

Protocol 4-7

SECTION: Adult Trauma Patient Care

PROTOCOL TITLE: Exposure – Airway/Inhalation Irritants

REVISED: 06/2017

INHALATION INJURY

OVERVIEW:

A majority of fire related deaths are the result of smoke inhalation. Suspect inhalation injury and respiratory damage in any victim of a thermal burn, particularly if the patient has facial burns, singed nasal hair, carbonaceous sputum or was in an enclosed space. Be aware that many chemicals are present during ordinary combustion including Hydrogen Sulfide, Hydrogen Cyanide and Carbon Monoxide (CO). CO is a tasteless, odorless, colorless, and non-irritating gas. Almost any flame or combustion device can produce the gas. CO poisoning is a common problem and produces a broad spectrum of signs and symptoms, often imitating the flu. Think about CO poisoning when multiple patients present with the same signs and symptoms at a residence.

Hydrogen cyanide is a by-product of the combustion of materials used in everyday life products (i.e., insulation, carpets, clothing, and synthetics). The culprit is nitrogen. Nitrogen gas in atmospheric air can contribute (under the right circumstances) to the formation of minute amounts of cyanide during combustion. High temperatures and low-oxygen concentrations favor the formation of cyanide gas. Smoke from the combustion of grass clippings, green wood, tobacco, cotton, paper, wool, silk, weeds, and animal carcasses will likely contain some hydrogen cyanide gas. But the real offender is the combustion of manmade plastic and resins containing nitrogen, especially if the fire is hot and in an enclosed space. Common manmade materials that generate cyanide gas during combustion include nylon, polyurethane, melamine, and acrylonitrile.¹

HPI	Signs and Symptoms	Considerations
<ul style="list-style-type: none"> Type of exposure (heat, gas, chemical) Inhalation injury Time of injury Past medical history Medications Other trauma 	<ul style="list-style-type: none"> Burns, pain, swelling Dizziness Loss of consciousness Hypotension/ shock Airway compromise, distress Singed facial or nasal hair Hoarseness, wheezing 	<ul style="list-style-type: none"> Electrical Chemical Thermal Radiation

	EMR	EMT	A	I	P
1. Perform general patient management.	•	•	•	•	•
2. Support life-threatening problems associated with airway, breathing, and circulation.	•	•	•	•	•

¹ www.fireengineering.com: Hydrogen Cyanide: New Concerns for Firefighting and Medical Tactics. Posted 06/29/2009. Author: Richard Rochford

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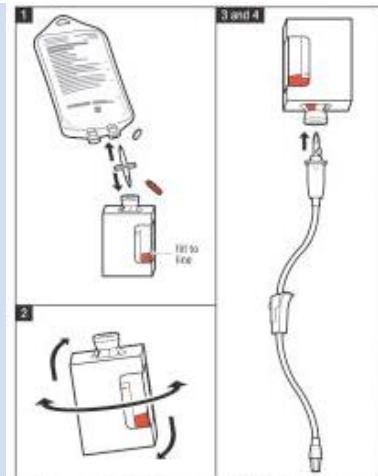
INHALATION INJURY

	EMR	EMT	A	I	P
3. Administer oxygen by NRBM or support respirations with a BVM as indicated (SPO ₂ is often unreliable for these patients).	•	•	•	•	•
4. Consider <u>orotracheal intubation</u> for impending respiratory failure.				•	•
5. Monitor <u>capnography</u> , if available. Maintain a range between 35 - 45 Torr.			•	•	•
6. Place patient on cardiac monitor and obtain/interpret <u>12 lead ECG</u> . Refer to appropriate <u>Cardiac Care protocol</u> .		•	•	•	•
7. Establish an IV of normal saline at KVO.			•	•	•
8. If available, consider <u>CPAP</u> with 5 - 10 cm H ₂ O PEEP.		•	•	•	•
9. Transport to Burn Center and perform ongoing assessment as indicated.		•	•	•	•
10. If carbon monoxide is suspected or confirmed, administer O ₂ with non-rebreather mask.	•	•	•	•	•
11. If cyanide is suspected or confirmed, and kit is available, administer Cyanokit®. ** See administration instructions.				•	•

**Cyanokit® Infusion²

Mix and administer Cyanokit® infusion:

1. Add **200 ml of Normal Saline injection to Hydroxocobalamin 5g vial** using supplied transfer spike.
2. Fill to line on bottle with vial in upright position.
3. Rock or rotate vial for 60 seconds to mix solution. Do not shake.
4. Attach included vented IV tubing. **Infuse over 15 minutes.**
5. Total amount infused should be documented as 5g.



PEARLS:

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<http://www.cyanokit.com/pdf/Two%20.5g%20Vials%20Administration%20Guide%20101611.pdf>

1. Pulse oximetry may give falsely elevated readings in patients with methemoglobin or CO / CN exposure.
2. Hyperbaric therapy can be indicated for some carbon monoxide poisonings; especially in early pregnancy and patients with failing vital signs. For fire related exposures, transport to the burn center at VCU Health System. For non-fire related CO exposures, contact Medical Control for guidance. Hyperbaric chambers are located at Chippenham Hospital, Southside Regional Medical Center, Retreat Doctor's Hospital, University of Virginia Medical Center.
3. Critical burns: burns over > 25% TBSA; 2° burns > 10% TBSA; 2° and 3° burns to the face, eyes, hands, or feet; electrical burns; respiratory burns; deep chemical burns; burns with extremes of age or chronic disease; and burns with associated major traumatic injury. These patients should be transferred directly to a burn center.
4. Have a high index of suspicion and a low intubation threshold when treating burn patients with possible airway involvement. Early intubation should be considered in significant inhalation injuries.
5. Burn patients are prone to hypothermia – never cool burns that involve > 15% TBSA.
6. Never overlook the possibility of multi-system trauma.

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