ED Reports 2023

Renal and Pelvic Trauma Handout

- AAST Kidney Injury Scale: Grades I-V
- Renal injury can be a contusion or laceration due to blunt or penetrating trauma
- Renal injuries that are graded I-III typically do not require surgical management; higher grade injuries may require possible nephrectomy
- Majority of pelvic ring fractures are caused by MVC's, motorcycle crashes, pedestrians hit by cars, and falls
- Tile Classification and Young Burgess used to determine stable verses unstable
- Stable verses nonstable pelvic injuries
    - Stable injuries can be treated conservatively, and unstable injuries may require formal external fixation, angiography and embolization, or laparotomy
- Priority treatment of pelvic trauma includes pelvic stabilization through splinting, identifying any blood loss, and preparing the patient for possible surgical treatment
- Stable pelvic injuries can be treated conservatively
- CT scan is gold standard when trying to determine extent of injuries
- Most severe and fatal complication following pelvic trauma is hemorrhage
- Foley catheter is contraindicated when there is damage to the urethra from evident blood at the meatus, a displaced prostate, and a severe anterior pelvic fracture

Fishhook Injuries

Tissue Damage: Typically, deeper tissues are not involved due to the linear force of the fishing line that causes the hook to be parallel to the skin. Any fishhook injury that is suspected to involve deeper structures like bone, tendons, vessels, and nerves require careful assessment to determine the best technique of removal.

Types of hooks: No barb, single barb, multi barbed, and treble.

- A barb embedded in tissue prevents the hook from being pulled out until the barb is disengaged. Its removal requires skill to prevent further damage.

On-scene treatment: It is best to seek medical attention/treatment due to the likeliness to cause unnecessary soft tissue damage and the potential of the hook being lodged near a blood vessel, tendon, or nerve.

- Cut fishing line and remove bait from hook when possible and use tape to cover extra hooks.
- When is it an emergency? Hook is lodged in the eye or neck; breathing is impaired and or severe bleeding.

Removal Techniques: Advance and Cut, Push Through, String Yank and Needle Cover.

- Choosing which technique to use depends on the type of fishhook, the location and depth at which the hook has become embedded in the patient's skin, and the treating physician's judgement.

Advance and Cut

- Advance the hook until the barb exits the tissue, cut the barb off the hook, and pull the hook back through the portal of entry.

Push Through

- Best practice for multi barbed hooks.
- Cut off the eye of the hook and pull on the point/barb of hook until entire hook exits the tissue.

String Yank

- Best for deeply embedded hooks but must be performed on parts of the body that are fixed. When done successfully, produces no new wounds.
- Tie the midpoint of suture or string around the bend of the hook. Then securely wrap the rest of the line around your index and middle finger or wrist of your dominant hand. Stabilize the affected extremity on a flat surface and grasp the eye and shank of the hook with your free hand and push them downwards towards the pts skin until the barb disengages, or until you are met with resistance. When the shank is depressed and the barb is disengaged, with your dominate hand grasp the string about 12 inches from the hook and firmly pull the string. Sudden and forceful pulling on the hook is necessary for the success of this technique.

Needle Cover

- Introduce an 18-gauge needle through the same entrance point of the hook along the inside curvature of the hook. The needle should be parallel to the shank with the bevel towards the inside curve. Then advance the hook

slightly to dislodge the barb. Gently pull and twist the hook to firmly lodge the barb in the lumen of the needle. Back the hook and needle out of the tissue together.

Hypertensive Crisis

<table>
<tr>
<td>Patho -
A hypertensive crisis can occur when a rapidly increasing blood pressure resulting in shearing of the endothelial surface due to turbulent blood flow in the blood vessels leading to damage to vascular damage and release of vasoconstricting agents.

Causes –
Acute aortic dissection, exacerbation of chronic hypertension, head injury, MAOIs taken with tyramine foods, preeclampsia, rebound hypertension, recreational drug use: cocaine and amphetamines.</td>
<td>Hypertensive Emergency –
Blood pressure is severely elevated (SBP>180/DBP>120), that also involves evidence of target organ damage (including neuro, cardiac, or renal injury). This is a medical emergency!
Hypertensive emergencies can cause malignant hypertension → Increased ICP.
Can also cause renal insufficiency → Renal failure(↑BUN, Cr)
Hypertensive emergency can also be causes by cardiac issues → CHF, MI. (↑Troponin, Electrolyte imbalances – K, Na)</td>
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<tr>
<td>Hypertensive Urgency –
A hypertensive urgency is when blood pressure is severely elevated (SBP>180/DBP>120) with
no target organ damage = No abnormal BUN/Cr, Troponin, AST/ALT, Urinalysis.</td>
<td>Hypertensive Encephalopathy -
Hypertensive encephalopathy occurs when there is a sudden significant increase in blood pressure from baseline, that is associated with severe headache, N/V, seizures, confusion, visual disturbances, and coma.</td>
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<tr>
<td>Role of ED nurse –
• Assessment - edema? dizziness? headache? chest pain? altered mental status? decreased urinary output?
• Obtain health history – history of HTN? Any other conditions?
• Establish IV access - if not done by EMS.
• Medications - what medication(s)do they currently take, dosage, sticking to regimen, last time they took the medication(s)?
• Frequent Blood pressures(Q5-15 minutes), Q2-3-minute BP during initial BP administration of medications
• EKG and continuous cardiac monitoring
• Spo2 monitoring, apply/titrate O2 if needed for Spo2 <92%
• Draw labs to determine/monitor organ function: BUN/Cr, Troponin, H&H, Platelets, Potassium, Sodium, AST/ALT, Uric acid, Urinalysis.
• Medication administration as ordered → Be sure to follow order closely, do not lower MAP or BP too quickly. During the first hour of treatment, the MAP should not be decreased by greater than 20-25% or to a MAP of 110-115.</td>
<td>Treatment –
Hypertensive Emergency - the following drugs could be given. They will be given IV and be titrated according to the patient's MAP, blood pressure, and doctor's order.
• Nitrates: sodium nitroprusside, nitroglycerin.
• Vasodilators: fenoldopam, nicardipine.
• Adrenergic inhibitors: phentolamine, labetalol, esmolol, metoprolol.
• Calcium channel blockers: clevidipine, nicardipine
Hypertensive Urgency
• Does not always require IV drug therapy. Oral antihypertensive therapy can be used.
• Treatment is determined based on if patient has a history of hypertension.
• Other contributing factors – anxiety, stress, pain.
• Most common PO drugs include Captopril, labetalol, clonidine, and amlodipine.
• Non-pharmacological treatments are often used – allow to sit in a dark, quiet environment for 20-30 minutes then recheck BP.
• Discuss any stress or anxiety that can be contributing to high BP.</td>
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<tr>
<td colspan="2">Prevention/Education – Adherence to mediation regimen, Side effects of antihypertensive medications: dizziness, dry mouth, palpitations, orthostatic hypotension, Take BP daily in morning, prior to taking medications, Signs and symptoms of hypertension: HA, vision changes, chest pain, dizziness, anxiety, dyspnea, Routine doctors' visits to PCP and cardiologist, Lifestyle modifications: exercise, low-sodium diet, limit alcohol intake, decrease stress.</td>
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Abdominal trauma, puncture wounds, and tetanus

Abdominal trauma

- Blunt force trauma is a non-penetrating injury from an impactful force to a part of the body. EX: MVA, falls.
  - S/S: guarding + splinting, hard + distended abdomen, bruising over abdomen, abdominal pain, rebound tenderness. Cullen's Sign: periumbilical ecchymosis, indicates intraperitoneal hemorrhage.
    Kehr's sign: referred pain in the left shoulder due to presence of blood in the peritoneal cavity.
    Seat belt syndrome: Can cause contusions, rib fractures, or damage to internal organs such as bowel perforation and diaphragm rupture. Produces a blunt trauma to abdominal organs by pressing them into the spinal column.

Puncture wounds: Break through the skin and into the tissue. From a sharp object or animal bite. Risk for infection and tetanus.

- Tetanus: infection of the nervous system and affects spinal and cranial nerves. Caused by a neurotoxin (tetanospasmin). Stops the release of inhibitory neurotransmitters -> sustained muscle contractions. Risk factors: IV drug use, animal bite, stepping on a nail, burns, and open fractures/wounds. S/S: muscle rigidity and spasms, difficulty swallowing, tachycardia. Facial muscles affected 1st – stiffness of the jaw and a sardonic smile. R/F respiratory failure due to respiratory muscle spasms. At r/f fractures and dislocations.

On-scene treatment:

- Abdominal trauma/puncture wound: ABCs, control external bleeding with direct pressure from a sterile pressure dressing. Stabilize the impaled object and don't remove it. IV access with NS or LR infusing. If abdominal contents are protruding from the wound -> cover with a sterile dressing moistened with NS and cover with plastic wrap.
- Tetanus: anticipate the need for mechanical ventilation + intubation depending on severity.

ED treatment:

- Abdominal trauma: CT scan, diagnostic peritoneal lavage, FAST US, NG/OG tube, prophylactic abx, emergent laparotomy

  Diagnostic peritoneal lavage detects hemoperitoneum. Catheter insertion into peritoneal cavity, lavage of fluid, and evaluation of fluid to determine if RBC or WBC are present. Negative – no bleeding. Positive – bleeding/fluid present.
  FAST US: bedside US to rapidly identify free fluid in the abdomen. Done in all patients suspected of an abdominal injury.
  Wound care: wash with soap + water for 10 minutes -> irrigate with NSS (use 18g needle + 30-60ml syringe) -> debride -> pack with DSD.
- Puncture wound: CT or XR, wound care, and tetanus prophylaxis. Tetanus has no specific diagnostic –> use S/S and H+P.

Role of the ED nurse:

- Abdominal trauma: Monitor VS, LOC, O2, UO. Labs (ex: H+H & type and crossmatch). Administer blood products, vasopressors, and pain meds PRN.
- Puncture wounds: wound care, administer abx as ordered, and Tdap vaccination status.
- Tetanus: administer benzodiazepines, dantrolene, or magnesium sulfate PRN for muscle contractions. Administer HTIG, abx, and Tdap for infection control. Perform wound debridement. If severe/requiring intubation, transfer to ICU.
  Tdap: increased r/f tetanus + should be considered for a booster if wound is dirty (contaminated with dirt, soil, or saliva), penetrating wound or puncture wound. If unvaccinated, should receive the 3-dose primary series of Tdap. If their last dose is within 5 years, they're protected. If it's been more than 5 years, they should receive a booster.

Discharge/prevention instructions:

- Abdominal trauma: post-op limitations, pain management, deep breathing + coughing, wound care instructions, s/s of infection.
- Puncture wounds/tetanus: wound care instructions, ways to prevent this type of injury in the future, s/s of infection, immediate thorough cleaning of the wound for prevention, receive Tdap booster q10years

Tranexamic Acid – TXA

- Given to pt's w/ bleeding disorders to help control/prevent bleeding complications- Antifibrinolytic agent: inhibits the conversion of plasminogen to plasmin & the breakdown of fibrin in blood clots. Used to prevent blood loss, decrease need for more blood, & is hung w/ blood. Standard trauma does: 1 gram IV loading does over 10 min. & give an additional 1 gram over 8 hrs for continued bleeding. Max dose: 2 grams. Watch hemodynamics & for thrombotic events. PE = the biggest risk. Contraindications: Hypersensitivity, known history of DVT/PE/clotting disorders

Massive Transfusion Protocol – MTP (per Beebe's policy)
- A priority for pt's who are rapidly losing blood & circulating volume
- Rapid/massive blood loss definition: 8-10 units of blood given in 24 hrs, 4-5 units of RBC's in 1 hr, A loss of more than 40% of a person's volume of blood in 3 hrs, or Losing more than 150 mL of blood per minute
- Use a rapid transfuser to give blood quickly & safely
- Watch for adverse effects: febrile reaction, hemolytic reaction, circulatory overload and air embolism.

Traumatic Wounds – Control of Bleeding
- Get a baseline of the # of wounds, the location, type/classification, the time/duration, & treatment possibilities. Look at the wound size and appearance, description of edges, and color/condition of the surrounding skin. Pain PQRST, any exudate (amount, type, consistency, odor, color), any s/s of infection. Stop the Bleed- Apply direct pressure, use of a tourniquet. Do not release tourniquet.

Pressure Points
- Brachial Artery Pressure Point- Position are in a 90^{o} angle & hold upper arm away from the body. Feel the inside of the pt's biceps halfway between the elbow & shoulder, push the bicep muscle out of the way "Squeeze" or press your hand down the pt's humerus
    - If done correctly, you will feel a pulse
- Femoral Artery Pressure Point- supine, kneel next to their hips, on the outside of the bleeding extremity. Find the pelvis & place the little finger of your hand that is the closest to the injured leg along the anterior crest. Rotate your hand down firmly into the pelvic bone & genitals to compress the artery
    - If the bleeding does not slow down – reposition your hand & try again

Hemostatic Dressings
- Are used in the presence of bleeding w/ direct manual pressure. Dressings are infused w/ agents that help enhance blood clotting. Should be applied w/ 3+ minutes of direct pressure. If it does not work, removes & apply the same or a different type of dressing. No adverse effects but should not be used in head, chest, & abdomen wounds

INJECTED POISONS: SNAKES

ETIOLOGY/PATHOPHYSIOLOGY

- PIT VIPERS (CROTALIDAE FAMILY)
    - Hemolytic Venom: Acts directly on both local tissue and systemically; Attacks circulatory system (Pro/anticoagulation, platelet aggregation, edema development, inflammation, myotoxicity)
- CORAL SNAKES (ELAPIDAE FAMILY)
    - Neurotoxic Venom: Systemic effects via the lymphatic system; Blocks acetylcholine receptor sites in neuromuscular transmission pathways and causes a disconnect between brain and muscles (Cardiac and respiratory)

ON-SCENE TREATMENT

- PIT VIPERS: Flat triangular head with a distinguishable heat sensitive put between thin slit eyes.
    - S/Sx: Immediate pain at bite site, rubbery taste in mouth, increased bruising/blood blisters, complications of hemorrhage or thrombosis (chest/abdomen pain, headache, tachycardic, hypotension, confusion)
- CORAL SNAKES: Brightly colored alternating bands of red, yellow, and black; rounded head and pupils
    - S/Sx: N/V, slurred speech, blurred vision, numbness/tingling around face, ptosis, dysphagia; Be conscious of respiratory or cardiac arrest!

- Common Myths/what NOT to do: Never use a tourniquet, or ice.
- What to do: Keep bite at heart level, clean with soap and water then cover; Dead snakes can still bite!

ED TREATMENT

- Pit Vipers: Two types of antivenin (Crotalidae Polyvalent Immune Fab and Cortalidaie Immune F(ab)2)
- Coral Snakes: North American Coral Snake Antivenin (NACSA)

ROLE OF ED NURSE: ASSESSMENT, PATIENT HISTORY, MONITORING, AWARE OF COMPARTMENT SYNDROME AND THIRD SPACE LOSSES

DISCHARGE/PREVENTION INSTRUCTIONS

- Call doctor if any changes in s/sx or wound changes, serum sickness, hypersensitivity reaction
- Be aware of your surroundings to prevent future bites.

Penetrating Wounds – Gunshot wounds, neck injuries, and forensic concerns

- Low Velocity – direct tissue destruction localized to the area that is proportional to the size of the projectile
  - Bullet travels <1200 ft per second
  - Cavitation – wound size will be 3 – 6 times bigger than the original bullet diameter
- High Velocity – lateral tissue is also involved and damaged
  - Bullet travels >3000 ft per second
  - Cavitation – wound size will be 30 – 40 times bigger than the original bullet size
- Yaw – Rotation of the nose of the bullet away from a straight path, the line of flight
- Tumbling – End on end rotation of a bullet in motion, change in rotation of the bullet, causing it to appear as if it is somersaulting in the body
- Cavitation – Cavity (expansion of surrounding tissue) left from high velocity entry of a bullet. Energy is then transferred simultaneously, and a temporary cavity is created
- Neck Anatomy
  - Zone 1 – Between clavicles and the cricoid cartilage
  - Zone 2 – Between cricoid cartilage and angle of the mandible
  - Zone 3 – Between angle of the mandible and the base of the neck
- Stabilization
  - GSW
    - Stop bleeding
  - Stabbings
    - Stop bleeding
    - If knife still in patient, secure knife
  - Impaled objects
    - Do not remove object
    - Secure object – wrap with gauze, secure with tape
    - Be cautious not to apply pressure on the object
- Forensic Concerns
  - Put patient hands in paper bags
  - When cutting off clothes cut around bullet wounds, use caution not to cut through holes of blood-stained areas, and handle clothing a little as possible
  - Label all items
  - Keep chain of custody to a minimal amount of personnel
- Infection risk!
  - Debris from clothing can enter wound
  - Debris from gun or on knife blade
  - Internal penetration of bowel, allowing bowel content/feces to enter the abdominal cavity
- Airway issues
  - Adequate protection of airway
    - Supply supplemental oxygen
    - Continue breathing assessment
  - Inadequate protection of airway

- If possible, remove obstruction
- GCS less than 8 intubate or significant bleeding into airway or airway displacement

Key Points: Drug Overdose – Opioids

- **Opioid Overdose Triad:** respiratory depression (<12 breaths/min), miosis (pinpoint pupils), and decreased LOC.
  - Focused assessment **first** and establish a safe environment. (A-B-C) AIRWAY via bag-valve mask.
  - **Administer Naloxone** intranasally in conjunction with ventilation. Assess need for additional dosages based on VS, LOC, WOB
  - **Goal = stabilization for transfer to emergency department.**
- **Naloxone:** reversal agent for opioid overdose.
  - Intranasal: 4-8mg/nare q 2-3 minutes while alternating nostril. If ineffective 1mg per nare q 3-5 minutes.
  - IV: Initially 0.02-0.2mg; dosage based on effective dose used and duration of response. 2/3 of the initial effective Naloxone may be given via bolus hourly as an alternative. ½ of the initial bolus dose should be given in 15 minutes.
- Primary cause of death in Opioid Overdose patients= **Respiratory acidosis.** (decreased RR, ventilation r/t hypercapnia and hypoxia)
  - Prevention! VENTILATION: establish and maintain patent airway (assess need for additional respiratory support)
  - Monitor VS (continuous pulse oximetry, BP, RR, HR)
- **3 Waves of Opioid Deaths**
  - First, 1999- increase in prescription opioids being distributed
  - Second, 2010 related to availability of Heroin
  - Third, in 2013 mainly due to illicitly manufactured Fentanyl
- **Provide discharge education and prevention instructions**

Inhaled poisons: Inhalant abuse

Etiology/ Pathophysiology

- Chemicals like butane, toluene, and solvents are found in many household items.
  - Butane is found in gas tanks and lighter canisters.
  - Toluene is found in glues, markers, paints, and paint thinners/ removers.
  - Other solvents are found in aerosol computer cleaning products, aerosol dispensers such as whipped cream canisters, and hair spray canisters.
- The biggest population for inhalant abuse is seen in high school students.
- These chemicals are rapidly absorbed into the blood stream affecting the central nervous system and the cardiovascular system.
  - Signs and symptoms: euphoria “feeling high”, dizziness, slurred speech, and lack of coordination, confusion, tremors, and weakness. Further CNS depression: ataxia, lethargy, coma, possible seizures, and respiratory depression. Arrhythmias, palpitations, syncope, and shortness of breath.
- Sudden sniffing death syndrome can happen usually the first time a chemical is inhaled that is then followed up by some form of physical activity such as running. The myocardium blocks the potassium current causing a prolonged repolarization leading to hypoxia and death.
- Inhalants may be sniffed, huffed, or bagged. Each technique delivers a different concentration of the substance.

On scene treatment/ ED Treatment

- Remove from source, follow ABC’s, and obtain a history.
- Administer oxygen 100%.

Role of the ED nurse

- Follow ABC’s and administer oxygen.
- Obtain a urine culture for a tox screen and other diagnostic tests such as an EKG, CT of the head, MRI, BMP, and CBC. Correct electrolyte imbalances.
- Vital signs, level of consciousness, and cardiac monitoring continuously. Strict I&Os.
- Assess mental health.

Discharge/ Prevention

- Possible referral for substance abuse disorder and counseling.
- Provide education of signs and symptoms of intoxication and warning signs to parents and schools.

Ingested Poisons: Corrosives & Hydrocarbons

Etiology & Pathophysiology of Ingested Poisons: <u>Corrosives (Acids & Alkalis) "Caustic"</u>	**Acids:** cause coagulation necrosis, eschar forms, tends to affect the stomach more than the esophagus, with a pH of less than 2 cause the most extensive injury **Alkalis:** causes rapid liquefaction necrosis, no eschar forms and damage continue until the alkali is neutralized or diluted. Affect the esophagus more than the stomach, with a pH greater than 12 cause the most extensive injury
Etiology & Pathophysiology of Ingested Poisons: <u>Hydrocarbons (Petroleum)</u>	Hydrocarbons if ingested in large amounts can be absorbed systemically and cause central nervous system or hepatic toxicity. Direct destruction of airway epithelium Inflammatory response causes an increase in temperature.
On Scene Treatment: Ingested Corrosives/Caustic Ingested Hydrocarbons	**Corrosive:** most immediate risk is the loss of airway! clothing should be removed as potential splashes, spills or emesis may have occurred, identify what was ingested, amount ingested, age, height, and weight of pt, do not induce vomiting, transport to ED ASAP **Hydrocarbons:** assess for a patent airway, respiratory rate, pulses, LOC, identify what was ingested and amount, identify age, height & weight of pt, call poison control, do not induce vomiting, transport to ED ASAP
ED treatment: Ingested Corrosives/Caustic Ingested Hydrocarbons	**Corrosive Caustic ED Tx:** maintain patent airway or place airway if indicated (by first sign of change in voice) HOB elevated greater than 30 degrees to prevent aspiration. Thorough physical exam & history, identify poison & amount ingested, NPO, aggressive rehydration via IV fluids, **Hydrocarbons ED Tx:** Thorough physical exam & history, identify poison & amount ingested supportive care, avoid gastric emptying, intubation may be necessary in extreme pulmonary toxicity high PEEP indicated to maintain alveoli, cardiovascular symptoms should be treated with aggressive IV fluids in cases of hypotension. Chest CT done
Role of ED Nurse: Ingested Corrosives/Caustic Ingested Hydrocarbons	**Corrosives:** Maintain patent airway, maintain HOB greater than 30 degrees, do not induce vomiting, establish/maintain IV access, focused assessment, then full head to toe, followed by frequent reassessments, ECG monitoring, Is &Os, **Hydrocarbons:** Apply O2, initiate EKG, initiate and maintain seizure precautions, correct electrolyte disturbances, , focused assessment, then full head to toe, followed by frequent reassessments, ***Activated charcoal is contraindicated as they do not bind hydrocarbons and increase the risk of hydrocarbon aspiration
Pediatric Concerns: Ingested Corrosives Ingested Hydrocarbons	Always call poison control, ages 1-3 and intellectually disabled are at highest risk, asymptomatic children w/ normal VS should be observed for 6 hours post exposure before discharge, pts w/ milder respiratory or CNS symptoms should be admitted for longer period of observation and supportive care,
Discharge/Prevention Instructions Ingested Corrosives Ingested Hydrocarbons	D/C criteria: normal ECG, No respiratory Symptoms, Normal VS & pulse ox, no mental health risk, referral to mental health services if intentional ingestion keep any poisonous containers in locked and out of reach from children, label all containers that contain hazardous materials.

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Inhaled Poisons: Carbon Monoxide + Chlorine

CARBON MONOXIDE (CO):	CHLORINE:

▪ Colorless, odorless, tasteless gas ▪ **Has a stronger affinity for hemoglobin than oxygen →** severe hypoxia! Exposure: inhaling smoke from a fire, exhaust from cars, or leaks from appliances S/Sx of Exposure: headache, confusion, nausea, cherry red skin + mucous membranes, shortness of breath, dizziness ▪ Severe exposure: dysrhythmias, death ***** CAUTION pulse oximeters may be deceiving and appear normal ***** Treatment: **treated w/ high flow 100% O2 via a non-rebreather (*even if a pulse oximetry does not show hypoxia*)**, may need hyperbaric oxygen therapy Prevention: install CO detectors/ensure they are working , never leave cars running in an enclosed garage, routinely check appliances for gas leaks	▪ Yellow-green gas, with a pungent + irritating odor (easier to suspect) ▪ Not systemically absorbed but can cause airway and alveolar irritation Exposure: household bleach mixed with other cleaning agents, inhaling chlorine from pool water S/Sx of Exposure: burning + irritation to the eyes, nose, and throat, coughing and shortness of breath ▪ Severe exposure: respiratory distress Treatment: **supplemental humidified oxygen** and bronchodilator treatment if bronchospasm is present Prevention: exit the area if exposed to chlorine, do not mix household cleaners, do not inhale pool water, and keep household cleaners out of reach to children

*** Call 911 or poison control immediately and remove yourself from the area if exposure to chlorine or carbon monoxide is suspected! ***

Active Shooter in a Hospital Setting

- Active shooter- an individual actively engaged in killing or attempting to kill people in a confined and populated area
- How to respond
  - Run/Evacuate-Run at sound of gunshots. Leave belongings.
  - Hide/Barricade- Hide out of shooters view. Block entry.
  - Fight- Fight only as last resort! Distract/incapacitate attacker by swarming and yelling. Commit to your action!
  - Alert authorities only when safe to do so.
- Role of the Nurse
  - Duty to care for patients.
  - Ensure least loss of life as possible.
  - Make every reasonable attempt to care for patients.
  - Prepare to discontinue care to those not able to evacuate.
- Law enforcement tactics
  - Proceeds to area where gunshots last heard and will not render first aid.
  - Dress in normal uniform or tactical gear.
  - Follow commands. Hands up fingers apart.
- Preventing an active shooter event: warning signs
  - Foster respectful work environment.

    - Observe indicators of violence (i.e. unexplained absenteeism, depression, withdrawal, suicidal comments, severe mood swings)
- A.L.I.C.E. training for staff
    - **Alert**- alert law enforcement when safe or receive first notification of danger
    - **Lockdown**- Lockdown if evacuation is not safe
    - **Inform**- Continue to communicate in real time if safe to do so.
    - **Counter**- Only as last resort. Counter is not fighting. Provides time to escape.
    - **Evacuate**- Only when safe
- How to keep patients safe
    - Evacuate non-impacted areas
    - Lockdown
    - Do not move wounded

Drug Overdose

Acetaminophen - S/Sx: abd. Pain, loss of appetite, diarrhea, coma, irritability, jaundice, N/V - Complications: SJS, liver failure - TX: gastric decontamination, activated charcoal, NAC (N-acetyl-cysteine) anecdote for Tylenol	**Aspirin** - S/Sx: wheezing, tachypnea or bradypnea, confusion, incoherence, coma, N/V/D, HA, fatigue - Complications: Resp. arrest, dyspnea, hypotension, coma - Tx: fluid resuscitation, potassium, activated charcoal, gastric lavage, symptomatic support
Rophynol: - S/Sx: sedation, LOC, bradypnea, bradycardia - Complications: severe sedation, unconsciousness, death - Tx: activated charcoal, emetic medications, flumazenil (benzo antidote)	**Ecstasy:** - S/Sx: HTN, teeth clenching, hyperthermia, dizziness, agitation, LOC, seizures - Complications: seizures, dysrhythmias, rhabdomyolysis, SIADH, MI - Tx: activated charcoal, symptomatic support: benzodiazepines, ice packs/cooling blankets
Methamphetamine: - S/Sx: chest pain, tachycardia, HTN, hyperthermia, confusion, agitation - Complications: HTN, intracranial hemorrhage, seizures, coma - Tx: benzodiazepines, symptomatic support: antipsychotics, Benadryl, beta-blockers, fluids	**Cocaine:** - S/Sx: seizures, LOC, loss of urine control, hyperthermia, sweating, HTN, cyanosis, dyspnea - Complications: thrombophlebitis, HIV, pulm. emboli, aneurysms - Tx: symptomatic support: benzodiazepines, Calcium channel blockers, nitroglycerin, Benadryl, cooling blankets
On Scene Treatment - ABCs, Collect H+P, drug used, how much, when, current medications, etc., IV access, Set of vitals, No pulse = CPR, Decreased LOC or altered mental status -> OPA and resp. support with BVM	**Role of ED nurse** - Focused assessment, start IV, vitals, ABC's, draw labs to monitor serum drug levels, urine drug screen, EKG, H+P, administer prescribed medications, NG tube/foley, prepare for diagnostic tests

Alcohol Overdose & Withdrawal

Alcohol Overdose

- Excessive amount of alcohol in bloodstream causing basic life support functions to shut down.
  - ↓RR, ↓HR, poor temp regulation, absent gag reflex
- Sx: Mental confusion →stupor/coma
  - Unarousable, N/V, seizures, hypothermia,
  - Bradypnea or irregular breathing, bradycardia
- On- Scene Treatment: assess ABC!
  - Found conscious or unconscious?
  - Witnesses? Time of last drink?
- ED treatment:
  - Apply 100% nonrebreather is SpO2 <92%
    - May need intubation.
  - IV access & admin IV fluids to correct dehydration/electrolyte imbalances.
  - Lateral position and admin antiemetics if needed.
  - Sedation: may bed needed if the patient is agitated or violent to prevent injury to self (ex: lorazepam, diazepam).
- Role of ED Nurse:
  - Apply 100% nonrebreather and place in lateral position.
  - Insert/maintain IV: Administer fluids and draw labs.
  - Reassess vital signs q15 mins until stable.
  - Maintain calm, low stimuli environment.

Alcohol Withdrawal

- Occurs when an individual stops/reduces alcohol intake after long term use.
- Sx: N/V, diaphoresis, insomnia, HTN, anxiety, HA, palpitations.
  - Can progress to seizures, tremors, and hallucinations w/o treatment.
- CIWA protocol: objective way to measure the severity of alcohol withdrawal.
  - Consists of 10 questions that assess the presence/severity of each symptom.
  - Mild: ≤8, Moderate: 9-15, Severe >15
  - Scale is used to guide treatment and assess progress during time of care.
- On- Scene Treatment: Assess ABC!!
  - Determine time of last drink
  - Assess onset of symptoms
    - When did symptoms start and what symptoms are they experiencing?
- ED Treatment: correct dehydration with IV fluids, utilize CIWA scale, **admin benzodiazepines per order,** admin supplements (ex: thiamine).
- Role of ED Nurse:
  - CIWA assessment q1hr, establish IV access/hang fluids/draw labs.
  - Administer IV benzodiazepines per MD order, assess VS, and maintain seizure precautions.

Withdrawal Complications:

- **Seizures:** caused by overstimulated CNS, imbalance in electrolytes, and/or dehydration. Tx: IV benzos, seizure precautions, assess VS and apply oxygen if needed.
- **Delirium Tremens:** severe, life threatening form of withdrawal. Sx: visual hallucinations, extreme confusion, tachycardia, hypertension, hyperthermia, seizures, and agitation. Tx: high doses of IV benzodiazepines
- **Wernicke-Korsakoff Syndrome:** neurological disorder caused by a deficiency in thiamine.
  - Wernicke encephalopathy: acute brain disorder. Sx: confusion, ataxia, visual changes
    - If untreated, progresses to Korsakoff Syndrome
  - Korsakoff Syndrome: chronic memory disorder

Discharge/Prevention Instructions: Teach the signs and symptoms of alcohol overdose/ withdrawal, potential complications of withdrawal, and the importance of maintaining sobriety.

- Inpatient rehab, community support groups, AA, distraction techniques.
- Daily medications: supplemental vitamins, thiamine supplement.
- Long term abstinence medications: naltrexone, acamprosate, disulfiram.
  - Alcohol combined with disulfiram= N/V, hypotension, flushing and palpitations.

Ticks & Tickborne Disease

Tick Tips
FOR ED NURSES

Investigate for potential exposures, take thorough patient histories

Know which tick-borne illnesses exist in your area

Delaware: Lyme, Ehlrichiosis, RMSF

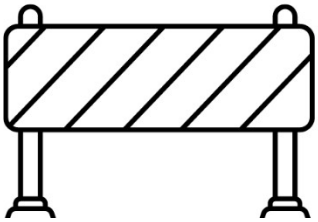
Consider ticks when observing distinct rash patterns

Lyme: bullseye rash; RMSF: pink-red macules on hands + feet;
Tularemia: enlarged lymph node distal to suspected bite

Ensure COMPLETE removal of tick; failure to remove mouthparts may cause worsening or return of symptoms

Educate patients about antibiotic courses + compliance. Consider the need for PICC placement and home care.

Prevention Education



- Emphasize tick-checks every 4 hours spent outside
- Use insect repellents containing deet
- Cover any exposed skin prior to outdoor recreation

Decompression Sickness & Submersion Injuries

- **Decompression Sickness (DCS):** nitrogen gases dissolved in the blood during high pressure are **trapped as bubbles in the tissues** during depressurization, then **occludes blood flow and oxygenation**
- **Pathophysiology:**
  - Physics laws: lung compressed on descent & tissues absorb more nitrogen
  - Slow Ascent (Good): pressure decreases gradually giving time for nitrogen to diffuse out of tissues eventually going back to lungs to diffuse in alveoli
  - **Rapid** Ascent (**Bad**): Pressure decreases **rapidly → nitrogen comes out of solution** and **forms bubbles → injure tissues & occlude blood flow and oxygenation**
- **Causes of DCS**: **SCUBA Diving**

    - Increased risk: **air travel after diving**, deep or prolonged dives, **rapid ascent, honeymooners**
- Types of DCS: Type I (mild)- musculoskeletal and epithelial & Type II (life-threatening)- Pulmonary & Neuro
    - S/sx: *gradual* onset- 15 minutes to 12 hours.
- **Type I "The Bends": Musculoskeletal Sx:** severity of **pain in the joints** and bones can cause diver to continuously "bend over". Epithelial Sx: Pruritus, rash, skin mottling.
- **Type II: Life-threatening sx.** More debilitating.
    - **Pulmonary Sx:** dyspnea, chest pain, cough
    - **Neurologic Sx:** confusion, speech disturbances, HA, visual disturbances
    - **Other Sx: Spinal cord injuries,** vertigo, tinnitus, dysrhythmias, PE, MI, CVA
- **On-Scene Treatment:**
    - Contact EMS, then Divers Alert Network
    - Stabilize **ABC's**. **Administration of O2 always 1st tx independent of spO2 levels**
    - **Rapid transportation**- maintain supine during transport
- **ED Treatment Goal**: improve oxygenation by **increasing nitrogen elimination**
    - **100% O2** until HBO, IVF- dehydration, NSAIDs- pain. Mild sx is tx w/ supplemental O2 & pain meds.
    - **Gold standard: Hyperbaric Oxygen Chamber** → dec. size of bubble and improves nitrogen elimination
- **Discharge/Prevention Instructions: Gradual ascent** back to surface, **NO flying within 24h of dive**

Submersion Injuries (Near Drowning):

- **Submersion**: air hunger + hypoxia leading to aspiration of water
- **Drowning**: **respiratory impairment** from submersion in liquid
- **Risk Factors:** children, alcohol use, male, inability to swim
- **Pathophysiology:** aspiration cause surfactant dysfunction, ↑ alveolar-capillary permeability, ↓ lung compliance, V/Q mismatch. **Death occurs from cerebral hypoxia**
    - **Wet vs Dry Drowning:** Wet = **aspiration of fluid** in lungs bc laryngospasm stopped. Dry = no aspiration
    - **Cold Water Drowning:** Hypothermia slows progression of hypoxic brain injury.
        - Parasympathetic: Mammalian reflex → shunts blood to vital organs → slows HR → reduces metabolic & electrical activity of brain → **reducing O2 consumption**
    - **Freshwater vs Saltwater:** both cause respiratory issues
        - Freshwater- hypotonic, dilutes surfactant → alveolar collapse
        - Saltwater- hypertonic, fluid pulled into alveoli → **pulmonary edema**
- **S/sx: Pulmonary insufficiency (hypoxia),** changes in LOC, hypothermia
- **Risk for Pulmonary Edema:** coughing thick, pink, frothy liquid
- **On-Scene Tx:** 1. Self-Safety, remove from water. 2. **Call for help**, resp assessment. 3. **CPR**. 4. Prevent Aspiration. 5. **Treat hypothermia.** C-spine precautions → stabilize, logrolling, backboard
- **ED Tx:** 100% O2 via non-rebreather, Respiratory support using CPAP and PEEP, warmed IVF
- **Discharge/ Prevention:** Water safety, no risk-taking behavior, **learn CPR,** learn how to swim, **adequate child supervision**

Injected poisons – Hymenoptera Stings & Anaphylaxis

What are Hymenoptera

Hymenopterans are a vast assemblage of insects that contain stingers. These insects deliver venom via their stingers found in their abdomen, the stinger and venom is used as a defense mechanism or used against their prey.

Reactions to Hymenopteran Venom

Possible reactions:

- Uncomplicated local reaction: May presents with warmth, tenderness, and focal edema at the sting site.
- Large local reaction: Similar to uncomplicated local reactions; however, these reactions are larger, last longer, and have an area of erythema that is greater than a 10-centimeters.
- Systemic reactions (anaphylaxis): May present with skin reactions, including hives, itching, flushed or pale skin, low blood pressure, constriction of the airways, swollen tongue or throat which can cause wheezing and trouble breathing, a weak in rapid pulse, nausea, vomiting, diarrhea, dizziness, fainting, erythema, edema, and pain at the sting site. Anaphylaxis if not treated properly can be fatal.

On Scene Treatment
Within a few minutes the stinger should be removed via scraping across the stinger with a straight edged object like a credit card (Do not tweeze or squeeze the stinger as it can cause further envenomation). Next wash the site thoroughly with soap and water, ice can be used to reduce swelling.

If an anaphylactic reaction occurs an Epi Pen should be used followed by a trip to the emergency room. Get to an emergency room as soon as possible if there is no Epi Pen. Avoid itching/scratching the sting area. If a pustule forms do not pop as it poses as a risk for infection.

Epi Pen
When using the EpiPen (Autoinjector syringe), have the orange tip pointing downward towards the middle of outer thigh, remove the blue safety cap by pulling straight up. The orange tip against the middle the outer thigh. Push the auto injector firmly into the thigh until it clicks and hold firmly in place for three seconds (Allowed to inject through clothes). Massage injection site for 10 seconds, after injection call 911 or go to the emergency room immediately as the effects of epinephrine can wear off. If experiencing a severe allergic reaction that does not improve or has worsening symptoms, inject another dose of EpiPen 5 to 15 minutes after the first injection. Epinephrine does not replace a doctor or going to the hospital.

Store the injection kits at room temperature, away from heat, moisture, and direct light. Do not store inside of vehicles. If medicine is dropped, check it for damage or leakage. Throw away expired, unwanted, partially used, or unused EpiPens in FDA cleared sharps container (do not throw away into a trash bin). Keep Epi Pen out of the reach of children. Check medicines regularly, should be clear and colorless without particles.

DOG, CAT, HUMAN BITES AND RABIES

Bites: Dog Bites: blunt and broad teeth, cause sheering and crushing. Cat Bites: puncture wounds, inoculate pathogens into small joints, deep spaces, or tendons. Human Bites: laceration, puncture, crush, soft tissue injury, amputation; clenched fists bites and occlusive bites; high risk for Staphylococcus aureus infection. Initial treatment: cleaning, splint wounds over joints, apply pressure to stop bleeding, cover wound. ED Treatment: Irrigation, debridement, Tetanus prophylaxis, analgesics, topical and systemic prophylactic antibiotics

Rabies: Symptoms of Rabies: fever, chills, malaise, fatigue, insomnia, anorexia, headache, anxiety, irritability, pain, paresthesia, pruritus. Rabies reaches the brain and symptoms manifest (always fatal when symptoms appear)

- Encephalitic Rabies: episodes of hyperexcitability separated by lucid periods (agitation, confusion, hallucinations, aggressive behavior lasting 1-5 minutes), hypersalivation, sweating, possible seizures, hydrophobia (difficulty swallowing, contractions of the diaphragm and accessory muscles, retching, vomiting, convulsions), aerophobia (occurrence of spasms when air is fanned).
- Paralytic Rabies: muscles weakness from bitten extremity to quadriparesis and bilateral facial weakness, urinary incontinence, weak respiratory muscles, often misdiagnosed with Guillain-Barre syndrome.
- Rabies post-exposure vaccination (RIG and HDVC) given on days 0, 3, 7, 14 for active immunity. Vaccinated animals are observed at a vet's office for 10 days, if rabies symptoms occur the animal is killed, and brain is examined for rabies. Stray/wild animals that bite should be euthanized and have their brains examined.

Crush Injuries and Traumatic Amputations

Etiology & Pathophysiology

- Amputation- Tissue has been separated from the extremity & is without nutrition/oxygenation.
  - Complete- vessels are completely transected, this causes constriction & retraction.
  - Incomplete- the two ends can not retract & blood continues to flow out.
- Crush Injury/Crush syndrome-Prolonged crushing or entrapment from a traumatic mechanism.
  - Cellular hypoperfusion & hypoxia occur due to prolonged compression or torn vessels.
  - Prolonged compression→rhabdomyolysis- myoglobin & potassium are released.
  - During extrication, the limb becomes reperfused with fresh blood- the blood from the injured body part with increased levels of myoglobin & potassium are released to the rest of the body.
  - High levels of myoglobin produce tea-colored urine (can lead to renal failure) & high levels of potassium can cause cardiac dysrhythmias.

- Before removal of the object- apply a tourniquet above the site of injury- helps to prevent the release of toxins into the circulatory system.
- Compartment syndrome- Rise in interstitial pressure within the closed fascial compartment.
  - The swelling occurs inward, leading to compression & collapse of nerves, muscle fibers, & blood vessels.
  - Pressure rises = compromised atrial flow & nerve function & cells become hypoxic (then necrotic).

On-scene Treatment

- Patients are in shock- May be unaware of the extent of injuries & this can precipitate extreme anxiety & hemodynamic instability.
- ABC's or CAB
- Hemorrhage control is essential to survival- Initially bleeding should be controlled with direct pressure & if unsuccessful = apply tourniquet.
- Management of the limbs (EMT)- 1. Clean the amputated part with LR or NS 2. Wrap in sterile gauze soaked with LR & place in a container or plastic bag 3. Label the bag & place it in a container with ice
- Stump & limb care- Do not directly place on ice or add dry ice, do not use hydrogen peroxide.
- Re-implantation may be unsuccessful due to
  - Comorbidities: diabetes mellitus, vascular disorders, HTN, & advanced age.
  - Extensive neurovascular damage, prolonged ischemia, multiple injury levels, severe contamination.

ED Treatment

- Tetanus prophylaxis & broad-spectrum antibiotic therapy.
- IV opioid therapy for pain management & obtaining labs/imaging.
- Treatment for Rhabdomyolysis- initiation of aggressive fluid resuscitation.
- Treatment for Compartment Syndrome- Emergency surgical intervention (Fasciotomy) for decompression

Role of the ED Nurse

- Surgery prep- consents signed & answer questions.
- Recognize s/sx of deterioration & report immediately.
- Administer emergency medications/fluids & any blood products prn
- Control Bleeding & prevent shock & keep vitals within normal limits ex. Sp02 >93%.

Discharge and Prevention

- Review safety precautions→ dangerous recreational activities & hazardous working conditions.
- Develop a realistic attitude about the future- monitor for PTSD.
- Teach about prevention & detection of complications after surgery.
- PT & OT will be a central part of the patient's overall plan of care.

Hypothermia and Frostbite

Hypothermia

- Lowering of core body temperature to less < than 35C
- Heat loss> Heat production

Mild Hypothermia – 32.2C-35C (90-95F)

- Alert, the mental status may be altered
- s/s- ataxia, slowed response to stimuli, dysarthria.

Moderate Hypothermia – 28C-32.2C (82.4-90F)

- Decreased LOC, respirations, pulse, and cardiac output
- Increased risk v- tach
- Shivering ceased

Severe Hypothermia – 23.8-28C (75-82.4F)

- Absence reflexes and pain response
- Decreased cerebral blood flow

Frostbite – tissue damage after exposure to freezing temperatures.

- Superficial vs Deep Frostbite
- 4 phases –Pre- freeze, freeze and thaw, vascular stasis, ischemic phase

On scene treatment

- ABCS & CPR for at least 5 minutes
- removing wet clothing if appliable and external passive rewarming (insulation or blankets)
- Avoid rubbing frostbitten areas r/f further tissue trauma
- Resuscitate until temp >30C

ED Treatment

- Slow and controlled rewarming—trunk first then extremities r/f core temp after drop
- Place affected extremities in warm water for 30 minutes
- Tetanus prophylaxis
- Anticoagulation within 24hrs

Ed Nurse Role

- Cardiac monitoring (v-fib or a fib)
- Monitor Vitals (HR, BP, Temp) and electrolytes -- K+
- Isotonic fluid resuscitation (hypotension)
- Heating pads, warmed fluids, warmed blankets
- Stabilized BEFORE Rewarming frostbitten areas

Injected Poisons- Spiders

Venomous Spiders:

- Black Widow (*Latrodectus Mactans*)
  - "Hourglass"
  - Neurotoxic: major venom component of sphingomyelinase D potentially resulting in vascular injury, dermatonecrosis, and hemolysis.
- Brown Recluse (*Loxosceles Reclusa*)
  - "Violin", "Fiddleback"
  - Cytotoxic: the major venom component of α-Latrotoxin potentially resulting in massive presynaptic discharge of neurotransmitters, lymphatic and hematogenous spread, and neurotoxicity

Clinical Presentation:

- Black Widow
  - Tachycardia
  - Bradycardia
  - Leukocytosis
  - Hyperglycemia
  - Bronchoconstriction
  - Pain at site (and systemic)
  - Anxiety
  - Muscle Cramps
  - Psychosis
  - Hallucinations
  - Visual disturbances
  - Seizures
- Brown Recluse
  - Tissue necrosis
  - Tissue sloughing
  - Red blood cell hemolysis
  - Systemic release of serotonin

Treatment:

- Black Widow *Symptoms can appear immediately
  - Maintain airway!
  - Basic first-aid (ex: dress wound, ice pack prn)
  - Administer Latrodectus IV to high-risk patients (contraindicated if allergic to horse, horse serum)
- Brown Recluse *Symptoms can appear 3-5 days after envenomation/penetration
  - Assess for any immediate reactions, although not common
  - Educate! – When to return, symptoms/changes of concern, assessment skills, at home management

Teaching:

- Found outside under rocks, stone walls, crevices, woodpiles, outhouses, barns, stables, and rubbish piles- so take caution and avoid
- Wound Care
- Signs and symptoms of infection or further complications
- When to return to the ED

Injected Poisons – Jellyfish

Etiology/Pathophysiology: > 9,000 species of jellyfish

- Anatomy: bell & body – covered in nematocytes (with stinging organelle called nematocyst)
- Stimuli ->Nematocytes Discharge ->Penetrates target ->Venom infiltrates ->Sting develops
    - Nematocysts **remain lodged in target** releasing venom (venom specific to species)
    - Venom: enzymes, pore forming toxins, neurotoxins & nonprotein bioactive components
- Venom + immune mediated response = Dermal reaction (painful, raised erythematous/urticarial lesions)
    - Venom enters circulation = systemic reaction (GI, neuro, and/or allergic response).
    - Reaction should be self-limiting (depending on species).

On-Scene Treatment/First Aid: Prevent drowning & further stinging, ABCs prn, apply solution to block further discharge (vinegar, sodium bicarb, shaving cream, Stingose) – not urine, remove tentacles (gloved hands, tweezers, sand/water).

Removal of Nematocyst: Credit card or ID to scrape site to remove lodged nematocysts (**AFTER** applying solution)

When to seek Emergency Care: Persistent pain with antihistamine & heat/ice use, allergic reaction, necrosis, open wound, persistent lesions, impaired sensation/movement of extremity, symptoms of Irukandji syndrome (HTN, tachycardia, etc.).

ED Treatment: IV access (rehydration); Apply solutions, remove tentacles & nematocysts prn; Pain management (saline irrigation, HWI, PO/ IV/topical analgesics, topical steroids); Control systemic effects (allergic response); Irukandji syndrome: manage HTN (nitro, phentolamine, benzos); Antivenom (*Carukina barnesia*); Open sites: Abx/tetanus vaccine.

Role of the ED Nurse: Assess for: sting severity, allergic reaction, systemic effects, pain, muscle spasms, nausea, fever, & location where sting occurred. Establish IV access, administer analgesics & antivenom prn. Edu. discharge/prevention.

Discharge/Prevention Instructions: Prevention –use pools, create public warnings, protective clothing & goggles (full body lycra “stinger suit”), sunscreen lotions with sting inhibitors, education on prevention & first aid. Discharge – continue pharmacological therapy, HWI prn pain, avoid re-exposure, open wound = infection prevention. Return to ED: worsening systemic symptoms (HTN, tachycardia), new symptoms, lesions worsening (necrosis).

Heat Exposure

Patho: Thermal receptors in the skin, spinal cord and abdomen create action potentials that are received in the preoptic area of the anterior hypothalamus (POAH). sweating is an evaporative way the body cools down (humidity levels >75% makes this method ineffective) Primary way the body maintains thermoregulation hemostasis. Caution: sweating decreases circulating volume resulting in hypovolemia that further	**Etiology:** Environmental Lack of acclimatization Physical exertion during hot weather Trauma Metabolic Job Description: Athletes Outdoor laborers (farmers, construction workers, firefighters) Military personnel
Heat Edema: Cause: Vasodilation→ vascular leak→ increased interstitial fluid. s/s: swelling in extremities On scene Tx: relocate to a cooler environment, elevate lower extremities. Won't require any further medical treatment.	**Exercise associate muscle cramps:** Cause: Over exertion of muscles & electrolyte/fluid depletion. S/S: normal body temperature, muscle spasms. On scene Tx: relocate to a cooler environment, replace electrolytes/fluid (isotonic fluid replacement), Won't need further medical treatment.
Heat rash: Cause: skin vessels vasodilate→ pores are obstructed by sweat. S/S: red papules or pustules On scene Tx: remove clothing, evaporative cooling fans. Rash should go away once skin is dry.	**Exercise associated collapse:** Cause: profound vasodilation, hypovolemia→ decreased venous return→ syncope. S/S: lightheadedness, dizziness, loss of consciousness On scene Tx: rest in supine position, elevate lower extremities, rehydrate. s/s should resolve within 15-20 minutes.
Heat exhaustion: Heat exhaustion = decreased perfusion to the heart, core temperature up to 104°F no CNS dysfunction, heat stress> cardiac output. S/S: HA, fatigue, tachycardia, myalgia, syncope core temp 38ºC-40ºC On scene Tx: cooler environment, remove clothing, lower body temperature to 101ºF rehydrate with oral or IV fluids. ED Treatment: Obtain labs! Cool pt down ED Nurse role: Determine if heat exhaustion or heat stroke. Any ataxia, confusion, irritability, seizures? → no → suspect heat exhaustion Obtain labs asap, Obtain IV access and start fluids (NaCl) gradually, Apply an ECG monitor, obtain a core body temperature, Insert foley catheter to monitor UO and renal status	**Heat stroke** Heat = medical emergency. Core temperature 105°F or > multiorgan damage, and central nervous dysfunction. S/S: Neurological s/s: Loss of consciousness, confusion, delirium, agitation, seizures hot skin with or without diaphoresis, hypotension, tachycardia, tachypnea On scene Tx: cooler environment, remove clothing, ensure patent airway apply ice packs to armpit and groin area. ED Treatment: cold (8º-14ºC) and ice water (2º-5ºC) immersion. This causes body temperature to decrease 0.16º-0.36ºC a minute. Administer cooled IV fluids, continue to cool till temperature of 101ºF Other treatments: Cool water gastric, bladder and rectal lavages ED nurse role: Ensure patent airway! Focused assessment, Apply an ECG Obtain IV access and start cooled IV fluids, continuous rectal core temperatures, insert a foley catheter, Obtain labs.
Myoglobinuria: Myoglobinuria excess myoglobin in the urine → can lead to acute kidney injury caused by muscle breakdown. Large amounts of potassium, phosphate, myoglobin, creatine kinase, and urate to enter the blood→ can lead to AKI Monitor myoglobinuria via a urine dipstick test Monitor for s/s of rhabdomyolysis:	**Prevention:** Acclimatization to hot environment adequate hydration wearing loose-fitting, light-colored clothing avoid activities outdoors during hottest time during the day (1200-1500) Be familiar with symptoms of heat-related illnesses and initial treatment. Know s/s of dehydration:

Muscle swelling Weak/tender muscles Dark brown/red pee Prevention: normal saline or lactated ringers are recommended/Correct electrolyte imbalances	Dry mouth Weakness/dizziness Tachycardia with hypotension Headache decrease in urination→ dark yellow urine

Poisonous Plants

Poison ivy, oak, sumac

- All parts of the poison ivy, oak, and sumac plants are considered poisonous. When urushiol oil is burned it releases into the air and is not safe to inhale.
- Identification: **"Leaves of three, let it be!!!"**
- Pediatric population at the highest risk is 5-15 years of age.
- Signs and symptoms: erythematous rash containing weeping lesions that appear in a linear configuration and maybe papules, vesicles, and bullae. Does not spread unless more contact is made.
- Treatment: cool showers, oatmeal baths, topical cortisone/calamine creams, over-the-counter antihistamine, prevention
- How to prevent: wear protective clothing when in areas of unknown plants, wash hands with soap and water within 30 minutes if suspected contact, remove all clothing including shoes and wash with hot water, do not scratch or rub the skin, and do not burn poisonous plants.

Poison Foxglove

- All parts are poisonous and should never be ingested.
- Can be identified by their downward bell-shaped flowers with stalks containing 20-80 blooms with basal clumps of leaves at the base.
- Signs and symptoms: epigastric pain, N/V, hypotension, weakness, bradycardia, hyperkalemia, high levels of digoxin in blood, and cardiac dysrhythmias.
- Seek medical treatment if known ingestion.
    - **Poison control : (800)222-1222**
    - Antidote= digoxin immune Fab
    - Cardiopulmonary support (ABC's)
    - Symptomatic support
    - Atropine for cardiac dysrhythmias

- How to prevent: remove foxglove from area safely or have it removed professionally, be able to identify foxglove plant, and do not ingest any unknown plants of unknown origin.