Cyanide
(Includes Cyanide and any Cyanogenic Compound, i.e.acetonitrile)

UNYPCC Management Guideline
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Home Management
● There is no acceptable dose that can be managed at home
● Any exposure requires transport to the hospital via EMS

A consultant should be immediately notified of any patient with a known cyanide exposure or in a patient with suspicion of cyanide toxicity (eg: Unexplained, sudden cardiovascular collapse)

Gastrointestinal Decontamination
● Activated Charcoal 1 g/kg should be considered in patients with ingestion of cyanide salts

Laboratory Tests
● Basic Metabolic Profile
● Arterial Blood Gas
● Serum Lactate (lactate > 8 mmol/L indicative of cyanide exposure)
● Cyanide levels are send-outs and not of any clinical value when acutely managing patients

Treatment
● Cyanide should be considered in any patient with rapid cardiovascular collapse that is unresponsive to standard supportive care and antidotal therapy should be recommended immediately
● Cyanide should be considered in any fire victim that is hemodynamically unstable despite supplemental oxygen, or with a lactic acidosis
● IV Normal Saline
● Hydroxocobolamin (Cyanokit(R))
  ○ Adult: 5 grams IV over 15 minutes; can be repeated ONCE
  ○ Pediatric: 70 mg/kg IV over 15 minutes; can be repeated ONCE
● Sodium thiosulfate
  ○ Adult: 50 mL of 25% solution IV (12.5 grams IV); can be given via IV bolus or infused over 10-20 minutes; if necessary, half of the dose can be
repeated
  ○ Pediatric: 2 mL/kg of 25% solution IV (up to adult dose); can be given via IV bolus or infused over 10-20 minutes can be repeated; if necessary, half of the dose can be repeated

● Amyl/Sodium Nitrite (NOT to be given in house fire victims or in other scenarios of concomitant carbon monoxide poisoning):
  ○ Amyl Nitrite: One ampule (0.3 mL) inhaled until IV access obtained
  ○ Sodium Nitrite:
    ■ Adult: 300 mg (10 mL of 3%) over 2-4 minutes
    ■ Pediatric: 0.2 mL/kg of 3% (6 mg/kg) over 2-4 minutes (up to the adult dose)

{Cyanokit(R)} is the brand name for hydroxocobalamin
{Nithiodote(R)} is the brand name for a Cyanide antidote kit that contains 1 vial of Sodium Nitrite (300 mg) and 1 vial of Sodium Thiosulfate (12.5 grams)}

Prevention of Nitroprusside Induced Cyanide Toxicity
● Nitroprusside is used in the management of malignant hypertension and each molecule is broken down into 5 cyanide molecules
● To prevent cyanide toxicity, either sodium thiosulfate or hydroxocobalamin has been used (most facilities use sodium thiosulfate)
  ○ Sodium thiosulfate: For every 100 mg of nitroprusside, 1 gram of sodium thiosulfate is added directly to the nitroprusside infusion
  ○ Hydroxocobalamin: 100 mg hydroxocobalamin in 100 mL D5W infused at 25 mg/hour; this is a separate infusion than the nitroprusside and should be infused in a different line. Hydroxocobalamin should be continued for 10 hours after the nitroprusside has been discontinued.
    ■ This should only be done if the patient is demonstrating signs of thiocyanate toxicity. (Sodium thiosulfate is the preferred agent to prevent CN toxicity and should be used empirically)
    ■ Sodium thiocyanate is renally eliminated and in patients with oliguric renal insufficiency, hydroxocobalamin may be the preferred agent during a prolonged nitroprusside infusion

References:
Shepherd et al. Role of hydroxocobalamin in acute cyanide poisoning
Borron et al Hydroxocobalamin for severe cyanide poisoning
Antidotes for Toxicologic Use