend withholding antidotal treatment from patients who display minimal or no signs of cyanide toxicity
- A treatment guideline based on clinical features and rapidly available laboratory markers may be important in the triage and management of multiple patients (e.g., a nightclub fire, burning industrial complex)

Limitation
- There are no randomized controlled human trials
- Cyanide toxicity is rare, thus validation of this algorithm is challenging

Selected Citations