

# Poisoning or Overdose Universal Care

## Aliases

Toxin, overdose, poison, exposure

## Patient Care Goals

1. Remove patient from hazardous material environment and decontaminate to remove continued sources of absorption, ingestion, inhalation, or injection (if properly trained and equipped).
2. Identify intoxicating agent by toxidrome or appropriate environmental testing.
3. Assess risk for organ impairments (heart, brain, kidney).
4. Identify antidote or mitigating agent.
5. Treat signs and symptoms in effort to stabilize patient.

## Patient Presentation

### Inclusion (Suspect Exposure) Criteria

1. Presentation may vary depending on the concentration and duration of exposure. Signs and symptoms may include, but are not limited to, the following:
  - a. Absorption:
    - i. Nausea
    - ii. Vomiting
    - iii. Diarrhea
    - iv. Altered mental status
    - v. Abdominal pain
    - vi. Rapid heart rate
    - vii. Dyspnea
    - viii. Wheezing
    - ix. Seizures
    - x. Arrhythmias
    - xi. Respiratory depression
    - xii. Sweating
    - xiii. Tearing
    - xiv. Defecation
    - xv. Constricted or dilated pupils
    - xvi. Rash
    - xvii. Burns to the skin
  - b. Ingestion:
    - i. Nausea
    - ii. Vomiting
    - iii. Diarrhea
    - iv. Altered mental status
    - v. Abdominal pain
    - vi. Rapid or slow heart rate
    - vii. Dyspnea
    - viii. Seizures
    - ix. Arrhythmias
    - x. Respiratory depression
    - xi. Chemical burns around or inside the mouth
    - xii. Abnormal breath odors
  - c. Inhalation:
    - i. Nausea
    - ii. Vomiting
    - iii. Diarrhea
    - iv. Altered mental status
    - v. Abnormal skin color

- vi. Dyspnea
- vii. Seizures
- viii. Burns to the respiratory tract
- ix. Stridor
- x. Sooty sputum
- xi. Known exposure to toxic or irritating gas
- xii. Respiratory depression
- xiii. Sweating
- xiv. Tearing
- xv. Constricted or dilated pupils
- xvi. Dizziness

d. Injection:

- i. Local pain
- ii. Puncture wounds
- iii. Reddening skin
- iv. Local edema
- v. Numbness
- vi. Tingling
- vii. Nausea
- viii. Vomiting
- ix. Diarrhea
- x. Altered mental status
- xi. Abdominal pain
- xii. Seizures
- xiii. Muscle twitching
- xiv. Hypoperfusion
- xv. Respiratory depression
- xvi. Metallic or rubbery taste

1. **Toxidromes** (constellations of signs and symptoms that add in the identification of certain classes of medications and their toxic manifestations). These toxidrome constellations may be masked or obscured in poly pharmacy events:

a. Anticholinergic

- i. Red as a beet (flushed skin)
- ii. Dry as a bone (dry skin)
- iii. Mad as a hatter (altered mental status)
- iv. Blind as a bat (mydriasis)
- v. Hot as a pistol (hyperthermia)
- vi. Full as a flask (urinary retention)
- vii. "Tachy" like a pink flamingo (tachycardia and hypertension)

b. Cholinergic (DUMBELS)

**DUMBELS** is a mnemonic used to describe the signs and symptoms of acetylcholinesterase inhibitor agent poisoning. All patient age groups are included where the signs and symptoms exhibited are consistent with the toxidrome of DUMBELS.

- i. **D**iarrhea
- ii. **U**rination
- iii. **M**iosis or **M**uscle weakness
- iv. **B**ronchospasm, **B**ronchorrhea, **B**radycardia (the killer Bs)
- v. **E**mesis
- vi. **L**acrimation
- vii. **S**alivation or **S**weating

c. Opioids

- i. Respiratory depression
- ii. Miosis (pinpoint pupils)
- iii. Altered mental status
- iv. Decreased bowel sounds

- d. Sedative Hypnotic
  - i. Central nervous system depression
  - ii. Ataxia (unstable gait or balance)
  - iii. Slurred speech
  - iv. Normal or depressed vital signs (pulse, respirations, blood pressure)
- e. Stimulants (Sympathomimetic)
  - i. Tachycardia, tachydysrhythmias
  - ii. Hypertension
  - iii. Diaphoresis
  - iv. Delusions or paranoia
  - v. Seizures
  - vi. Hyperthermia
  - vii. Mydriasis (dilated pupils)
- f. Serotonin Syndrome (presentation with at least three of the following)
  - i. Agitation
  - ii. Ataxia
  - iii. Diaphoresis
  - iv. Diarrhea
  - v. Hyperreflexia
  - vi. Mental status changes
  - vii. Myoclonus
  - viii. Shivering
  - ix. Tremor
  - x. Hyperthermia
  - xi. Tachycardia

### **Exclusion Criteria**

No recommendations

### **Patient Management**

#### **Assessment**

1. Make sure the scene is safe. Use environmental Carbon Monoxide (CO) detector on "first in" bag if possible
2. Consider body substance isolation (BSI) or appropriate PPE.
3. Assess ABCD and, if indicated, expose patient for assessment, and then re-cover to assure retention of body heat.
4. Check vital signs including temperature.
5. Attach ECG cardiac monitor and examine rhythm strip for arrhythmias (consider 12-lead ECG)
6. Check blood glucose level
7. Monitor pulse oximetry and ETCO<sub>2</sub> for respiratory decompensation.
8. Perform carboxyhemoglobin device assessment, if available.
9. Identify specific medication taken (including immediate release vs sustained release), time of ingestion, dose, and quantity. When appropriate, bring all medications (prescribed and not prescribed) in the environment.
10. Obtain an accurate ingestion history (as patient may become unconscious before arrival at ED):
  - a. Time of ingestion
  - b. Route of exposure
  - c. Quantity of medication or toxin taken (safely collect all possible medications or agents)
  - d. Alcohol or other intoxicant taken
11. Consider the threat to yourself and the destination facility if bringing in exposure agent.
12. Obtain pertinent cardiovascular history and other prescribed medications.
13. Check for needle marks, paraphernalia, bites, bottles, or evidence of agent involved in exposure, self-inflicted injury, or trauma.
14. Check for weapons and drugs (law enforcement should have checked, but you may decide to

- re- check).
15. Obtain pertinent patient history.
  16. Perform physical examination.

## Treatment and Interventions

1. Assure a patent airway.
2. Administer oxygen as appropriate for dyspnea or distress with a target of achieving greater than 93% saturation for most acutely ill patients.
3. Initiate IV access for infusion treatment medication and/or lactated Ringer's or normal saline if indicated *[AEMT]*.
4. Consider isotonic IV/IO fluid bolus 20 ml/kg *[AEMT]* if evidence of hypoperfusion.
5. Administer appropriate antidote or mitigating medication (refer to specific agent guideline if not listed below).
  - a. Acetaminophen overdose:
    - i. Consider **Activated Charcoal [EMT-O]** only if within the first hour of ingestion and prolonged transport to definitive care.
    - ii. Do not administer oral agents if there is a risk of rapidly decreasing mental status.
  - b. Aspirin overdose:
    - i. Consider **Activated Charcoal [EMT-O]**.
      1. Administer charcoal early (highly recommended), as aspirin is erratically absorbed.
      2. Do not administer oral agents including activated charcoal if altered mental status or risk of rapid decreasing mental status from polypharmacy.
    - ii. Avoid manual ventilation in salicylate poisonings. Let the patient breathe on their own, even if tachypnea, until there is evidence of decompensation or dropping oxygen saturation. Acid or base disturbances and outcomes worsen when the patient is manually ventilated.
  - c. Benzodiazepine overdose:
    - i. Provide respiratory support.
    - ii. Consider isotonic IV/IO fluid bolus 20 ml/kg *[AEMT]*
    - iii. Consider vasopressors after adequate fluid resuscitation (1–2 liters of crystalloid) for the hypotensive patient.
  - d. Caustic substances ingestion (e.g. acids and alkali):
    - i. Evaluate for airway compromise secondary to spasm or direct injury associated with oropharyngeal burns.
    - ii. In the few minutes immediately after ingestion, consider administration of water or milk if available.
      1. Adults: maximum 240 mL (8 ounces)
      2. Pediatrics: maximum 120 mL (4 ounces) to minimize risk of vomiting
      3. Do not attempt in patients with respiratory distress, altered mental status, severe abdominal pain, nausea or vomiting, or patients who are unable to swallow or protect their airway.
      4. Do not force fluids in anyone who refuses to drink.
  - e. Dystonia (symptomatic), extrapyramidal signs or symptoms, or mild allergic reactions
    - i. Consider administration of **Diphenhydramine [PARA]**
      1. Adult: 25mg-50mg IM/IV/PO/IO (maximum dose of 50 mg)
      2. Pediatric: 1mg/kg IM/IV/PO/IO (maximum dose of 25mg)
  - f. Monoamine oxidase inhibitor overdose—symptomatic; e.g. MAOI; isocarboxazid (Marplan<sup>®</sup>), phenelzine (Nardil<sup>®</sup>), selegiline (Emsam<sup>®</sup>), tranylcypromine (Parnate<sup>®</sup>)
    - i. Consider administration of **Benzodiazepine [PARA]** for temperature control.
  - g. Opiate overdose: Treat per the Opioid Poisoning/Overdose guideline.
  - h. Oral ingestion unknown poisoning:
    - i. Do not administer oral agents if there is a risk of rapidly decreasing mental status or for petroleum-based ingestions.
    - ii. Consider administration of **Activated Charcoal [EMT-O]**, particularly if it is within the first 1 hour after ingestion (including acetaminophen), or prolonged

- transport to definitive care.
- iii. Administer activated charcoal to patients who have ingested medications with extended release or delayed absorption.
  - i. Selective serotonin reuptake inhibitors (SSRIs)
    - i. Consider early airway management.
    - ii. Treat arrhythmias following ACLS guidelines.
    - iii. Aggressively control hyperthermia with cooling measures.
    - iv. Consider isotonic IV/IO fluid bolus 20 ml/kg [*AEMT*]
    - v. Consider vasopressors after adequate fluid resuscitation (1–2 liters of crystalloid) for the hypotensive patient [see Shock guideline].
    - vi. Consider administration of **Benzodiazepine [PARA]** for agitation.
    - vii. Treat seizures per Seizures guideline.
  - j. Tricyclic Antidepressant (TCA) Overdose:
    - i. Consider early airway management.
    - ii. Consider sodium bicarbonate if widened QRS (100 msec or greater).
    - iii. Consider isotonic IV/IO fluid bolus 20 ml/kg [*AEMT*]
    - iv. Consider **vasopressors** after adequate fluid resuscitation (1–2 liters of crystalloid) for the hypotensive patient [*PARA*] [see Shock guideline].
    - v. Consider administration of **Benzodiazepine [PARA]** for agitation.
    - vi. Treat seizures per Seizures guideline.

### Patient Safety Considerations

- Consider scene or environmental safety for patient and provider: Consider environmental carbon monoxide monitor use.
- Monitor patient airway, breathing, pulse oximetry, ETCO<sub>2</sub> for adequate ventilation as they may change over time.
- Repeat vital signs often.
- Monitor level of consciousness.
- Monitor ECG with special attention to rate, rhythm, QRS and QT duration.
- Maintain or normalize patient temperature.
- Engage the regional poison center as early as reasonably possible to aid in appropriate therapy and to track patient outcomes to improve knowledge of toxic effects. The national 24-hour toll-free telephone number to poison control centers is **(800) 222- 1222**, and it is a resource for free expert advice from anywhere in the United States.

### Notes and Educational Pearls

#### Key Considerations

1. Each toxin or overdose has unique characteristics which must be considered in individual protocol.
2. Activated charcoal (which does not bind to all medications or agents) is still a useful adjunct in the serious agent, enterohepatic, or extended release agent poisoning as long as the patient does not have the potential for rapid alteration of mental status, or airway or aspiration risk. Precautions should be taken to avoid or reduce the risk of aspiration.
3. Ipecac is no longer recommended for any poisoning or toxic ingestion. The manufacturer has stopped production of this medication.
4. Flumazenil is not indicated in a suspected benzodiazepine overdose as you can precipitate refractory or intractable seizures if the patient is a benzodiazepine dependent patient.

### Pertinent Assessment Findings

Frequent reassessment is essential as patient deterioration can be rapid and catastrophic.

### Quality Improvement

**Associated NEMESIS Protocol(s) (eProtocol.01)**

- 9914135—General-Overdose/Poisoning/Toxic Ingestion

### Key Documentation Elements

- Repeat evaluation and documentation of signs and symptoms as patient clinical conditions may deteriorate rapidly
- Identification of possible etiology of poisoning
- Initiating measures on scene to prevent exposure of bystanders when appropriate or indicated
- Time of symptoms onset and time of initiation of exposure-specific treatments

### Performance Measures

- Early airway management in the rapidly deteriorating patient
- Accurate exposure history
  - Time of ingestion or exposure
  - Route of exposure
  - Quantity of medication or toxin taken (safely collect all possible medications or agents)
  - Alcohol or other intoxicant taken
- Appropriate protocol selection and management.
- Multiple frequent documented reassessments.

### References

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