Toxicology Presentation

What is a toxicological emergency?

A toxicological emergency is any situation where exposure to a toxin, poison, or drug causes life-threatening effects.

Poison: any substance whose chemical action can damage the body or impair bodily function (the dose is what matters!)

Toxin: poisonous substance produced by plants, animals, bacteria (a subset of poisons)

POISONING | INGESTION | OVERDOSE

- **Routine Medical Care**
- **Protect Yourself!** - See Hazardous Materials Incidents - EMS Response **page 152**
- **Identify substance** - Bring any containers, labels or a sample (if safe) into the hospital with the patient. Determine type, amount and time of the exposure.
- **Consult the Base Physician:**
  - ➔ If ***organophosphate poisoning*** suspected*
  - ➔ If ***calcium channel*** or ***beta blocker OD*** suspected*
  - ➔ For treatment options for specific exposures

  * Consider contacting Poison Control for other substances **800-222-1222**
- Remove contaminated clothing. Brush off powders, wash off liquids with copious amounts H_2O

Scene Safety

EMS interface with HazMat teams

2.1 The Incident Command System (ICS) shall be used for on scene management

2.2 The Medical Branch Supervisor shall make contact with the Incident Commander, face-to-face or by radio, who will direct the Medical Branch Supervisor to the Hazardous Materials Group Supervisor

2.3 Pertinent information will be relayed to the Medical Branch Supervisor including, patient information (number requiring transport and injuries) and the type of exposure (chemical name and information about the chemical [**SPELL CHEMICAL NAME**])

2.4 The Medical Branch Supervisor shall make Base contact in order to obtain recommendations regarding decontamination and patient treatment

2.5 Once cleared by the Site Access Leader, EMS personnel may proceed to the end of the "Contamination Reduction Corridor" to receive patients. Any secondary treatment by EMS personnel should be done in the "Support Area"

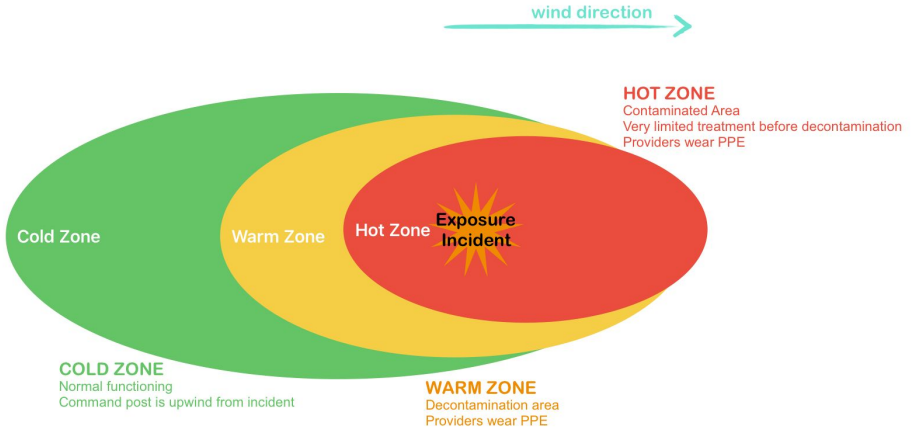
Definitions

3.1 **Exclusion Zone** (Hot Zone) - Area that encompasses all known or suspected hazardous materials

3.2 **Contamination Reduction Zone** (Warm Zone) - Area between the "Exclusion Zone" and the "Support Area". "Safe Refuge Area" and "Contamination Reduction Corridor" are set up within this area

3.3 **Contamination Reduction Corridor** - An area within the "Contamination Reduction Zone" where the actual decontamination takes place. EMS personnel, once cleared, receive patients at the end of the "Contamination Reduction Corridor" and move them to the "Support Area" for secondary treatment

3.4 **Support Zone** (Cold Zone) - Clean area outside "Contamination Reduction Zone" where equipment and rescue personnel are staged to receive and treat decontaminated patients. Secondary exposure to hazardous materials is not expected in this area and special clothing is not required



Types of drugs and their effects

Depressants: reduce neural activity and body functions

- Alcohol
- Marijuana (technically a depressant although it can act as a stimulant or hallucinogen)
- Opioids
- Benzodiazepines: prescribed depressants to treat seizures or anxiety
    - Ex. Lorazepam, Clonazepam

Stimulants: increase the activity of the sympathetic nervous system

- Methamphetamine, Caffeine, Cocaine, Nicotine

Hallucinogens: alter a person's perception of reality, thoughts, and feelings

- LSD, MDMA/Ecstasy, Magic Mushrooms

Modes of Entry of Poisons

The modes of Poison entry are **Ingestion, Inhalation, Injection, and Absorption**.

Ingestion is the most common type of poisoning making up 80% of poisonings.

It’s important for EMTs to identify the route of poisoning while on scene.

Ingestion

Mechanism: Substance is swallowed and goes through GI system where it is absorbed into the bloodstream.

Examples: Alcohol, Medications, Food, Cleaning supplies.

Dangers:

- GI bleeds
- Burns (acids or bases)

Treatment:

- Do not induce vomiting (causes reexposure of the esophagus to the poison)
- Administer activated charcoal
- Bring pill bottle or anything that was ingested to the hospital
- Monitor Airway

Inhalation

Mechanism: Toxin enters through the lungs and is absorbed into the bloodstream at the alveoli

Examples: CO, Smoke, Chlorine gas, ammonia

Dangers:

- Hypoxia
- Pulmonary edema
- CNS effects

Treatment:

- High flow O_2 with non rebreather
- Monitoring airway and breathing
- CPAP for severe respiratory depression

Injection

Mechanism: Entry into the bloodstream

Examples: Needles, snake bites, Insect stings, IV drug use

Dangers:

- Very rapid systemic effect
- Local swelling or allergic reactions
- Shock or infection

Treatment:

- Cold pack slows absorption
- Move affected limb to below the heart level
- Mark the swelling to monitor changes
- Rapid transport

Absorption

Mechanism: Toxins are absorbed from the skin to the bloodstream

Examples: Fertilizers, Pesticides, Acids,

Dangers:

- Skin Irritation and burns
- Systemic absorption (Organophosphates)

Treatment:

- Brush off any powder without getting it on your own skin
- Flush with water for at least 20 minutes
- Remove contaminated clothing and any jewelry

Scenario 1: 19 YOM unconscious/minimally responsive

What is your field impression?

Correct Answer: Opioid Overdose

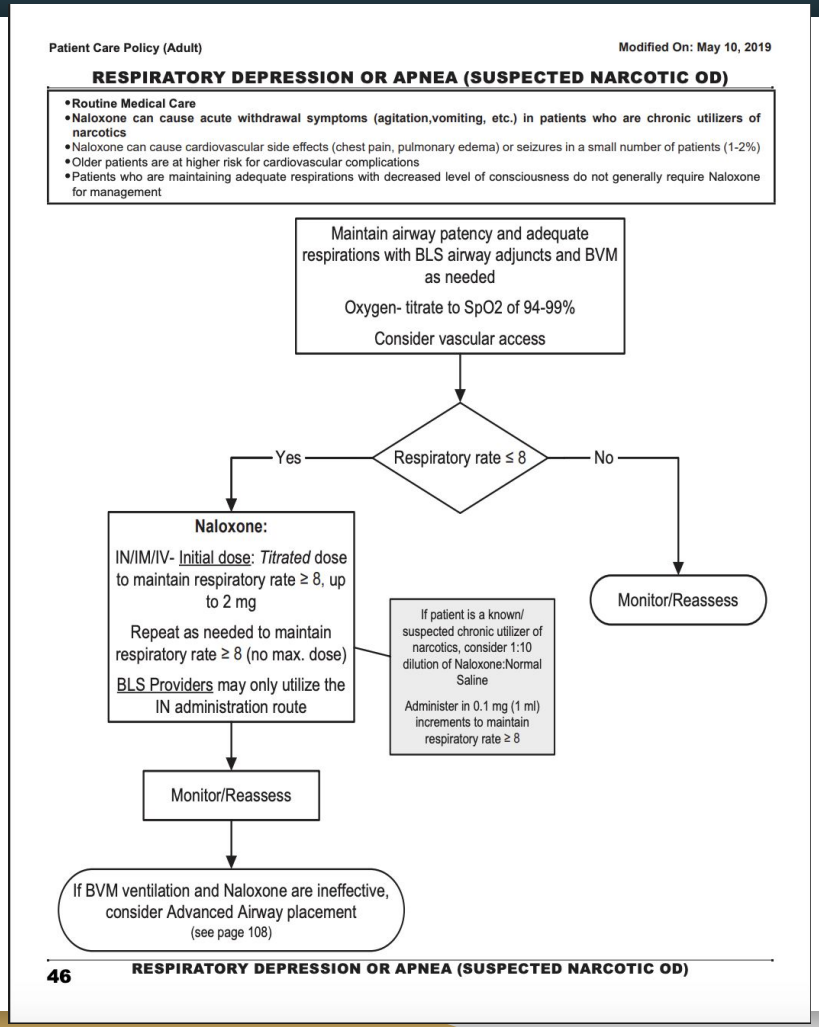
What is an Opioid Overdose?

- Opioids (such as fentanyl, heroin, or oxycodone) bind to opioid receptors in the brain, causing excessive stimulation that leads to respiratory depression, and potentially death
- Signs and Symptoms:
    - Blue or purple fingernails and lips.
    - Unresponsive to voice or touch.
    - Pinpoint pupils (center part of eye is very small)
    - Slow, irregular, or stopped breathing.
    - Slow heartbeat or low blood pressure.
    - Pale, clammy skin.

EMT Actions

- Supplemental O2
- Narcan(2mg)
- Close monitoring and transport

Treat the airway first, then circulation, then drugs!



Patient Care Policy (Adult) Modified On: May 10, 2019

RESPIRATORY DEPRESSION OR APNEA (SUSPECTED NARCOTIC OD)

- **Routine Medical Care**
- **Naloxone can cause acute withdrawal symptoms (agitation,vomiting, etc.) in patients who are chronic utilizers of narcotics**
- Naloxone can cause cardiovascular side effects (chest pain, pulmonary edema) or seizures in a small number of patients (1-2%)
- Older patients are at higher risk for cardiovascular complications
- Patients who are maintaining adequate respirations with decreased level of consciousness do not generally require Naloxone for management

Maintain airway patency and adequate respirations with BLS airway adjuncts and BVM as needed

Oxygen- titrate to SpO2 of 94-99%

Consider vascular access

Respiratory rate ≤ 8

Yes

No

Naloxone:

IN/IM/IV- Initial dose: *Titrated* dose to maintain respiratory rate ≥ 8, up to 2 mg

Repeat as needed to maintain respiratory rate ≥ 8 (no max. dose)

BLS Providers may only utilize the IN administration route

If patient is a known/ suspected chronic utilizer of narcotics, consider 1:10 dilution of Naloxone:Normal Saline

Administer in 0.1 mg (1 ml) increments to maintain respiratory rate ≥ 8

Monitor/Reassess

Monitor/Reassess

If BVM ventilation and Naloxone are ineffective, consider Advanced Airway placement

(see page 108)

Scenario 2: 22 yo M ALOC at house party

What is your field impression?

Correct Answer: Alcohol poisoning + diabetic emergency

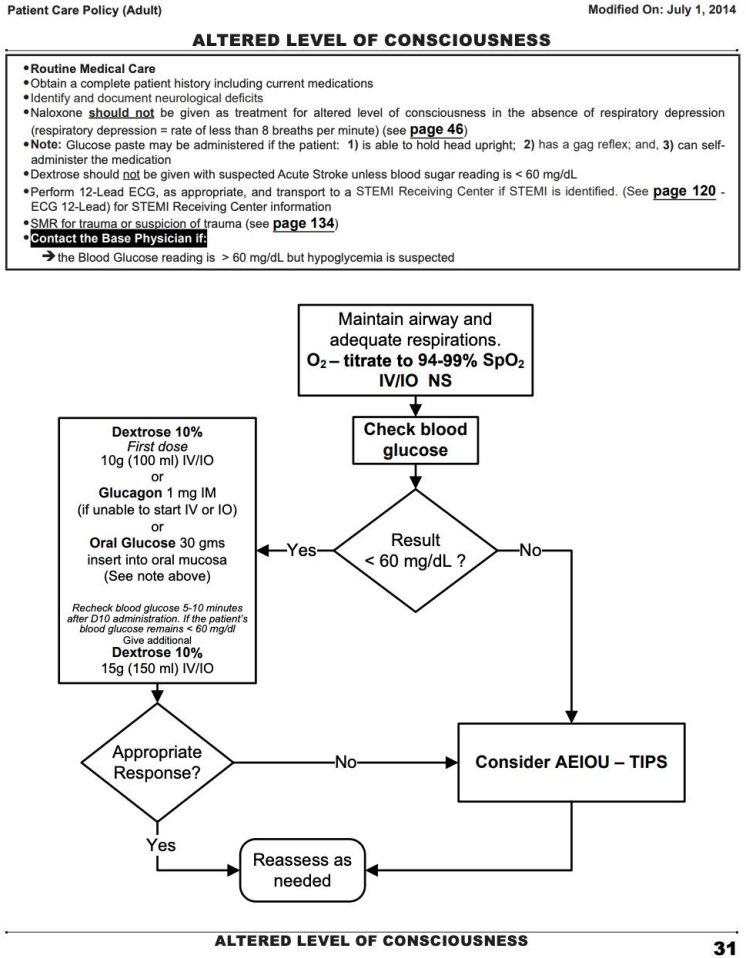
Alcohol Poisoning

Clinical Presentation:

- Slurred speech, ALOC, emesis
- Slow, irregular respirations
- Cool clammy skin, cyanosis
- Hypoglycemia (especially fast drinkers and diabetes)
- Aspiration risk

Treatment:

- Maintain patent airway
- O2 if needed
- Recovery position to protect airway
- Treat for shock if indicated



Patient Care Policy (Adult) Modified On: July 1, 2014

ALTERED LEVEL OF CONSCIOUSNESS

- **Routine Medical Care**
- Obtain a complete patient history including current medications
- Identify and document neurological deficits
- Naloxone **should not** be given as treatment for altered level of consciousness in the absence of respiratory depression (respiratory depression = rate of less than 8 breaths per minute) (see **page 46**)
- **Note:** Glucose paste may be administered if the patient: **1)** is able to hold head upright; **2)** has a gag reflex; and, **3)** can self-administer the medication
- Dextrose should not be given with suspected Acute Stroke unless blood sugar reading is < 60 mg/dL
- Perform 12-Lead ECG, as appropriate, and transport to a STEMI Receiving Center if STEMI is identified. (See **page 120** - ECG 12-Lead) for STEMI Receiving Center information
- SMR for trauma or suspicion of trauma (see **page 134**)
- **Contact the Base Physician if:**
  - ➔ the Blood Glucose reading is > 60 mg/dL but hypoglycemia is suspected

Benzodiazepine Overdose

Prescription CNS depressants used to treat anxiety as well as seizures. They are very dangerous when combined with alcohol or opioids. Examples are Lorazepam and Clonazepam

Clinical Presentation:

- ALOC that can lead to a coma
- Unsteady gait
- Slurred speech
- Respiratory Depression
- For sever overdoses and mixing of drugs: Hypotention and bradycardia

EMT Consideration:

- No antidote in the prehospital setting
- Monitor airway and respiratory status
- Monitor vitals
- Prepare suction
- O_2

Kahoot

https://create.kahoot.it/share/toxicology/ec73d6d9-b742-4f65-9953-5833578aeb51

Scenarios

https://docs.google.com/document/d/1xqYdTPBmfgbCZfcps6l2lege6_O_0hWlA0_5Aff76Ns/edit?usp=sharing

Kahoot questions

Which of these drugs is a stimulant?

- Cocaine
- Alcohol
- Opioids
- Lorazepam

Which of the following is a sign of an opioid overdose?

- Increased HR
- Pinpoint pupils
- Warm skins
- Rapid respiratory rate

What medication is used to reverse an opioid overdose?

- Narcan
- Epinephrine
- Albuterol
- Activated charcoal

What is the first step in treating a drug overdose?

- Maintain airway
- Give oxygen
- Scene Safety
- Rapid transport

What is the most common method of drug entry?

- Injection
- Ingestion
- Inhalation
- Intramuscular

More kahoot

6. What is the most immediate life threat in most overdoses?

Low blood pressure, Altered mental status, **Airway compromise**, Tachycardia

7. Heroin is an example of a

Opioid, Hypnotic, Stimulant, Benzodiazepine

8. Which substance is MOST likely to cause vomiting AND aspiration risk in an unconscious patient?

Cocaine, **Alcohol**, Methamphetamine, nalaxone

9. Which sign suggests a stimulant overdose?

Bradycardia, Pinpoint pupils, **agitation and tachycardia**, decreased respiratory rate

10. A patient is suspected of taking a large amount of diazepam. Which finding is most consistent with diazepam overdose?

Agitation, dilated pupils, and hypertension; **Slurred speech, ataxia, and CNS depression**; pinpoint pupils; Hot, dry skin and hallucinations