Study Guide
Chapters 26-36

Chapter 26
Poisoning and Overdose

Poisoning: exposure to substance that is generally harmful, with no beneficial effects
Overdose: excessive exposure to a substance that has normal treatment uses. Nearly ½ involve prescription drugs.

Types of toxicological emergencies:
1. Unintentional Poisonings
    - Dosage Errors: accidental by nurses, drs, family members or self
    - Idiosyncratic reactions: unpredictable side effects
    - Childhood poisoning: inattentive care/childhood curiosity. These are the most frequent calls to the poison control centers
    - Environmental exposures
    - Occupational exposures
    - Neglect and abuse: fine line between
2. Drug and Alcohol Abuse/Substance Abuse: millions of $$ of injuries and illness each year
3. Intentional Poisonings or Overdose
    - Chemical warfare: terrorism, war, WMD
    - Assault or homicide: using poison to commit murder
    - Suicide attempts: deliberate exposure to a known poison or overdose of a therapeutic drug

Scene size-up comes first.
Assure your safety and that of your team first.

Routes of absorption:
- Ingestion: poison enters the body through the mouth and absorbed by the digestive tract. Mushrooms, sleeping pills. Preferred method of care is activated charcoal and/or gastric lavage
- Inhalation: toxic fumes or gas inhaled into the lungs. Carbon Monoxide. Move patient to fresh air, provide hi-flow O2
- Absorption: substances may pass through the skin to the blood stream. Pesticides, ag chemicals. Brush off, flush with H2O, Remove clothing, Protect yourself
- Injection: toxic material injected by needles or stingers, deal with the symptoms. Epi for bee/wasp as necessary, some snakebites have antivenom, Narcan for opiates.

Geographically Specific Types:
- Venomous Snakes: coral snakes in FL
- Spiders

- Marine animals: jelly fish, lion fish
- Manufacturing industries: chemical plants, oil refineries
- Transportation industries: railroad routes, interstate highways

Toxidromes: groups of drugs that present with the same patterns of toxicity
Management: protect and maintain ABCs. Antidotes may be available, but attention to the basics is most important.
Assessment: Ask:

1. What was taken?
2. How much was ingested?
3. When the poisoning occurred?
4. What has been done for the patient so far?

Signs and Symptoms vary:

- Burning, tearing of eyes
- Respiratory distress
- Cyanosis
- Nausea, vomiting, diarrhea
- Diaphoresis, salivation
- Weakness, dizziness, headache, seizure
- Altered level of consciousness

Physical Findings:

- Pulse: tachycardia – stimulants, bradycardia – heart meds, pesticides
- Respiratory Rate: increased in children may mean aspirin, depressed resps from narcotics, sedatives and CO poisoning
- Temperature: elevated = aspirin and stimulants, lowered = alcohol, sedatives, narcotics, pesticides
- Blood Pressure: decreased by depressants or narcotics, elevated by cocaine, stimulants

Focused Physical Exam

- Respiratory System: can cause resp depression, airway obstruction, distress and wheezing
- Cardiovascular System: irregular heart rhythms, chest pain, shock and cardiac arrest
- Neurological System: pupil size, narcotics constrict (myosis), stimulants dilate

Care of the Poisoned Patient:

1. Airway, breathing, circulation
2. Follow vital signs, pulse Ox
3. Put on cardiac monitor
4. Position patient to prevent aspiration
5. High flow O2 by mask, cannula or consider intubation
6. PASG as per local protocols
7. Restrain violent/suicidal patient as per local protocols
8. Notify receiving hospital: bring pills, bottles, containers, samples, snakes (dead), spiders (dead)

Activated Charcoal: 1 gram per kg. 30-100g for an adult, 15-30g for a child up to 12

Cholinergics: stimulate the parasympathetic nervous system, block the breakdown of acetylcholine. Pesticides like organophosphates and nerve gas agents like sarin, or soman.

- Severe symptoms are called: SLUDGE – salivation, lacrimation, urination, defectation, gi cramping, emesis
- Bradycardia
- Wheezing
- Myosis
- Coma
- Convulsions

Management: Own safety! HazMat only. Atropine, Pralidoxime (2-pam chloride), Diazepam, Activated Charcoal if oral ingestion

Anticholinergics: block the parasympathetic nervous system, also called vagolytic agents. Atropine, ipratropium, antihistamines, antispasmodics, tricyclic antidepressants

- Severe symptoms will be hot, red, dry and mad
- Tachycardia, tachypnea
- Temporary psychosis

Management: Maintain ABCs. Counter-drugs are rarely given, they are more dangerous than the anticholergics themselves. Treat the symptoms. Activated charcoal may help.

Narcotics/Opiates: CNS and respiratory depressants. Heroin, morphine, codeine, meperidine, propoxyphene, fentanyl, hydrocodone.

- Euphoria
- Hypotension
- Respiratory depression/arrest
- Nausea
- Pinpoint pupils
- Seizures
- Coma

Management: Maintain ABCs. Naloxone (Narcan) antagonizes narcotics (and the users). IV administration may wear off too fast, and wake them up too much. IM dose lasts longer and they awake more slowly.

Toxic Gas inhalation:

- Inert gases: displaces O2 and injury/death is due to asphyxiation. CO2, methane, exane, propane acetylene. Mental, seizures, cardiac dysrhythmias
- Irritant gases: irritate tissues. Highly water soluable irritate upper airways. Less water soluble pass through to the lungs and cause sever tissue damage
    - Immediate reactions: 1-2 hours, red mucous membranes, eye and nasal irritation, cough, sore throat, bronchospastic
    - Delayed: 6-24, larygeal edema, hoarseness, stridor, non-cardio PE
    - Chronic: recurrent pneumonia and lung disease

- Systemic Toxins: gases that poison the cells. CO, cyanide, hydrogen interfere with O2 transport and delivery. Other agents can damage the liver and kidneys

Sources of Toxic Gases: accidents and fires are the most common. Leaking tanks, truck rollovers, by-products from fires, chemical reactions
Pathophysiology: determines the effects of gas inhalation:

- Water solubility
- Depth and rate of breathing
- Smell: if it smells, we can detect and avoid it
- Concentration of gas
- Length of exposure
- Differences in host: some people are more sensitive
- Smokers: lower resistance to toxic gas
- COPDer will have a worse time as well

Management: Protect yourself. Treat the symptoms. Protect ABCs. Hi-flow O2, intubate if necessary, IV, nebulized bronchodilators may help, prompt transport

Carbon Monoxide Poisoning: colorless, flavorless, odorless, non-irritating gas. Gas heaters are among the most common sources of domestic CO exposure. CO binds with hemoglobin 250x more readily and so O2 can't, suffocating the patient on a cellular level.
Assessment: suspect CO in any fire, smoke or closed space. Pulse ox won't detect. Signs and symptoms:

- Malaise, weakness, headache
- Confusion, dizziness
- Nausea, shortness of breath
- Drowsiness
- Unconsiousness
- Chest pain, may develop AMI or PE
- Cherry red skin – late sign
- Rales, rhonchi
- Seizures, blisters

Management: Protect yourself. Fresh air, Protect ABCs. Hi-flow O2, ventilate/intubate if necessary, IV, prompt transport

Tricyclic Antidepressants: common are amitriptyline (Elavil), amoxapine (Asendin), clomapramin (Anafranil), doxepin (Sinequan, Adepin), imipramine (Tofranil) and nortriptyline (Aventyl, Pamelor). Block the reuptake of norepinephrine and seratonin in the brain. Some have anticholergic and cardiac membrane actions. Heat exhaustion and heat stroke. V-Tac dysrythmias. Very dangerous in an overdose because it only takes a few pills. A typical one-month prescription is more than enough to be fatal. Signs and symptoms vary on the drug, dose and time since ingestion:

- Dry mouth
- Confusion
- Hallucinations
- Delirium

- Respiratory depression
- Hypotension
- Hyperthermia
- Seizures
- Coma

Management: Protect yourself. Maintain ABCs. Hi-flow O2, ventilate/intubate if necessary, IV, prompt transport. Medications: Sodium Bicarbinate, Activated Charcoal, Diazepam (seizures).

Bites and Stings: Bees, wasps, spiders, ants, scorpions, snakes, jelly fish
Management: usually unless anaphylaxis is present, no medications are warranted
Snakebites: Of most concern are Coral snakes and Pit vipers. Venom has:

- Neurotoxicity: parathesias, paralysis neuromuscular disturbances
- Hemotoxicity: coagulant, anti-coagulant, hemolytic, platelet
- Cardiotoxicity: decrease cardiac output and BP
- Enzymes can lead to tissue destruction

Management: Protect yourself. Maintain ABCs. Hi-flow O2, IV with normal saline, prompt transport. Antivenom as possible.

Chapter 27
Neurological Emergencies

Central Nervous System (CNS) = brain and spinal cord, involved in the serious neurological problems. Affects:

- Cognitive Systems: responsible for alertness, awareness, normal wakeful state
- Cerebral Homeostasis: balance, maintaining brain perfusion and oxygenation using cerebral autoregulation.
- Motor Control: affects tics to seizures, weakness to paralysis
- Sensation: alterations in sensory systems accompany weakness>paralysis

Types of CNS Disorders: **V I N D I C A T E**

- **V**ascular: involving circulation problems to the brain and spinal cord
- **I**nfections of the Brain, Spinal Cord and Meninges
    - Meningitis: viral is more common, milder, can't treat. Bacterial is less common, more severe and can be treated with antibiotics
    - Encephalitis: infection of the brain tissue, usually viral
    - Brain Abscess: localized collection of pus and debris in the brain. One kind is from bacterial endocarditis – heart valve infection
- **N**eoplastic: tumor metastasizing to the brain. Brain tumor is responsible for 1 out of 5 new-onset seizures in people over 21.
- **D**egenerative: progressive deterioration of the CNS
    - Alzheimer's
    - Multiple Sclerosis
    - Parkinson's
- **I**nflammatory – types of inflammation without infection
    - Rheumatoid arthritis
    - Systemic lupus erythematosus
- **C**ongenital: rupture of a congenital aneurysm is the most common cause of spontaneous intracerebral hemorrhage in a young person
- **A**llergic and autoimmune: lupus cerebritus is an autoimmune inflammatory condition. Severe allergic reactions can cause cerebral hypoperfusion and brain damage
- **T**rauma: head trauma can obviously cause neurological problems
- **E**ndocrine and metabolic: glandular, electrolyte, hormonal imbalances may result in neurological symptoms. Hypoglycemia and hypoxia and common and easily cared for.

Assessment:

1. General Appearance: first impression of how sick they appear
2. Level of consciousness: give them a challenging task, memorization
3. Speech: determine if there has been any recent changes
4. Skin: splotchy, bruised looking rash could be sign of meningitis
5. Posture and Gait: determine if there has been any recent changes
6. Vital signs:
7. Head and neck: Ketones on breath can smell like alcohol

8. Thorax and lungs: look for hypoventilation, CO2 retention and hypoxia
9. Cardiovascular: ECG changes can mimic AMI
10. Nervous system: look for symmetry. Marked differences in the two sides of the body are probably abnormal

Management: Ongoing assessment. ABCs. Assess blood glucose level, treat hypoglycemia. What is normal blood sugar again? 70-100? Start an IV with normal saline or LR

Stroke (Cerebrovascular accident -CVA) and Transient Ischemic Attack (TIA):
Stroke (CVA) results from interruption of circulation to the brain causing ischemia and damage to brain tissue. Neurological symptoms persist longer than 24 hours. Recovery takes place in weeks to months. Two types:

- Occlusive: 3 out of 4 strokes, caused by blockage in a blood vessel
- Hemorrhagic: caused by bleeding in the brain. Symptom abrupt and severe

Clot Busters: Occlusive strokes only! Must be within 3 hours. Most wake up in the am when it is too late.
Ischemic penumbra: area of tissue potentially viable surrounding the infarct zone.
Cocaine is becoming the most common cause of stroke in young people

Assessment (Stroke): Most common finding is paralysis. Usually hemiplegia, damage on one side of brain affects opposite side of the body. Most have elevated BP. Also seizures, dizziness, loss of consciousness, stiff neck, headache, altered LOC, airway problems, hypoventilation, cardiac dysrhythmias. My favorite: vomiting. Pupillary abnormalities.
Cincinnati Prehospital Stroke Scale:

1. Facial Droop: show teeth or smile
2. Arm Drift: close eyes and hold arms out
3. Speech: you can't teach an old dog new tricks

Management:

- Establish and maintain the airway, provide hi-flow O2 by mask.
- Consider intubation if necessary
- Nothing by mouth, prepare for vomit
- Reassure patients
- Start an IV
- Cardiac monitor
- Measure blood glucose

TIAs: mini-strokes: stroke-like neurological deficits that resolve within minutes to hours. They still should be evaluated at the hospital, because they are at risk for stroke.

Seizures and Epilepsy
Seizure: sudden abnormal brain cell activity. Seizures reoccurring over a span of years is called epilepsy. 3/4^{ths} of people with epilepsy have their first seizures before age 20.
Four types of seizures:

1. Generalized major motor seizures: tonic-clonic, muscles rapidly contract and relax. Also called Grand mal, last 205 minutes

2. Focal motor seizures or simple partial seizures. 1-2 minutes or may spread to body and become generalized.
3. Behavioral Seizure: brief absence, could be temporal lobe epilepsy, also called complex-partial seizure, or in children called petit mal seizure
4. Status Epilepticus: series of seizures without a period of wakefulness between them.

Secondary Causes of Seizures: they are not a disease, they are a symptom.

- Infection (meningitis, brain abscess, encephalitis)
- Fever
- Trauma
- Stroke
- Tumor
- Failure to take anti-seizure meds
- Metabolic abnormalities
- Drug overdose or alcohol i.e. TCAs
- Hypertensive emergency
- Liver or kidney failure

Patient Assessment: F A C T S

- F- Focus, focal motor or generalized body involvement
- A – Activity; what movements took place
- C – Color, did they turn cyanotic
- T – Time, how long did it last
- S – Secondary info like OPQRST for pain, get a SAMPLE history

Postictal state: decreased LOC lasting about 30 minutes. Watch for violent behavior.

Management:

1. give hi flow O2
2. Don't put anything in their mouth
3. Assist ventilation as nec.
4. Be prepared for suction
5. Do not restrain, use padding to protect them
6. Start an IV line
7. Cardiac monitor
8. Check O2 sats
9. Transport in recovery position

Anti-seizure Drugs: diazepam (Valium), lorazepam (Ativan)

Coma and Altered LOC

Causes of coma AIEOU, TIPS

- Acidosis, Alcohol
- Epilepsy, endocrine
- Infection
- Overdose
- Uremia
- Trauma

- Insulin
- Psychosis
- Shock, stroke

Assessment:

1. When was the patient last well? What was the onset?
2. How did the symptoms progress? Pinpoint when things started to change.
3. What symptoms preceded the onset of coma?
4. Clues to drug use
5. Abnormal breathing
6. Evidence of trauma
7. Abnormal pupil response
8. Always check blood sugar

Management:

- Establish and maintain the airway
- Hi-flow O2
- If spinal injury is likely, then immobilize
- Monitor vital signs
- Transport supine or in coma position
- Prepare for vomit
- Start IV line for normal saline or LR
- Monitor cardiac rhythm
- Reassure the patient, even the unresponsive ones.

Syncope and Weakness: partial loss of consciousness. Monitor for cardiac dysrhythmias
Headache: serious causes are tumors, bleeding, hypertension, meningitis, poisoning. Brain tissue has no nerves to feel pain, so all pain is from stretching or irritation of nearby structures:

- Vascular: involves cerebrovascular circulation, constriction or dilation of cerebral vessels. Rapid onset of severe headache could be intracranial bleeding
- Non vascular: infection, tumor, muscle spasm

Assessment: In addition to pain, there may be blurred vision, nausea and vomiting, vertigo, stiff neck. Bradycardia, hemiplegia, hypertension, unequal or pinpoint pupils, photophobia.

Management:

1. Monitor ABSs
2. Prepare for vomiting
3. Reduce bright lights
4. Ice pack on painful area
5. O2 2-4L via nasal cannula

Chapter 28
Non-Traumatic Abdominal Emergencies

Acute abdomen: abdominal pain not due to injury
It is not necessary for the EMT-I to make a diagnosis in the field – probably impossible

Digestive System/Gastrointestinal System

Solid	**RUQ**	**LUQ**	**Hollow**
Liver Spleen Pancreas Kidneys Ovaries	Liver Gall Bladder Kidney Large Intestine Small Intestine	Stomach Spleen Pancreas Kidney Large Intestine Small Intestine	Stomach Intestines Gall Bladder Urinary Bladder Uterus Ureter
Main problem	**RLQ**	**LLQ**	**Main Problem**
Injury =Bleeding	Colon Appendix Large Intestine Small Intestine Ovary/Fallopian tube Ureter Urinary Bladder Uterus	Large Intestine Small Intestine Ovary/Fallopian Tube Ureter Urinary Bladder Uterus	Injury=Peritonitis

Common causes of acute abdomen:

- Bacterial contamination: infection in the bowel or peritonitis
- Chemical irritation: leakage of blood or bile into wrong space
- Peritoneal inflammation: bacterial, chemical or trauma
- Bleeding: solid organ laceration. Abdominal cavity can hold 1500mL of blood before distention
- Obstruction

Four life-threatening acute abdomens

- AMI
- Ruptured Abdominal Aortic Aneurysm
- Ruptured ectopic pregnancy (any woman age 12-50)
- Ruptured viscus (any hollow organ)

Localized or diffuse pain: abdominal organs have receptors for pressure, but not for pain.
Focused Physical Exam: evaluate:

- General appearance
- Tenderness, guarding, rebound tenderness
- Pulsating mass – AAA

Management and Treatment

- Maintain the airway

- Hi-flow O2
- Allow the patient to lie in a comfortable position
- Nothing by mouth
- Start in IV normal saline or LR
- Avoid pain meds that mask the symptoms
- Start IV line for normal saline or LR
- Monitor cardiac rhythm
- Prepare for vomit
- Consider AMI
- Transport gently but rapidly

Gastrointestinal (GI) Bleeding: rapidly result in hypovolemic shock. Evaluate:

- Is the airway open, obstruction due to vomiting blood is common
- Is the patient in shock
- Is active bleeding present
    - Upper GI is bleeding above the duodenum – top of small intestine
    - Lower GI is usually lesion in tract below the duodenum

Management: same as above, except more chance of shock

Hematochezia: bright red blood in stool
Melena: dark tarry stool – digested blood
Hematemesis: vomiting blood
Coffee-grounds vomitus: digestion of blood by stomach acids

Chapter 29
Environmental Emergencies

Medical condition caused or exacerbated by weather, terrain, atmospheric pressure or other local factors. Risk factors that make it more likely:

- Old or young age
- General health
- Fatigue
- Existing medical conditions (diabetes etc.)
- Medications

Systemic: hypothermia, heat exhaustion and heat stroke
Localized: frostbite, sunburn

Core body temperature (CBT): normal is 37 C or 98.6 F. Most accurate rectally or fresh urine.

Radiation: transmission of heat through space
Conduction: direct transmission of heat by sitting on cold surface
Convection: transfer of heat by circulation of heated particles (wind chill)
Evaporation: loss of heat by vaporization of liquid – only effective means of heat dissipation in high temps.

Heat illness = increased CBT due to inadequate thermolysis

- Heat cramps: pains in muscles exercising in hot environment. Excessive loss of salt and water in sweat. Care: move to cool, sips of cools water, IV of normal saline, 15L/min O2, transport
- Heat Exhaustion: more severe loss of fluid and salt.
    - Pale, sweaty, hypotensive
    - Headache, thirst, normal slightly elevated temperature

  Care: move to cool, sips of cools water, IV of normal saline, 15L/min O2, monitor ECG, transport
- Heat Stroke: extreme medical emergency, body can no longer regulate temp.
    - No sweat
    - Hot, red dry skin
    - Lethargy, fatigue, weakness, nausea, vomiting, dizziness
    - Confused, irrational, altered LOC
    - Increased body temp

  Care: immediate cooling: ice packs at neck, armpits, wrists, groin. Immersion, fanning, IV of normal saline or LR, 15L/min O2, monitor ECG, transport

Cold Disorders:

- Mild: CBT > 32.2 C or 90 F
- Severe: CBT < 32.2 C or 90 F
- Compensated: presenc of signs and symptoms but with normal CBT
  Hypothermia victims stop shivering at 90 degrees

Three primary causes:

- Cold water immersion - principle cause of death in boating accidents. Any water less than 98.6. Acute onset, without rescue, chances are low
- Cold weather exposure - close 2nd in occurrence, over minutes to hours
- Urban hypothermia - debilitated, aged, intoxicated, or all three at once, lack proper thermoregulation, also babies. Chronic onset = hours to days

Signs and Symptoms:

- Diminished coordination and psychomotor function
- Altered mentation
- Cardiac irritability – A-FIB most common, brady down. V-Fib more common in rewarming
- They're not dead til they're warm and dead

Treatment:

- Remove from cold
- Dry off and provide barriers/blankets, insulate
- Handle gently, check pulse for 30-45 seconds, begin chest compressions/ventilation/AED as necessary. Cold hearts are resistant to shock (under 86)
- Hi-flow O2, can be warm, moist
- Warm fluids if conscious
- IV of warm LR
- Dress and care for frostbite – NEVER allow to refreeze
- Hot packs over carotids, head, lateral thorax and groin
- Warm the core first, not extremities – there could be cold acidotic blood and waste in the extremities that will rush in "afterdrop phenomenon"

Frostbite: formation of ice crystals in the extremities
Trench foot: frostbite of feet from wet socks and boots
Treatment: rule out other significant injuries, raise core body temp before extremities, transport asap, protect the site and handle gently, do not break blisters, no smoking, no rubbing. Do not allow to refreeze.

Near Drowning: drowning is death by asphyxiation during an immersion episode, so near drowning is when the process is interrupted and reversed. Drugs and alcohol are involved in 35-75% of drownings. Lakes, ponds and backyard pools. Males 5-8x more likely, also older, younger and African American are higher risks.
Assessment: Signs and symptoms:

- Progressive dyspnea
- Wheezing
- Tachycardia
- Cyanosis
- Chest pain
- Mental confusion
- Coma, resp. or cardiac arrest

Treatment:

- Mouth to mouth can begin in the water

- Stabilize neck if nec.
- ECG monitoring
- IV of normal saline or LR at TKO

Three types of drowning:
- Dry drowning: 10-20% laryngeal spasm cuts off the air
- Wet drowning: 80-90% fluid fills the lungs
- Secondary drowning: reoccurrence of fluid in lungs (PE or Asp. Pneu) after successful recovery, few minutes up to four days.

Seawater causes an influx of hypotonic serum. Blood can't exchange O2 and CO2
Freshwater causes a washout of surfactant and lung loses elasticity.

Diving Accidents:
Pressure increases about 1 pound per square inch (PSI) with each 2 feet in depth. Divers must take pressurized air in scuba gear so the lungs will not collapse

Air Embolism: Divers must exhale on the way up or the volume of gas "trapped" in the lungs will expand. Also it is easier to hold your breath underwater, because the O2 is under pressure and more gets to the cells. But never hold your breath under water, or upon ascent, the drop in pressure ceases to feed the tissues at the same rate and you could black out. Signs and Symptoms: frothy pink sputum, shortness of breath, vertigo, seizures.
Treatment: High-flow O2, watch for tension pneumothorax, Trendelenberg, left side lateral trap air in heart. Recompression in hyperbaric chamber

Nitrogen Narcosis: apathetic, slightly euphoric state

Decompression Sickness: the "bends". Nitrogen dissolves into the tissues under high pressure and is released into the bloodstream in the form of bubbles upon a too-rapid ascent. Most cases due to repetitive diving (more than 1 in a 12-hour period). Signs and Symptoms: blotchy red rash, pain in joints, dizziness, paralysis, shortness of breath,
Treatment: High-flow O2, IV normal saline TKO, Trendelenberg, left side lateral trap air in heart. Recompression in hyperbaric chamber

Squeeze Symptoms: severe pain in the ears, sinuses, lungs, airways, teeth, other air spaces, gut, Gradual ascent watch the eardrums.

Assessment for all diving emergencies:
- Did you breathe compressed air underwater?
- Number of dives, bottom time
- Type of equipment
- Diver's activities
- Type of water, environmental factors, water entry
- Companion
- Gas mix

- In-water recompression
- Flew or ran before symptoms

High Altitude Sickness

- Acute Mt. Sickness (AMS) unacclimatized people in excess of 8,000 feet. Dizziness. Headache, irritability, breathlessness, euphoria
- High Altitude Pulmonary Edema (HAPE) increased pulmonary artery pressures in response to hypoxia. Shortness of breath, tachypnea, cyanosis
- High Altitude Cerebral Edema (HACE) Increased intracranial pressure. Most severe form. Progression from AMS to HACE takes 1-3 days

Chapter 30
Behavioral Emergencies

Behavior = how a person acts
Abnormal behavior = deviates from society's norms and expectations
Maladaptive behavior = unable to properly adapt to challenging circumstances
Behavioral Emergency = disorders characterized by abnormal and maladaptive behavior that family/social group can't tolerate

Causes grouped in three categories:

- Biological/Organic: diseases, drugs, toxins, biochemical psychiatric disorders
- Psychosocial: childhood trauma, bad parents, dysfunctional family
- Sociocultural: life events war, death of loved one, economic problems

Management: first and foremost scene and personal safety
10 Useful Interview Skills for Behavioral Emergencies:

1. Listen, use eye contact and empathy
2. Elicit feelings and facts
3. Respond to feelings, validate them
4. Correct misconceptions
5. Provide info on followup care
6. Offer honest support
7. Ask effective questions
8. Don't lead the "testimony"
9. Structure the interview chronologically
10. Conclude by asking about other events or feelings

Restraining a Patient: Have adequate help, use only necessary force and approved equipment, document all your and your patient's actions

Depression: common reaction to major life stresses, may present as another disease
Suicidal Patients: suicide gesture is a cry for help. Suicide attempt shows true desire to die. Ask directly "Were you trying to kill yourself?"

Legal Issues: know specific regulations for handling these individuals

Substance abuse:
Alcohol abuse = medical, behavioral or social problems related to excessive alcohol consumption
Alcoholism = chronic dependence on alcohol and a pattern of abnormal behaviors. Severe intoxication can result in cardiac dysrhythmias, shock and death. Conditions that may mimic alcohol intoxication: drug abuse, brain tumor, hypoglycemia, meningitis, head injury, stroke, postictal state, DKA, hypoxia
Emergency care: ABCs, hi-flow O2, check blood sugar, transport severely intoxicated patients

Withdrawal Syndromes: Shakes (within 24 hours), seizures (24-48 hours after stopping drinking), delirium tremens (DTs – within 12-48 hours delirium, hallucinations, fever, tachycardia, hypertension. 15% die.)

Drugs: taken by mouth, injected, placed on skin to treat or prevent a disease or condition.

- Ethical: manufactured by legitimate pharmaceutical company to treat specific diseases or conditions
- Illicit: manufactured illegally for the purpose of abuse

Drug misuse: intentional or accidental use of a drug not as intended

Drug abuse: use of a drug for a non-therapeutic effect – to get high etc.

Drug addiction: overwhelming desire to continue taking a drug to get a desired effect. True addiction is both psychological and physical. Drug dependence is just psychological.

Drug withdrawal: signs and symptoms resulting from abrupt cessation of use

Five classes of abused drugs:

- Stimulants – uppers. Cocaine, meth, speed, caffeine hyperactivity, euphoria, tachycardia, sleeplessness, seizures
- Depressants – downers. Marijuana, barbiturates, sleeping pills, antidepressants, tranquilizers. Sluggishness, slurred speech, decreased respiration and resp. arrest.
- Hallucinogens – LSD, mescaline, psilocybin and PCP. Unpredictable behavior, hallucinations, tachypnea, nausea, dilated pupils, tachycardia, hypertension
- Narcotics – heroin, morphine, methadone… drowsiness, impaired coordination, sweating, resp. depression, constricted pupils, shock, convulsions and coma
- Volatile Chemicals – aerosols, glue, gasoline, freon. Altered LOC, swollen mucus membranes of mouth and nose, hypertension, tachycardia, resp. distress, nausea

Assessment: Expect the history to be unreliable, ask “were you trying to hurt yourself?” Expect a mixture of drugs and alcohol, violent behavior is common

Management:

1. Maintain the airway, assist as necessary
2. Monitor patient for deterioration in respirations
3. O2 by nasal cannula or non-rebreather
4. Watch for vomiting of course
5. Prepare to suction
6. Notify Law Enforcement/Poison Control
7. Measure blood sugar
8. Monitor ECG
9. Place an IV
10. Monitor for shock
11. Restrain patient as necessary
12. Do not be judgmental

Chapter 31
Gynecological Emergencies

Gynecological Emergencies can include:

- Multiple types of chronic or acute infection
- Hemorrhage from uterus, fallopian tubes and ovaries
- Ectopic pregnancy

Hormones rise and fall stimulating development of eggs in the ovaries. Menses occur approx. every 28 days. First day of menstruation is the first day of the cycle.
Menarche: first cycle age 8-14
Menopause: anywhere from 35-60

Questions need to be broad enough to get information about the whole area:

- Is there pain or cramping
- OPQRST
- Bleeding or discharge
- Nausea, vomiting change in appetite
- Fever, diaphoresis, sweating
- Change in normal bowel habits, constipation/diarrhea
- Urination, pain with urination, hematuria
- Preexisiting or chronic medical problems, surgeries

Dysmenorrhea: pain with menses
Dyspareunia: pain with intercourse

Gravida: total number of pregnancies
Para: total number of live births
G5P2 = five pregnancies, 2 live births

Special Concerns:

- Professional behavior: establish trust and support
- Privacy and modesty: limit people on scene
- Pain: there could be significant pain and stress

General Examination

- Vital Signs= BP: hypotension could be internal hemorrhage or infection. Pulse: tachycardia due to dehydration, anemia, infection, pain, sepsis. Respiratory rate: could be increased
- Skin = cyanosis could indicate anemia or resp. problems
- Genitourinary exam: note presence of blood indirectly. No exams
- Abdomen = palpate for masses or tenderness. Rebound tenderness is a sign of significant intraabdominal inflammation

Management: O2, tachycardia, hypotension, severe pain i.e. if BP is below 90 start 2 IVs

Specific Emergencies Include:

- Pelvic Inflammatory Disease (PID): caused by bacteria. Signs and symptoms: fever, lower ab pain, dischanrge, dyspareunia, guarding. Can lead to sepsis, and infertility
- Ruptured Ovarian Cyst: follicles stimulated by hormones enlarge and can rupture> significant hemorrhage>hypotensive
- Ectopic Pregnancy: implantation of a fertilized egg outside of the uterus. 1 in 200. Consider this first for any female age 12-50. Tubal rupture> massive bleeding> shock.
- Straddle injuries: trauma to perineum due to a fall
- Blunt trauma: MVA, physical assault, falls
- Foreign bodies: don't try and remove, transport asap

Vaginal Bleeding

- Miscarriage= spontaneous demise of a pregnancy. Collect any tissue/clots to take to hospital
- Placenta Previa: abnormal positioning of the placenta over the cervix opening. Profuse, painless bright red bleeding
- Abruptio Placenta: premature detachment of a normally situated placenta. Severe, constant low pain and dark red bleeding

Sexual Assault: be professional, empathetic, show respect, help them cope, be an advocate for the patient and provide a comforting environment. Preserve evidence, collect clothing, do not wash or urinate

Chapter 32
Obstetrical Emergencies

Delivery is a natural process. Normal and uncomplicated deliveries require an EMT-I to support the mother. Remember there are two patients.

Anatomy:

- Ovaries: produce eggs, estrogen and progesterone
- Fallopian tubes: passageway between ovaries and uterus
- Uterus: hollow pear-shaped muscular organ where the fetus develops
- Cervix: inferior narrow neck of the uterus
- Vagina: birth canal
- Perineum: between urethra and anus
- Placenta: exchanges O2 and nourishment from the mother for CO2 and wastes from the fetus
- Umbilical cord: attaches fetus and placenta has two arteries and one vein
- Amniotic sac contains 500-100 mL of amniotic fluid, should be clear
- Fetus: unborn child

Ovulation is at about day 14 in the cycle

Normal Pregnancy

- Full term – 280 days or 40 weeks
- LMP = last menstrual period
- Increased Respiratory depth and rate
- Total blood volume increases by 40-50%
- Resting heart rate increases 10-20 beats per minute
- Normal blood pressure drops 10-15 mm Hg
- EDC = expected date of confinement = due date of baby
- Three trimesters, each about 13 weeks
    - First trimester: most common time for miscarriages
    - Second trimester
    - Third trimester
- GPA = Gravida, Para and Miscarriages/Abortions

History of Present Situation:
In addition to SAMPLE information:

- Pertinent medical conditions/history
- Current health of mother
- Recent injuries, illness, fever
- Prenatal care
- Drug use (baby may need extra resuscitation)

Regarding the current pregnancy

- First day of LMP
- Delivery date

- Previous pregnancies/deliveries? Any complications?
- Previous C-Section?
- When did the contractions start, how far apart?
- Any other pain/bleeding

Physical Examination

- Look for crowning

Management:

- O2
- IV
- Position on left side to avoid supine hypotensive syndrome

Complications:

- Diabetes: preexisting or gestational
- Ectopic pregnancy: can only tell by ultrasound
- Supine hypotensive syndrome: lay on the left side to avoid the uterus squashing the inferior vena cava
- Preeclampsia: hypertension and fluid retention. Mild 140/90, severe 160/110. Rise in 20/10 . Puffiness, excessive weight gain, headache, protein in urine
- Eclampsia: seizures. ABC, O2, IV, valium + magnesium sulfate
- Pregnancy induced hypertension is 30/15 above normal baseline BP. Consider 140/90 to be hypertensive

Trauma During Pregnancy:
Due to increased HR and lowered BP, vital signs are challenging to make sense of. During trauma, the body will preserve the mom first.

- Miscarriage= spontaneous demise of a pregnancy. Collect any tissue/clots to take to hospital
- Placenta Previa: abnormal positioning of the placenta over the cervix opening. Profuse, painless bright red bleeding
    - Risk factors: multiple pregnancies, rapid succession of pregnancies, over 35 yo, previous history of Placenta Previa
- Abruptio Placenta: premature detachment of a normally situated placenta. Severe, constant low pain and dark red bleeding
    - Risk factors: history of preeclampsia, chronic hypertension, multiple pregnancies, previous history of Abruptio Placenta, MVA, cocaine use
- Uterine Rupture: occurs most commonly after onset of labor

Labor and Delivery

- First Stage: Dilation. Beginning of regular contractions to complete dilation of cervix to approx 10 cc. Averages 12.5 hours to 7 hours
- Second Stage: Expulsion. 10cc cervix to delivery of newborn. 80 min to 30 min

If birth is imminent, do not transport. Place patient in a semireclining position on the firm, comfortable surface. Signs:

- Frequent contractions less than 2 min apart
- Intense urge to push

- Crowning
  - Remember, gentle back pressure to prevent explosive delivery/tears to perineum
  - Manually rupture amniotic sac
  - As head delivers, check for the cord, if wrapped, slip it over head
  - Suction mouth first and then nose, preferably before the chest is delivered
  - Position head slightly down to drain fluids
  - Support head while it rotates and rock shoulders up and down gently
  - Clamp umbilical cord 4" from baby and 6" from baby, cut between the clamps
  - Record time of delivery. Perform an apgar test at 1 min and 5 min

Sign	0	1	2
Appearance	Blue Pale	Pink body, blue extremities	Completely Pink
Pulse rate	Absent	<100 beats/min	>100 beats/min
Grimace	No response	Grimace	Cough, sneeze, cry
Activity	Limp	Some flexion	Active motion
Respirations	Absent	Slow, irregular	Good, crying

- Third stage: delivery of the placenta 5-20 min
  - Do not pull on it
  - Do not delay transport
  - Place in clean plastic bag or other container for inspection in hospital
- Postpartum care: breastfeeding helps uterus contract> constricting bloodflow, massaging uterus will help stop bleeding. Hemorrhage of more than 500mL immediately after delivery is cause for concern.

Care of Distressed Newborn see next chapter.

Abnormal Presentations:

- Multiple Births. Twins are 1 in 90 live births. 40% are premature. There may be a shared placenta or two placentas
- Breech: 3-4% of deliveries, preterm 20-30%. If the head does not deliver within 3 minutes of the torso, or tries to breathe, form a V with your fingers to try and make a tunnel of air to the newborn's face. If the baby's head does not deliver, transport mom with buttocks elevated or in knees to chest position
- Prolapsed Cord: cord presents first and may get compressed between the newborn and the mother's pelvis, cutting off fetal circulation before delivery. Insert a gloved finger and try to keep the head from mashing the cord. Pulsations in the cord indicate a viable newborn. Transport with mom in Trendelenburg or knee to chest. Cover the cord with warm moist gauze.
- Limb Presentation: Transport asap, requires C-section
- Cephalopelvic Disproportion: transport asap, requires C-section

Chapter 33
Neonatal Resuscitation

Newborn = first few hours of life
Neonate = first 28 days
Infant > 28 days < 1 year

About 6% of deliveries require some type of life support. Complications increase as birthweight goes down. 20x more likely to die.
Size : best chances for babies 3000-4000 grams and over 36 weeks gestation

- Low birth weight is considered under 2500 grams
- Moderately low is 1501 to 2500
- Very low less than 1500
- Extremely low less than 1000

Gestational age

- Premature/Preterm born before 37 weeks
- Full term 38-42 weeks
- Postmature after 42 weeks

Mortality

- Live birth: neonate that has any sign of breathing, heartbeat or any voluntary movement
- Fetal death: after 20 weeks gestation, before delivery, no signs of life after birth
- Early Neonatal death: first week, Neonatal death is first 28 days
- Perinatal mortality: total # of fetal and early neonatal deaths per 1000 live births
- Postnatal death: 28 days to 1 year

Life OUTSIDE:

- Respiratory System: breathing is the most critical and immediate change required. Stimuli are thermal (cold outside the womb) and chemical (low O2, high CO2 and low pH). These factors stimulate the medulla.
- Circulatory System: changes are more gradual and are a response to pressure changes. Fetal shunts close: the foramen ovale and the ductus arteriosus.
- Thermoregulation: Large surface ares, thin layer of fat and can't shiver, so wrap them up quick and cover their heads
- Hemopoietic System: Full term newborn has 80-85 mL of blood/kg of body weight. Most have about 300 mL at birth

Care of Newborn in Distress:

- Airway: as the head is delivered, suction the mouth first then the nose. Keep the head down a bit from the body to allow fluids to drain
- Breathing: Rub soles of feet and back to stimulate. Newborns are sensitive to hypoxia> brain damage. Primary apnea is reversed with stimulation. Secondary apnea requires ventilation
    - Use a rolled towel under shoulders. Sniffing position, don't hyperextend the trachea

    - If breathing is absent or irregular, BVM at 40-60 breaths per minute
- Circulation/Heart Rate: Cardiac arrest is secondary to respiratory failure. If HR is below 100 beats per minute, ventilate with 100% O2. If HR is below 60 initiate CPR
- Color: If central cyanosis persists after stimulation and they are breathing, give O2. Acrocyanosis or peripheral cyanosis (blue hands and feet) can persist for up to 48 hours after birth and does not require O2
- If and IV is needed: arms, feet and scalp are the most common spots. Fluid therapy is *10 mL/kg of body weight over 5-10 min*. Normal saline or Lactated Ringers.

Meconium: thick greenish black stools that usually pass after birth. Stress can cause it earlier. Neonate can aspirate and this is an emergency> respiratory distress. Vigorous suctioning of the hypopharanx before delivery of the shoulders.

Preterm infants:

- Less Surfactant: reduces surface tensions of fluids in the lungs. Makes diffusion of O2 and CO2 more efficient. Without it, newborns are unable to keep their lungs inflated.
- Less fat, translucent skin, cartilage soft, reflexes absent, can't cough, suck, swallow or gag.
- Apnea of prematurity, more prone to SIDS
- Sepsis: generalized bacterial infection. 4x greater chance of developing it

Transport:

- Level I: normal care
- Level II: manage full range of care and most maternal and neonatal complications
- Level III: full range, all complications, neonatologist on staff

From the Basic Class and still matches this book:
Neonatal Resuscitation
Assess and support Temperature, Airway, Breathing and Circulation
HEART RATE is the most important measure of the need for further resuscitation

Heart Rate		**Action**
More than 100 beats per minute	Frequently Needed	Dry, warm, position head slightly down, suction mouth then nose, stimulate Transport, assess continually
60-100 beats per minute	Less Frequently needed	Establish effective ventilations BVM 100% O2 Every 3 seconds, 20 times a minute Transport, reassess continually
Fewer than 60 beats per minute	Infrequently needed	Establish effective ventilations : BVM 100% O2 Every 3 seconds, 20 times a minute Chest compressions 120 beats per minute, hand-encircling, thumbs to sternum Ventilation to Compression 3:1 ALS backup: Medications, Intubation

Chapter 35
Geriatrics

Common Problems due to Falling:

- Reduced mobility and independence
- Poor nutrition due do difficulty preparing food and eating it
- Difficulty with elimination
- Skin abrasions, injuries and circulatory compromise
- Injuries/trauma from falling
- Decreased medical compliance

History of Falls, investigate:

- CNS disorders
- Weakness
- Impaired vision
- Dizziness
- Cerebral vascular accidents
- Medications

Changes in Normal Sensation:

- Vision: cataracts are opacities in the lens, Glaucoma is high ocular pressure that can lead to vision loss
- Hearing loss: can cause a barrier to proper treatment
- Speech: physical and metal changes can impair speech
- Pain perception: things just don't hurt as much
- Continence and Elimination: can be embarrassing and unsanitary

General Assessment: you may be the only person who has seen them in a long time. Take the time to assess their ability to care for themselves and assess their activities of daily living.

Physical Exam: do a full head to toe, like a trauma exam if possible because they may not be able to tell you what's going on with them.

General Management:

- Airway: watch for dentures and other airway obstructions
- Circulation: Don't give too much IV fluids to CHFers
- Transport: ask them to move and you help them, so as not to injure fragile bones

Specific Systems: Ask them "What has Changed?"

- Respiratory complaints – watch for: Pneumonia, PE, CPOD,
- Cardiovascular watch for: CHF, what medications, take orthostatics
- Nervous system: watch for Stroke, and determine when the current issue started.
    - Cincinnati Stroke Scale: Facial droop (smile), Arm Drift, Speech
    - Thrombolytics must be administered within 3 hours to help
- Endocrine: watch for diabetes 20% of the geriatric population has it. Many times geriatric diabetics have COPD too.

- GI: these symptoms can be secondary to some other medical problem
    - Nausea, Hiatal Hernia, GI bleed, Bowel obstruction
- Central Nervous System:
    - Stroke
    - TIAs
    - Delerium: quick onset, caused by infection, electrolyte imbalance, fever, medications etc. and reversible
    - Dementia: progressive loss of intellectual function, irreversible
    - Alzheimer's: progressive loss of cognitive function
    - Parkinson's" degeneration of the basal ganglia causes tremor at rest, sluggish movement and muscle rigidity

Other Special Considerations:

- Toxicology: average 4-5 prescriptions routinely> drug interactions>non-compliance>side effects
- Substance Abuse: stress, depression, confusion, falls
- Environmental Emergencies: sensitive to changes in temperature
- Trauma: osteoporosis makes it easy to fracture long bones, pelvis and hip
- Cardiac: function and output are already reduced. Shock and blood loss can have a profound effect on perfusion
- Head injuries: the brain shrinks, leaving more room to bounce around
- Burns: significant cause of mortality. They don't heal as fast, infections abound and stress can cause AMI
- Immobilization on a long board may be impossible or traumatic. Watch their backs and necks.
- Neglect/Geriatric abuse: frequent calls to EMS, multiple injuries in different stages of healing, lack of food, clothing, shelter, lack of proper medications, hygiene, APS = Adult Protective Services