Poisoning, Overdose & Abdominal Emergencies (Class 16)

Poisoning & Overdose

• Terminology
  – Addiction
    • Physical and/or psychological dependence on a drug
  – Delirium tremens
    • Alcohol withdrawal
  – Drug abuse
    • Self administration of drugs in a manner not accepted by society or medicine
  – Physical dependence
    • A condition wherein the body must have a continual presence of a drug in order to properly function

• Terminology (Cont.)
  – Poisoning
    • The introduction of a substance into the body which has a toxic effect on the tissues
  – Potentiation
    • The cumulative effect of two drugs is greater than the sum total of their individual effects (1*1=3)
  – Psychological dependence
    • An overpowering desire to re-experience a drug following its first use
  – Tolerance
    • Bodily acclimation to the presence of a drug
  – Withdrawal
    • The physical effects prompted by ceasing use of a drug

• Patient History
  • What substance?
  • When did you ingest/become exposed?
  • If an ingestion, how much did you ingest?
  • Over what time period?
  • Interventions?
  • How much do you weight?

Exposure Routes
Ingestion

- Signs & symptoms
  - History of ingestion
  - Nausea
  - Vomiting
  - Diarrhea
  - Abdominal pain
  - Chemical burns around the mouth
  - Different breath odors
    - Arsenic produces a garlic odor
    - Cyanide produces an almond odor

- Emergency medical care
  - Remove pills, tablets or fragments with gloves from patient's mouth, as needed, without injuring oneself.
  - Consult medical direction - activated charcoal.
  - Bring all containers, bottles, labels, etc. of poison agents to receiving facility.

Inhalation

- Signs & symptoms
  - History of inhalation of toxic substance
    - CO, chlorine gas, etc.
  - Difficulty breathing
  - Chest pain
  - Cough
  - Hoarseness
  - Dizziness
  - Headache
  - Confusion
  - Seizures
  - Altered mental status

Carbon Monoxide (CO) poisoning

- Most prevalent form of poisoning in industrialized countries
  - Suicide attempts
  - Accidental exposure (home furnace); tend to peak in winter months
  - Workplace/disaster exposure
    - Portable generators develop 150 times more CO than automobiles
    - Smoldering fires generate tremendous amounts of CO
      - Firefighters have significantly shorter lifespan due to heart disease caused by chronic CO exposure
  - Cigarette smoke
    - One cigarette can increase carboxyhemoglobin level by 3%
    - Half life of carboxyhemoglobin is > 4 hours, so chain smoking increases levels significantly
  - 5,000 to 6,000 annual deaths in US due to CO poisoning
  - 40,000 to 50,000 annual Emergency Department visits

Carbon Monoxide (CO) poisoning (Cont.)

- Pathology
  - Decreased oxygenation
    - CO bonds with hemoglobin more readily than oxygen
    - Body cannot utilize CO in aerobic metabolism
    - Patient literally suffocates at the cellular level due to no oxygen being available for metabolism
    - Fetal hemoglobin has far greater affinity for CO than does adult hemoglobin
      - All pregnant women exposed to CO, even if slight exposure, should be transported for evaluation
  - Vasodilation
Results in hypotension which decreases tissue perfusion
- Causes tissue inflammation
- Reduces cardiac function

• Carbon Monoxide (CO) poisoning (cont.)
  - Signs & Symptoms
    - Headache
    - Light-headedness
    - Dizziness
    - Confusion
    - Shortness of breath
    - Nausea
    - Cherry-red skin discoloration (late sign)

• Inhalation (Cont.)
  - Emergency medical care
    - Only trained rescuers should remove patient from poisonous environment.
    - Give oxygen, if not already done in the initial assessment.

• Injection
  - Signs & symptoms wildly varied depending on substance
    - Weakness
    - Dizziness
    - Chills
    - Fever
    - Nausea
    - Vomiting

• Injection (Cont.)
  - Emergency medical care
    - Airway and oxygen.
    - Be alert for vomiting.
    - Bring all containers, bottles, labels, etc. of poison agents to receiving facility.
      - Probably not a good idea to transport contaminated sharps with the patient.

• Absorption
  - Signs & symptoms
    - History of exposure
    - Liquid or powder on patient's skin
    - Burns
    - Itching
    - Irritation
    - Redness
• Absorption (Cont.)
  – Emergency medical care
    • Skin - remove material (including clothing) while protecting oneself from contamination.
      – Liquid - irrigate with clean water for at least 20 minutes (and continue en route to facility if possible).
      – Powder - brush powder off patient, then irrigate with clean water for at least 20 minutes (and continue en route to facility if possible).
    • Caution: some materials produce an endothermic reaction or become caustic in the presence of water.
  • Eye - irrigate with clean water away from affected eye for at least 20 minutes and continue en route to facility if possible.

Classes of Drugs

• Alcohol
  – General
    • Ethyl alcohol in all of it's manifestations
    • Alcohol is the "great potentiator"
      – Narcotics
      – Depressants
    • The signs and symptoms of other problems mimic alcohol intoxication
      – DKA
      – Head injury
      – Epilepsy (postictal phase)

• Alcohol (Cont.)
  – Examples
    • Beer
    • Wine
    • "Hard" liquor
  – Uses
    • No true medical use

• Alcohol (Cont.)
  – Effects
    • Low dose
      – Odor of alcohol
      – Slurred speech
      – Flushed appearance
      – Decreased coordination
      – Decreased reaction time
    • High dose
      – Nausea and vomiting
      – Depressed gag reflex
      – Respiratory depression
      – Slightly dilate pupils
      – Vertigo
• Alcohol (Cont.)
  – Delirium Tremens (alcohol withdrawal)
    • Maniacal behavior
    • Confusion
    • Hallucinations
    • Muscular tremors

• Narcotics
  – General
    • Opium and derivatives of opium
    • Synthetic substitutes
    • Major adverse effect is respiratory depression
    • Easily reversed by a drug called Narcan

• Narcotics (Cont.)
  – Examples
    • Heroin
    • Morphine
    • Demerol
    • Codeine
    • Dilaudid
    • Talwin
    • Darvon
    • Oxycodone (OxyContin)
    • Hydrocodone (Vicodin)

• Narcotics (Cont.)
  – Uses
    • Analgesia
    • Suppress coughing
    • Anesthesia
    • “Chemical tourniquet”

• Narcotics (Cont.)
  – Effects
    • Low dose
      – Drowsiness
      – Apathy
      – Lethargy
      – Constipation
      – Pinpoint pupils
        » Demerol is the one exception
      – Blurred vision
    • High dose
      – Prolonged sleep
- Nausea and vomiting
- Respiratory depression

• Narcotics (Cont.)
  - Withdrawal
    • Early signs
      - Watery eyes & runny nose
      - Increased perspiration
    • Later signs
      - Insomnia
      - Tremors
      - Yawning & sneezing
      - Nausea and vomiting, cramps, diarrhea
      - Tachycardia
      - Hypertension

• Depressants
  - General
    • Sedatives & tranquilizers
    • Drugs which inhibit the sympathetic nervous system
    • Drugs which give psychic relief from anxiety

• Depressants (Cont.)
  - Examples
    • Nembutal (Pentobarbital)
    • Seconal (Secobarbital)
    • Valium
    • Librium
    • Phenergan
    • Quaalude
    • Thorazine
    • Haldol
    • Ketamine

• Depressants (Cont.)
  - Uses
    • Control of anxiety and/or insomnia
    • Control of nausea and vomiting
    • Psychiatric use

• Depressants (Cont.)
  - Effects
    • Resemble alcohol intoxication
    • High dose
- Pupils
  » Normal
  » Dilated
  » Constricted
- Coma
- Weak, rapid pulse
- Cold, clammy skin
- Shallow respirations
- Hypotension

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- **Depressants (Cont.)**
  - Withdrawal
    • Anxiety
    • Agitation
    • Nausea and vomiting
    • Tachycardia
    • Sweating
    • Muscle spasms

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- **Cannabis products**
  - General
    • Drugs manufactured from substances found in the hemp plant
    • Drugs chemically related to substances found in the hemp plant
    • One of the most frequently abused drugs in American culture
  - Examples
    • Marijuana
    • Hashish
    • THC (Tetrahydrocannabinol)

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- **Cannabis products (Cont.)**
  - Uses
    • Marinol
      - THC available by prescription
      - Controls glaucoma
      - Controls side-effects of chemotherapy
      - Increases appetite in AIDS patients
  - Effects
    • Low dose
      - Euphoria (an exaggerated feeling of happiness, confidence, or well-being)
      - Drowsiness
      - Increased appetite
      - Pinpoint pupils
    • High dose
      - Disorientation
      - Paranoia

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- **Cannabis products (Cont.)**
  - Withdrawal
    • Insomnia
    • Hyperactivity
    • Decreased appetite
• Stimulants
  – General
    • Drugs producing increased SNS effects
    • Drugs producing mood elevation
    • According to the 2003 National Survey on Drug Use and Health, over 12 million people in the United States (5.2%) reported illicit use of methamphetamine at least once in their lifetime and 607,000 (0.3%) reported current use
  – Examples
    • Coffee
    • Tobacco
    • Cocaine, including crack cocaine
    • Amphetamines
      – Dexedrine
      – Methamphetamine
      – Ecstasy (also has hallucinogenic effects)

• Stimulants (Cont.)
  – Uses
    • Appetite control
    • Sleepiness control
    • Topical local anesthetic for the upper respiratory tract
  – Effects
    • Low dose
      – “Rush” then “crash”
      – Exhilaration
      – Hyperactivity
      – Anxiety
      – Apprehension

• Stimulants (Cont.)
  – Effects
    • High dose
      – Dizziness
      – Tremor
      – Pupil dilation
      – Flushed skin
      – Elevated temperature
      – Convulsions
      – Cardiovascular collapse
      – Dental changes

• Stimulants (Cont.)
  – Withdrawal
    • Apathy
    • Depression
    • Fatigue
• Hallucinogens
  – General
    • Drugs producing altered perception
    • Fell from popularity, now making a comeback
  – Examples
    • LSD (Lysergic Acid Diethylamide)
    • Mescaline (Peyote cactus)
    • Psilocybin (Psychedelic mushrooms)
    • Phencyclidine (PCP)
    • Ecstasy (stimulant with hallucinogenic effects)

• Hallucinogens (Cont.)
  – Uses
    • CIA interrogation
    • Psychiatric treatment (no longer used for this purpose)
    • Medical uses
      – None

• Hallucinogens (Cont.)
  – Effects
    • Low dose
      – Hallucinations
      – Restlessness
      – Incommunication
      – Dilated, reactive pupils
      – Drug produces increased SNS response which dilates pupils; drug itself does not affect pupils
      – Repetitive motor movements
• Hallucinogens (Cont.)
  – Effects
    • High dose
      – Coma
      – Disorientation
      – Misperception
  – Withdrawal
    • Usually not physiologically addictive
    • May be psychologically addictive

• Common Drugs of Abuse
  – Methyleneoxymethamphetamine (Ecstasy or MDMA)
    • Routes
      – Oral or smoked
    • Synonyms
      – Ecstasy, ADAM, candy canes, disco biscuit, doves, E, eckie, essence, hug drug, love drug, M&M, rolls, white doves, X, XTC
    • Onset of action
      – 10 minutes
    • Duration of effect
      – Overall effects typically last 2-3 hours

• Common Drugs of Abuse (Cont.)
  – Phencyclidine (PCP)
    • Routes
      – Smoked (most common), intravenous injection, snorted, added as eye drops, oral ingestion, and transdermal absorption
    • Synonyms
      – Amp, angel dust, animal tranquilizer, dips, duct, elephant, embalming fluid, formaldehyde, fry, hog, ozone, peace pill, rocket fuel, super kools, TicTac, tranq, water, wet
    • Onset of action
      – 30 to 45 minutes after oral ingestion
      – 1 to 10 minutes after snorting or injecting
    • Duration of effect
      – 4 to 6 hours

• Common Drugs of Abuse (Cont.)
  – Lysergic acid diethylamide (LSD)
    • Routes
      – Primarily oral administration, but can be inhaled, injected, and transdermally absorbed
    • Synonyms
      – Acid, animal, barrels, beast, blotter, ‘cid, dots, kool aid, microdots, panes, sandoz, tabs, trips, white lightning, window panes
    • Onset of action
      – 10 minutes following intravenous administration, 20-30 minutes following oral ingestion
    • Duration of effect
      – Effects peak at 2-4 hours and gradually diminishing over 6-8 hours
      – Flashbacks may occur suddenly, often without warning, and may occur within a few days or more than a year after use.

• Common Drugs of Abuse (Cont.)
  – Methamphetamine (Crystal Meth)
    • Routes
      – Users often begin with smoking, intranasal or oral use and progress to intravenous use
    • Synonyms
      – Chalk, chrissy, crank, crystal, glass, go, hydro, ice, meth, rock candy, speed, whiz
    • Onset of action
      – 5 to 10 minutes following intravenous use and smoking
• Common Drugs of Abuse (Cont.)
  – Cocaine and crack
    • Routes
      – Users often begin with intranasal use or smoking, may progress to intravenous use
    • Synonyms
      – Coke, snow, flake, blow, cane, dust, shake, toot, nose candy, white lady, crack, rock, free-base
    • Onset of action
      – 15 to 30 seconds following intravenous use and smoking
      – 30 seconds to one minute following snorting
    • Duration of effect
      – 1 to 2 hours

Treatment

• Establish responsiveness

• Airway
  – Positioning
  – Modified jaw thrust
  – Chin lift
  – Adjuncts as needed
    • Nasal airway
    • Oral airway
    • PTL

• Breathing
  – High flow oxygen
    • Non-rebreathing mask @ 15 LPM
    • Bag-valve-mask assembled and ready
  – Ventilate, assist and supplement breathing as necessary

• Circulation
  – Check and maintain appropriate pulse
  – IV normal saline TKO (may use INT)

• Positioning
  – Coma position if breathing
    • Prevent aspiration
  – Supine if managing airway

• Identify drug
  – Good history
  – Transport bottles, pills, etc.
- Transport pill fragments from vomitus
- NPO (non per os)
- Frequent vital signs

- Psychological intervention
  - Encourage communication
  - Be non-judgmental
  - Tell patient that he/she is experiencing the effects of the drug, not an altered reality
- Emergency transport, if necessary

- Medications
  - Activated charcoal
    - Medication name
      - Generic - Activated charcoal
      - Trade
        » SuperChar
        » InstaChar
        » Actidose
        » LiquiChar
        » Others

- Medications
  - Activated charcoal (Cont.)
    - Indications - poisoning by mouth
    - Contraindications
      - Altered mental status
      - Ingestion of acids or alkalis
      - Unable to swallow
    - Medication form
      - Pre-mixed in water, frequently available in plastic bottle containing 12.5 grams activated charcoal
      - Powder - should be avoided in field

- Medications
  - Activated charcoal (Cont.)
    - Dosage
      - Adults and children: 1 gram activated charcoal/kg of body weight.
      - Usual adult dose: 25 - 50 grams
      - Usual infant/child dose: 12.5 - 25 grams

- Medications
  - Activated charcoal (Cont.)
    - Administration
      - Obtain order from medical direction
      - Container must be shaken thoroughly
      - Since medication looks like mud, patient may need to be persuaded to drink it
      - A covered container and a straw may improve patient compliance since the patient cannot see the
medication this way
- If patient takes a long time to drink the medication, the charcoal will settle and will need to be shaken or stirred again
- Record activity and time

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**Medications**
- Activated charcoal (Cont.)
  - Actions
    - Binds to certain poisons and prevents them from being absorbed into the body
    - Not all brands of activated charcoal are the same; some bind much more poison than others, so consult medical direction about the brand to use

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**Medications**
- Activated charcoal (Cont.)
  - Side effects
    - Black stools
    - Some patients, particularly those who have ingested poisons that cause nausea, may vomit
    - If the patient vomits, the dose should be repeated once

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**Medications**
- Syrup of Ipecac
  - Induces emesis
  - Indication – ingested poisoning
  - Contraindications
    - Caustic poison ingestion
    - Petroleum ingestion
    » Unless pesticide
    - Unconscious patient or decreased LOC
    - Anything depressing the gag reflex
    - Seizures

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**Medications**
- Syrup of Ipecac (Cont.)
  - Dose
    - 6 months to 1 year
      » 10 ml Ipecac
      » 2 to 3 oz. tepid water
    - 1 to 5 years
      » 15 ml Ipecac
      » 4 to 6 oz. tepid water
    - 5 years to adult
      » 15 to 30 ml Ipecac
      » 8 oz. tepid water

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Abdominal Emergencies

- Assessment
  - Restless or quiet?
  - Pain increased upon movement?
  - Nausea
  - Vomiting
    - Hematemesis (vomiting blood)
      - Bright Red
      - Coffee ground appearance
    - Diarrhea
      - Bright red blood
      - Melena
        - Black, tarry stool
        - Digested blood

- Assessment (Cont.)
  - Visualization
  - Distention
  - Posturing
    - Knee-chest position
    - Fetal position
    - Arms across abdomen

- Assessment (Cont.)
  - Palpation
    - Localize pain to single quadrant if possible
    - Brief, gentle, midline palpation for pulsating mass
    - Begin in quadrant diagonally away from the pain
    - Observe for
      - Pain
        - Point tenderness
        - Rebound tenderness
      - Distention
        - Air
        - Blood
      - Masses
        - Pulsating
        - Non-pulsating
      - Guarding
        - Abdominal rigidity
        - Can patient relax abdominal muscles upon request
• Assessment (Cont.)
  – Auscultation
    • Probably not profitable use of time
    • Listen one minute in each quadrant for peristaltic noises

Problems/Conditions

• Peritonitis
  – Causes
    • Inflammation of peritoneum
      – Perforation of gut or stomach
      – Bile release

• Peritonitis
  – Signs and symptoms
    • Severe abdominal pain
    • Rebound tenderness
    • Abdominal distention
    • Abdominal rigidity
    • Fetal positioning
    • Nausea and vomiting
    • Tachycardia
    • Tachypnea
    • Fever

• Appendicitis
  – Causes
    • Inflammation of appendix
  – Signs and symptoms
    • Abdominal pain or cramping
    • Lower right quadrant
    • Nausea and vomiting
    • Fever
    • Guarding
    • Diarrhea
• **Cholecystitis**
  – Causes
    • Usually caused by gallstones
  – Signs and symptoms
    • Right upper quadrant pain
      – Usually after large, fat laden meals
      – Can occur at night
    • Fever
    • Nausea and vomiting
      – Bile

• **Pancreatitis**
  – Causes
    • Gallstones
    • Alcoholism
  – Signs and symptoms
    • Steady midline epigastric pain that radiates to the back unrelieved by vomiting
    • Rales at lung bases (pancreatic enzymes inflame diaphragm causing lung inflammation at bases)
    • Vomiting
    • Weight loss
    • Low grade temperature
    • Tachycardia
    • Extreme fatigue
    • New onset diabetes (hyperglycemia)
    • Cramping (calcium loss causes muscle spasms)

• **Hepatitis**
  – Definition
    • Inflammation of the liver due to viral infection.
  – Viral
    • Types
      – Type A
        » Highly contagious
        » Transmitted by fecal-oral route
        » Ingestion of contaminated food, milk, water
        » Once had it, you are immune
      – Type B
        » Once thought to be transmitted only by direct blood contact
        » Now know to be transmitted also like Type A
        » No immunity
      – Type C
        » Once thought to be related to blood transfusions
        » Now know to be specific virus
      – Type D
        » Found only with patients also having Type B
      – Type E
        » Patient typically infected by trip to Asia, Central America, India, Africa
• Hepatitis (Cont.)
  – Non-viral (Chemical)
    • Causes
      – Tylenol
      – Carbon tetrachloride
      – Certain mushrooms
      – Certain anesthetic agents
  – Signs & Symptoms
    • Upper abdominal pain, usually in the RUQ (largest area of liver)
    • Fatigue
    • Joint pain
    • Headache
    • Nausea & vomiting
    • Jaundice
    • Dark colored urine

• Cirrhosis
  – Definition
    • Liver tissue death, destruction and failure secondary to chronic inflammation of the liver
  – Causes
    • Alcoholism (most frequent cause)
    • Biliary tract disease
    • Hepatitis
  – Pathology
    • Liver cell death and destruction secondary to chronic inflammation
    • When cells repair themselves, they become scar tissue
    • Scar tissue is non-functional and changes the shape and structure of the liver
    • Vessels and ducts are squeezed causing secondary problems (esophageal varices)

• Cirrhosis (Cont.)
  – Signs & Symptoms
    • Vague abdominal pain, more prominent in RUQ when sitting up or leaning forward
    • Indigestion
    • Nausea & Vomiting
    • Nose bleeds
    • Easy bruising
    • Dry skin
    • Low grade temperature
    • Upper GI bleeding (esophageal varices)

• Upper GI bleeding
  – Causes
    • Gastric ulcers
    • Esophageal varices
  – Signs and symptoms
    • Hematemesis
      – Bright red
      – Coffee ground appearance
• Epigastric pain

• Lower GI bleeding
  – Causes
    • Cancers
    • Ulcerative Colitis/Crohn’s Disease
  – Signs and symptoms
    • Abdominal pain
    • Bloody stools
      – Bright red
      – Melena

• Abdominal aneurysm
  – Causes
    • Weakened aortic lining
  – Signs and symptoms
    • Abdominal pain
      – Radiates
        » Lower back
        » Between shoulder blades
    • Nausea and vomiting
    • Decreased pulses in lower extremities
    • Pulsating abdominal mass
    • Signs and symptoms of hypoperfusion

• Abdominal aneurysm (Cont.)
  – Types
    • Ruptured
    • Dissecting
  – Locations
    • Suprarenal
      – Above the renal arteries
    • Infrarenal
      – Below the renal arteries

• Emergency Medical Care
  – Airway
• All as previously learned
  – Breathing
    • All as previously learned
  – Circulation
    • Check and maintain a central pulse
    • IV normal saline TKO
    • 20 cc/kg bolus if hypotensive
  – Positioning
    • Trendelenburg
    • Left lateral recumbent
    • Semi-fowlers

• Emergency Medical Care (Cont.)
  – NPO
  – Treat for hypoperfusion if present
    • High flow oxygen
    • Trendelenburg position/MAST trousers
    • IV with volume expander
      – Normal saline
      – Lactated Ringer’s
    • Keep warm
  – Emergency transport if unstable vitals