OVERDOSES/ POISONINGS

TYPES OF OVERDOSE EMERGENCIES
Accidental/unintentional overdoses or poisonings
dosage errors
Adverse/allergic reactions
environmental exposures
occupational exposures
neglect and abuse
childhood poisonings

Intentional overdose or poisoning
suicide attempts
chemical warfare
assault/homicide

Drug and/or alcohol abuse

RESOURCES
Poison Control Centers
Computerized data bases
Haz Mat team
Medical Control Physician/Hospital

ROUTES OF EXPOSURE
Ingested

Inhaled

Injected

Absorbed

PATIENT ASSESSMENT-may be specific to toxic agent and situation
NEED a baseline
Respiratory system

Cardiovascular system
Neurological system
HISTORY
Thorough history of the exposure/poisoning
identify substance
bring it in!? eg plant, pill containers
route of entry
time taken
quantity taken
reason for exposure-
    accidental
    intentional
symptoms prior to arrival
treatment prior to arrival
other potential patients
psychiatric hx pertinent to suicide attempts/depression

GENERAL MANAGEMENT
Safety
Airway
Breathing
Circulation

Non-pharmacologic care
Ingested dilute remove

Inhaled remove oxygen support ventilations

Injected ice dependant position constricting band on extremity

Absorbed brush off wash off Eye-remove contact lens, irrigate

Pharmacologic care
eg Atropine/Duodote
Narcan
Sodium Bicarbonate
Dextrose
Activated Charcoal
Calcium
Digibind (Digoxin)
Cyanokit
OVERDOSES/SUBSTANCES

CHOLINERGICS
Substances that produce the effects of the Parasympathetic Nervous System (PNS)
Acetylcholine is the neurotransmitter (the carrier of the message) of the PNS.
Cholinergic drugs work by---
stimulating the receptor sites of the PNS directly (so you would see the actions of the PNS).
AND/OR
preventing the breakdown of Acetylcholine (by the enzyme cholinesterase or acetylcholinesterase ACH ). This produces a prolonged/intensified response at the receptor sites of the PNS since Acetylcholine keeps stimulating the receptor site.

Common agents
Organophosphates and
pesticides
pet, home and commercial insecticides
found in softeners for plastic, hydraulic fluids and fire proofing materials
Nerve agents eg Sarin (GB), Soman (GD), VX, Tabun (GA)
Physostigmine (Antilirium)
Certain mushrooms

Presentation
Brady-cardia
Miosis
Hypotension
Lacrimation
Rhinor-rhea
Blurred vision
Bronchoconstriction
Dizziness
Anxiety
Wheezing
Salivation
Dyspnea
Respiratory depression
Coma
Gastrointestinal cramps
Seizures
Nausea & vomiting
Urination
Increased bowel sounds
Defecation

S L U D G E

Management
Safety
ABC, IV, EKG
Decontamination
Drugs
Atropine
2-PAM (pralidoxime chloride)
Diazepam
Activated Charcoal for ingestions

C O W
ANTICHOLINERGICS
Substances that produce the opposite actions of the PNS.
Acetylcholine is the neurotransmitter (the carrier of the message) of the PNS.
Anticholinergics inhibit or block acetylcholine.

Common agents
- Antihistamines (ex Benadryl)
- Atropine
- Antispasmodics
- Atrovent
- Antiparkinson meds
- Plants (Jimson weed)
- Antidepressants

Presentation
- Mad as a Hatter (dementia)
- Hot as Hell (fever)
- Red as a Beet (flushed)
- Blind as a Bat (dilated pupils)
- Dry as a Bone (dry mouth)
- Cardiac Dysrhythmia

Management
- Safety
- ABC, IV, EKG
- Check with Poison Control
- ER-may give Physostigmine

D A D
OPIATES/NARCOTICS

Narcotics are drugs that depress the CNS, thus helping to relieve pain, produce sleep etc. Overdoses, excessive doses can produce unconsciousness, stupor, death. Most narcotics are analgesics
Opiates are considered narcotics

Common agents
Morphine  Heroin
Demerol  Oxycodone
Dilaudid  Oxycontin (time released Oxycodone)
Fentanyl  Vicodin (Hydrocodone & APAP)
Codeine
Darvon

Presentation
Hypotension
Bradycardia
Decreased LOC
Respiratory depression/arrest
Pinpoint pupils
Pulmonary edema

Management
Safety
ABC, IV, EKG
NARCAN

Withdrawal
Can be precipitated with Narcan
6-24 hours after last dose
Typically not life-threatening
Methadone

Yawning  Rhinorrhea
N & V  Diarrhea
Abdominal cramps  Flu like symptoms
Diaphoresis  Piloerection
Restlessness  Tachycardia
Irritability  Insomnia
Tremors
SEDATIVES-HYPNOTICS
Prescribed drugs include benzodiazepines, barbiturates (rarely prescribed)

Commonly known as downers. Prescribed for symptoms of anxiety, stress, insomnia, alcohol withdrawal and seizures.

Common agents
- Diazepam (Valium)
- Lorazepam (Ativan)
- Alprazolam (Xanax)
- Rohypnol (date rape drug)

Presentation
- Drowsiness
- Respiratory Depression/arrest
- Hypotension
- Decreased LOC
- Pupils may be constricted but more commonly dilated

Management
Safety
- ABC, IV, EKG
- Flumazenil (Romazicon)

Withdrawal
- Commonly 2-14 days after last dose
- Agitation
- Tachycardia
- Hypertension
- Fever
- Seizures
PSYCHIATRIC MEDICATIONS

Cyclic Antidepressants
Prescribed mainly for the management of depression. However also prescribed for certain pain management situations, sleep aid and to help stop smoking. bedwetting When prescribed these drugs often takes 2-3 weeks for therapeutic effects to occur.

From the AHA
Toxic effects are due to 4 pharmacologic properties
1. Stimulate catecholamine release and then block reuptake
2. Central and peripheral anticholinergic action
3. Inhibit potassium channels in the myocardium and sodium channels in the brain and myocardium
4. Direct alpha blocking actions

PROBLEM—overdoses may result in rapid, severe deterioration. Most patients will manifest signs of toxicity within 2-4 hours after ingestion.

Common Agents
Amitryptyline (Elavil)
Nortriptyline
Imipramine
Doxepin

Presentation
Earliest warning signs
Dry mouth
Vision changes, dilated pupils
Altered LOC (confusion, inability to concentrate, irritability, delirium)
*Tachycardia
*Widening QRS
*Rapid deterioration
Hypotension
Seizures
Dysrythmias (tachy, brady, AV block)
Respiratory/cardiac arrest
Extreme acidosis

Management
ABC, I.V, EKG
Monitor heart rate and QRS duration closely
*Sodium Bicarbonate
Fluids/Pressor agents for hypotension
Benzodiazepines for seizures
Consult with Poison Control
**Serotonin Re-uptake inhibitors**
Prescribed drugs used for the treatment of depression.

Common Agents
- Prozac/Fluoxetine
- Paxil / Paroxetine
- Zoloft/ Sertaline

Presentation
**Usually signs and symptoms of overdoses are mild**
- Drowsy
- Tremors
- N & V
- Sinus Tachycardia

Serotonin Syndrome occurs because of increased Serotonin levels. This syndrome is triggered by increasing the dose of the drug or adding in another antidepressant.

Presentation
- Agitation, anxiety, confusion, drowsy, insomnia
- Headache
- Nausea, diarrhea, cramps
- Tachycardia
- Fever
- Shivering, tremors, muscle rigidity

Management
- ABC, IV, EKG
- Check with Poison Control
**Lithium**
Used for the treatment of bipolar disorder (manic-depressive). It helps to prevent mood swings.
Lithium has a very narrow range of a therapeutic level. People on Lithium may easily become toxic, overdose.

Presentation with normal dose
- Muscle tremor
- Thirst
- Nausea
- Increased urination
- Abdominal cramping, diarrhea

With toxic ingestion
- Muscle weakness
- Slurred speech
- Severe trembling
- Blurred vision
- Confusion
- Seizure
- Apnea
- Coma

Management
- ABC, IV, EKG
- Treat seizures
- Treat symptoms
- Activated Charcoal will not bind Lithium

**MAO Inhibitors** (Monoamine oxidase inhibitors)

Used to treat depression and obsessive-compulsive disorders.
Blocks the breakdown of Norepinephrine, Dopamine and Serotonin
Overdoses are extremely life-threatening but toxicity is often not seen for hours (6-24)

Presentation
- Tachycardia and Severe Hypertension ⇒ Bradycardia and hypotension, coma and death
- Restless, agitated, tremor, seizures

Management
- ABC, IV, EKG
- Treat symptoms/Care with pressor agents
- Contact Poison Control,
OVER THE COUNTER PAIN MEDICATIONS

**Salicylates**  
Medications that commonly contain Aspirin, both OTC and prescription. A tab usually contains 325 mg.  
Mechanism of toxicity of an overdose is complex

Serious overdose is considered to be about 300 mg/kg
MATH!  
300mg x 100 K = 30,000 mg = 92 (325 mg) pills

Presentation

**CNS stimulation**  
Initially Respiratory alkalosis with Metabolic compensation ⇝ metabolic acids (accumulating and thus metabolic acidosis occurs

**GI Irritation**  
N & V  
GI bleed  
Abdominal pain

**Inhibition of Glucose metabolism**  
Interference with glucose uptake occurs and causes accumulation of serum glucose. Eventually glucose in the cell is depleted and hypoglycemia is seen.

**Fluid and electrolyte imbalance**  
Fluids and electrolytes are eliminated with GI symptoms ⇝ acid-base imbalance ⇝ low potassium ⇝ dysrhythmias

**Neurological**  
Tinnitus  
Confusion  
Lethargy  
Hallucinations, seizure, coma  
Fever

**Clotting problems**  
Bleeding/hemorrhage

Management  
ABC, IV, EKG  
Check blood sugar  
Consider Bicarb
**Acetaminophen (APAP)**
Most often used for the treatment of pain. Most common agent is TYLENOL. Found in combination with other drugs, hundreds of OTC and prescription. Often times found in cold remedies. Common dose per pill/caplet is 325 mg, extra strength 500 mg.

MATH!
140-150 mg/kg is considered toxic
- 50 K x 150 = 7500 mg or about 23 (325 mg) pills
- 75 K x 150 = 11,250 mg or about 35 (325 mg) pills
- 100 K x 150 = 15,000 mg or about 46 (325 mg) pills
- 15 K x 200 = 2250 or about 6 (500 mg) pills

Presentation-varies from source to source but...
**Early-up to 24 hours**
N & V, anorexia, diaphoresis, general malaise

**24-48 hours**
Abdominal pain/tenderness in right quadrant
decreased urine
elevating liver enzymes
resolution of stage 1 symptoms

**72-96 hours**
Liver destruction
Kidney failure
Coma
Dysrhythmias
Hypoglycemia

Management
ABC, IV, EKG
Treat symptoms
Mucomyst (n-acetylcysteine)
in hospital treatment
Nonsteroidal anti-inflammatory drugs (NSAIDS)
Common pain & fever relief and anti-inflammatory medications

Common Agents
Ibuprofen
Naproxen

Presentation
Side effects are usually easily treated, tend to resolve in about 24 hours and are seldom harmful.
Mild GI S & S
Altered LOC \( \Rightarrow \) seizures \( \Rightarrow \) apnea
Hypotension
Bradycardia
Metabolic acidosis
Liver and kidney failure

Management
ABC, IV, EKG
Treat symptoms
ENVIRONMENTAL TOXINS

**Cyanide**
Cyanide is a highly toxic substance that occurs in several forms. Cyanide causes asphyxia to cells. It does this by inhibiting an enzyme that is necessary for the cells to be able to use oxygen. High doses may lead to a rapid death.

**Sources**
- Metal plating
- Ore extraction
- Fumigation
- Fertilizer
- Combustion from burning nylon and polyurethane
- Seeds of cherries, pears, apples, apricots
- Nitroprusside infusions

**Presentation**
- Signs and symptoms of hypoxia
- Hypertension $\Rightarrow$ Hypotension
- Acidosis
- Pulmonary edema
- Dysrhythmias
- Coma

**Management**
- Safety! Remove patient from cyanide source if indicated
- ABC, IV, EKG
- ABC-airway control, high flow oxygen
- Cyanide antidote kit/Cyanokit
Caustics
Caustics are defined as Acids and Alkali agents.

Sources
<table>
<thead>
<tr>
<th>Acids</th>
<th>Alkalis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toilet bowl cleaners</td>
<td>Paint remover</td>
</tr>
<tr>
<td>Metal cleaners</td>
<td>Bleach</td>
</tr>
<tr>
<td>Battery acid</td>
<td>Ammonia</td>
</tr>
<tr>
<td></td>
<td>Drain Cleaners</td>
</tr>
<tr>
<td></td>
<td>Button batteries</td>
</tr>
</tbody>
</table>

Acids-complete their damage in 1-2 minutes
Alkalis may continue for minutes to hours, liquefying tissue

Presentation
Acids-immediate and severe pain, Alkalis may have delayed pain
If swallowed
- burns to GI tract (mouth to stomach)
- perforation of esophagus, stomach
- vomiting blood
- drooling, trouble swallowing
- potential damage to respiratory tract

Management
Safety
ABC
Dilution-controversial, work with Medical Control
**Hydrocarbons**
Compounds mainly obtained from crude oil, coal or plants. Compounds can vary greatly based on their viscosity, volatility, blends of other chemicals etc.

**Sources**
- Gasoline *(low)*
- Lamp oil (kerosene)
- Motor oils
- Pesticides
- Lighter fluids
- Polishes, cleaning agents
- Turpentine
- Paints

**Presentation**
Anyone suspected of hydrocarbon aspiration that coughs, chokes, cries of vomits suspect aspiration
- Aspiration pneumonia
- Acute gastritis
- CNS depression (coma)
- Hypoglycemia
- Seizures
- Ataxia

**Management**
- Respiratory support
- Circulatory support
- Avoid the use of decontamination of the stomach

**Mace, Pepper Spray, Tear Gas**

**Sources**
- Personal protection sprays
- Law enforcement

**Presentation**
- Respiratory irritation
- Tearing
- Nausea & vomiting

**Management**
- Safety, protect self
- Remove from environment
- Copious flush

***For Metal poisoning check Mosby’s Paramedic text pages 989-990. (Iron, Lead, Mercury)***
Food Poisoning
Illness with a sudden onset, usually associated with stomach pain, vomiting and diarrhea. Usually from food ingested in past 48 hours. Symptoms appear anywhere from 1-48 hours after ingestion.

Onset of S/S vary by cause and how heavily the food was contaminated.

1-12 hours bacterial toxins
12-48 hours with viral and bacterial infections

INFECTIOUS-Bacterial & Viral

1. Bacterial
   a. Salmonella
      -common
      -found in humans and animals and birds (esp chicken)
      -may be transferred to food from the excrement of infected animals/humans, and by an infected person handling food.
   
   b. Staphylococcal
      -causes formation of toxins
      -toxins may be difficult to destroy even with cooking
   
   c. E coli

   d. Shigella –Shigellosis
   
   e. Campylobacter

   f. Botulism
      -rare
      -results from ingestion of improper canned/preserved food
      -symptoms involve CNS -infants (under 1 year of age) may develop botulism from consuming infected spores from honey, perhaps corn syrup

2. Viral
   a. Norwalk
      -commonly from shellfish
   
   b. Rotavirus
      -From the Mayo Clinic

      “Rotavirus is the most common cause of diarrhea in infants and children worldwide, according to the Centers for Disease Control and Prevention. Most children have had at least one bout with rotavirus by age 2 or 3.”
Management
Protect yourself
ABC
IV
Evaluate orthostatics, fluid administration
Good history

NON-INFECTIONOUS

1. Mushrooms/toadstools
   try to obtain sample
   can cause death

2. Fresh produce contaminated with insecticides

3. MSG
   preservative
   flavor enhancement

overdoses