Chapter 19 Toxicology

Introduction
● Each day, we come into contact with things that are potentially poisonous.
● Acute poisoning affects 5 million people each year.
● Chronic _________________ is much more common.
   - Caused by abuse of medications,
     _________________ , alcohol, drugs

Definitions
● _________________ : the study of toxic or poisonous substances
● Poison: Any substance whose chemical action can damage body structures or impair body functions.
● Substance Abuse: The knowing misuse of any substance to produce a desire effect.
● _________________ : a toxic dose of a drug

Consider Poisoning In Patients With:
● Gastrointestinal S/S
● Altered LOC, Seizures, Unusual
   _________________
   ● Disturbed Autonomic Nervous System
     - Pupil changes, salivation, diaphoresis
   _________________ Depression
● Burns, Blisters of Lips or Mucous Membrane
● Vague or allusive _________________

Identifying the Patient and the Poison
If you suspect poisoning, ask the patient the following questions:
● What _________________ did you take?
• __________________ did you take it or (become exposed to it)?
• How much did you ingest?
• What __________________ have been taken?
• How much do you weigh?

6 Determining the Nature of the Poison
• Take suspicious materials, containers, and ________________ to the hospital.
• Provides key information on:
  - Name and concentration of the drug
  - Specific ingredients
  - Number of pills originally in bottle
  - Name of manufacturer
  - ________________ that was prescribed

7 Poison Control Centers
• Staff have information on most substances.
• Center has information on emergency treatments and antidotes.
• If poison control is contacted, gain permission for treatment from ________________ control
• 1-800-764-7661
• Can provide guidance but ________________ provide medical direction or give orders to EMS

8 Routes of Poisonings
• ________________ : By mouth
• Inhalation: Breathing in gases, toxins, or chemicals
• Injection: Mostly from deliberate drug overdose
• ________________ : Corrosive substances that contact the skin
• All routes can be __________________
9 How Poisons Get Into the Body

10 Ingested Poison (1 of 3)

- Poison enters the body by _______________________.
- Accounts for 80% of poisonings
  - Drugs
  - Liquids
  - Household cleaners
  - Contaminated _______________________
  - _______________________

Ingested Poisons (2 of 3)

- May be ________________________ or deliberate
- Signs and symptoms vary greatly with the:
  - Type of poison
  - ________________________ of the patient
  - ________________________ that has passed since ingestion

Management of Ingested Poisons (1 of 2)

- Goal is to rapidly _______________________ as much poison as possible from the GI tract.
  - Further care will be provided at the emergency department
- In the past, syrup of ipecac was used to induce vomiting.
  - Generally ________________________ used today

Management of Ingested Poisons (1 of 2)

- Assess ABCs.
- Prepare for ________________________
- Activated ________________________ may be indicated.
  - Will bind with poison to decrease potency and expedite removal
- Consult with medical direction

**Activated Charcoal (1 of 2)**
- Charcoal is not indicated for:
  - Ingestion of an acid, alkali, or petroleum
  - Patients with decreased level of consciousness
  - Patients who are unable to swallow
- Usual dosage (___________ g/kg)
  - ___________ to ___________ g for adults
  - 12.5 to 25 g for pediatric patients.

**Activated Charcoal (2 of 2)**
- Obtain approval from medical control.
- _______________ bottle vigorously.
- Ask patient to drink with a straw.
  - You may have to _______________ the patient to drink
- Record the time you administered the activated charcoal.
- Be prepared for vomiting.

**Inhaled Poisons (1 of 2)**
- Wide range of effects
  - Some inhaled agents cause progressive lung damage.
- Move to _______________ air immediately.
- All patients require immediate transport.
- _______________ is greatest danger
- Some poisons may require decontamination

**Inhaled Poisons (2 of 2)**
- Carbon Monoxide Poisoning
  - Colorless, tasteless, and _______________ gas
  - Produced by incomplete combustion
- Binds to hemoglobin ___________ times more readily than oxygen
- S/S: N/V, headache, “roaring” in ears, seizures, coma, and cherry red skin
  ● Suspect respiratory ________________________
  ● Pulse ox may register ____________ saturation

18 **Injected Poisons (1 of 2)**

● Usually result of drug overdose

● Signs and symptoms may include:
  - Weakness
  - _______________________
  - Fever/chills
  - Unresponsiveness
  - _______________________

19 **Injected Poisons (2 of 2)**

● Impossible to remove or ________________________ poison once injected
  - Usually absorbed quickly into the body
  - Can cause intense ______________________ tissue destruction

● Monitor the airway, provide high-flow oxygen, be alert for nausea and vomiting, and transport promptly.

20 **Care for Injected Poisonings**

● Try to slow absorption
  - Venous ________________________ bands
  - Cold Packs
  - Splinting

● Remove ________________________ if swelling starts

● Monitor airway and respirations

● ABCs and prompt transport
Absorbed Poisons (1 of 2)

- Many substances will damage the skin, mucous membranes, or eyes.
- Substance should be __________________________ from patient as rapidly as possible.
- If substance is in the eyes, they should be irrigated.
- Do not irrigate with water if substance is __________________________.

Absorbed Poisons (2 of 2)

Signs and symptoms include:
- A history of __________________________
- Liquid or powder on a patient’s skin
- Burns
- Itching
- __________________________
- Typical odors of the substance

Treatment of Absorbed Poisonings (1 of 3)

- Avoid __________________________ yourself or others.
- While protecting yourself, remove substance from patient as rapidly as possible.
- Remove all contaminated clothing.
- Flush and __________________________ the skin.
- Avoid using “________________________ ” agents

Treatment of Absorbed Poisonings (2 of 3)

- Try to obtain Material Safety Data Sheet (MSDS) of substance
- If in eyes __________________________ continuously
  - 5 to 10 minutes for acid substances
  - 15 to 20 minutes for alkalis
- If dry material, __________________________ off as much
as possible then flush with copious amounts of water

**Treatment of Absorbed Poisonings (3 of 3)**

- If chemical is water reactive:
  - Brush the chemical off.
  - Remove contaminated __________________________ .
  - Apply a __________________________ dressing to the burn area.
- In all cases involving flushing the skin, assure adequate __________________________ supply

**General Care of Poisonings (1 of 2)**

- Ensure scene safety
  - __________________________ activity involving illegal drugs
  - Hazardous conditions
  - Suicide attempts
- Treat the patient, not the poison.
- Rule out __________________________.
- Hi-Con oxygen.
- Bring in __________________________ of poison if possible.

**General Care of Poisonings (2 of 2)**

- Save __________________________ for analysis.
- Contact Poison Control and Medical Control
- If amount taken cannot be determined, assume __________________________ missing content was taken

**Emergency Medical Care**

- __________________________ decontamination is important.
- Care focuses on __________________________ : assessing and maintaining ABCs.
You may be permitted to give activated charcoal for ingested poisons.
- Contact medical control or follow protocols

**Substance Abuse Terms**

- **Drug**: substance for preventing or treating of diseases or enhancement of the welfare of humans or animals.
- **_______________________**: An overwhelming desire or compulsion to continue using the drug.
- **Dependency**: physical and psychological state in which the drug is required to prevent withdrawal
- **_______________________**: Increasing resistance to a drug

**Alcohol (1 of 3)**

- Most commonly abused ________________ in the US
- Kills more than 200,000 people a year
- Alcohol is a powerful CNS depressant.
- Acts as a ________________ and hypnotic
- A person that appears intoxicated may have a ________________ problem.

**Alcohol (2 of 3)**

- Intoxicated patients should be transported and seen by a ________________.
- If patient shows signs of serious CNS depression, provide respiratory support.
- Patients may also experience hypoglycemia, trauma, internal bleeding, respiratory depression, and shock.
- A patient with alcohol withdrawal may experience delirium ________________ (DTs).

**Alcohol (3 of 3)**
Patients with DTs may experience:

- __________________________ and restlessness
- Fever
- __________________________
- Confusion and/or disorientation
- Delusions and/or hallucinations
- __________________________

Care for ETOH Patients

- Use caution, protect yourself
- Check closely for other illnesses or health problems:
  - complete history and head to toe as needed
- Alcohol combines with other medications. Consider:
  - Suspect other medications or substances
- Treat patient with same care as others.
- Protect __________________________
- Protect from vomiting.

Opioids (Narcotics) (1 of 2)

- Drugs containing __________________________ from the poppy seed
- Most of these, such as codeine, Morphine, Darvon, and Percocet, have medicinal purposes.
- The exception is __________________________ , which is illegal.
- Opioids are CNS __________________________ causing severe respiratory distress and constricted (pinpoint pupils).

Opioids (Narcotics) (2 of 2)

- Care includes supporting airway and breathing.
You may try to wake patients by talking loudly or _______________________ them gently.
Always give supplemental oxygen and prepare for vomiting.
Request for _______________________ back up for administration of a narcotic antagonist (Narcan).

Sedative-Hypnotic Drugs (Barbiturates) (1 of 2)

- These drugs are CNS _______________________ and alter level of consciousness.
- Patients may have severe respiratory depression and even coma.
- The main concern is respiratory _______________________ and airway clearance, ventilatory support, and transport.

Sedative-Hypnotic Drugs (Barbiturates) (1 of 2)

- _________________ may be life threatening
- Treatment is to support airway and breathing
- The antidote (_______________________ ) may be administered in the hospital.

Abused Inhalants (1 of 3)

- Common household products inhaled by teenagers for a “high”
- Called “_______________________ ”
- Effects range from mild drowsiness to coma
- May often cause_______________________

Abused Inhalants (2 of 3)

These agents are inhaled instead of ingested or injected:
- __________________________ , toluene, xylene, hexane
  - Found in glues, cleaning compounds, paint thinners, and lacquers
Abused Inhalants (2 of 3)

- Halogenated hydrocarbon solvents can make the heart hypersensitive to the patient’s own adrenaline.
- Even the action of ________________ may cause a fatal ventricular arrhythmia and cardiac arrest.
- Give oxygen and use a ________________ to move patient.
- Prompt transport is essential.

Sympathomimetics

- CNS stimulants that mimic the effects of the ________________ (flight or flight) nervous system
- Cause hypertension, tachycardia, and dilated pupils.
- ________________ and methamphetamine are commonly taken by mouth.
- ________________ can be taken in many different ways.
  - Can lead to seizures and cardiac disorders
- Be aware of personal safety.

Street Names for Sympathomimetics

Marijuana

- Smoked by 20 million people daily in the US
- Produces ________________, relaxation, and drowsiness
- Impairs short-term memory and ability to work
- Transport to hospital is rarely needed.
- Marijuana can be used as ________________ for other drugs
- It can be covered with PCP, crack, or other drugs.

44 **Hallucinogens (1 of 2)**
- Alter an individual’s sense of
  - __________________________
- __________________________ and PCP are potent hallucinogens.
- Sometimes, people experience a “bad trip.”
- Patient typically are hypertensive, tachycardic, anxious, and __________________________ .

45 **Hallucinogens (2 of 2)**
- Use extreme caution
- Use a __________________________, professional manner and provide emotional support.
- Only restrain if danger of injury exists.
- __________________________ the patient carefully during transport.

46 **Anticholinergics**
- “Hot as a hare, blind as a bat, dry as a bone, red as a beet, and mad as a hatter”
- Block the __________________________ nerves
- __________________________ , Benadryl, Jimson weed, certain anti-depressants
- Patient may go from “normal” to seizure to death within __________ minutes.
- Treat ABCs and consider ALS backup.

47 **Cholinergic Agents**
- Commonly used as __________________________ agents for warfare
- Overstimulate body functions controlled by the parasympathetic nervous system
Organophosphate _______________________ or wild mushrooms are also cholinergic agents.

S/S produce DUMBELS/SLUDGE

**S/ S of Cholinergic Poisoning**

**DUMBELS**

- D _______________________
- U Urination
- M Miosis (tears)
- B Bronchorrhea
- E _______________________
- L Lacrimation (pupil constriction)
- S Salivation

**SLUDGE**

- S _______________________
- L Lacration
- U _______________________ 
- D Defecation
- G GI irritation
- E Eye constriction and _______________________

**Care for Cholinergic Poisoning (1 of 2)**

- Main concern is to avoid _______________________
- May require field decontamination
- Priority after decontamination is to decrease the secretions in the _______________________ and trachea.
- Provide airway support.
- May be treated as a HazMat incident
- Contact _______________________ backup

**Care for Cholinergic Poisoning (2 of 2)**

Antidote kits may be available:
Mark I kit, DuoDote kit

- Indications include a known _________________ to nerve agents or organophosphates with manifestation of signs and symptoms.
- The kit consists of an auto-injector of _________________ and one of 2-PAM chloride.

Aspirin

- Signs and symptoms of OD
  - Nausea/vomiting
  - _________________
  - Ringing in ears
  - Confusion
  - _________________

- Patients should be transported quickly to the hospital.

Acetaminophen

- Overdosing is common.
- Generally not _________________ toxic
- Symptoms may not appear until it is too late.
- _________________ failure may not be apparent for a full week.
- Gathering information at the scene is very important.

Other Alcohols

- Methyl alcohol and ethylene glycol are more toxic than ethyl alcohol.
- May be taken by chronic alcoholics who cannot obtain drinking alcohol
- More often taken by someone attempting _________________
- Immediate _________________ is essential.

Geriatic Needs
- Patient may become _____________________ about medications and experience an accidental overdose.
- Elderly patient may intentionally overdose in an attempt to commit suicide.
- Exposures may have increased effects due to _____________________ in various systems of the body.

**Food Poisoning**
- _____________________ bacterium causes severe GI symptoms within 72 hours.
- *Staphylococcus* is a common bacteria that grows in foods kept too long.
- _____________________ often results from improperly canned foods.

**Salmonella**
- Characterized by severe GI symptoms within 72 hours of ingestion, including nausea, vomiting, abdominal pain, and _____________________
- Proper cooking kills _____________________, and proper cleanliness in the kitchen prevents the contamination of uncooked foods.

**Staphylococcus**
- The more common cause of food poisoning is the ingestion of powerful toxins produced by bacteria, often in _____________________.
- Quick to grow and produce toxins in food.
- Foods prepared with _____________________, when left unrefrigerated, are a common vehicle.
- Produces extreme GI symptoms

**Botulism**
- The most _____________________ form of toxin
ingestion
- Can result from eating improperly canned food
- Symptoms are neurologic:
  - ____________ of vision
  - Weakness
  - Difficulty in speaking and breathing

**Care for Food Poisoning**
- Try to obtain as much ________________ as possible.
- Transport patient to hospital promptly.
- If more than one ________________ experiences symptoms, suspect food poisoning.
- If possible, bring some of the suspected food to the hospital.

**Plant Poisoning**
- Many household plants are poisonous if
  - ________________ .
- Several ________________ cases of plant poisonings occur each year.

**Dieffenbachia**
- Irritation of the ________________ and/or mucous membranes
- Maintain an open airway.
- Give oxygen.
- Transport the patient promptly to the hospital for ________________ support.

**Management of Plant Poisonings**
If Assess the patient’s airway and vital signs:
- Notify poison control center.
- Take the ________________ to the emergency
department.

- Provide _________________________ transport.