Smoke Inhalation/CO/Cyanide Poisoning

Signs and Symptoms

- Headache
- Flu-like symptoms
- Dyspnea on mild exertion
- Chest Pain
- Palpitations
- Cardiac dysrhythmias
- Irritability
- Weakness/Fatigue
- Nausea and vomiting
- Visual disturbances
- Lethargy or confusion
- Gait disturbances
- Syncope
- Seizures
- Respiratory arrest
- Singed nasal hairs, facial/airway burns, carbonaceous sputum

History

- Exposure to smoke-filled environment
- Victim of a fire
- Space heaters/generators in enclosed space
- Exposure to incomplete combustion or carbon based material
- Suicide attempts

Differentials

- Generalized illness
- Flu
- Viral
- Acute Coronary Syndrome
- Stroke
- Migraine
- Blood sugar abnormalities
- Other causes of altered mental status

WARNINGS

- ! The patient must be removed a safe distance from the environment
- ! Provider safety is paramount. Due to the potential for such patients to be located in an IDLH, it may be necessary to utilize SCBA and or obtain atmospheric samples prior to accessing the patient. Utilization of additional resources such as an engine company may be necessary to facilitate extrication.
- ! SPO_2 readings may be unreliable in patients with carbon monoxide poisoning.

Care: Adults and Pediatrics

B E I P

Follow General Directive #3, Orders for all Patients.

! Ensure scene safety. Remove patient to safe environment.
If available, monitor patient's SpCO level.
Administer high concentration O_2 via NRB mask.

E I P

Monitor patient's $ETCO_2$ level. Initiate advanced airway management as dictated by patient presentation. Establish IV access — fluid resuscitation shall be administered to maintain a systolic BP as per Cardiac Emergencies Protocol #7, Hypotensive Emergencies.

I P

Initiate cardiac monitoring. Acquire12 lead if cardiac compromise suspected.

E I P

Alubuterol (**Proventil®**) 2.5 mg and **Ipratropium** (**Atrovent®**) 0.5 mg via nebulizer if dyspnea or wheezing (all ages).

(B) (E) (I) (P)

If the patient presents with an elevated SpCO over 15% and associated signs and symptoms, direct transport to a hyperbaric chamber may be considered.

(I) (P)

In patients with severe symptoms, consider treatment for Cyanide Poisoning utilizing **Hydroxocobalamin (Cyanokit®)** 70mg/kg up to 5g infusion referring to manufacturer supplied instructions in consultation with Medical control.

E I P

Adults only: Consider the use of CPAP (5 cm H_20) in moderate to severe cases.

Pearls

- Patients removed from a smoke filled environment or suspected of CO exposure should be assessed and treated for CO poisoning and possible cyanide poisoning.
- CO poisoning can be difficult to detect. A high index of suspicion is needed.
- The handheld CO monitor or Lifepak monitor (if equipped) should be utilized for assessment of CO levels.
- Carboxyhemoglobin readings of 10-40% will show variable signs and symptoms.
- Treat any *symptomatic* CO exposure patient regardless of measured level. Treatment is generally indicated with SPCO readings >15% regardless of symptoms.
- High-Flow Oxygen (10-15Lpm) is indicated for all patients with signs/symptoms consistent with CO poisoning.
- Carbon Monoxide has a 250x greater affinity to hemoglobin than that of oxygen.
- Fetus of pregnant patient is at increased risk due to affinity of fetal hemoglobin for CO. Treat pregnant patients with CO exposure regardless of level.
- Consider CO poisoning in cases of multiple patients from same environment with similar symptoms/complaints.
- Patients who smoke may have constant carboxyhemoglobin level as high as10%.
- If the patient has a 20% carboxyhemoglobin level, the TRUE SpO_2 will be 80% as 20% of the receptor sites are bound by CO (older pulse oximetry devices may falsely display normal SpO_2).
- Atmospheric CO monitors shall be maintained on the oxygen/house bag for all EMS Licensed vehicles.
- Atmospheric CO monitors will be preset to alarm at 35ppm and 100ppm. An alarm at 35ppm will warrant a Fire Department (FD) response for investigation. An alarm at 100ppm will warrant FD response for investigation and immediate evacuation of personnel, and patient if possible.
- Cyanide poisoning may also be present in victims of smoke inhalation and can present with similar symptoms.
- Cyanide Poisoning should be considered for smoke inhalation victims who present with: Exposure to fire smoke in an enclosed area, soot present around face or oropharynx, and an altered mental status.

Performance Indicators

- If available, assessment and documentation of SpCO and ETCO2.
- Early contact with Medical Control for treatment advisement and destination determination considerations.