Enclosed space fires and the risk of cyanide exposure

Each year there are more than 1.3 million fires in the US. 3,390 civilian fire deaths make up 81% of civilian deaths. Smoke inhalation is a factor in 85% of fire fatalities.

Enclosed space fires can lead to smoldering combustion of plastic, vinyl, acrylic, neoprene, rubber, and insulation and the production of cyanide.

Hydrogen cyanide is detectable in approximately one-half of people exposed to enclosed space fires.

Suspect cyanide toxicity if:
- Altered mental status: lethargy, weakness, drowsiness in conscious patients
- Soot in around the nose or mouth — suspect cyanide poisoning in any unconscious patient removed from a burning building with this feature
- Shortness of breath, rapid, deep breaths (oxygen saturation may be normal)
- Prolonged loss of consciousness which does not improve when patient is free from a burning structure
- Seizures (carbon monoxide poisoning rarely causes this)
- Cardiac abnormalities including cardiac arrest
- Elevated blood lactate levels (prehospital determination often not available)
- Coughing up carbonaceous sputum
- Hypotension

Initial management of suspected cyanide exposure:
- Remove the individual(s) from the scene
- Assess oxygen level — initial resuscitation priorities are administration of 100% oxygen with a tracheal tube if airway is at risk
- Utilize lung-protective ventilation strategies and consider early bronchoscopic washout
- Careful administration of fluid therapy to avoid over/under-resuscitation
- Administer antidote for patients with suspected cyanide poisoning

Cyanide antidotes:
- Sodium nitrite + sodium thiosulfate
- Hydroxocobalamin

Hydroxocobalamin is considered more suitable for prehospital administration.

References: